CITY OF EL SEGUNDO

System Evaluation and Capacity Assurance Plan and Rehabilitation and Replacement Program

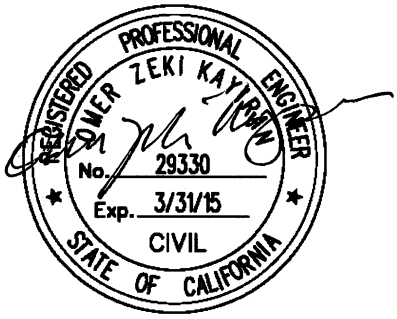
December 2014

Prepared For:
City of El Segundo
350 Main Street
El Segundo, CA 90245

Prepared by:
AKM Consulting Engineers
553 Wald
Irvine, CA 92618

City of El Segundo

SYSTEM EVALUATION AND CAPACITY ASSURANCE PLAN AND REHABILITATION AND REPLACEMENT PROGRAM



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EXECUTIVE SUMMARY

1-1 Introduction

Sewer Master Plans

The City of El Segundo's initial master planning dates back to 1967. The report, which was entitled "Master Plan-Sanitary Sewer Facilities", evaluated the then existing system, and recommended improvements to serve the City's future needs. The 1967 Master Plan was updated in 1977 to evaluate the changes that had taken place in development and planning. The last update to the Master Plan was completed in 1983.

The City of El Segundo's latest sewer master plan was completed in December 2002. A hydraulic analysis identified 12,295 feet of capacity deficiencies within the gravity sewer system. Over the years, it has been found that the sewage loads in the hydraulic model were conservative and no longer representative of the actual flows seen in the system. It is believed that the developed unit flow factors were overly conservative and with water conservation efforts in full effect, the flow estimates are inflated even further. This System Evaluation and Capacity Assurance Plan (SECAP) study will update the hydraulic model with more realistic flow estimates, based upon actual water use information and flow data at the pump stations. The 2002 master plan also assessed the condition of 192,300 feet of gravity sewer pipes by review of closed circuit television (CCTV) inspection records. The total Capital Improvement Program (CIP) included $8.6 Million in pump station and force main upgrades and $13.1 Million in gravity sewer main replacement/upgrades.

Sewer Pump Station Upgrades

Subsequent to the completion of the 1983 Master Plan, the City authorized a study of Pump Stations No. 2, 7 and 9. The study concluded that there was not sufficient room to increase wet well capacities. The City refurbished Pump Station No. 9 in 1988, and Pump Stations No. 2 and No. 7 in 1996. Pump Station No.1 was relocated in 1988.

The latest pump station improvements include the following:

- Sewer Pump Station No. 13 (2002) - Installed new pumps (two at 1530 gpm), motors, sump pump, blower, and associated valves and pipes, and a standby generator.
- Sewer Pump Station No. 4 (2003) – Replaced the pumps and motors; replaced suction and discharge pipes and valves; lined the wet well and dry well; added permanent standby generator with an automatic transfer switch; replaced the electrical and control equipment; constructed operational/emergency storage facility
- Sewer Pump Station No. 6 (2003) – Installed new pumps, motors, flow meter, sump pump, blower, pressure sensor, and associated valves and pipes
- Sewer Pump Station No. 12 (2003) – Decommissioned pump station by constructing siphon facility

- Sewer Pump Station No. 5 (2004) – Installed new pumps, motors, sump pump, blower, level float switch, and associated valves and pipes

A plan has been completed to bypass Pump Station No. 7, modify the wet wells of former Pump Station No. 10 and Pump Station No. 11, and upgrade Pump Station No. 1. The new Pump Station No. 1 pumps will be large enough to accommodate all flows currently conveyed to and pumped by Pump Station No. 7.

CCTV Inspections

In 2000, the City of El Segundo had 761 segments of its gravity sewers covering a total length of 192,300 feet inspected with the use of closed circuit television cameras. The CCTV inspections covered the portion of the system west of Sepulveda Boulevard, which drains to Hyperion Treatment Plant. National Plant Services, Inc, (NPS) performed the CCTV work and developed individual reports for each reach. The reports included severity ratings based upon a point value system suggested by NPS. The severities ranged from zero to 28,800.

In 2011, the City of El Segundo had 1,078 segments of its gravity sewers covering a total length of 259,589 feet inspected with the use of closed circuit television cameras. The CCTV inspections covered the entire city. Advance Sewer Technologies, Inc. (AST) performed the CCTV work and developed individual reports for each reach. The reports included severity ratings based upon a point value system suggested by AST. The severities ranged from 1 to 5, with 5 being the highest priority.

The information contained in these reports and the videotapes is essential in assessing the condition of the system. It is also used in formulating facility maintenance recommendations, and the upgrade/replacement portion of the capital improvement program.

1-2 Study Area

Location

The City of El Segundo (City) is located on the western edge of Los Angeles County. The City encompasses approximately 5.5 square miles of residential, commercial, and industrial land. It is a coastal community bounded by the Pacific Ocean on the west, the Los Angeles Airport to the north, the City of Hawthorne to the east, and the City of Manhattan Beach to the south.

Topography

The characteristic topography of El Segundo is a series of peaks and valleys throughout the City. Elevations range from 170 feet to 50 feet above mean sea level (amsl). Over the years, the construction of the sewer system has been dictated by the rolling terrain. Many of the existing sewers were designed deeper than typical in order to create enough slope to drain the sewage by gravity from one location to the next. In spite of the deep sewers, a total of nine (9) pump stations operate the system on a daily basis, pumping sewage over the numerous hills found throughout the City.

Climate

El Segundo is a coastline community that enjoys mild temperatures and plenty of sunshine throughout the year. The warmest months are typically August and September with an average maximum temperature of 76.1° F. The coolest months are typically December and January with an average minimum temperature of 47.7° F. The average annual rainfall of about 12.02 inches occurs primarily during the winter months, between November and March (*Western Regional Climate Center, Los Angeles Airport data, between 1944 and 2013*). Humidity is typically between 55 and 85 percent, depending on the time of year.

Land Use

The land use information utilized in the preparation of this report is primarily based upon the City's latest General Plan land use map. Sepulveda Boulevard and El Segundo Boulevard divide the City into four major quadrants. The northwest quadrant consists of the residential community and adjoining downtown business district. The Chevron Refinery is located in the southwest quadrant. The northeast and southeast quadrants are primarily industrial and commercial areas.

Of the City's 3,494 total acres, approximately 16.0 percent is residential (includes 540 E Imperial Ave Specific Plan area); 9.4 percent is commercial/office; 13.2 percent is mixed use (includes specific plan areas); 39.5 percent is industrial; 5.0 percent is open space and parks; and 3.8 percent is public and government facilities; the remaining 12.9 percent are right-of-ways.

Population

Since its incorporation in 1917, the City of El Segundo has grown from a population of 1,563 to 16,897 in 2014 (*California Department of Finance, Demographic Research Unit*). The estimated 2014 population is 1.46 percent higher than the 2010 Census Count of 16,654. The total number of housing units is estimated at 7,413. The average number of persons per household is estimated at 2.37.

The daytime employment population is considerably larger than the resident population at approximately 80,000.

1-3 Criteria

General

Establishing performance standards is an important part of evaluating existing wastewater collection systems and planning of future systems, as it forms the basis for system analysis and system improvement recommendations. These standards include methodology for estimating wastewater design flows and minimum design standards for the collection system pipes, pump stations, and force mains.

Average wastewater flows can be reasonably estimated by either using a percentage of water use or land use and a corresponding unit flow factor. The results are then compared to measured

flows. Peaking factors are needed for estimating peak dry weather and peak wet weather flows. Peak wet weather flows include an allowance for inflow / infiltration (I/I).

Collection system design standards include minimum pipe size, minimum flow velocity, and depth of flow to pipe diameter ratio. Pump station criteria includes the capacity and number of pumps, wet well and force main sizes, redundancy, emergency power, remote monitoring capabilities, as well as safety and regulatory agency requirements. Finally, facility useful lives are needed for adequately scheduling replacement of the aging infrastructure.

Unit Flow Factors

Residential unit flow factors, shown in Table 1-1 were developed based upon the existing land uses, water use information, and AKM's experience. Water use information was used in lieu of flow meter data because previously developed unit flow factors (2002 Sewer Master Plan) via flow meter data was found to be overly conservative. These factors can be used to estimate future development wastewater loads.

For commercial, industrial, and other land use types, the sewage loads should be based upon the detailed characteristics of the proposed development. In the absence of information, the sewage unit flow factors of the regional treatment agency that the proposed development is tributary to may be used. The regional treatment agency for the areas west of Sepulveda Boulevard is the City of Los Angeles. The treatment agency for the areas east of Sepulveda Boulevard is the Sanitation Districts of Los Angeles County (SDLAC).

Peak Dry Weather Factors

The wastewater unit flow factors shown in Table 1-1 are used to generate average dry weather flows (ADWF) entering the collection system. However, the adequacy of a sewage collection system is evaluated based upon its ability to convey the peak flows. At any individual point in the system, peak dry weather flow (PDWF) is estimated by converting the total average tributary flow to peak dry weather flow by an empirical peak-to-average relationship.

Table 1-1
Residential Unit Flow Factors

Land Use	Unit Flow Factor	Units
Single Family Residential	190	gpd/du
Two-Family Residential	140	gpd/du
Multi-Family Residential	110	gpd/du

The peaking formula commonly used in sewerage studies is of the following form:

$PDWF = a \times ADWF^{b}$ where PDWF = Peak Dry Weather Flow
ADWF = Average Dry Weather Flow
a, b = Peaking Formula Coefficients

The following peaking relationships were adopted for the **existing system**. All units are in million gallons per day (mgd).

Pump Station 1 Drainage Area: $PDWF = 1.73 \times ADWF^{0.92}$

Pump Station 2 and 7 Drainage Area: PDWF = 1.75 x ADWF $^{0.92}$

Pump Station 4 Drainage Area: PDWF = 2.21 x ADWF $^{0.92}$

Pump Station 5 Drainage Area: PDWF = 1.90 x ADWF $^{0.92}$

Pump Station 6 Drainage Area: PDWF = 1.46 x ADWF $^{0.92}$

Pump Station 7 Drainage Area: PDWF = 1.89 x ADWF $^{0.92}$

Pump Station 8 Drainage Area: PDWF = 1.38 x ADWF $^{0.92}$

Pump Station 9 Drainage Area: PDWF = 1.21 x ADWF $^{0.92}$

Pump Station 13 Drainage Area: PDWF = 1.48 x ADWF $^{0.92}$

Sand Hill Drainage Area: PDWF = 1.89 x ADWF $^{0.92}$

County Sanitation District Drainage Area: PDWF = 3.0 x ADWF

15" Imperial Highway Trunk: PDWF = 1.87 x ADWF $^{0.92}$

24" Imperial Highway Trunk: PDWF = 2.29 x ADWF $^{0.92}$

The Pump Station 7 formula was implemented in the Sand Hill Drainage Area due to similar land uses in the tributary area. A separate peaking relationship was developed for the main trunk lines in Imperial Highway based on flow monitoring data.

The CS drainage area consists of entirely commercial and industrial land uses. The water use and sewage generation is very different from the northwest portion of the City. The weekend flows are much less than the weekday flows in most cases due to the fact that the working population is significantly lower on the weekends. Based on a review of recent sewer studies and associated flow monitoring data, the peaking formula used for the CS drainage area is PDWF = 3.0 x ADWF. This will represent a typical 8 hour working period. It will be conservative in most cases in the drainage area but will account for any unaccounted for vacancies and variations in future land use types.

An additional 10 percent was added to the peaking coefficient for the future system to account for any vacancies and variations in future land use types. It is recommended that the City track any changes in land use, particularly in the commercial/industrial areas of the City, so that high water users and sewage generators can be accounted for and potential capacity deficiencies identified.

The following peaking relationships were adopted for the **future system**. All units are in million gallons per day (mgd).

Pump Station 1 Drainage Area: PDWF = 1.90 x ADWF $^{0.92}$

Pump Station 2 and 7 Drainage Area: PDWF = 1.93 x ADWF $^{0.92}$

Pump Station 4 Drainage Area: PDWF = 2.43 x ADWF $^{0.92}$

Pump Station 5 Drainage Area: PDWF = 2.09 x ADWF $^{0.92}$

Pump Station 6 Drainage Area: PDWF = 1.61 x ADWF $^{0.92}$

Pump Station 7 Drainage Area: PDWF = 2.07 x ADWF $^{0.92}$

Pump Station 8 Drainage Area: $PDWF = 1.52 \times ADWF^{0.92}$

Pump Station 9 Drainage Area: $PDWF = 1.34 \times ADWF^{0.92}$

Pump Station 13 Drainage Area: $PDWF = 1.63 \times ADWF^{0.92}$

Sand Hill Drainage Area: $PDWF = 2.07 \times ADWF^{0.92}$

County Sanitation District Drainage Area: $PDWF = 3.0 \times ADWF$

15" Imperial Highway Trunk: $PDWF = 2.05 \times ADWF^{0.92}$

24" Imperial Highway Trunk: $PDWF = 2.52 \times ADWF^{0.92}$

Peak Wet Weather Factors

The peak wet weather flow (PWWF) has two components: peak dry weather flow (PDWF) and rainfall dependent inflow/infiltration (I/I) as expressed by the following equation:

$$PWWF = PDWF + I/I$$

Until sufficient wet weather flow data can be collected and its impact on the wastewater flows is evaluated, it is recommended that the peak wet weather flow be estimated as the following:

Peak Wet Weather Flow (PWWF) = 1.25 x Peak Dry Weather Flow (PDWF)

Although the PWWF/PDWF factor of 1.25 may not cover all situations, it is not reasonable or feasible to design the sewer system to carry the flows that would result from the use of a larger ratio. Instead, it is recommended that the City concentrate on projects such as replacing manhole covers, installing plugs in manhole covers, and replacing or relining cracked pipes to reduce inflow and infiltration. Inflow and infiltration is discussed further in Sub-section 4-4.

Sewer Design Criteria

Design criteria are established to ensure that the wastewater collection system can operate effectively under all flow conditions. Each pipe segment must be capable of carrying peak wet weather flows without surcharging the system. Low flows must be conveyed at a velocity that will prevent solids from settling and blocking the system.

At a minimum, all pipes shall be 8 inches or larger in diameter and the velocity of flow shall be greater than 2 feet per second at average dry weather flow (ADWF). This velocity will prevent deposition of solids in the sewer. A velocity of 3 feet per second is desired at peak dry weather flow to resuspend materials that may have already settled in the pipe and help to re-suspend any materials that may have already settled in the pipe.

In this study, existing pipes are considered capacity deficient if the hydraulic analysis shows a d/D ratio above 64 percent at peak dry weather flows and 82 percent at peak wet weather flows. For design purposes, pipes 15-inches and smaller should be designed to flow at a maximum d/D ratio of 50 percent. Pipes 18-inches and larger in diameter should be designed with a maximum d/D

ratio of 64 percent. At a minimum, the peak wet weather flow should be estimated at 125 percent of the peak dry weather flows.

Pump Station Design Criteria

The performance of a wastewater pump station is of particular importance since a failure could have far reaching ramifications. It must therefore be reliable, sized with sufficient capacity, contain redundant equipment or backup, and be able to notify the appropriate personnel in the event of a failure.

It must be designed with sufficient capacity to prevent short cycles whereby the pumps frequently start and stop, yet small enough that it will regularly evacuate sewage from the wet well to prevent the wastewater from becoming septic.

The pumps must be sized to efficiently handle the peak flows. A minimum of two pumps sized at the peak wet weather flow to the station must be provided so that sufficient standby capacity is available when one pump is removed for repairs or experiences a mechanical failure.

The dry well must be well ventilated and provide unobstructed access to all equipment and have provisions for equipment removal.

The force mains must be selected to operate within a 3 feet per second to 5 feet per second velocity range, but shall not be smaller than 4-inches in diameter. Force mains shall be minimum 40 mil ceramic epoxy lined ductile iron pipe properly protected on the exterior.

All pump stations shall incorporate redundant control systems for operation of the pumps. A float system should be used as a backup for a primary control system that utilizes an ultrasonic device or a bubbler system for level measurement and pump operation.

Full SCADA telemetry equipment which includes a telephone dialer as a backup, must be provided at all sewer pump stations.

An emergency power source shall be provided to operate the pump station during outages of the primary power source. A standby generator with an automatic transfer switch is the preferred type of emergency power source.

Service Life of Pipe and Pump Station Equipment

In addition to the design criteria discussed in the previous subsections, the useful lives for which one can expect relatively trouble-free service is also of great importance when assessing an existing or future sewer system. Once the service life of a facility is exceeded, it becomes subject to failure and is often expensive to maintain. The determination of useful life can be difficult and depends on many different considerations including the following:

- Type of materials used and recorded performance of similar installations
- Construction methods and quality of installation

- Velocities and flow rates expected in the system
- Chemical and biological conditions of the wastewater

However, the values listed in Table 1-2 are generally accepted as prudent planning criteria and are used as benchmarks for replacement recommendations in this study.

Table 1-2
Planning Criteria for Facility Useful Life

Facility	Description	Useful Life (Years)
Gravity Sewers:	Cast Iron Pipe (cip)	20
	Plastic Pipe	60
	Vitrified Clay Pipe (vcp)	75
Force Mains:	Asbestos-Cement Pipe (acp)	30
	Ductile Iron Pipe (dip)	40
	PVC Pipe	30
Pump Stations:	Structure	60
	Piping	30
	Valving	20
	Mechanical	15
	Electrical	15

1-4 Existing and Future Wastewater System

General

The City's existing wastewater collection system is made up of a network of gravity sewers and nine sewer pump stations. The gravity system consists of approximately 51.4 miles of pipe and 1,100 maintenance access structures.

Drainage Areas

The City of El Segundo's wastewater collection system west of Sepulveda Boulevard and north of El Segundo Boulevard consists of nine (9) separate drainage areas. Eight (8) of these areas include a sewer pump station. There is a 15-inch and a 24-inch trunk sewer located in Imperial Highway. The wastewater flows west in these trunk sewers to the Hyperion Outfall, which then conveys the flows directly to the Hyperion Treatment Plant.

Drainage Area 1 is pumped to the City of Los Angeles Hyperion Outfall. Sand Hill Drainage Area outlets to the Hyperion Outfall by gravity flow. Drainage Area 2 is pumped into Drainage Area 7

and all the flow is eventually pumped to the 24-inch trunk sewer in Imperial Highway. Drainage Area 5 is pumped to the 15-inch trunk sewer in Imperial Highway. Drainage Area 9 can be pumped to either Drainage Area 4 or 8. Drainage Area 4, 6, and 8 are pumped to a discharge point at the intersection of Oak Avenue and California Street. The flows are conveyed north to a 15-inch sewer in Imperial Highway that becomes the 24-inch trunk sewer as flows are conveyed further west.

East of Sepulveda Boulevard, the City land is within the CSDLC District No. 5 area. The City sewers generally convey wastewater flows east to the CSDLC trunk sewer in Aviation Boulevard. A small area east of Aviation Boulevard drains easterly along El Segundo Boulevard to CSDLC facilities. There is only one pump station, Sewer Pump Station No. 13, located east of Sepulveda Boulevard on Grand Avenue.

Table 1-3 lists characteristics of each of the sewer drainage areas within the study area.

Future Developments

There are a few developments that plan to expand and/or begin new construction. These developments are listed in Table 1-4. The load estimates are from the specific sewer area studies approved by the City. Each study referred to the CSDLC sewage unit flow factors as the source of the load estimates.

Future System Changes

The City completed the design of the Modification of Pump Station No. 1 and No. 7 in September 2011. The City has current plans to move forward with construction in 2015. The concept of the design is to bypass Pump Station No. 7 and divert all flows to Pump Station No 1. The key components of the design include the following:

1. Pump Station No.1 Improvements
2. Former Pump Station No. 10 Wet Well Modifications
3. Former Pump Station No. 11 Wet Well Modifications
4. Construction of 12” siphon in Palm Avenue at Virginia Street to bypass flow from east under an existing 66” storm drain and bypass Pump Station No. 7

Once the project is completed, the City will have the ability to divert all flows currently pumped by Pump Station No. 7 to Pump Station No.1. Pump Station No. 7 can then be placed on stand-by and utilized in the case of an emergency.

Table 1-3
Drainage Area Characteristics

Drainage Area	Area (ac)	Land Uses	Boundaries	Sewer Cons. Dates	Comments
Northwest Side of City					
1	63	Residential	Imperial Hwy to north; Drainage Area 7 to east; Drainage Area 7 and SH to south; Drainage Area SH to west	1920's and 1950's	Wastewater at PS No. 1 is pumped north to Hyperion Outfall in Imperial Hwy
2	76	Residential; Industrial; Open Space	Drainage Area 7 to north; Drainage Area 8 to east; El Segundo Blvd to south; Drainage Area 7 and SH to west	Primarily 1920's	Wastewater at PS No. 2 is pumped west to Drainage Area 7
4	105	Residential; Commercial; Open Space	Imperial Hwy, Drainage Area 5 and 6 to north; Sepulveda Blvd to east; Drainage Area 9 to south; Drainage Area 5 and 8 to west	1940's and 1950's	Wastewater at PS No. 4 is pumped west and north to manhole at the intersection of California St and Oak Ave
5	183	Residential; Commercial; Public Facilities	Imperial Hwy to north; Drainage Area 4 and 6 to east; Drainage Area 8 to south; Drainage Area 7 to west	1940's and 1950's	Wastewater at PS No. 5 is pumped north to a trunk sewer in Imperial Hwy
6	28	Residential	Drainage Area 5 to north and west; Drainage Area 4 to south and east	1950's	Wastewater at PS No. 6 is pumped north and west to manhole at the intersection of California St and Oak Ave
7	370	Residential; Commercial; Industtrial; Public Facilities; Open Space	Imperial Hwy to north; Drainage Area 5 to east; Drainage Area 2 to south; Drainage Area 1 and SH to west	Primarily 1920's	Receives flows from PS No. 2. Wastewater at PS No. 7 is pumped north to a trunk sewer in Imperial Hwy
8	63	Residential; Commercial; Industrial; Public Facilities	Drainage Area 5 to north; Drainage Area 4 and 9 to east; El Segundo Blvd to south; Drainage Area 2 to west	1950's	Wastewater at PS No. 8 is pumped north and east to manhole at the intersection of California St and Oak Ave
9	35	Industrial; Public Facilities	Drainage Area 4 to north; Sepulveda Blvd to east; El Segundo Blvd to south; Drainage Area 8 to west	1950's	Wastewater at PS No. 9 is pumped north to Drainage Area 4
SH	161	Residential; Commercial; Open Space	Imperial Hwy to north; Drainage Area 1, 7 and 2 to east; El Segundo Blvd to south; City boundary to west	Primarily 1920's	All wastewater drains by gravity to the Hyperion Outfall in Imperial Hwy
Eastern Side of City					
13	42	Commercial	Drainage Area CS to north and east; El Segundo Blvd to south; Sepulveda Blvd to west	1970's	Wastewater at PS No. 13 is pumped east to Drainage Area CS
CS	1223	Commercial; Industrial; Public Facilities; Open Space	Imperial Hwy to north; Aviation Blvd to east; Rosecrans Ave to south; Sepulveda Blvd and Drainage Area 13 to west	1950's thru 1990's	All wastewater drains by gravity to the LACSD trunk sewers in Aviation Blvd

Table 1-4
Future Developments

No.	Project	Load added to MH ID in Model	Location	Address	Sewer Line Project is Tributary to	Existing Average Load (gpd)	Land Use	No. of Rooms	UFF (gpd/ rooms)	Bldg Area (tsf)	UFF (gpd/ tsf)	Proposed Additional Average Load (gpd)	Total Proposed Additional Average Load (gpd)	Source of Load Data	Status
1	Elevon at Campus El Segundo	CS-902	Douglas St and Campus Dr		15" sewer in Douglas St north of Maple	-							48,102 [1]	County Sanitation Districts of Los Angeles County Will Serve Letter (Oct. 13')	In Construction
2	Aloft Hotel	13-001	NW corner of El Segundo Blvd and Continental Blvd		15" sewer in Continental Blvd north of El Segundo Blvd	19,109	Hotel	167	130			21,710	930	Ratheon Campus Sewer Study (Dec 12')	Future
							Conference Room			0.57	150	85			
							Café			0.70	280	196			
							Bar Area			1.06	500	530			
3	Data Center	CS-082	East side of Nash St btw Mariposa Ave and Grand Ave	444 N Nash St	15" sewer in Duley Rd south of Mariposa Ave	-	Light Industrial			180	100	18,042	18,042	Ratheon Campus Sewer Study (Dec 12')	Future
4	888 N Sepulveda Blvd	CS-007	SE corner of Sepulveda Blvd and Walnut Ave	888 N Sepulveda Blvd	8" sewer in easement north of Maple Ave and west of Sepulveda Blvd	-	Hotel	190	150			28,500	430	888 N Sepulveda Blvd Sewer Study (July 13')	Future
							Sandwich Grill			1.20	280	336			
							Admin Offices			3.00	150	450			
5	Raytheon Campus	CS-145	South side of El Segundo Blvd btw Sepulveda Blvd and Douglas St	2100 E El Segundo Blvd	21" sewer in easement west of Douglas St, north of railroad	116,351	Office			1,750	200	349,919	575	Ratheon Campus Sewer Study (Dec 12')	Future
							Warehouse			76	25	1,898			
							Light Industrial			168	200	33,600			
							Commercial			149	150	22,344			
6	Boeing Company Building S50 Addition	5-914	South side of Imperial Ave, west of Sepulveda Blvd	1700 E Imperial Ave	8" sewer in Imperial Ave west of Sepulveda Blvd	10,117	Industrial						1,665 [2]	Boeing Company Building S50 Addition Sewer Study (Sept 13')	Constructed but wateruse data used in SECAP did not account for development.
7	The Point	CS-176	Northeast corner of Sepulveda Blvd and Rosecrans Ave	850 S Sepulveda Blvd	12" sewer in Roscrans Ave east of Sepulveda Blvd	-							29,404 [1]	County Sanitation Districts of Los Angeles County Will Serve Letter (Feb 14')	Future
												Total	**99,148**		

[1] Details of the project land use and load calculations were not provided in the Will Serve Letter

[2] Sewer study stated 322 existing fixture units and 53 proposed fixture units; proposed load = 10,117 gpd x (53/322) = 1,665 gpd

There are several conditions that will need to be monitored very closely if this project is implemented as currently designed. It will have three (3) siphons between Pump Station No.7 and Pump Station No.1, which will require regular maintenance. The 8-inch sewer in Loma Vista Street north of Walnut Avenue, and in Acacia Avenue between Loma Vista Street and Pump Station No.1 is capacity deficient with the future flows if the flow is allowed into it at the Loma Vista Street/Walnut Avenue intersection. Lastly, the 18-inch sewer in the easement between Sycamore Avenue and Walnut Avenue has adverse slope and will create backwater in the upstream sewers. The sewers planned to be utilized for diverting the Pump Station No.7 flows to Pump Station No.1 should be studied in detail to eliminate as many of the siphons as possible, and mitigate the capacity deficiencies that will result from this diversion. The alternative would be to upgrade Pump Station No.7 and its force main, and construct a scaled down improvement at Pump Station No.1.

Figure 5-6 illustrates the key components of the system and some of the critical points in the system that are of concern and should be monitored.

1-5 Pump Stations

The City's wastewater system includes a total of nine pump stations. Eight of these pump stations (No. 1, 2, 4, 5, 6, 7, 8, 9) are located west of Sepulveda Boulevard and ultimately contribute to the flow tributary to the City of Los Angeles Hyperion Treatment Plant. Pump Station No. 13 is located on Grand Avenue east of Sepulveda Boulevard. Its flow is tributary to the County Sanitation District of Los Angeles County (CSDLC) District No. 5 sewer in Aviation Boulevard. Pump Station characteristics are summarized in Table 1-5.

1-6 Hydraulic Model

A hydraulic model was developed of the sewer system to simulate the operating characteristics of the system. The simulations for this study were performed utilizing InfoSewer, which is a GIS based computer program with the ability to perform steady state analyses of the flows in sanitary sewer systems. Manning's Equation is used for depth of flow calculations in the gravity sewer pipes.

All of the City's existing manholes, sewer pipes, and pump stations were included in the model, based on the latest sewer GIS files, atlas sheets, as-built drawings, and interviews with City staff. A combination of the following information was utilized to estimate the average sewage loads and distribute the loads for each drainage area:

- Permanent flow meter data (2013-2014) at the connections to the City of Los Angeles trunk sewer (Imperial Highway Parshall Flume, Sand Hill Leopold Flume, and Pump Station No. 1 Venturi Meter).
- SCADA data at pump stations (wet well levels, pump on/off times) and pump station plans (wet well geometry)
- Water meter billing data linked to the parcel map

Table 1-5

Sewer Pump Stations

General Pump Station Information										Pump Specifications							Motor Specifications		Existing Flows						Future Flows					
											Pump Operating Levels (ft)								ADWF (mgd)		PDWF (mgd)		PWWF (mgd)		ADWF (mgd)		PDWF (mgd)		PWWF (mgd)	
Pump Station	Location	Date of Cons	Date of Recent Modifi-cation	Area Served (Acres)	Force Main Dia (in)	Force Main Length (ft)	Force Main Material	Type	Wet Well Dimensions	Number of Pumps	Start	Stop	Pump Mfg	Pump Type	Pump Model	TDH (ft)	Estimated Flow Capacity (gpm)	RPM	HP	mgd	gpm	mgd	gpm	mgd	gpm	mgd	gpm	mgd	gpm	mgd	gpm
Pump Station 1	Acacia Ave West of Loma Vista st	1988	-	63	6	400	DIP	Wetwell/ Drywell	11'-6"' x 6' x ~21'	2	4.1	1.8	WEMCO	Torque Flow	6x11M	30	300		15	0.104	73	0.196	136	0.245	170	0.528	367	1.056	733	1.319	916
Pump Station 2	Franklin Ave West of Arena St	1925	1996	76	8	625	DIP	Wetwell/ Drywell	18' x 8'-8" x ~11'	2	4.5	3.0	WEMCO		6x11M	42	700		25	0.153	106	0.283	196	0.353	245	0.153	106	0.342	237	0.427	297
Pump Station 4	Kansas St and Holly Ave	1964	2003	105	12	1,420	ACP	Wetwell/ Drywell	15' x 10' x ~7'-6"	2	7.4	4.8	ESSCO	Torque Flow	8x6x17VDPL	60	1500		75	0.199	138	0.453	315	0.567	394	0.199	138	0.549	381	0.686	476
Pump Station 5	Center St North of Oak Ave	1954	2004	183	10	1,780	CIP	Wetwell/ Drywell	15' x 8'-8" x 9'	2	4.8	2.8	WEMCO	Torque Flow	6x6x11M	41	800		25	0.194	135	0.383	266	0.479	333	0.194	135	0.464	322	0.580	403
Pump Station 6	Palm Ave between California St and Washington St	1953	2003	28	6	760	Steel	Wetwell/ Drywell	10' x 6' x ~13'	2	4.4	2.4	ESSCO	Torque Flow	6x12 VDPL	60	350	1750	25	0.047	33	0.080	56	0.100	70	0.047	33	0.097	67	0.121	84
Pumps Station 7	Virginia St and Palm Ave	1962	1996	370	12	2,460	CIP	Wetwell/ Drywell	10' x 7'-1" x ~9'-6"	2	5.0	2.2	WEMCO		6x11M	65	1350	1760	50	0.424	294	0.779	541	0.973	676	0.424	294	0.942	654	1.178	818
Pump Station 8	Center St North of Franklin Ave	1955	1995	63	8	3,630	DIP	Wetwell/ Drywell	10' x 6' x ~13'-2"	2	6.4	3.7	WEMCO		6x11M	65	500	1800	30	0.075	52	0.116	80	0.145	101	0.075	52	0.140	97	0.175	122
Pump Station 9	El Segundo Blvd and Kansas St	1957	1991	35	6	830	CIP	Wetwell/ Drywell	10' x 10' x ~13-6"	2	3.9	2.0	WEMCO		6x11M	52	425	1800	25	0.035	25	0.051	35	0.064	44	0.035	25	0.062	43	0.077	54
Pump Station 13	Grand Ave and Sepulveda Blvd	1972	2002	42	10	1,430	DIP	Wetwell/ Drywell	Rear 8.33' of 20' diameter structure	2	5.6	2.8	WEMCO	Torque Flow	6x6x11M	68	1250		60	0.125	87	0.200	139	0.249	173	0.125	87	0.241	168	0.302	210

Peak dry weather flows are calculated in the model by a user defined relationship. The peaking formula used in the sewer model is as follows:

$$PDWF = a \times ADWF^{0.92}$$

Where PDWF = Peak Dry Weather flow in mgd

ADWF = Average Dry Weather flow in mgd

a = coefficient

Peaking factors were developed for each drainage area based on the influent flow calculations at the pump stations and/or the flow meter information. The resultant calculated existing coefficient "a" for each drainage area is shown in Table 1-6.

Due to the fact that this calculation is based upon limited data, the coefficient is increased by 10 percent for planning purposes. The increased coefficient is shown in Table 7-4 as the "adjusted existing coefficient". This coefficient was used for the existing conditions hydraulic analysis.

An additional 10 percent was added to the "adjusted existing coefficient" to calculate the "adjusted future coefficient". This coefficient was used for the future conditions hydraulic analysis. This factor accounts for any unaccounted for vacancies and variations in future land use types. It is recommended that the City track any changes in land use, particularly in the commercial/industrial areas of the City, so that high water users and sewage generators can be accounted for and potential capacity deficiencies identified.

1-7 System Analysis

Existing and Projected Sewage Generation

Approximately 2.66 mgd of sewage is generated in the City's existing sewer service area. A total of 1.17 mgd is conveyed to the City of Los Angeles Hyperion Outfall in Imperial Highway. The tributary area is primarily the area of the City located west of Sepulveda Boulevard, including the Chevron facility. A total of 1.49 mgd is conveyed to the CSDLC trunk sewers in and adjacent to Aviation Boulevard. The tributary area is primarily the area of the City located east of Sepulveda Boulevard.

The future sewage loads include the future developments shown in Table 5-3 and on Figure 5-5. The total City sewage generation is estimated at 3.23 mgd. The total conveyed to the City of Los Angeles Hyperion Outfall increases to 1.18 mgd. The total conveyed to the CSDLC trunk sewers increased to 2.05 mgd.

Table 1-6
Peaking Coefficient "a"

Drainage Area or Sewer	ADWF (mgd)	PDWF (mgd)	[1]Calculated Existing Coefficient "a"	[2]Adjusted Existing Coefficient "a"	[3]Adjusted Future Coefficient "a"	Primary Land Use	Notes
1	0.0893	0.1699	1.57	1.73	1.90	SFR, MFR	Based on influent flow calculation at PS 1
2	0.1536	0.2844	1.59	1.75	1.93	Commercial, Industrial	Based on influent flow calculation at PS 2
4	0.2002	0.4565	2.01	2.21	2.43	SFR, MFR, Commercial	Based on influent flow calculation at PS 4
5	0.1958	0.3859	1.73	1.90	2.09	SFR, MFR, Public Facility	Based on influent flow calculation at PS 5
6	0.0475	0.0806	1.33	1.46	1.61	SFR	Based on influent flow calculation at PS 6
7	0.4320	0.7920	1.71	1.89	2.07	SFR, MFR, Commercial, Public Facility	Based on influent flow calculation at PS 7
8	0.0756	0.1166	1.25	1.38	1.52	MFR, Industrial, Public Facility	Based on influent flow calculation at PS 8
9	0.0360	0.0518	1.10	1.21	1.34	Industrial	Based on influent flow calculation at PS 9
13	0.1251	0.1993	1.35	1.48	1.63	Corporate Office	Based on influent flow calculation at PS 13
CS	-	-	-	-	-	Commercial, Industrial	A peaking factor of 3 was implemented in the CS drainage area, representing an 8 hour operation for the industrial area. PDWF=3xADWF
SH	-	-	1.71	1.89	2.07	SFR, MFR	Applied Drainage Area 7 coefficient to SH Drainage Area due to similar land use type; Chevron Treatment Plant Discharge is not peaked
Imperial 15"	0.2630	0.4970	1.70	1.87	2.05	Mixed	Based on flow data provided in *Boeing Company Building S50 Addition Sewer Study* dated Sept. 2013
Imperial 24"	0.9990	2.0800	2.08	2.29	2.52	Mixed	Based on flow data provided in Boeing Company Building S50 Addition Sewer Study dated Sept. 2013

[1] Calculated existing coefficient = PDWF / (ADWF)$^{0.92}$

[2] Adjusted existing coefficient = calculated existing coefficient x 1.10

[3] Adjusted future coefficient = adjusted existing coefficient x 1.10

Existing and Future System Capacity Analysis

The analysis of the City's existing gravity sewer system was based upon the calculated peak dry weather flows. Any segment of sewer pipe with a depth to diameter ratio (d/D) of 0.64 or more was considered a hydraulic deficiency. This allows for 25 percent above the peak dry weather flow for inflow and infiltration (based upon the fact that the full capacity of a circular pipe is the same as when d/D = 0.82).

Only one sewer reach was identified as capacity deficient under existing or future loading conditions and with the existing system geometry (Pump Station No. 7 still in operation). The deficient reach is located in the CS Drainage Area on the east side of the City and tributary to the CSDLC system. It is a 15-inch pipe located in Douglas Street at Maple Avenue (MH CS-904 to MH CS-903), as shown on Figure 8-1. It is the last reach owned by the City prior to entering into the CSDLC 120th Street Extension No. 2 Trunk Sewer. Per the sanitary sewer improvement plans for Tract No. 53570, the sewer in Maple Avenue from Nash Street to Douglas Street are 18-inches in diameter at a slope of 0.0135. At Manhole CS-904, the pipe is downsized to 15-inches in diameter with the same slope of 0.0135. The reason for downsizing the pipe is unknown at this time. It is possible that CSDLC would not allow the City to connect a pipe larger than their trunk sewer.

The hydraulic analysis resulted in an existing d/D ratio of 0.69 and a future d/D ratio of 0.80 for the 15-inch pipe from MH CS-904 to MH CS-903 (see Appendix 1 & 2). The Elevon at Campus El Segundo development is under construction and is planned for completion in 2015. This is the primary reason for the expected increase in flows and the d/D ratio. It is recommended that the City conduct temporary flow monitoring at MH CS-904 after the completion of The Elevon at Campus El Segundo development. If the flows and depths are confirmed, it is recommended that this pipe be replaced with an 18-inch pipe.

There is some concerns about the design and planned construction of the Modification of Pump Station No. 1 and No. 7 project. The reaches that become deficient once this project is implemented are shown in Table 1-7.

Table 1-7
Future System Capacity Deficiencies due to Diversion at PS 7

Pipe ID	U/S MH ID	D/S MH ID	Location	Pipe Size (in)	Length (ft)	Slope	PDWF (mgd)	d/D
1-005	1-005	1-006	Oak	18	253	0.0001	0.861	1.00
1-013	1-013	1-015	Easement	18	340	-0.0007	0.894	1.00
1-017	1-017	1-018	Loma Vista	8	322	0.0022	0.517	1.00
1-018	1-018	1-047	Loma Vista	8	213	0.0022	0.530	1.00
1-516	1-516	1-017	Loma Vista	8	16	0.0025	0.514	1.00

Pipe 1-1013 has an inverse slope per survey data

Pump Stations

The pump stations were all found to have ample firm capacity to handle the estimated existing and future peak wet weather flows. Additional storage capacity and emergency generators are recommended for several of the pump stations. A summary of the pump station improvement recommendations is as follows:

1. The sewers planned to be utilized for diverting the Pump Station No. 7 to Pump Station No. 1 should be studied in detail to eliminate as many of the siphons as possible, and mitigate the capacity deficiencies that will result from this diversion. Consider the alternative of upgrading Pump Station No. 7 and its force main, and constructing a scaled down improvement at Pump Station No. 1.

2. When Pump Station No. 2 is upgraded:
    a. Place all electrical, controls, and telemetry equipment above ground
    b. Equip pump station with a either an engine driven bypass pump or permanent emergency generator and an automatic transfer switch
    c. Add emergency storage capacity of 10,000 gallons
    d. Equip lowest maintenance access structure on the influent sewer with a Smart Cover
    e. Replace existing 8-inch force main with a ceramic epoxy lined ductile iron pipe. Rehabilitate existing force main and maintain it as a redundant facility

3. Pump Station No. 4
    a. Replace existing 12-inch force main with epoxy lined ductile iron pipe. Rehabilitate existing force main and maintain it as a redundant facility

4. When Pump Station No. 5 is upgraded:
    a. Provide 13,000 gallons of emergency storage above the operating band
    b. Equip pump station with a either an engine driven bypass pump or permanent emergency generator and an automatic transfer switch
    c. Replace existing 10-inch force main with a ceramic epoxy lined ductile iron pipe. Rehabilitate existing force main and maintain it as a redundant facility

5. When Pump Station No. 6 is upgraded:
    a. Provide 3,000 gallons of emergency storage above the operating band
    b. Equip pump station with a either an engine driven bypass pump or permanent emergency generator and an automatic transfer switch
    c. Replace existing 6-inch force main with a ceramic epoxy lined ductile iron pipe. Rehabilitate existing force main and maintain it as a redundant facility

6. When Pump Station No. 7 is upgraded:
    a. Replace existing 12-inch force main with a ceramic epoxy lined ductile iron pipe as a backup facility in case it needs to be used in lieu of diverting its flows to Pump Station No. 1. Rehabilitate existing force main and maintain it as a redundant facility

7. When Pump Station No. 8 is upgraded:
    a. Provide 4,700 gallons of emergency storage
    b. Equip pump station with a either an engine driven bypass pump or permanent emergency generator and an automatic transfer switch
    c. Replace existing 6-inch force main with a ceramic epoxy lined ductile iron pipe. Rehabilitate existing force main and maintain it as a redundant facility

8. When Pump Station No. 9 is upgraded:
    a. Provide 2,300 gallons of emergency storage
    b. Equip pump station with a either an engine driven bypass pump or permanent emergency generator and an automatic transfer switch
    c. Replace existing 8-inch force main with smaller diameter ceramic epoxy lined ductile iron pipe. Rehabilitate existing force main and maintain it as a redundant facility
    d. Re-evaluate pump capacities

9. When Pump Station No. 13 is upgraded:
    a. Re-evaluate pump capacities
    b. Replace existing 10-inch force main with ceramic epoxy lined ductile iron pipe. Rehabilitate existing force main and maintain it as a redundant facility

Condition Assessment

In formulating a capital improvement program, both the hydraulic capacity of the facilities, and their condition have to be considered. In order to assess the condition of its facilities, the City had closed circuit television (CCTV) inspections of 259,589 feet of sewers completed in 2011. The inspections covered the entire system. The work was performed by Advance Sewer Technologies, Inc. (AST). Individual reports were developed for each sewer reach with severity ratings based upon a point value system suggested by AST. The severities ranged from 1 to 5, with 5 being the highest priorities.

The information contained in these reports and the videotapes is essential in assessing the condition of the system. It is also used in formulating facility maintenance recommendations, and the upgrade/replacement portion of the capital improvement program.

Maintenance

The sewer system is maintained by the City's Public Works Wastewater Division. The maintenance staff primarily consists of a five person crew that is responsible for routinely cleaning sewer lines,

checking equipment and recording runtimes at all sewer pump stations, and responding to calls from residents. Although the City does not own the sewer laterals, City staff often respond to calls from residents when there is a problem with individual laterals. It has been a free service provided by the City.

Root intrusion, broken lines, and offset joints have historically been the main problems encountered throughout the City's sewer system. Grease is not typically a problem except for in the downtown areas, such as along Main Street where the majority of the restaurants are located. The City has a root foaming program that helps to temporarily kill the roots that have intruded into the sewer pipes.

A comprehensive maintenance program is an important tool in assuring reliable system operation. This not only includes regular inspections and preventative maintenance, but also good record keeping. Accurate records are the backbone of any maintenance operation. They can be used for many purposes including: scheduling regular maintenance activities; allocating manpower; budgeting; pinpointing persistent problems; tracking equipment performance and maintenance history; and the identification of equipment which may be showing signs of failure. The Sewer Geographic Information System can be used for this purpose.

Inspections of the facilities are of course very important. Regular inspections can help identify and eliminate a potential problem before it creates an emergency situation. Facility inspection recommendations can be found in Section 8-4.

1-8 Capital Improvement Program

The primary goal of the Capital Improvement Program (CIP) is to provide the City of El Segundo with a long range-planning tool for implementing its sewer infrastructure improvements in an orderly manner, and providing a basis for financing of these improvements. To accomplish this goal, the program is phased based upon the implementation cost of the facilities, the quantity of work the City can reasonably administer each year, and the funds available for these projects.

The needed capital improvements were identified as a result of assessment of the system through capacity analyses, video inspections, and physical facility inspections.

The capital improvement projects were selected primarily based upon safety and health concerns and minimizing the possibility of overflows.

Pump station project priorities have been established to:

- Bring existing pump stations that have not been improved in the last 10 years, to current standards
- Eliminate capacity deficiencies
- Eliminate structural problems
- Conduct periodic upgrades of existing pump stations
- Replace force mains that have reached the end of their useful lives

The recommended CIP has been based upon the best information currently available. It should be updated as new information becomes available. The project priorities may be adjusted to take advantage of concurrent construction such as street paving projects or adjacent infrastructure work.

The gravity main sewer improvement project related to capacity deficiencies is shown in Table 1-8. Flow monitoring is recommended prior to project implementation. The flow monitoring should be done after the completion of the Elevon at Campus El Segundo development, which is tributary to the deficient sewer reach.

The pump station improvement projects and associated costs are shown in Table 1-9. For the gravity condition related improvement projects, refer to the City of El Segundo Capital Improvement Projects for Sewer System, provided in Appendix 4.

Table 1-8
Capital Improvement Program
Gravity Main Capacity Improvements

Project No.	Description	Ex. Pipe Size (in)	Prop. Pipe Size (in)	Length (ft)	Cons Cost ($)	Engin and Admin Cost ($)	Total Project Cost ($)
G1	Douglas Street at Maple Avenue	15	18	90	40,500	14,175	54,675
				Total	**40,500**	**14,175**	**54,675**

Table 1-9
Capital Improvement Program
Pump Station and Force Main Improvements

Project No.	Description	Ex. Pipe Size (in)	Prop. Pipe Size (in)	Length (ft)	Date of Cons	Date of Recent Modifi-cation	Operational Storage (gal)	Emergency Storage (gal)	Permanent Standby Generator or Engine Driven Bypass Pump	Automatic Transfer Switch	Cons Cost ($)	Engin and Admin Cost ($)	Total Cost ($)	Total Project Cost ($)
PS1	Modification of Pump Station No. 1 and No. 7	-	-	-	1988	-					1,629,630	570,370	2,200,000	2,200,000
PS7	PS No. 7 Upgrades				1962	1996	3,000		x		120,000	42,000	162,000	1,596,680
	PS No. 7 FM Replacement	12	12	2460	1962	-					678,960	237,636	916,600	
	PS No. 7 FM Rehabilitation	12	12	2460	1962	-					383,760	134,316	518,080	
PS9	PS No. 9 Upgrades	-	-	-	1957	1988		2,300	x		500,000	175,000	675,000	1,042,600
	PS No.9 FM Replacement	8	8	830	1957	-					166,000	58,100	224,100	
	PS No.9 FM Rehabilitation	8	8	830	1957	-					106,240	37,260	143,500	
PS8	PS No. 8 Replacement	-	-	-	1955	1995		4,700	x		2,000,000	700,000	2,700,000	3,680,100
	PS No.8 FM Replacement	8	8	3630	1955	-					726,000	254,100	980,100	
PS2	PS No. 2 Replacement	-	-	-	1925	1996		10,000	x	x	2,000,000	700,000	2,700,000	2,976,800
	PS No.2 FM Replacement	8	8	625	1976	-					125,000	43,800	168,800	
	PS No.2 FM Rehabilitation	8	8	625	1976	-					80,000	28,000	108,000	
PS4	PS No.4 FM Replacement	12	12	2420	1964	-					667,920	233,780	901,700	1,411,400
	PS No.4 FM Rehabilitation	12	12	2420	1964	-					377,520	132,180	509,700	
PS5	PS No. 5 Upgrades				1954	2004		13,000	x	x	500,000	175,010	675,010	1,636,300
	PS No.5 FM Replacement	10	10	1780	1954	-					445,000	155,790	600,790	
	PS No.5 FM Rehabilitation	10	10	1780	1954	-					267,000	93,500	360,500	
PS 6	PS No. 6 Upgrades				1953	2003		3,000	x		350,000	122,500	472,500	768,200
	PS No.6 FM Replacement	6	6	760	1953	-					136,800	47,900	184,700	
	PS No.6 FM Rehabilitation	6	6	760	1953	-					82,152	28,848	111,000	
PS13	PS No.13 FM Replacement	10	10	1430	1972	-					357,500	125,200	482,700	772,300
	PS No.13 FM Rehabilitation	10	10	1430	1972	-					214,500	75,100	289,600	
										Total	**11,913,982**	**4,170,391**	**16,084,380**	**16,084,380**

SECTION 2

INTRODUCTION

2-1 Purpose

This section provides and overview and outline for the City of El Segundo's System Evaluation and Capacity Assurance Plan (SECAP). A brief background description, objectives and scope of work, acknowledgments, and a list of abbreviations used throughout the report are provided.

2-2 History and Background

In 1911 the Standard Oil Company began construction of its second oil refinery in what is today El Segundo, Spanish for "the second". Prior to this time, the area had remained largely undeveloped. The City of El Segundo (City) was incorporated on January 18, 1917. The City's population was 1,563 in 1920. The City remained a one-industry town until the 1920's when the site of the Los Angeles International Airport was selected just to the north. The airport was opened for business in 1930 and played a significant role in turning the City into a major aerospace center. Companies such as Douglas Aircraft, Hughes Aircraft, Northrop, and North American Aviation moved into the area during the 1940's and 1950's. Most of these aircraft-related companies eventually transitioned into the aerospace/defense industry. By 1960, the Aerospace Corporation and the Los Angeles Air Force Base were also located in the City.

Today, the City consists of three main areas: the residential community and adjoining downtown business district to the northwest, the Chevron Refinery to the southwest, and the commercial/industrial area to the east. El Segundo is the home of a variety of Fortune 500 companies including Aetna, Boeing, Chevron, Mattel, Motorola, Northwest Airlines, Oracle, Sun Microsystems, Raytheon, Unocal, and Xerox. The population has leveled off at approximately 16,900. This low number of residents has preserved the original charm of the City, which prides itself on providing the combination of a small town atmosphere where big business can be done.

2-3 Past Studies and Work Completed

1967, 1977, and 1983 Sewer Master Plans

The City of El Segundo's initial master planning dates back to 1967. The report, which was entitled "Master Plan-Sanitary Sewer Facilities", evaluated the then existing system, and recommended improvements to serve the City's future needs. The 1967 Master Plan was updated in 1977 to evaluate the changes that had taken place in development and planning. The last update to the Master Plan was completed in 1983.

The 1983 Master Plan recommended unit flow factors for single and multi-family residential, commercial and industrial land uses; and developed unit flow factors for multi-story commercial office use based upon flow monitoring conducted at two locations.

The calibration was based upon the comparison of calculated flows to the measured flows tributary to Hyperion Plant.

The master plan study developed average sewer flows utilizing the unit flow factors and the tributary land uses.

The criteria recommended by the Master Plan included depth to diameter ratios at peak dry weather flows, minimum velocities, Manning's n value for hydraulic analysis, and peak dry weather unit flow factors.

The City's sewer system is divided into two distinct collection systems. At the time of the 1983 Master Plan, the portion of the City located west of Sepulveda Boulevard and the area from Sepulveda Boulevard to Nash Street between El Segundo Boulevard and Mariposa Avenue (Drainage Area 13) were tributary to the City of Los Angeles Hyperion Treatment Plant. The remainder of the City was tributary to the Los Angeles County Sanitation District No. 5.

Due to the rolling terrain west of Sepulveda Boulevard, there are ten (10) separate drainage areas in the city. Nine (9) of these areas include a sewer pump station. The tributary wastewater of each of these areas is conveyed by a local gravity sewer collection system to the pump station. The wastewater is then pumped directly to the trunk sewers in Imperial Highway or to a neighboring drainage area where it can flow by gravity to Imperial Highway. The flows are then conveyed west in either the 15-inch or the 24-inch Imperial Highway trunk sewers to the Hyperion Outfall and Treatment Facility. The wastewater generated within the Sand Hill drainage area, located on the far west side of the City, is conveyed by gravity directly to the Hyperion Outfall in Imperial Highway.

The 1983 Master Plan analyzed only the mainline gravity sewers for hydraulic capacity under the then existing land use conditions as well as the ultimate land use allowed by the General Plan. The analyses for the existing land use showed minor capacity deficiencies in:

- Four sewer reaches in El Segundo Boulevard, Standard Street, and Franklin Avenue in Drainage Area 2- depth to diameter ratios of 0.52 to 0.72
- Four reaches of sewer in Center Street between Acacia Avenue and Oak Avenue in Drainage Area 5-depth to diameter ratios of 0.53 to 0.59
- One reach of sewer in extension of Palm Avenue east of Main Street in Drainage Area 7- depth to diameter ratio of 0.56
- One reach of sewer between Nevada Street and Oregon Street south of Grand Avenue in Drainage Area 8- depth to diameter ratio of 0.51
- One reach of sewer in Rosecrans Avenue between Douglas Street and Aviation Boulevard- depth to diameter ratio of 0.54

Additional minor deficiencies were identified with the ultimate land use conditions. These were:

- Two sewer reaches in Sepulveda Boulevard between Pine Avenue and Holly Avenue- depth to diameter ratios of 0.57 to 0.60
- One reach of sewer in El Segundo Boulevard east of Kansas Street- depth to diameter ratio of 0.52

The sewer analysis criteria set in the Master Plan included the following:

Manning's "n"	0.013	
Minimum Velocity	2 ft/sec	
D/d Criteria	0.75-1.00	Overload
	0.50-0.75	Normal to High Flows
	0.33-0.50	Low to Normal Flows
	0.00-0.33	Low Flows

The pump stations were evaluated for capacity only, and improvements were recommended for providing adequate firm pumping capacity.

Recommendations were made for drainage improvements in the Sand Hill Drainage Area to minimize rainfall related inflow into the sanitary sewer system.

The 1983 Master Plan evaluated the treatment capacity needed at the Hyperion Treatment Plant, and recommended that the area tributary to Pump Station No.13 be annexed and diverted to Los Angeles County Sanitation District No. 5 in lieu of purchasing additional capacity in the Hyperion Treatment Plant. This recommendation was implemented in 1986.

The Master Plan included recommendations for connection and user fees, as well as updated guidelines for the industrial waste program.

2002 Sewer Master Plan

The City of El Segundo's latest sewer master plan was completed in December 2002. A hydraulic analysis identified 12,295 feet of capacity deficiencies within the gravity sewer system. Over the years, it has been found that the sewage loads in the hydraulic model were conservative and no longer representative of the actual flows seen in the system. It is believed that the developed unit flow factors were overly conservative and with water conservation efforts in full effect, the flow estimates are inflated even further. This System Evaluation and Capacity Assurance Plan (SECAP) study will update the hydraulic model with more realistic flow estimates, based upon actual water use information and flow data at the pump stations. The 2002 master plan also assessed the condition of 192,300 feet of gravity sewer pipes by review of closed circuit television (CCTV) inspection records. The total Capital Improvement Program (CIP) included $8.6 Million in pump station and force main upgrades and $13.1 Million in gravity sewer main replacement/upgrades.

Sewer Pump Station Upgrades

Subsequent to the completion of the 1983 Master Plan, the City authorized a study of Pump Stations No. 2, 7 and 9. The study concluded that there was not sufficient room to increase wet well capacities. The City refurbished Pump Station No. 9 in 1988, and Pump Stations No. 2 and No. 7 in 1996. Pump Station No.1 was relocated in 1988.

The latest pump station improvements include the following:

- Sewer Pump Station No. 13 (2002) - Installed new pumps (two at 1530 gpm), motors, sump pump, blower, and associated valves and pipes, and a standby generator.
- Sewer Pump Station No. 4 (2003) – Replaced the pumps and motors; replaced suction and discharge pipes and valves; lined the wet well and dry well; added permanent standby generator with an automatic transfer switch; replaced the electrical and control equipment; constructed operational/emergency storage facility
- Sewer Pump Station No. 6 (2003) – Installed new pumps, motors, flow meter, sump pump, blower, pressure sensor, and associated valves and pipes
- Sewer Pump Station No. 12 (2003) – Decommissioned pump station by constructing siphon facility
- Sewer Pump Station No. 5 (2004) – Installed new pumps, motors, sump pump, blower, level float switch, and associated valves and pipes

A plan has been completed to bypass Pump Station No. 7, modify the wet wells of former Pump Station No. 10 and Pump Station No. 11, and upgrade Pump Station No. 1. The new Pump Station No. 1 pumps will be large enough to accommodate all flows currently conveyed to and pumped by Pump Station No. 7.

CCTV Inspections

In 2000, the City of El Segundo had 761 segments of its gravity sewers covering a total length of 192,300 feet inspected with the use of closed circuit television cameras. The CCTV inspections covered the portion of the system west of Sepulveda Boulevard, which drains to Hyperion Treatment Plant. National Plant Services, Inc, (NPS) performed the CCTV work and developed individual reports for each reach. The reports included severity ratings based upon a point value system suggested by NPS. The severities ranged from zero to 28,800. Most of the deficiencies included root intrusion. The portion of the system with the highest severity rating is the 15-inch diameter sewer in Imperial Highway that conveys the Drainage Area 5 flows to the Hyperion Treatment Plant. Most of the deficiencies in this sewer were cracked pipe. National Plant Services also provided recommendations for mitigating the deficiencies.

In 2011, the City of El Segundo had 1,078 segments of its gravity sewers covering a total length of 259,589 feet inspected with the use of closed circuit television cameras. The CCTV inspections covered the entire city. Advance Sewer Technologies, Inc. (AST) performed the CCTV work and developed individual reports for each reach. The reports included severity ratings based upon a point value system suggested by AST. The severities ranged from 1 to 5, with 5 being the highest priority.

The information contained in these reports and the videotapes is essential in assessing the condition of the system. It is also used in formulating facility maintenance recommendations, and the upgrade/replacement portion of the capital improvement program.

2-4 Objectives and Scope of Work

The objective of this System Evaluation and Capacity Assurance Plan (SECAP) is to evaluate the capacity of the City's sewer collection system and provide a framework for undertaking the construction of new and replacement facilities for serving the wastewater collection needs in an efficient and cost effective manner. As a planning document, it is general in nature and is predicated upon the best information available at this time.

The scope of work for the SECAP consists of the following tasks:

1. Obtain as-built plans of facilities constructed since the completion of the hydraulic model for the 2002 Master Plan, update the geometric model.
2. Upon verification of the accuracy of the flow meters at the sewer pump stations by the City, install flow monitoring instruments on the flow meters, and record flow data for a four week period
3. Review water use data for the various customer types, develop unit flow factors based upon water use during the minimum consumption period, refine the unit flow factors based upon comparison of flows to the monitored flow information
4. Assign flows to parcels by land use.
5. Develop dry weather peaking relationships for use in the model
6. Update criteria
7. Conduct analyses with the peak dry weather flows, identify capacity deficiencies
8. Formulate a capital improvement program to eliminate the capacity deficiencies
9. Prepare a SECAP report summarizing the study

2-5 Statewide General Waste Discharge Requirements

The State Water Resources Control Board (SWRCB), which oversees all wastewater permitting and enforcement, adopted Resolution 2004-80 requiring staff to work with stakeholders in developing a regulatory program that will provide a consistent approach for reducing SSOs. To assist in the development of the regulatory program, a statewide SSO Guidance Committee composed of representatives from the Regional Water Quality Control Boards, county environmental health departments, environmental groups, U.S. EPA, local public collection system owners and other collection system experts was formed. SWRCB staff and the SSO Guidance Committee drafted Statewide General Waste Discharge Requirements (WDR) for Sewage Collection System Agencies.

The State Water Resources Control Board adopted the Statewide General Waste Discharge Requirements (WDR) for sanitary sewer systems and the associated monitoring and reporting program by issuing Order No. 2006-0003 on May 2, 2006.

The WDR and reporting program addresses SSO reporting and proper collection system management and operation necessary to protect the public health, water quality, the environment, and the public's investment in the sewer system infrastructure.

The Statewide WDR is essentially California's equivalent of the proposed Federal regulation, Capacity, Management, Operation, and Maintenance (CMOM), and includes all elements of CMOM.

The fifth paragraph of the preamble to the Waste Discharge Requirements is:

"To facilitate proper funding and management of sanitary sewer systems, each Enrollee must develop and implement a system-specific Sewer System Management Plan (SSMP). To be effective, SSMPs must include provisions to provide proper and efficient management, operation, and maintenance of sanitary sewer systems, while taking into consideration risk management and cost benefit analysis. Additionally, an SSMP must contain a spill response plan that establishes standard procedures for immediate response to an SSO in a manner designed to minimize water quality impacts and potential nuisance conditions."

The Sewer System Management Plan must address the following elements:

1. Goals
2. Organization Structure
3. Legal Authority
4. Operation and Maintenance Program, including a Preventive Maintenance Program and a Rehabilitation and Replacement Program
5. Design and Performance Provisions
6. Overflow Emergency Response Plan
7. Fats, Oils, and Grease (FOG) Control Program
8. System Evaluation and Capacity Assurance Plan (SECAP)
9. Monitoring, Measurement, and Program Modifications
10. Sewer System Management Plan Program Audits
11. Communication Program

The Waste Discharge Requirements define a sanitary sewer system as, "Any system of pipes, pump stations, sewer lines, or other conveyances, upstream of a Wastewater Treatment Plant headworks used to collect and convey wastewater to the publicly owned treatment facility. Temporary storage and conveyance facilities (such as vaults, temporary piping, construction trenches, wet wells, impoundments, tanks, etc.) are considered to be part of the sanitary sewer system, and discharges into these temporary storage facilities are not considered to be SSOs"

Enrollees are required to certify that the final SSMP and its constituent subparts are in compliance with the Sanitary Sewer Order within the time frame above. Enrollees are also required to obtain their governing board's approval of the SSMP Development Plan and Schedule and final SSMP at a

public hearing prior to certification as complete and in compliance. Enrollees do not send their SSMP to the State or Regional Water Boards for review or approval, but need to make them available upon request.

2-6 Government Accounting Standards Board Statement 34 (GASB 34)

Government Accounting Standards Board Statement 34 (GASB 34), issued in June 1999, requires that agencies have an asset management system in place. They must establish the condition in which they will maintain their assets, assess the condition of their infrastructure, estimate the useful lives and replacement costs, and determine the cost to maintain the desired condition of the infrastructure. Section I, Background, of the proposed CMOM regulations acknowledge GASB 34, and the regulations encompass many of the components of GASB 34. Complying with Statement 34 will provide agencies with the necessary tools for maintaining the integrity of their assets, and will most likely improve their bond rating.

2-7 Organization of System Evaluation and Capacity Assurance Plan (SECAP) and Rehabilitation and Replacement Program (RRP) Report

This SECAP report presents the methodology, analyses, findings, and recommendations of a comprehensive study of the City of El Segundo's wastewater collection system. A brief outline of the report follows:

- Section 1: **Executive Summary** provides a summary of the SECAP report.
- Section 2: **Introduction** provides an overview and outline for the SECAP.
- Section 3: **Study Area** describes the physical features, current and future land use characteristics and population of the study area.
- Section 4: **Criteria** discusses the standards and procedures utilized in estimating the wastewater flows, assessing the system, and selecting the recommended improvements.
- Section 5: **Existing and Future Wastewater System** describes the City's existing sewer system, drainage regions, and the regional facilities that will receive flows from the study area.
- Section 6: **Pump Stations** provides a detailed discussion of each of the City's sewer pump stations. The pump capacities, pump station cycle times, wet well storage capacity, and force main velocities are evaluated.
- Section 7: **Hydraulic Model** provides a detailed description on the development of the sewer hydraulic model that was utilized for capacity analysis.
- Section 8: **System Analysis** describes the hydraulic model, total flows, and condition assessment of the sewer system. The hydraulically deficient segments of the system are identified in this section.
- Section 9: **Capital Improvement Program** presents a prioritized capital improvement program for the recommended projects.

- Appendices: The **Appendices** contain background information and are referred to in the text as the location of supplementary facts and figures.

2-8 Acknowledgments

AKM Consulting Engineers would like to express their sincere appreciation to the following individuals for their valuable assistance and support throughout the preparation of this study:

Lifan Xu, Principal Civil Engineer

Gil Busick, Wastewater Supervisor

2-9 Abbreviations

To conserve space and improve readability, abbreviations have been used in this report. Each term abbreviated has been spelled out in the text the first time it is used. Subsequent usage of the term is usually by its abbreviation. The abbreviations utilized in this report are contained in Table 2-1.

Table 2-1
Abbreviations

Abbreviations	Explanation
AC	Acres
ACP	Asbestos cement pipe
ADWF	Average Dry Weather Flow
amsl	Above Mean Sea Level
CCTV	Closed Circuit Television
cfs	Cubic Feet per Second
CI	Cast Iron Pipe
CIF	Capital Improvement Fee
CIP	Capital Improvement Program
City	City of El Segundo
CMOM	Capacity, Management, Operations and Maintenance
CSDLC	County Sanitation District of Los Angeles County
d/D	Depth to Diameter Ratio
DIP	Ductile Iron Pipe
DU	Dwelling Unit
D/S	Downstream
EDU	Equivalent Dwelling Unit
ENR	Engineering News-Record
EPA	Environmental Protection Agency
FAR	Floor Area Ratio
fps	Feet per Second
GASB34	Government Accounting Standards Board Statement 34
GIS	Geographic Information System
gpcd	Gallons per Capita per Day
GPD	Gallons per Day
gpm	Gallons per Minute
HGL	Hydraulic Grade Line
HP	Horsepower
I/I	Inflow and Infiltration
LACDPW	Los Angeles County Department of Public Works
LAFCO	Local Agency Formation Commission
LF	Lineal Feet
mg	Million Gallons

Abbreviations	Explanation
MGD	Million Gallons per Day
NCPI	National Clay Pipe Institute
NEC	National Electric Code
NFPA	National Fire Prevention Association
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
OSHA	Occupational Safety & Health Administration
PDWF	Peak Dry Weather Flow
PVC	Polyvinyl Chloride
PWWF	Peak Wet Weather Flow
RPM	Revolutions per Minute
SCADA	Supervisory Control and Data Acquisition
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SECAP	System Evaluation and Capacity Assurance Plan
SSMP	Sewer System Management Plan
SSO	Sanitary Sewer Overflow
TDH	Total Dynamic Head
TSF	Thousand Square Feet
U/S	Upstream
USGS	United States Geological Survey
VCP	Vitrified Clay Pipe
WDR	Waste Discharge Requirements

Section 3

STUDY AREA

3-1 Purpose

This section describes the study area of the System Evaluation Capacity Assurance Plan and discusses the land uses and population estimates within the study area.

3-2 Location

The City of El Segundo (City) is located on the western edge of Los Angeles County. The City's regional location is depicted on Figure 3-1. The City encompasses approximately 5.5 square miles of residential, commercial, and industrial land. It is a coastal community bounded by the Pacific Ocean on the west, the Los Angeles Airport to the north, the City of Hawthorne to the east, and the City of Manhattan Beach to the south. The majority of the coastline is owned by the City of Los Angeles, which operates the Hyperion Sewage Treatment Plant and the Los Angeles Department of Water and Power Scattergood Generating Station. The small portion of coastline within El Segundo is occupied by the Chevron Refinery and the Southern California Edison Generating Station.

The Century Freeway (I-105) to the north and the San Diego Freeway (I-405) to the east provides easy access into the City. The major transportation routes within the City include Sepulveda Boulevard (SR-1), El Segundo Boulevard, Imperial Highway, and Rosecrans Avenue.

3-3 Topographical Description

The characteristic topography of El Segundo is a series of peaks and valleys throughout the City. Elevations range from 170 feet to 50 feet above mean sea level (amsl). Over the years, the construction of the sewer system has been dictated by the rolling terrain. Many of the existing sewers were designed deeper than typical in order to create enough slope to drain the sewage by gravity from one location to the next. In spite of the deep sewers, a total of nine (9) pump stations operate the system on a daily basis, pumping sewage over the numerous hills found throughout the City.

3-4 Geotechnical Information

The Los Angeles County Department of Public Works (LACDPW) Hydrology and Sedimentation Appendix provides information on the soil characteristics within Los Angeles County. This document shows that the soils found in the City include Montezuma clay adobe, Oakley fine sand, Ramona loam, and Ramona sandy loam. Oakley fine sand is prevalent west of Sepulveda Boulevard between Imperial Highway and Rosecrans Avenue. The clay and loams are found east of Sepulveda Boulevard.

Groundwater within the City has been observed at a range of 90 feet to 107 feet below the ground surface (LACDPW monitoring well records, April 2000 – present). The most recent groundwater depth was recorded at 97.9 feet below the ground surface on October 17, 2008. Due to the deep groundwater levels, large amounts of infiltration into the sewer system is not expected.


Jefferson Blvd
Sepulveda Blvd
Centinela Ave
La Tijera Blvd
City of Los Angeles
City of Inglewood
405
Century Blvd
Los Angeles International Airport
Lennox
105
Imperial Hwy
Nash St
1
120th St
Del Aire
City of Hawthorne
City of El Segundo
El Segundo Blvd
405
Hawthorne Blvd
Rosecrans Ave
Ocean Dr
Valley Dr
Ardmore Ave
City of Manhattan Beach
Aviation Blvd
City of Lawndale
Prairie Ave
Manhattan Beach Blvd
Sepulveda Blvd
Inglewood Ave
Redondo Beach B
Pacific Ocean
Artesia Blvd
91
City of Hermosa Beach
City of Redondo Beach
Hermosa Ave
190th St
N
0
2,500
5,000
10,000
Feet
1" = 5,000'
CITY OF EL SEGUNDO
SECAP & RRP
Location Map
PROJECT NO: 1031266.00
DATE: December 2014
Figure 3-1

3-5 Climate

El Segundo is a coastline community that enjoys mild temperatures and plenty of sunshine throughout the year. The warmest months are typically August and September with an average maximum temperature of 76.1° F. The coolest months are typically December and January with an average minimum temperature of 47.7° F. The average annual rainfall of about 12.02 inches occurs primarily during the winter months, between November and March (*Western Regional Climate Center, Los Angeles Airport data, between 1944 and 2013*). Humidity is typically between 55 and 85 percent, depending on the time of year.

3-6 Land Use

The land use information utilized in the preparation of this report is primarily based upon the City's latest General Plan land use map, as shown in Figure 3-2. Sepulveda Boulevard and El Segundo Boulevard divide the City into four major quadrants. The northwest quadrant consists of the residential community and adjoining downtown business district. The Chevron Refinery is located in the southwest quadrant. The northeast and southeast quadrants are primarily industrial and commercial areas. Table 3-1 provides a summary of the study area land use categories.

Of the City's 3,494 total acres, approximately 16.0 percent is residential (includes 540 E Imperial Ave Specific Plan area); 9.4 percent is commercial/office; 13.2 percent is mixed use (includes specific plan areas); 39.5 percent is industrial; 5.0 percent is open space and parks; and 3.8 percent is public and government facilities; the remaining 12.9 percent are right-of-ways.

Residential Land Uses

Single-Family Residential areas allow one residence per legal lot at a maximum density of 8 dwelling units per acre (DU/AC). The minimum lot size for new lots is 5,000 square feet.

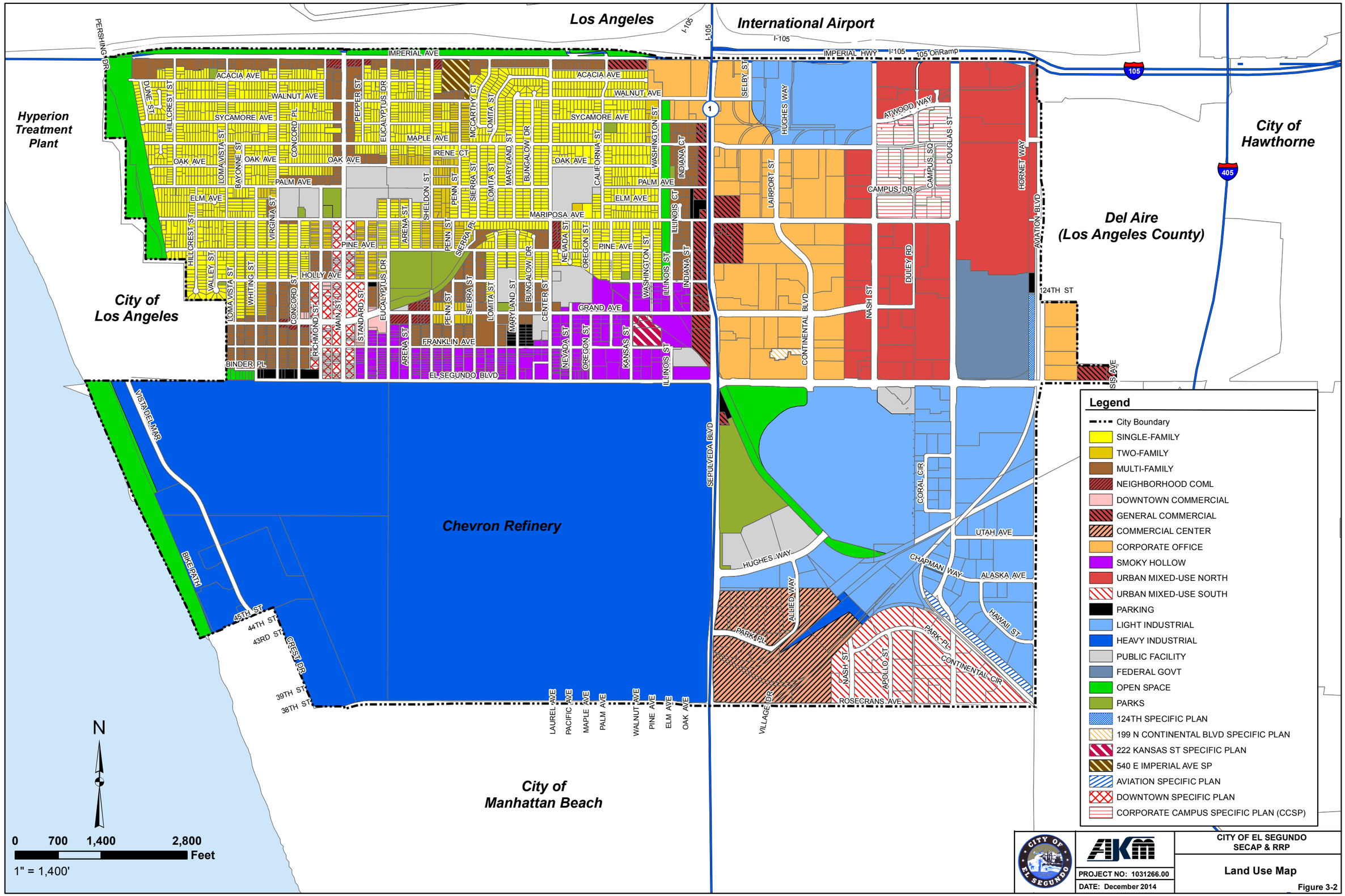
Two-Family Residential areas allow two residences on one legal lot at a maximum density of 12 DU/AC. The minimum lot size for new lots is 7,000 square feet.

Multi-Family Residential areas allow three or more dwelling units in either a condominium or apartment configuration. The maximum permitted density is 27 DU/AC on lots less than or equal to 15,000 square feet and 18 DU/AC on lots greater than 15,000 square feet.

Commercial Land Uses

Neighborhood Commercial areas permit neighborhood serving businesses and limited residential on a single floor above the commercial ground floor. The maximum FAR is 0.50 and the maximum residential density is 10 DU per acre.

Downtown Commercial areas permit community serving businesses and limited residential on a single floor above the commercial ground floor. The maximum floor area ratio (FAR) is 1.0 and the maximum residential density is 10 DU per acre.



CITY OF EL SEGUNDO
SECAP & RRP

AKM

PROJECT NO: 1031266.00

DATE: December 2014

Land Use Map

Figure 3-2

Table 3-1
Existing Land Use

Land Use Category	Allowed Uses	Existing Acres	% of Total
Single-Family Residential	Single family homes	385.80	11.0
Two-Family Residential	Two residences per lot	45.06	1.3
Multi-Family Residential	Multiple dwelling units	121.45	3.5
Neighborhood Commercial	Neighborhood-serving retail, office, and residential	8.20	0.2
Downtown Commercial	Community-serving retail, office, and residential	3.90	0.1
General Commercial	All retail, including hotel and medical facilities	33.47	1.0
Commercial Center	Commercial	80.06	2.3
Corporate Office	Office and food-serving	202.99	5.8
Smoky Hollow	Light industrial and manufacturing, R&D, warehousing, office, residential	93.10	2.7
Urban Mixed-Use North	Office, R&D, retail, and hotel	220.01	6.3
Urban Mixed-Use South	Office, R&D, retail, and hotel	68.18	2.0
Parking	Parking	9.45	0.3
Light Industrial	Light manufacturing, warehousing, R&D, office	374.92	10.7
Heavy Industrial	Heavy manufcturing (factories, refinery, etc.)	1,004.23	28.7
Public Facility	Publicly owned facilities (schools, library, utilities, etc.)	85.20	2.4
Federal Government	U.S. Government facility	48.23	1.4
Open Space	Open Space (utility easement, flood control sumps, etc.)	120.81	3.5
Parks	Parks for recreational use	53.26	1.5
124th Street Specific Plan	Warehousing and mini-storage	1.36	0.04
199 N Continental Blvd Specific Plan	Hotel, offices, public facilities, recreational facilities, R&D, restaurants	1.75	0.1
222 Kansas St Specific Plan	Light industrial, manufacturing, offices, public facilities, R&D, warehouses, public facilities	4.83	0.1
540 E Imperial Ave Specific Plan	Senior housing/multi-family residential or single family/multi-family residential	5.70	0.2
Aviation Specific Plan	Warehousing and storage	6.05	0.2
Downtown Specific Plan	Retail, service, and office	25.28	0.7
Corporate Campus Specific Plan	Office, commercial, retail, and recreational	40.64	1.2
Right-of-Ways		450.47	12.9
	Total	**3,494**	**100.0**

General Commercial areas permit all retail uses, including hotels and major medical facilities, at a maximum FAR of 1.0.

Corporate Office areas permit a mixture of office and food-serving uses, research and development, limited retail, and hotels and motels at a maximum FAR of 0.8.

Smoky Hollow Mixed-Use areas permit light industrial uses including light manufacturing, research and development, warehousing, and office uses. The maximum FAR is 0.6 for new construction. Multi-family residential units up to 18 du/ac are also allowed.

Urban Mixed-Use North areas and Urban Mixed-Use South areas permit a mixture of office, research and development, retail, hotel, and light industrial uses at a maximum FAR of 1.3.

124th Street Specific Plan area permits warehousing and mini-storage uses and a water facility at a maximum FAR of 0.47 (with water facility) and 0.54 (without water facility).

199 North Continental Boulevard Specific Plan area permits hotels, offices, public facilities, recreational facilities, research and development, and restaurants.

222 Kansas Street Specific Plan area permits light industrial, public facilities, offices, research and development, warehousing and distribution, manufacturing, and mixed uses of commercial and light industrial.

540 East Imperial Avenue Specific Plan area permits either a mix of senior housing and multi-family residential or a mix of single family and multi-family residential.

Aviation Specific Plan area permits warehouse and storage uses at a maximum FAR of 0.22.

Downtown Specific Plan area permits community serving retail and service uses and offices. It also includes the Civic Center.

Corporate Campus Specific Plan area permits a mix of office, commercial, retail, and related recreational uses at a maximum FAR of 0.99.

Industrial Land Uses

Light Industrial areas permit light manufacturing, warehousing, research and development, and office uses at a maximum FAR of 0.6.

Heavy Industrial areas permit heavy manufacturing uses such as construction yards, factories, generating station, extraction of raw materials, and refineries at a maximum FAR of 0.6.

Other Land Uses

Public Facilities permits publicly owned facilities such as schools, maintenance yards, utilities, libraries, and the civic center.

Federal Government areas permit U.S. Government facilities that are consistent with surrounding uses.

Parking areas permit parking of automobiles, motorcycles, and bicycles.

Open Space areas permit passive or active use of areas preserved as useable or visual open space both publicly or privately owned.

Parks permit passive or active use of areas developed as parks, for community and recreational uses.

3-7 Population

Since its incorporation in 1917, the City of El Segundo has grown from a population of 1,563 to 16,897 in 2014 (*California Department of Finance, Demographic Research Unit*). The estimated 2014 population is 1.46 percent higher than the 2010 Census Count of 16,654. The total number of housing units is estimated at 7,413. The average number of persons per household is estimated at 2.37.

The daytime employment population is considerably larger than the resident population at approximately 80,000.

Section 4

CRITERIA

4-1 General

Establishing performance standards is an important part of evaluating existing wastewater collection systems and planning of future systems, as it forms the basis for system analysis and system improvement recommendations. These standards include methodology for estimating wastewater design flows and minimum design standards for the collection system pipes, pump stations, and force mains.

Average wastewater flows can be reasonably estimated from by either using a percentage of water use or land use and a corresponding unit flow factor. The results are then compared to measured flows. Peaking factors are needed for estimating peak dry weather and peak wet weather flows. Peak wet weather flows include an allowance for inflow / infiltration (I/I).

Collection system design standards include minimum pipe size, minimum flow velocity, and depth of flow to pipe diameter ratio. Pump station criteria includes the capacity and number of pumps, wet well and force main sizes, redundancy, emergency power, remote monitoring capabilities, as well as safety and regulatory agency requirements. Finally, facility useful lives are needed for adequately scheduling replacement of the aging infrastructure.

4-2 Unit Flow Factors

Residential unit flow factors, shown in Table 4-1 were developed based upon the existing land uses, water use information, and AKM's experience. Water use information was used in lieu of flow meter data because previously developed unit flow factors (2002 Sewer Master Plan) via flow meter data was found to be overly conservative. These factors can be used to estimate future development wastewater loads.

Table 4-1
Residential Unit Flow Factors

Land Use	Unit Flow Factor	Units
Single Family Residential	190	gpd/du
Two-Family Residential	140	gpd/du
Multi-Family Residential	110	gpd/du

For commercial, industrial, and other land use types, the sewage loads should be based upon the detailed characteristics of the proposed development. In the absence of information, the sewage unit flow factors of the regional treatment agency that the proposed development is tributary to may be used. The regional treatment agency for the areas west of Sepulveda Boulevard is the City of Los Angeles. The treatment agency for the areas east of Sepulveda Boulevard is the Sanitation Districts of Los Angeles County (SDLAC).

4-3 Peaking Factors

Peak Dry Weather

The wastewater unit flow factors shown in Table 4-1 are used to generate average dry weather flows (ADWF) entering the collection system. However, the adequacy of a sewage collection system is evaluated based upon its ability to convey the peak flows. At any individual point in the system, peak dry weather flow (PDWF) is estimated by converting the total average tributary flow to peak dry weather flow by an empirical peak-to-average relationship.

The peaking formula commonly used in sewerage studies is of the following form:

$PDWF = a \times ADWF^{b}$ where PDWF = Peak Dry Weather Flow
ADWF = Average Dry Weather Flow
a, b = Peaking Formula Coefficients

The pump station influent flow was calculated based upon supervisory control and data acquisition (SCADA) information, particularly wet well levels and pump on and off times and the geometry of the wet wells. The calculated influent flow was then used to develop a peaking relationship for each pump station tributary area. As expected, these relationships varied from site to site depending upon the makeup and size of the tributary land use. Areas with similar type land uses often resulted in similar peaking relationships due to the fact that water is used at similar times of the day. The residential areas produced higher peak to average flow ratios than the commercial / industrial areas.

Coefficient "b" is typically found to be in the range of 0.91 to 0.92 based on empirical studies. Using a coefficient "b" of 0.92, the resulting coefficient "a" can be calculated from the influent pump station flow data. The following peaking relationships were adopted for the **existing system**. All units are in million gallons per day (mgd).

Pump Station 1 Drainage Area: $PDWF = 1.73 \times ADWF^{0.92}$

Pump Station 2 and 7 Drainage Area: $PDWF = 1.75 \times ADWF^{0.92}$

Pump Station 4 Drainage Area: $PDWF = 2.21 \times ADWF^{0.92}$

Pump Station 5 Drainage Area: $PDWF = 1.90 \times ADWF^{0.92}$

Pump Station 6 Drainage Area: $PDWF = 1.46 \times ADWF^{0.92}$

Pump Station 7 Drainage Area: $PDWF = 1.89 \times ADWF^{0.92}$

Pump Station 8 Drainage Area: $PDWF = 1.38 \times ADWF^{0.92}$

Pump Station 9 Drainage Area: $PDWF = 1.21 \times ADWF^{0.92}$

Pump Station 13 Drainage Area: $PDWF = 1.48 \times ADWF^{0.92}$

Sand Hill Drainage Area: $PDWF = 1.89 \times ADWF^{0.92}$

County Sanitation District Drainage Area: $PDWF = 3.0 \times ADWF$

15" Imperial Highway Trunk: $PDWF = 1.87 \times ADWF^{0.92}$

24" Imperial Highway Trunk: PDWF = 2.29 x ADWF $^{0.92}$

The Pump Station 7 formula was implemented in the Sand Hill Drainage Area due to similar land uses in the tributary area. A separate peaking relationship was developed for the main trunk lines in Imperial Highway based on flow monitoring data.

The CS drainage area consists of entirely commercial and industrial land uses. The water use and sewage generation is very different from the northwest portion of the City. The weekend flows are much less than the weekday flows in most cases due to the fact that the working population is significantly lower on the weekends. Based on a review of recent sewer studies and associated flow monitoring data, the peaking formula used for the CS drainage area is PDWF = 3.0 x ADWF. This will represent a typical 8 hour working period. It will be conservative in most cases in the drainage area but will account for any unaccounted for vacancies and variations in future land use types.

An additional 10 percent was added to the peaking coefficient for the future system to account for any vacancies and variations in future land use types. It is recommended that the City track any changes in land use, particularly in the commercial/industrial areas of the City, so that high water users and sewage generators can be accounted for and potential capacity deficiencies identified.

The following peaking relationships were adopted for the **future system**. All units are in million gallons per day (mgd).

Pump Station 1 Drainage Area: PDWF = 1.90 x ADWF $^{0.92}$

Pump Station 2 and 7 Drainage Area: PDWF = 1.93 x ADWF $^{0.92}$

Pump Station 4 Drainage Area: PDWF = 2.43 x ADWF $^{0.92}$

Pump Station 5 Drainage Area: PDWF = 2.09 x ADWF $^{0.92}$

Pump Station 6 Drainage Area: PDWF = 1.61 x ADWF $^{0.92}$

Pump Station 7 Drainage Area: PDWF = 2.07 x ADWF $^{0.92}$

Pump Station 8 Drainage Area: PDWF = 1.52 x ADWF $^{0.92}$

Pump Station 9 Drainage Area: PDWF = 1.34 x ADWF $^{0.92}$

Pump Station 13 Drainage Area: PDWF = 1.63 x ADWF $^{0.92}$

Sand Hill Drainage Area: PDWF = 2.07 x ADWF $^{0.92}$

County Sanitation District Drainage Area: PDWF = 3.0 x ADWF

15" Imperial Highway Trunk: PDWF = 2.05 x ADWF $^{0.92}$

24" Imperial Highway Trunk: PDWF = 2.52 x ADWF $^{0.92}$

Peak Wet Weather

The peak wet weather flow (PWWF) has two components: peak dry weather flow (PDWF) and rainfall dependent inflow/infiltration (I/I) as expressed by the following equation:

$$PWWF = PDWF + I/I$$

Until sufficient wet weather flow data can be collected and its impact on the wastewater flows is evaluated, it is recommended that the peak wet weather flow be estimated as the following:

Peak Wet Weather Flow (PWWF) = 1.25 x Peak Dry Weather Flow (PDWF)

Although the PWWF/PDWF factor of 1.25 may not cover all situations, it is not reasonable or feasible to design the sewer system to carry the flows that would result from the use of a larger ratio. Instead, it is recommended that the City concentrate on projects such as replacing manhole covers, installing plugs in manhole covers, and replacing or relining cracked pipes to reduce inflow and infiltration. Inflow and infiltration is discussed further in Sub-section 4-4.

4-4 Inflow and Infiltration

Inflow is the surface water that typically gains entry to the sewer system through perforated or unsealed maintenance access structure covers during rainfall events. Infiltration is defined as water entering the collection system from the ground through defective pipes, pipe joint connections, or maintenance access structure walls. The sewer system design capacity must include allowances for these extraneous water components, which inevitably become a part of the total flow. The amount of inflow and infiltration (I/I) that enters the system typically depends upon the availability and location of the storm water drainage facilities, age of structures, materials and methods of construction, maintenance access structure cover openings, location of maintenance access structures, the elevation of the groundwater table, and the characteristics of the soil. In absence of flow monitoring data, many regulating agencies implement commonly accepted practices for estimating I/I. For example, I/I is often estimated based on the diameter and length of pipeline (100 to 400 gpd/ in. dia/ mile) or as a percentage of the peak flow or pipeline capacity. Due to the deep groundwater levels found throughout the City, significant infiltration is not expected.

Our experience from other master planning studies and review of limited flow monitoring information available during severe rainfall events indicate that the peak wet weather flow can vary from 10 percent of average dry weather flows in steeper areas with adequate drainage facilities, to over 400 percent of average dry weather flows in flat areas that lack adequate drainage facilities.

For this study, extraneous flow due to inflow and infiltration is included in the peak wet weather flow formula described above. If better data becomes available subsequently for specific areas, the analysis should be updated based upon that information.

4-5 Sewer Design Criteria

Design criteria are established to ensure that the wastewater collection system can operate effectively under all flow conditions. Each pipe segment must be capable of carrying peak wet weather flows without surcharging the system. Low flows must be conveyed at a velocity that will prevent solids from settling and blocking the system.

The design capacity of a gravity pipeline is the calculated capacity of the pipeline based on the Manning formula. Sewer system capacity is established using a Manning's friction factor of 0.013 for vitrified clay pipe. The Manning formula is as follows:

$$\mathbf{Q = 1.486\ A\ R^{2/3}\ S^{1/2} / n}$$

where, **Q** = flow in cubic feet per second
R = hydraulic radius in feet = A / P
A = cross-sectional area of the pipe in square feet
P = wetted perimeter in feet
S = slope of pipe in feet of rise per foot of length
n = Manning's friction factor

The design and analysis of sewer pipes is typically based upon the depth to diameter ratio (d/D). In this study, **existing** pipes are considered capacity deficient if the d/D is above 0.64 at peak dry weather flows. This d/D ratio was arrived at by taking 75 percent of a pipe's maximum stable flow capacity, which is at a d/D of 0.82. The area above a d/D of 0.82 is considered hydraulically unstable. This provides capacity for 25 percent of peak dry weather flow for inflow and infiltration. Calculated capacity deficiencies shall be verified through flow monitoring prior to replacing facilities.

The extra pipeline capacity allows for the possibility that actual wastewater flows may be slightly higher than anticipated, especially during the hours when instantaneous or intermittent peaks may occur. These peaks are generally observed between the hours of 6:00 a.m. and 9:00 a.m. and 7:00 p.m. and 9:00 p.m. during weekdays and somewhat later in the morning hours during weekends in the predominantly residential areas. They may also be observed during rainfall events due to inflow and infiltration. Additionally, the area above the water surface helps to keep the sewage aerated, reducing the possibility of septic conditions and odors.

For **new construction**, the design and analysis of gravity sewer pipes shall be based on the following depth to diameter ratios:

- Pipes **15-inches and smaller** in diameter shall be designed to flow at a maximum **d/D of 0.50** with peak dry weather flows
- Pipes **18-inches and larger** in diameter shall be designed to flow at a maximum **d/D of 0.64** with peak dry weather flows
- For either group, the depth of flow to diameter ratio shall not exceed **0.82 with peak wet weather flows**

At a minimum, all pipes shall be 8 inches or larger in diameter and the velocity of flow shall be greater than 2 feet per second at average dry weather flow (ADWF). This velocity will prevent

deposition of solids in the sewer. A velocity of 3 feet per second is desired at peak dry weather flow to resuspend materials that may have already settled in the pipe and help to re-suspend any materials that may have already settled in the pipe. The corresponding minimum slopes for the various pipe sizes are as shown in Table 4-2. The peak flow velocity shall be less than 8 feet per second in vitrified clay pipe, and less than 5 feet per second in PVC pipe.

Table 4-2
Minimum Sewer Slopes

Sewer Size	2 ft/s Velocity Slope	3 ft/s Velocity Slope
8"	0.0033	0.0074
10"	0.0025	0.0055
12"	0.0019	0.0044
15"	0.0014	0.0032
18"	0.0011	0.0025
21"	0.0009	0.0021
24"	0.0008	0.0018

15" and smaller based on d/D=0.50
18" and larger based on d/D=0.64

The City recognizes that minimum slopes and velocities are sometimes not achievable under certain circumstances. On a case by case basis, the City may approve sewer designs that do not meet these criteria. It is important to note that the slopes provided in Table 4-2 are based upon the depth of flow in the pipe equaling half the diameter of the pipe. If there is insufficient flow to create this condition, greater slopes than those shown will be necessary.

A summary of sewer system design criteria is listed in Table 4-3.

4-6 Pump Station Design Criteria

It is desirable to develop a sewer collection system with as few pump stations as possible due to the associated cost and maintenance required. This report does not recommend any new sewer pump stations. However, in the case that a pump station is necessary, it must be designed to be reliable, and sized with sufficient capacity and redundancy to minimize the possibility of spills. It must contain redundant equipment, an emergency power supply, sufficient storage, and be able to notify the appropriate personnel in the event of failure.

The primary components of a typical pump station are the wet well, motors, valves, dry well, pumps, ventilation, electrical, controls and the force main. The following general criteria are recommended.

The wet well stores the incoming wastewater until a pump is activated to discharge it to a facility for further conveyance. It must be designed with sufficient capacity to prevent short cycles whereby the pumps frequently start and stop, yet small enough that it will regularly evacuate sewage from the wet well to prevent the wastewater from becoming septic. Generally, the desired number of pump cycles shall be limited to no more that 6 per hour for motors up to 10 horsepower. Motors up to 75 horsepower should start no more than 4 times per hour. Larger motors should cycle less frequently. Pump stations should also have sufficient volume to store sewage in the event of failures until the City can respond to the failure and prevent overflows. The necessary emergency storage is dependent upon how rapidly the City can respond to a failure and mitigate it. A minimum emergency storage of 90 minutes at average dry weather flow shall be provided.

The pumps must be sized to efficiently handle the peak flows. A minimum of two pumps sized at the peak wet weather flow to the station must be provided so that sufficient standby capacity is available when one pump is removed for repairs or experiences a mechanical failure. The pumps must be able to pass a minimum solid size of 3 inches without clogging. The shafts, seals and impellers must be constructed of wear resistant material such as Tungsten Carbide seals, Ni-Hard

impellers, and 316 stainless steel pump shafts to provide long life. For services where aggressive agents may be found in the sewage, such as at golf courses, complete stainless steel construction must be used, including the pump bowl, shaft, impeller, and motor housing.

The dry well houses the valves, pumps, motors and electrical controls. It must be well ventilated and provide unobstructed access to all equipment. A minimum 3-foot clearance from all obstructions must be provided. Greater clearances may be required for equipment with special maintenance needs. Provisions for equipment removal including hatches, large door openings, and hoists must also be provided.

The force mains must be selected to operate within a 3 feet per second to 5 feet per second velocity range, but shall not be smaller than 4-inches in diameter. Force mains shall be minimum 40 mil ceramic epoxy lined ductile iron pipe properly protected on the exterior.

The City shall have the sole responsibility to select either submersible pump stations or wet well/dry well pump stations. The pump stations shall be designed with easy access to all equipment. The National Electric Code classifies the wet wells of wastewater pumping stations as Class I, Group D, Division 1 facilities if ventilated at less than 12 air changes per hour, and Division 2 if continuously ventilated at 12 or more air changes per hour. Dry wells, which are physically separated from wet wells, if ventilated at less than 12 air changes per hour, are classified as Class I, Group D, Division 2 locations. Wet wells, and under certain circumstances dry wells, are considered confined spaces and should be entered in accordance with the corresponding requirements of Occupational Safety and Health Administration (OSHA).

All pump stations shall incorporate redundant control systems for operation of the pumps. A float system should be used as a backup for a primary control system that utilizes an ultrasonic device or a bubbler system for level measurement and pump operation.

Full SCADA telemetry equipment which includes a telephone dialer as a backup, must be provided at all sewer pump stations. When an alarm or failed condition occurs, the dialer must call pre-programmed telephone numbers in sequence until the call is acknowledged, indicating response will be provided by City staff. If the alarm or failed condition is not corrected within a set time, the dialer must call the pre-programmed numbers again. The dialer can also be used to remotely check the status of the station if desired.

The maintenance hole just upstream of the pump station and the maintenance access structure with the lowest rim elevation must be equipped with Smart Covers to notify the City staff of an impending problem when the wastewater level exceeds the level corresponding to peak wet weather flow.

An emergency power source shall be provided to operate the pump station during outages of the primary power source. Either an emergency power source or an engine operated bypass pump should be provided at each pump station.

Service criteria for sewer pump stations are summarized in Table 4-3.

Table 4-3
Sewer System Criteria

Collection System	
Minimum Pipe Size	8-inch
Minimum Velocity	2.0 ft/sec at average flow 3.0 ft/sec at peak flow
Pipe Depth to Diameter Ratio	0.50 for diameters 15 inches or less at peak dry weather flow 0.64 for diameters 18 inches or more at peak dry weather flow

Pump Stations	
Pumps	▪ Minimum 2 each sized at peak flow ▪ Minimum solids handling capacity 3"
Wet Wells	▪ Sized to limit pump cycling to less than 4 to 6 times/hr ▪ Provide sufficient storage at peak flow to allow response to a failure ▪ Equipment to be maintained must be accessible without entering structure
Ventilation	▪ 12 -air changes/hour minimum in dry well and as required by NFPA 820 ▪ 30-air changes/hour minimum in wet well if not operated continuously ▪ 12-air changes/hour minimum in wet well if operated continuously
Controls	Redundant system. Float operated back-up controls.
Emergency Power	Emergency power source or an engine operated bypass pump
Telemetry	Dialer system at all pump stations to alert personnel in the event of a station failure.
Force Mains	▪ Minimum velocity 3.0 ft/sec ▪ Maximum velocity 5.0 ft/sec ▪ Minimum size 4" ▪ Air/Vacs installed in vaults

4-7 Service Life of Pipe and Pump Station Equipment

In addition to the design criteria discussed in the previous subsections, the useful lives for which one can expect relatively trouble-free service is also of great importance when assessing an existing or future sewer system. Once the service life of a facility is exceeded, it becomes subject to failure and is often expensive to maintain. The determination of useful life can be difficult and depends on many different considerations including the following:

- Type of materials used and recorded performance of similar installations
- Construction methods and quality of installation
- Velocities and flow rates expected in the system
- Chemical and biological conditions of the wastewater

However, the values listed in Table 4-4 are generally accepted as prudent planning criteria and are used as benchmarks for replacement recommendations in this study.

Table 4-4
Planning Criteria for Facility Useful Life

Facility	Description	Useful Life (Years)
Gravity Sewers:	Cast Iron Pipe (cip)	20
	Plastic Pipe	60
	Vitrified Clay Pipe (vcp)	75
Force Mains:	Asbestos-Cement Pipe (acp)	30
	Ductile Iron Pipe (dip)	40
	PVC Pipe	30
Pump Stations:	Structure	60
	Piping	30
	Valving	20
	Mechanical	15
	Electrical	15

Section 5

EXISTING AND FUTURE WASTEWATER SYSTEM

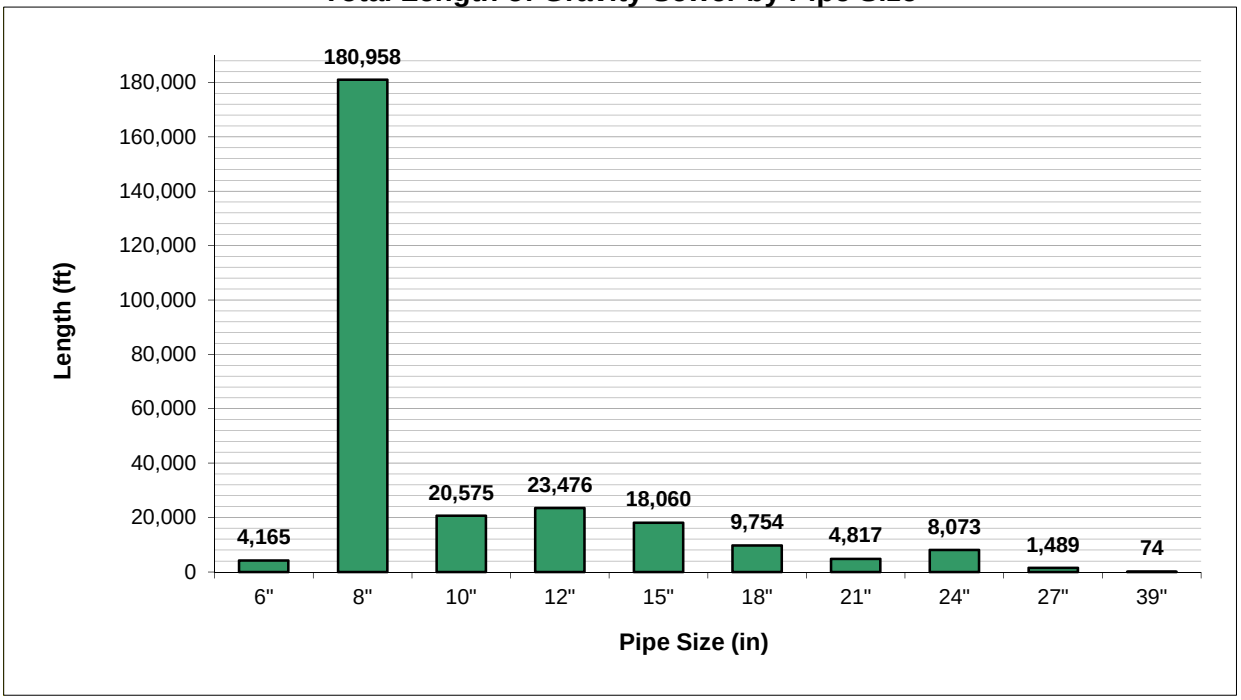
5-1 Existing Wastewater System

5-1.1 Gravity Sewers

The City's existing wastewater collection system is made up of a network of gravity sewers and nine sewer pump stations. The gravity system consists of approximately 51.4 miles of pipe and 1,100 maintenance access structures.

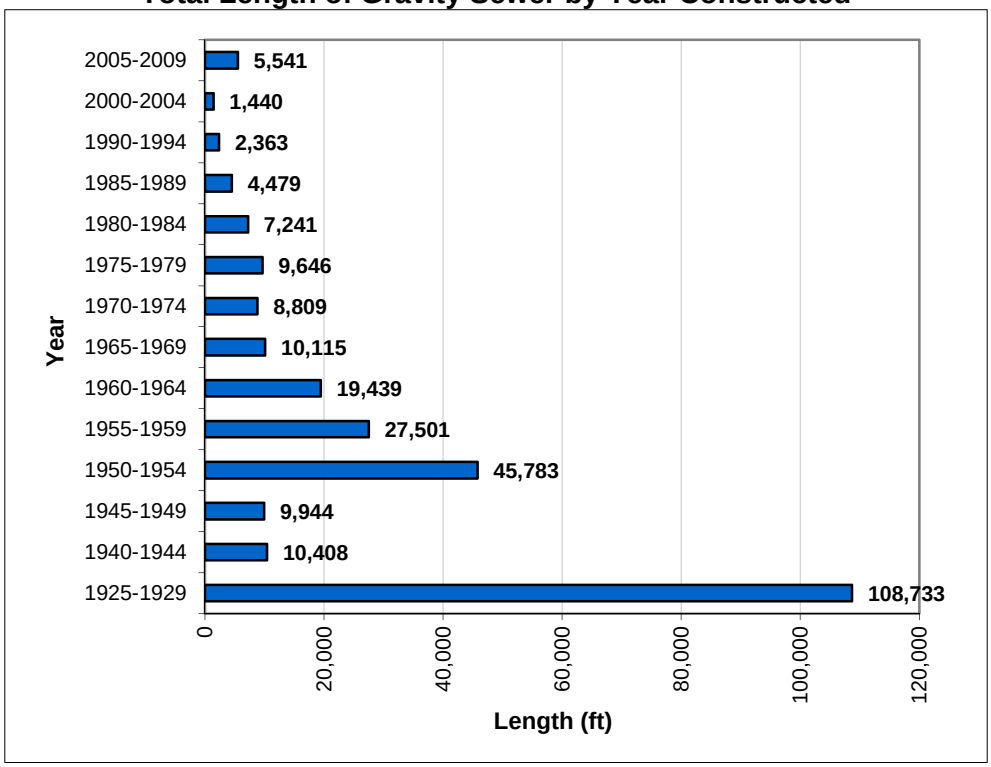
The majority of the gravity sewers are constructed of vitrified clay pipe with sizes ranging from 6-inch to 39-inch in diameter. Approximately 66 percent of the gravity sewers are 8-inches in diameter and over 99 percent of pipes are made of vitrified clay. Figure 5-1 shows a breakdown of the total length of gravity sewer by pipe size.

Figure 5-1
Total Length of Gravity Sewer by Pipe Size



The sewer system was constructed over the years based on development needs. Approximately 40 percent of the sewers were built in the late 1920's. The second largest development period occurred in the 1950's. Approximately 27 percent of the City's sewers were built between 1950 and 1959. Figure 5-2 shows the length of pipe constructed by year.

Figure 5-2
Total Length of Gravity Sewer by Year Constructed



Sepulveda Boulevard divides the City into two distinct collection systems. The area west of Sepulveda Boulevard is tributary to the City of Los Angeles Hyperion Treatment Plant. The area east of Sepulveda Boulevard is tributary to the County Sanitation District of Los Angeles County (CSDLC) sewer system. The drainage areas of these two collection systems are described in Subsection 5-2.

5-1.2 Drainage Areas

The City of El Segundo's wastewater collection system west of Sepulveda Boulevard and north of El Segundo Boulevard consists of nine (9) separate drainage areas as shown on Figure 5-3. Eight (8) of these areas include a sewer pump station. There is a 15-inch and a 24-inch trunk sewer located in Imperial Highway. The wastewater flows west in these trunk sewers to the Hyperion Outfall, which then conveys the flows directly to the Hyperion Treatment Plant.

Drainage Area 1 is pumped to the City of Los Angeles Hyperion Outfall. Sand Hill Drainage Area outlets to the Hyperion Outfall by gravity flow. Drainage Area 2 is pumped into Drainage Area 7 and all the flow is eventually pumped to the 24-inch trunk sewer in Imperial Highway. Drainage Area 5 is pumped to the 15-inch trunk sewer in Imperial Highway. Drainage Area 9 can be pumped to either Drainage Area 4 or 8. Drainage Area 4, 6, and 8 are pumped to a discharge point at the intersection of Oak Avenue and California Street. The flows are conveyed north to the 15-inch sewer in Imperial Highway.

Hyperion Outfall

Los Angeles International Airport

Hyperion Treatment Plant

City of Los Angeles

Chevron Refinery

PERSHING DR
IMPERIAL HWY
IMPERIAL AVE
I-105
SELBY ST
24"
15"
ACACIA AVE
WALNUT AVE
SYCAMORE AVE
MAPLE AVE
OAK AVE
PALM AVE
ELM AVE
PINE AVE
HOLLY AVE
MARIPOSA AVE
FRANKLIN AVE
ELSEY PL
EL SEGUNDO BLVD
SEPULVEDA BLVD
VISTA DEL MAR
DOCKWEILER
HYPERION
BINDER PL
DUNE ST
REDWOOD AVE
YUCCA ST
HILLCREST ST
LOMA VISTA ST
BAYONNE ST
CEDAR ST
CONCORD PL
PEPPER ST
CYPRESS ST
EUCALYPTUS DR
WHITING ST
VALLEY ST
VIRGINIA ST
MAIN ST
RICHMOND ST
STANDARD ST
ARENA ST
SHELDON ST
PENN ST
IRENE CT
MCCARTHY CT
LOMITA ST
SIERRA ST
SIERRA PL
MARYLAND ST
BUNGALOW DR
CENTER ST
NEVADA ST
OREGON ST
CALIFORNIA ST
KANSAS ST
WASHINGTON ST
ILLINOIS ST
INDIANA CT
INDIANA ST
PS 1
PS 2
PS 4
PS 5
PS 6
PS 7
PS 8
PS 9
PS 13
SH
1
2
4
5
6
7
8
9

N

0 400 800 1,600 Feet

1" = 1,400'

Legend

- Pump Station
- Sewer Maintenance Access Structure
- Gravity Sewer
- CSDLC Sewer
- Force Main
- City Boundary

- Drainage Area 1
- Drainage Area 2 (Tributary to Drainage Area 7)
- Drainage Area 4
- Drainage Area 5
- Drainage Area 6
- Drainage Area 7
- Drainage Area 8
- Drainage Area 9 (Tributary to Drainage Area 4)
- Sand Hill Drainage Area

CITY OF EL SEGUNDO
SECAP & RRP

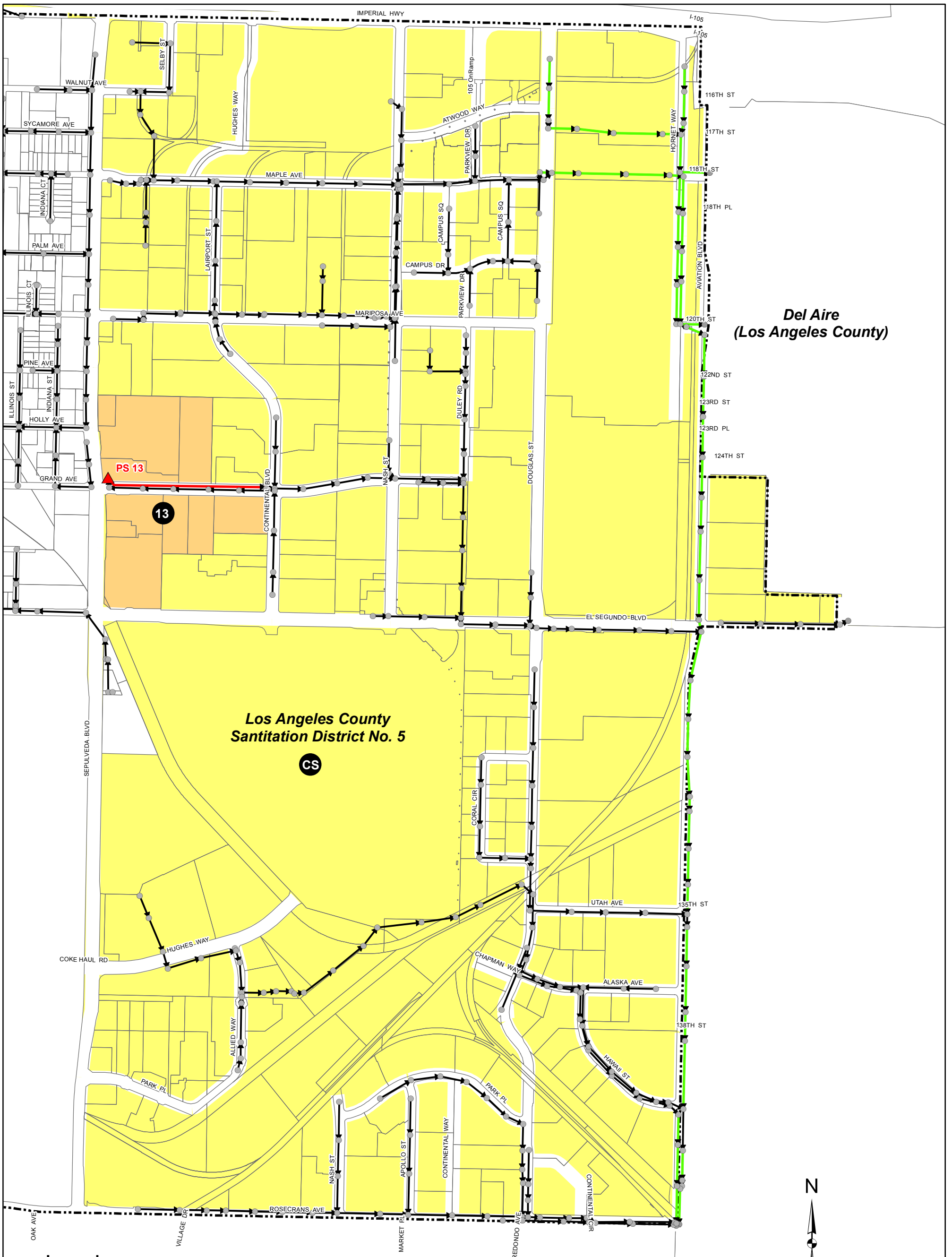
Sewer Drainage Areas (Northwest)

Figure 5-3

AKM

PROJECT NO: 1031266.00

DATE: December 2014


IMPERIAL HWY
I-105
I-105
SELBY ST
WALNUT AVE
HUGHES WAY
105 OnRamp
ATWOOD WAY
PARKVIEW DR
HORNET WAY
116TH ST
117TH ST
118TH ST
118TH PL
SYCAMORE AVE
INDIANA CT
MAPLE AVE
CAMPUS SQ
CAMPUS SQ
LAIRPORT ST
PALM AVE
CAMPUS DR
PARKVIEW DR
AVIATION BLVD
ILLINOIS CT
MARIPOSA AVE
120TH ST
PINE AVE
ILLINOIS ST
INDIANA ST
DULEY RD
122ND ST
123RD ST
123RD PL
HOLLY AVE
DOUGLAS ST
124TH ST
GRAND AVE
PS 13
NASH ST
CONTINENTAL BLVD
13
EL SEGUNDO BLVD
Los Angeles County
Santitation District No. 5
CS
SEPULVEDA BLVD
CORAL CIR
UTAH AVE
135TH ST
HUGHES WAY
COKE HAUL RD
CHAPMAN WAY
ALASKA AVE
138TH ST
ALLIED WAY
HAWAII ST
PARK PL
PARK PL
NASH ST
APOLLO ST
CONTINENTAL WAY
CONTINENTAL CIR
OAK AVE
VILLAGE DR
ROSECRANS AVE
MARKET PL
REDONDO AVE
Del Aire
(Los Angeles County)
Legend
Pump Station
Sewer Maintenance Access Structure
Gravity Sewer
CSDLC Sewer
Force Main
City Boundary
Drainage Area 13
CSDLC District No. 5
N
0
400
800
1,600
Feet
1" = 1,400'
CITY OF EL SEGUNDO
SECAP & RRP
Sewer Drainage Areas
(East)
Figure 5-4
PROJECT NO: 1031266.00
DATE: December 2014

East of Sepulveda Boulevard, the City land is within the CSDLC District No. 5 area. The City sewers generally convey wastewater flows east to the CSDLC trunk sewer in Aviation Boulevard. A small area east of Aviation Boulevard drains easterly along El Segundo Boulevard to CSDLC facilities. There is only one pump station, Sewer Pump Station No. 13, located east of Sepulveda Boulevard on Grand Avenue. Its drainage area can be seen in Figure 5-4 along with the rest of the City's service area east of Sepulveda Boulevard.

5-1.3 Drainage Areas West of Sepulveda Boulevard

Drainage Area SH (Sand Hill)

Drainage Area SH (Sand Hill) is located at the westerly end of the City, extending from Imperial Highway to El Segundo Boulevard. It consist of 161 acres of residential, open space, and commercial land uses (not including Chevron Refinery). The sewage generated in this area flows northerly and westerly by gravity, directly to the Hyperion Outfall. A portion of the Chevron Refinery, located south of El Segundo Boulevard and west of Sepulveda Boulevard, is tributary to the Sand Hill Drainage Area. Currently, the Chevron Refinery discharges about 48,455 gpd of biomass to the sewer in Whiting Street just north of El Segundo Boulevard. The 2014 Annual Quality Surcharge Fee Billing Information showed an average daily flow of 48,455 gpd. The administration building sewer lateral is also tributary to the sewer in El Segundo Boulevard and the Sand Hill drainage area. The wastewater from Drainage Area SH is measured at a Leopold Flume prior to discharge into the Hyperion Outfall.

Drainage Area 1

Drainage Area 1 is located generally west of Virginia Street, north of Palm Avenue, east of Sand Hill, and south of Imperial Highway. It covers 63 acres of residential land uses.

The tributary flow of Drainage Area 1 is conveyed to Pump Station No. 1, located on Acacia Avenue west of Loma Vista Street. It is then pumped north through a 6-inch ductile iron force main, along an easement to Imperial Highway. The force main discharges into the upstream maintenance access structure of the Hyperion Outfall.

Drainage Area 2

Drainage Area 2 extends from Concord Street to east of Lomita Street with El Segundo Boulevard to its south. It consist of 76 acres of residential, industrial, commercial and open space land uses. . It also encompasses a portion of the Smoky Hollow Specific Plan area.

The flow collected in Drainage Area 2 drain to Pump Station No. 2, located on Franklin Avenue west of Arena Street. The sewage is then pumped west through an 8-inch cast iron force main, along Franklin Avenue. The force main discharges into a Drainage Area 7 maintenance access structure located at the intersection of Franklin Avenue and Standard Street.

Drainage Area 4

Drainage Area 4 extends from Imperial Highway to El Segundo Boulevard west of Sepulveda Boulevard. It covers 105 acres of residential, commercial, and open space land uses. It also encompasses a portion of the Smoky Hollow Specific Plan area.

The sewers of Drainage Area 4 drain convey flow to Pump Station No. 4, located on Holly Avenue east of Kansas Street. The wastewater is then pumped through a 12-inch asbestos cement force main, west in Holly Avenue and north in California Street. The force main discharges into a maintenance access structure located at the intersection of California Street and Oak Avenue. From this point, the flow is conveyed north to the 24-inch trunk sewer in Imperial Highway.

Drainage Area 5

Drainage Area 5 consists of 183 acres of residential, commercial, public facility, and open space land uses generally south of Imperial Highway and west of Drainage Area 4.

The tributary flow of Drainage Area 5 is transported to Pump Station No. 5, located on Center Street north of Oak Avenue. It is then pumped north through a 10-inch cast iron force main, along Center Street. The force main discharges into a maintenance access structure located at the intersection of Center Street and Imperial Highway. A 15-inch gravity trunk sewer then conveys the flows west toward the Hyperion Outfall.

Drainage Area 6

Drainage Area 6 is located between Maple Avenue and Mariposa Avenue, mostly east of California Street. It covers 28 acres of residential land uses.

The sewers of Drainage Area 6 drain to Pump Station No. 6, located on Palm Ave east of California Street. The sewage is then pumped through a 6-inch steel force main, north in an easement and west in Oak Avenue. The force main discharges into a maintenance access structure located at the intersection of California Street and Oak Avenue. From this point, the flow is conveyed north to the 24-inch trunk sewer in Imperial Highway.

Drainage Area 7

Drainage Area 7 covers 370 acres of residential, commercial, industrial, public facility, and open space land uses in the central portion of the City's northwest quadrant. It also encompasses the 540 E Imperial Avenue Specific Plan Area and most of the Downtown Specific Plan area.

The tributary flow of Drainage Area 7 is conveyed to Pump Station No. 7, located on the southeast corner of Palm Avenue and Virginia Street. It is then pumped north through a 12-inch force main, along Virginia Street. The force main discharges into a maintenance access structure located at the intersection of Center Street and Imperial Highway. A 24-inch gravity trunk sewer then conveys the flows west toward the Hyperion Outfall.

Drainage Area 7 encompasses the old Drainage Area 12. Pump Station 12 was bypassed in 2003 with the construction an 8-inch sewer siphon in Oak Avenue (*Decommissioning of Pump Station Number 12 Siphon Conversion Plan, Job No. PW 03-02*).

Drainage Area 8

Drainage Area 8 is located generally between the alley west of Maryland Street and California Street north of El Segundo Boulevard. It covers 63 acres of residential, commercial, industrial, and public facility land uses. It also encompasses a portion of the Smoky Hollow Specific Plan area and the 222 Kansas Street Specific Plan area.

The wastewater generated by Drainage Area 8 flows to Pump Station No.8, located on Center Street north of Franklin Avenue. It is then pumped through an 8-inch ductile iron force main, north in Center Street and east in Oak Avenue. The force main discharges into a maintenance access structure located at the intersection of California Street and Oak Avenue. From this point, the flow is conveyed north to the 24-inch trunk sewer in Imperial Highway.

Drainage Area 9

Drainage Area 9 is located generally east of Oregon Street between Grand Avenue and El Segundo Boulevard. It also includes a triangular shaped parcel south of El Segundo Boulevard and east of Sepulveda Boulevard. It covers 35 acres of industrial and public facility land uses.

The sewage collected in Drainage Area 9 flows to Pump Station No. 9, located on Kansas Street north of El Segundo Boulevard. It is then pumped north through an 8-inch cast iron force main, along Kansas Street. The force main discharges into a Drainage Area 4 maintenance access structure located in Kansas Street between Franklin Avenue and Grand Avenue. At the intersection of Franklin Avenue and Kansas Avenue the force main splits in two directions, north and west (See Figure 5-3). Under normal operation, the sewage from Pump Station No. 9 is pumped to Drainage Area 4 as described above. The flow can be pumped west in Franklin Avenue to Drainage Area 8 in case of emergency or for construction purposes.

5-1.4 Drainage Areas East of Sepulveda Boulevard

Drainage Area 13

Drainage area 13 covers 42 acres of commercial land use east of Sepulveda Boulevard and north of El Segundo Boulevard.

The tributary flow of Drainage Area 13 is conveyed to Pump Station No. 13, located on the northeast corner of Sepulveda Boulevard and Grand Avenue. It is then pumped east through a 10-inch ductile iron force main, along Grand Avenue. The force main discharges into a maintenance access structure located on Grand Avenue west of Continental Boulevard. From this point, the wastewater flows are transported east and south to the CSDLC trunk sewers in Aviation Boulevard.

Drainage Area CS

Drainage Area CS covers about 1,223 acres of commercial, industrial, public facility, and open space land uses east of Sepulveda Boulevard.

The wastewater generated in Drainage Area CS is conveyed generally east by gravity through a network of City sewers to the CSDLC trunk sewers in Aviation Boulevard.

Table 5-1 lists characteristics of each of the sewer drainage areas within the study area.

5-1.5 City of Los Angeles Hyperion Treatment Plant

The wastewater generated by the nine drainage areas located in the northwest quadrant of the City drains to the City of Los Angeles Hyperion Treatment Plant. The Hyperion facility, located on 144 acres of land just west of the City of El Segundo and south of the Los Angeles International Airport, is the largest of the City of Los Angeles' four wastewater treatment plants. The plant treats most of the wastewater generated by Los Angeles residents and businesses as well as several other cities and unincorporated areas, including the City of El Segundo. The construction for full secondary treatment was completed in 1998. Today, the Hyperion facility has the capacity to treat up to 450 million gallons of sewage per day. The treated water is discharged to the Santa Monica Bay via an outfall that extends five miles off shore.

The City of El Segundo has an agreement with the City of Los Angeles that permits an average flow of 2.75 MGD of wastewater treatment and disposal capacity in the Hyperion system. The permitted peak flow is 7 cfs or approximately 4.5 MGD.

In order to ensure that the terms of the capacity agreement are met, the City wastewater tributary to the Hyperion system is measured at three connection points by either a flume or a venturi meter. The first connection point is located in Imperial Highway west of Hillcrest Street, on a Sand Hill trunk sewer. Here, the flow generated by Drainage Area SH is measured by a Leopold Flume. The second connection point is located in Imperial Highway west of Loma Vista. A venturi meter is used to measure the flow from Pump Station No. 1. The third connection point is also located in Imperial Highway west of Loma Vista, on the Imperial Highway Trunk Sewer. A Parshall Flume is used to measure the flow generated by the remaining Drainage Areas in the northwestern part of the City.

The flow measurement data from FY 2013-2014 is presented in Table 5-2. The average yearly flow to the Hyperion Treatment Plant was measured as 1.24 MGD. This is well below the capacity limit allowed (2.75 MGD).

Table 5-1
Drainage Area Characteristics

Drainage Area	Area (ac)	Land Uses	Boundaries	Sewer Cons. Dates	Comments
Northwest Side of City					
1	63	Residential	Imperial Hwy to north; Drainage Area 7 to east; Drainage Area 7 and SH to south; Drainage Area SH to west	1920's and 1950's	Wastewater at PS No. 1 is pumped north to Hyperion Outfall in Imperial Hwy
2	76	Residential; Industrial; Open Space	Drainage Area 7 to north; Drainage Area 8 to east; El Segundo Blvd to south; Drainage Area 7 and SH to west	Primarily 1920's	Wastewater at PS No. 2 is pumped west to Drainage Area 7
4	105	Residential; Commercial; Open Space	Imperial Hwy, Drainage Area 5 and 6 to north; Sepulveda Blvd to east; Drainage Area 9 to south; Drainage Area 5 and 8 to west	1940's and 1950's	Wastewater at PS No. 4 is pumped west and north to manhole at the intersection of California St and Oak Ave
5	183	Residential; Commercial; Public Facilities	Imperial Hwy to north; Drainage Area 4 and 6 to east; Drainage Area 8 to south; Drainage Area 7 to west	1940's and 1950's	Wastewater at PS No. 5 is pumped north to a trunk sewer in Imperial Hwy
6	28	Residential	Drainage Area 5 to north and west; Drainage Area 4 to south and east	1950's	Wastewater at PS No. 6 is pumped north and west to manhole at the intersection of California St and Oak Ave
7	370	Residential; Commercial; Industtrial; Public Facilities; Open Space	Imperial Hwy to north; Drainage Area 5 to east; Drainage Area 2 to south; Drainage Area 1 and SH to west	Primarily 1920's	Receives flows from PS No. 2. Wastewater at PS No. 7 is pumped north to a trunk sewer in Imperial Hwy
8	63	Residential; Commercial; Industrial; Public Facilities	Drainage Area 5 to north; Drainage Area 4 and 9 to east; El Segundo Blvd to south; Drainage Area 2 to west	1950's	Wastewater at PS No. 8 is pumped north and east to manhole at the intersection of California St and Oak Ave
9	35	Industrial; Public Facilities	Drainage Area 4 to north; Sepulveda Blvd to east; El Segundo Blvd to south; Drainage Area 8 to west	1950's	Wastewater at PS No. 9 is pumped north to Drainage Area 4
SH	161	Residential; Commercial; Open Space	Imperial Hwy to north; Drainage Area 1, 7 and 2 to east; El Segundo Blvd to south; City boundary to west	Primarily 1920's	All wastewater drains by gravity to the Hyperion Outfall in Imperial Hwy
Eastern Side of City					
13	42	Commercial	Drainage Area CS to north and east; El Segundo Blvd to south; Sepulveda Blvd to west	1970's	Wastewater at PS No. 13 is pumped east to Drainage Area CS
CS	1223	Commercial; Industrial; Public Facilities; Open Space	Imperial Hwy to north; Aviation Blvd to east; Rosecrans Ave to south; Sepulveda Blvd and Drainage Area 13 to west	1950's thru 1990's	All wastewater drains by gravity to the LACSD trunk sewers in Aviation Blvd

Table 5-2
Tributary Flow to Hyperion Treatment Plant

Month and Year	Imperial Highway Parshall Flume (gpd)	Sandhill Leopold Flume (gpd)	Pump Station 1 Venturi Meter (gpd)	Total (gpd)
Jul-13	1,077,419	138,065	109,525	1,325,009
Aug-13	1,042,581	135,161	95,137	1,272,879
Sep-13	1,021,000	134,667	104,209	1,259,876
Oct-13	1,019,032	128,387	101,518	1,248,937
Nov-13	1,002,333	124,667	91,644	1,218,644
Dec-13	997,097	151,613	142,305	1,291,015
Jan-14	987,742	137,097	96,214	1,221,053
Feb-14	988,929	141,786	106,911	1,237,625
Mar-14	942,581	145,484	105,088	1,193,153
Apr-14	984,333	139,333	104,062	1,227,729
May-14	977,742	123,548	93,782	1,195,072
Jun-14	993,333	95,000	102,193	1,190,526
Annual	**1,002,986**	**132,932**	**104,404**	**1,240,322**

5-1.6 County Sanitation District of Los Angeles County (CSDLC)

East of Sepulveda Boulevard, the City land is encompassed within the CSDLC District No. 5. The wastewater collected by City sewers in Drainage Areas 13 and CS, generally flow east to the CSDLC trunk sewers in Aviation Boulevard. The flow is then conveyed through the joint outfall system of District No. 5 to the Joint Water Pollution Control Plant (JWPCP) located in the City of Carson.

The JWPCP, the largest of the District's wastewater treatment plants, provides advanced primary and secondary treatment for up to 400 million gallons of sewage per day. The treated wastewater is disinfected with sodium hypochlorite and discharged to the Pacific Ocean through a network of outfalls that extend 1-1/2 miles off the Palos Verdes Peninsula to a depth of 200 feet.

5-2 Future Wastewater System

5-2.1 Future Developments

There are a few developments that plan to expand and/or begin new construction. These developments are listed in Table 5-3 and the locations are shown on Figure 5-5. The load estimates are from the specific sewer area studies approved by the City. Each study referred to the CSDLC sewage unit flow factors as the source of the load estimates.

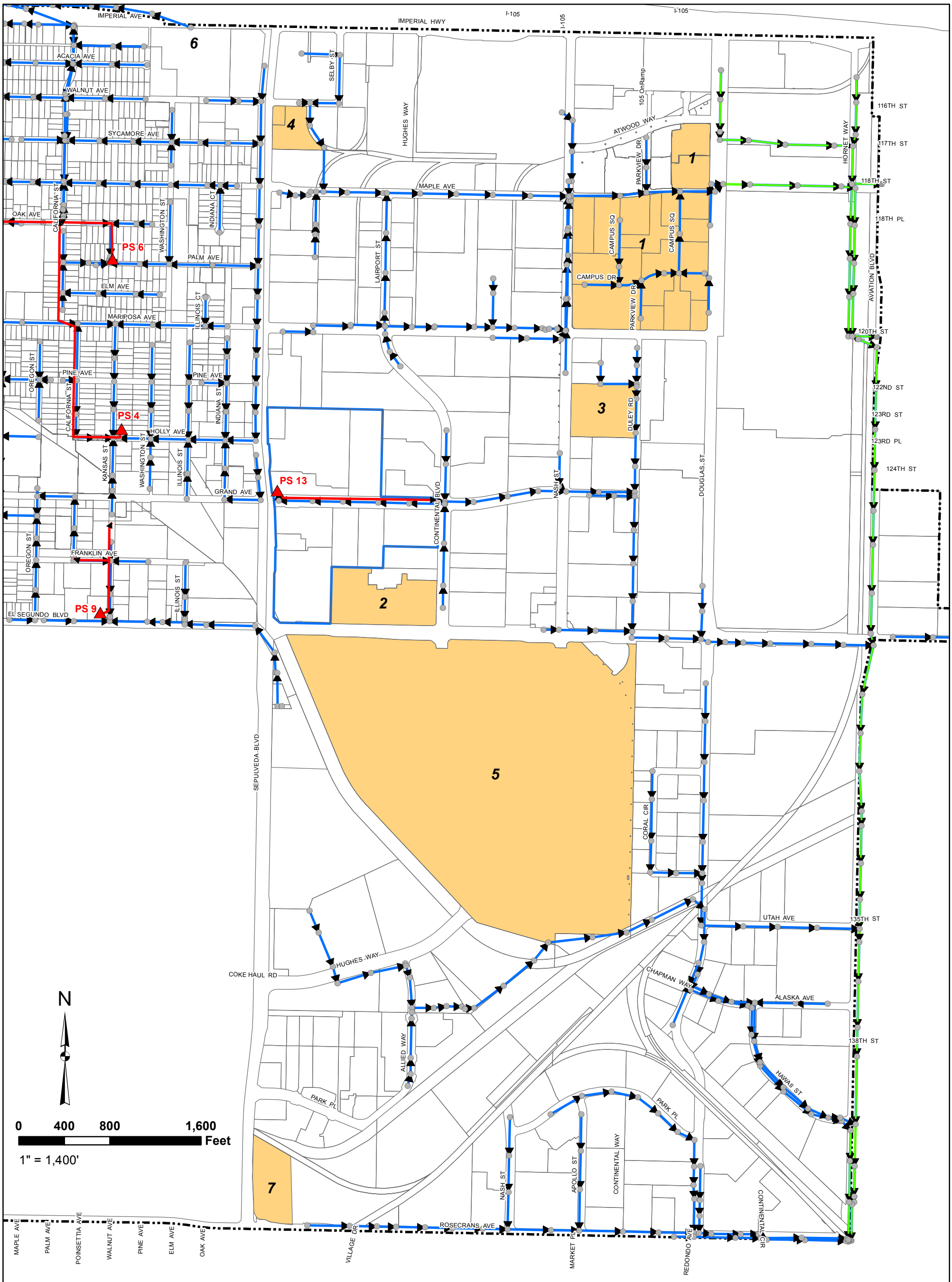
Table 5-3
Future Developments

No.	Project	Load added to MH ID in Model	Location	Address	Sewer Line Project is Tributary to	Existing Average Load (gpd)	Land Use	No. of Rooms	UFF (gpd/ rooms)	Bldg Area (tsf)	UFF (gpd/ tsf)	Proposed Additional Average Load (gpd)	Total Proposed Additional Average Load (gpd)	Source of Load Data	Status
1	Elevon at Campus El Segundo	CS-902	Douglas St and Campus Dr		15" sewer in Douglas St north of Maple	-							48,102 [1]	County Sanitation Districts of Los Angeles County Will Serve Letter (Oct. 13')	In Construction
2	Aloft Hotel	13-001	NW corner of El Segundo Blvd and Continental Blvd		15" sewer in Continental Blvd north of El Segundo Blvd	19,109	Hotel	167	130			21,710	22,521	Ratheon Campus Sewer Study (Dec 12')	Future
							Conference Room			0.57	150	85			
							Café			0.70	280	196			
							Bar Area			1.06	500	530			
3	Data Center	CS-082	East side of Nash St btw Mariposa Ave and Grand Ave	444 N Nash St	15" sewer in Duley Rd south of Mariposa Ave	-	Light Industrial			180	100	18,042	18,042	Ratheon Campus Sewer Study (Dec 12')	Future
4	888 N Sepulveda Blvd	CS-007	SE corner of Sepulveda Blvd and Walnut Ave	888 N Sepulveda Blvd	8" sewer in easement north of Maple Ave and west of Sepulveda Blvd	-	Hotel	190	150			28,500	29,286	888 N Sepulveda Blvd Sewer Study (July 13')	Future
							Sandwich Grill			1.20	280	336			
							Admin Offices			3.00	150	450			
5	Raytheon Campus	CS-145	South side of El Segundo Blvd btw Sepulveda Blvd and Douglas St	2100 E El Segundo Blvd	21" sewer in easement west of Douglas St, north of railroad	116,351	Office			1,750	200	349,919	407,761	Ratheon Campus Sewer Study (Dec 12')	Future
							Warehouse			76	25	1,898			
							Light Industrial			168	200	33,600			
							Commercial			149	150	22,344			
6	Boeing Company Building S50 Addition	5-914	South side of Imperial Ave, west of Sepulveda Blvd	1700 E Imperial Ave	8" sewer in Imperial Ave west of Sepulveda Blvd	10,117	Industrial						1,665 [2]	Boeing Company Building S50 Addition Sewer Study (Sept 13')	Constructed but wateruse data used in SECAP did not account for development.
7	The Point	CS-176	Northeast corner of Sepulveda Blvd and Rosecrans Ave	850 S Sepulveda Blvd	12" sewer in Roscrans Ave east of Sepulveda Blvd	-							29,404 [1]	County Sanitation Districts of Los Angeles County Will Serve Letter (Feb 14')	Future

Total 556,780

[1] Details of the project land use and load calculations were not provided in the Will Serve Letter

[2] Sewer study stated 322 existing fixture units and 53 proposed fixture units; proposed load = 10,117 gpd x (53/322) = 1,665 gpd



Legend

- Sewer Maintenance Access Structure
- Pump Station
- Gravity Sewers
- CSDLC Sewers
- Force Main
- City Boundary
- Future Development Area
  Site No. Matches Table 5-3

CITY OF EL SEGUNDO
SECAP & RRP

Future Developments

PROJECT NO: 1031266.00
DATE: December 2014

Figure 5-5

5-2.2 Future System Changes

The City completed the design of the Modification of Pump Station No. 1 and No. 7 in September 2011. The City has current plans to move forward with construction in 2015. The concept of the design is to bypass Pump Station No. 7 and divert all flows to Pump Station No 1. The key components of the design include the following:

1. Pump Station No.1 Improvements
   - Replace pumping equipment (1000 gpm pumps)
   - Replace existing valves and piping
   - Install new electrical service, control systems, and telemetry equipment above grade
   - Install 1000 gpm emergency diesel sewage pump that would operate when the primary pumping equipment or controls fail
   - Construct 18'x16'x18'-10" operational and emergency storage wet well
   - Construct new 10" force main from Pump Station No. 1, along Acacia Avenue, Loma Vista Street, and Imperial Avenue to the City of Los Angeles Hyperion Outfall in Imperial Highway
2. Former Pump Station No. 10 Wet Well Modifications
   - Concrete backfill portion of wet well
   - Turn pipe up for the upstream end of siphon that crosses under 7.5' W x 6.0' H storm drain. Old 10" force main and 12" overflow pipe will be converted into siphon facility.
3. Former Pump Station No. 11 Wet Well Modifications
   - Concrete backfill portion of wet well
   - Turn pipe up for the upstream end of siphon that crosses under 102" storm drain. Old 8" force main and 12" overflow pipe will be converted into siphon facility.
4. Construction of 12" siphon in Palm Avenue at Virginia Street to bypass flow from east under an existing 66" storm drain and bypass Pump Station No. 7

Once the project is completed, the City will have the ability to divert all flows currently pumped by Pump Station No. 7 to Pump Station No.1. Pump Station No. 7 can then be placed on stand-by and utilized in the case of an emergency.

There are several conditions that will need to be monitored very closely if this project is implemented as currently designed. It will have three (3) siphons between Pump Station No.7 and Pump Station No.1, which will require regular maintenance. The 8-inch sewer in Loma Vista Street north of Walnut Avenue, and in Acacia Avenue between Loma Vista Street and Pump Station No.1 is capacity deficient with the future flows if the flow is allowed into it at the Loma Vista Street/Walnut Avenue intersection. Lastly, the 18-inch sewer in the easement between Sycamore Avenue and Walnut Avenue has adverse slope and will create backwater in the upstream sewers. The sewers planned to be utilized for diverting the Pump Station No.7 flows to Pump Station No.1 should be studied in detail to eliminate as many of the siphons as possible, and mitigate the capacity

deficiencies that will result from this diversion. The alternative would be to upgrade Pump Station No.7 and its force main, and construct a scaled down improvement at Pump Station No.1.

Figure 5-6 illustrates the key components of the system and some of the critical points in the system that are of concern and should be monitored.

City of Los Angeles
Hyperion Outfall

IMPERIAL HWY

IMPERIAL AVE

Pump
Station
No. 1

Surcharge
Condition

Surcharge Condition

See Detail C

Adverse Slope
Future Capacity
Deficiency

ACACIA AVE

WALNUT AVE

SYCAMORE AVE

CONCORD PL

MAPLE AVE

PALM AVE

OAK AVE

LOMA VISTA ST

VIRGINIA ST

RICHMOND ST

See Detail B

Future
Capacity
Deficiency

See Detail A

Pump
Station
No. 7

Detail C

Surcharge Condition
Siphon
Remodel Old
Wetwell
Surcharge
Condition

Detail B

Siphon
Remodel Old Wetwell

Detail A

Siphon
Overflow

Legend

- Existing Sewer Maintenance Access Structure
- Existing Pump Station
- Exising Sewer to be Abandoned
- Existing Sewer
- Future Sewer
- Force Main

N

0 100 200 400 Feet

CITY OF EL SEGUNDO
SECAP & RRP

Modification of PS No. 1
and No. 7

PROJECT NO: 1031266.00

DATE: December 2014

Figure 5-6

Section 6

PUMP STATIONS

6-1 General

This section provides a detailed discussion of each of the City's pump stations. The design conditions, observed flows, and calculated flows are compared. Wet weather flows estimated based on the established criterion are used in evaluating whether or not each pump station has sufficient capacity. The wet weather flow includes an allowance of 25 percent above the peak dry weather flow. The average and peak dry weather flows are based upon the criteria discussed in Subsection 4-3. The analysis of the remaining aspects of the pump stations' design such as cycle times, wet well storage capacity, and force main velocity is based upon the criteria discussed in Subsection 4-7. Pump Station characteristics are summarized in Table 6-1.

6-2 Pump Stations

Pump Station No. 1

Pump Station No. 1 is located on the north side of Acacia Avenue, west of Loma Vista Street (625 West Acacia Avenue) as shown on Figure 6-1. It has a tributary area of approximately 63 acres, consisting of residential and open space land uses. It is a wet well – dry well type facility that was constructed in 1988. It has two 15 hp Wemco EVP 6x11M pumps with 10" diameter impellers. Wastewater is pumped approximately 400 feet north in an easement through a 6-inch ductile iron force main from Pump Station No. 1 to the Hyperion Outfall. The flows are discharged to Maintenance Access Structure T-029 in Imperial Highway. The dry well of pump Station No. 1 is shown on Figure 6-2.

Fig. 6-1. PUMP STATION NO. 1 SITE
In Acacia Avenue West of Loma Vista Street

The design information shows 300 gallons per minute (gpm) or 0.67 cubic feet per second (cfs) capacity at 30 feet of total dynamic head for each pump. The flow measurement conducted by AKM in 2010 showed pump capacities of about 340 gpm (0.76 cfs). The average wastewater flow tributary to the station, determined based upon SCADA data and City of Los Angeles flow meter records was 73 gpm. The peak dry weather flows is estimated at 136 gpm. The peak wet weather flow is estimated to be 170 gpm (0.38 cfs). The existing pump station has ample capacity to handle the estimated peak wet weather flow with one pump.

Table 6-1
Sewer Pump Stations

General Pump Station Information										Pump Specifications							Motor Specifications		Existing Flows						Future Flows					
Pump Station	Location	Date of Cons	Date of Recent Modifi-cation	Area Served (Acres)	Force Main Dia (in)	Force Main Length (ft)	Force Main Material	Type	Wet Well Dimensions	Number of Pumps	Pump Operating Levels (ft)		Pump Mfg	Pump Type	Pump Model	TDH (ft)	Estimated Flow Capacity (gpm)	RPM	HP	ADWF (mgd)		PDWF (mgd)		PWWF (mgd)		ADWF (mgd)		PDWF (mgd)		PWWF (mgd)	
											Start	Stop								mgd	gpm	mgd	gpm	mgd	gpm	mgd	gpm	mgd	gpm	mgd	gpm
Pump Station 1	Acacia Ave West of Loma Vista st	1988	-	63	6	400	DIP	Wetwell/ Drywell	11'-6"' x 6' x ~21'	2	4.1	1.8	WEMCO	Torque Flow	6x11M	30	300		15	0.104	73	0.196	136	0.245	170	0.528	367	1.056	733	1.319	916
Pump Station 2	Franklin Ave West of Arena St	1925	1996	76	8	625	DIP	Wetwell/ Drywell	18' x 8'-8" x ~11'	2	4.5	3.0	WEMCO		6x11M	42	700		25	0.153	106	0.283	196	0.353	245	0.153	106	0.342	237	0.427	297
Pump Station 4	Kansas St and Holly Ave	1964	2003	105	12	1,420	ACP	Wetwell/ Drywell	15' x 10' x ~7'-6"	2	7.4	4.8	ESSCO	Torque Flow	8x6x17VDPL	60	1500		75	0.199	138	0.453	315	0.567	394	0.199	138	0.549	381	0.686	476
Pump Station 5	Center St North of Oak Ave	1954	2004	183	10	1,780	CIP	Wetwell/ Drywell	15' x 8'-8" x 9'	2	4.8	2.8	WEMCO	Torque Flow	6x6x11M	41	800		25	0.194	135	0.383	266	0.479	333	0.194	135	0.464	322	0.580	403
Pump Station 6	Palm Ave between California St and Washington St	1953	2003	28	6	760	Steel	Wetwell/ Drywell	10' x 6' x ~13'	2	4.4	2.4	ESSCO	Torque Flow	6x12 VDPL	60	350	1750	25	0.047	33	0.080	56	0.100	70	0.047	33	0.097	67	0.121	84
Pumps Station 7	Virginia St and Palm Ave	1962	1996	370	12	2,460	CIP	Wetwell/ Drywell	10' x 7'-1" x ~9'-6"	2	5.0	2.2	WEMCO		6x11M	65	1350	1760	50	0.424	294	0.779	541	0.973	676	0.424	294	0.942	654	1.178	818
Pump Station 8	Center St North of Franklin Ave	1955	1995	63	8	3,630	DIP	Wetwell/ Drywell	10' x 6' x ~13'-2"	2	6.4	3.7	WEMCO		6x11M	65	500	1800	30	0.075	52	0.116	80	0.145	101	0.075	52	0.140	97	0.175	122
Pump Station 9	El Segundo Blvd and Kansas St	1957	1991	35	6	830	CIP	Wetwell/ Drywell	10' x 10' x ~13-6"	2	3.9	2.0	WEMCO		6x11M	52	425	1800	25	0.035	25	0.051	35	0.064	44	0.035	25	0.062	43	0.077	54
Pump Station 13	Grand Ave and Sepulveda Blvd	1972	2002	42	10	1,430	DIP	Wetwell/ Drywell	Rear 8.33' of 20' diameter structure	2	5.6	2.8	WEMCO	Torque Flow	6x6x11M	68	1250		60	0.125	87	0.200	139	0.249	173	0.125	87	0.241	168	0.302	210

Fig. 6-2. PUMP STATION NO. 1 DRY WELL

The existing 6-inch force main was constructed in 1988 when the pump station was replaced. It extends north through Acacia Park and an easement to Imperial Avenue, and terminates at a manhole 228 feet west of Loma Vista Street. The velocity through the existing force main is approximately 3.4 feet per second, which is in the desired range of 3 to 5 feet per second.

The existing wet well is 6 feet wide and 11.5 feet long (516 gallons per foot of depth), with a depth of approximately 21 feet. The existing operational band of 2.3 feet provides 1187 gallons of storage, which would limit pump cycling to 4.5 starts per hour with a single pump and 2.2 starts per hour when the two pumps are alternated. The influent sewer invert is 3 feet higher than the existing pump start level, which provides only 21 minutes of average dry weather flow storage above the operational band.

Most of the electrical equipment is located in the below ground dry well. The City will upgrade this pump station in 2015. The upgrade project has been designed to handle the wastewater flows that are currently tributary to Pump Station No.7 as well. The project will replace the existing pumps with two 1000 gpm capacity screw centrifugal pumps; add operational and emergency wet well capacity in Acacia Park just north of the existing pump station; provide above ground motor control center and pump station control panel at the south east corner of the park; construct a diesel engine operated 1000 gpm capacity standby pump to the west of the new motor control center; and a new 10-inch diameter forcemain along Acacia Avenue, Loma Vista Street, and Imperial Avenue. The new pump station capacity will be greater than the estimated peak wet weather flow from the tributary area of Pump Stations No.1 and No.7, and the velocity in the new force main will be 4.1 fps, which is in the desirable range.

Pump Station No. 2

Pump Station No. 2 is located on the north side of Franklin Avenue, west of Arena Street (327 Franklin Avenue), as shown on Figure 6-3. It has a tributary area of approximately 76 acres, consisting of industrial land uses (zoned small business) as well as multi-family residential areas. This pump station handles flows from Chevron as well. The total average dry weather flow tributary to the pump station is 105 gpm (0.24 cfs).

Pump Station No. 2 is a wet well – dry well type facility that was originally constructed in 1925, upgraded in 1976, and rehabilitated in 1996. It has two 25 hp Wemco EVP 6x11M pumps with 8-7/8" diameter impellers. The dry well is shown on Figure 6-4. Wastewater is pumped approximately 625 feet west in Franklin Avenue through an 8-inch ductile iron force main from

Fig. 6-3. PUMP STATION NO. 2 SITE

In Franklin Avenue West of Arena Street

Fig. 6-4 PUMP STATION NO. 2 DRY WELL

Pump Station No. 2 to Drainage Area 7. The wastewater is discharged to Maintenance Access Structure 7-134, located at the intersection of Franklin Avenue and Standard Street.

The design information shows 700 gpm (1.56 cfs) capacity at 42 feet of total dynamic head for each pump.

The peak dry weather and wet weather flows tributary to the station are estimated at 196 gpm (0.0.44 cfs), and 245 gpm (0.55 cfs). The pump station has ample firm capacity to handle the estimated peak wet weather flows. The existing 8-inch force main was constructed in 1976, replacing the previous 6-inch diameter force main. The velocity through the existing force main is approximately 4.5 feet per second, which is in the desired range of 3 to 5 feet per second. The force main should be planned for replacement with a ceramic epoxy lined ductile iron pipe. The existing force main should be rehabilitated and maintained as a redundant facility.

The existing wet well is 8.67 feet wide and 18 feet long (1167 gallons per foot of depth), with a depth of approximately 11 feet. The operating band of 1.5 feet (3.0 to 4.5 ft) can limit pump cycling to less than 4.1 starts per hour with the two pumps being alternated. Between the invert elevation of the

influent sewer and the pump start elevation, the wet well has additional volume to store 11 minutes of calculated average dry weather flow. This amount of storage is not adequate for responding to an emergency and pumping through the bypass system with a portable pump.

The existing pump station has a portable generator connection and manual transfer switch but not a separate engine driven bypass pump. The electrical and control equipment is below ground. The structure is 89 years old. It should be replaced with a new pump station incorporating above ground electrical and control system, either a separate engine driven bypass pump or a standby generator and an automatic transfer switch, and 10,000 gallons of emergency storage capacity. A smart cover is installed in the wet well. The most downstream, and the lowest maintenance access structures on the influent sewer should also be equipped with Smart Covers to notify the staff of an impending problem when the wastewater level rises above the peak wet weather flow depth.

Pump Station No. 4

Pump Station No. 4 is located on the north side of Holly Avenue, east of Kansas Street (400 Kansas Street). It has a tributary area of approximately 105 acres, but also receives wastewater flows from Pump Station No. 9 which has a tributary area of about 35 acres. The land uses include corporate office, general commercial, single family residential, multi-family residential, and industrial (zoned medium manufacturing). It is a wet well – dry well type facility that was originally constructed in 1964, modified in 1982, and upgraded in 2003. It has two 75 hp ESSCO 8x6x17VDPL pumps. Wastewater is pumped west in Holly Avenue and north in California Street through approximately 2,420 feet of 12-inch asbestos-cement forcemain from Pump Station No. 4 to Maintenance Access Structure T-001, located at the intersection of California Street and Oak Avenue.

The design information shows 1,500 gpm (3.34 cfs) capacity at 60 feet of total dynamic head for each pump. The average flow tributary to the pump station, based upon May 2014 SCADA records and City of Los Angeles flow meters, is 138 gpm (0.31 cfs). The peak dry weather and wet weather flows are estimated to be 315 gpm (0.70 cfs), and 394 gpm (0.88 cfs) respectively, including the pumped flow from Pump Station No. 9. The existing pump station's firm capacity is significantly greater than the calculated peak wet weather flow.

The 2003 upgrade replaced the pumps and motors with 75 hp ESSCO Torque Flow pumps; the suction and discharge pipes and valves; lined the wet well and dry well; added a permanent standby generator with an automatic transfer switch in Kansas Park; replaced the electrical and control equipment; and constructed an operational/emergency storage facility which provided 4,211 gallons per foot of additional storage. The new storage facility has about 20,000 gallons available above the operational band which will provide over 144 minutes of storage for average flows and 51 minutes for the peak wet weather flows.

With only one pump available, there is sufficient operational storage within the facility to limit pump starts to less than two per hour.

The existing 12-inch ACP force main should be planned for replacement with ceramic epoxy lined ductile iron pipe, as it has exceeded its expected useful life. The existing force main should be rehabilitated and maintained as a redundant force main.

Pump Station No. 5

Pump Station No. 5 is located on the west side of Center Street, north of Oak Avenue (735 Center Street). It has a tributary area of approximately 183 acres, consisting of residential, commercial and public facility land uses. The pump station was originally constructed in 1954, and upgraded in 1984 and 2004. It is a wet well – dry well type facility with two 25 hp Wemco EVP 6x11M pumps. Wastewater is pumped approximately 1,780 feet north in Center Street through a 10-inch cast iron forcemain. The forcemain discharges into Maintenance Access Structure 5-120, located in Imperial Highway.

The design information shows pump capacities of 800 gpm (1.78 cfs) at 41 feet of total dynamic head for each pump. The average and peak dry weather wastewater flows tributary to the station, determined based upon May 2014 SCADA and records and the City of Los Angeles flow meter records are 135 gpm (0.30 cfs), and 266 gpm (0.59 cfs), respectively. The peak wet weather flow is estimated to be 333 gpm (0.74 cfs). The pump station has ample firm capacity to handle the estimated peak wet weather flows.

The velocity through the existing 10-inch cast iron force main is approximately 3.3 feet per second, which is in the desired range of 3 to 5 feet per second. It was constructed in 1954, and should be planned for replacement with a ceramic epoxy lined ductile iron pipe. The existing force main should be rehabilitated and maintained as a redundant force main.

The existing wet well is 8.67 feet wide and 15 feet long (973 gallons per foot of depth), with an approximate depth of 9 feet. With an operating band of 2 feet (2.8 ft to 4.8 ft), one pump will cycle approximately 6 times per hour, and two pumps will cycle 3 times per hour if alternated. The pump station has minimal emergency storage. When the pump station is upgraded, it should be provided with 13,000 gallons of emergency storage above the operating band. It should be equipped with either a separate engine driven bypass pump or a permanent emergency generator and an automatic transfer switch. Currently, the pump station has a generator connection and manual transfer switch at the south east corner of Oak Avenue and Center Street.

Pump Station No. 6

Pump Station No. 6 is located on the north side of Palm Avenue, east of California Street (1465 East Palm Avenue), as shown on Figure 6-5. It has a tributary area of approximately 28 acres, consisting of single family residential and open space land uses. The facility was originally constructed in 1953, and upgraded in 1981 and 2003. It is a wet well – dry well type facility with two 20 hp ESSCO 6x12 VDPL pumps. Wastewater is pumped north in an easement and west in Oak Avenue through 760 feet of 6-inch steel force main. The force main discharges into Maintenance Access Structure T-001 located at the intersection of Oak Avenue and California Street

The flow measurements performed at the conclusion of the improvements to the pump station showed pump capacities of 250 gpm and 260 gpm for the two pumps. The average and peak dry weather wastewater flows tributary to the station, determined from May 2014 SCADA records and the City of Los Angeles flow meter data are 33 gpm (0.08 cfs), and 56 gpm (0.13 cfs), respectively. Based upon these flows, the peak wet weather flow is estimated to be 70 gpm (0.16 cfs). The pumps station has ample firm pumping capacity to handle the estimated peak wet weather flows.

Fig. 6-5. PUMP STATION NO. 6 SITE
In Palm Avenue East of California Street

The velocity through the existing 6-inch steel force main is approximately 4 feet per second, which is in the desired range of 3 to 5 feet per second. It was constructed in 1953, and should be planned for replacement with a ceramic epoxy lined ductile iron pipe. The existing force main should be rehabilitated and maintained as a redundant force main.

The existing wet well is 6 feet wide and 10 feet long (449 gallons per foot of depth), with a depth of approximately 13 feet. The operating band of 2 feet (2.4 ft to 4.4 ft) provides sufficient storage to limit pump cycling to less than four (4) per hour with a single pump, and less than 2 starts per hour with two pumps alternated. However, it does not have sufficient emergency storage. When the pump station is upgraded, it should be provided 3000 gallons of emergency storage above the operating band.

The pump station has a portable generator connection and a manual transfer switch. It should be equipped with either a separate engine driven bypass pump or a permanent emergency generator and an automatic transfer switch.

Pump Station No. 7

Pump Station No. 7 is located at the southeast corner of Palm Avenue and Virginia Street (640 Virginia Street), as shown on Figure 6-6. It has a tributary area of approximately 370 acres, but it also receives wastewater flow from Drainage Areas 2 with a tributary areas of approximately 76 acres. The land uses include commercial, residential, public facilities, and open space. Pump Station No. 7 was originally constructed in 1962 and modified in 1973 and 1996. It is a wet well – dry well type facility with two 60 hp Wemco EVP 6x11M pumps. The dry well of Pump Station No. 7 is shown on Figure 6-7. Wastewater is pumped approximately 2,460 feet north in Virginia Street

Fig. 6-6. PUMP STATION NO. 7 SITE
In Virginia Street south of Palm Avenue

through a 12-inch force main that discharges into Maintenance Access Structure T-022 in Imperial Highway.

The design information shows 1,400 gpm (3.12 cfs) capacity at 65 feet of total dynamic head for each pump. The average wastewater flow tributary to the station, determined from May 2014 SCADA information and the City of Los Angeles flow meter data is 294 gpm (0.66 cfs). The peak dry weather flow is 541 gpm (1.21 cfs). The peak wet weather flow is estimated to be 676 gpm (1.51 cfs). The pump station has ample firm capacity for the estimated peak wet weather flows.

The force main velocity with the design flows is 4.0 fps, which is within the desirable range of 3.0 to 5.0 fps. It is 52 years old, and should be replaced with a 12-inch diameter ceramic epoxy lined ductile iron pipe as a backup facility in case it needs to be used in lieu of diverting its flows to Pump Station No.1. The existing force main should be rehabilitated and maintained as a redundant facility.

The existing wet well is 7.08 feet wide and 10 feet long (524 gallons per foot of depth), with a depth of approximately 9.5 feet.

Within the 2.8 feet of operating band, a single pump would cycle over 15 times per hour, and two (2) pumps would cycle over 7 times per hour, which are excessive. If Pump Station No.7 is maintained as a permanent back-up facility, it should be upgraded with smaller capacity pumps (800 gpm). Because the tributary flows can be diverted to Pump Station No.1, a separate standby bypass pump or emergency storage are not necessary.

Fig. 6-7. PUMP STATION NO. 7 DRY WELL

Pump Station No. 8

Pump Station No. 8 is located on the west side of Center Street, north of Franklin Avenue (219 Center Street), as shown on Figure 6-8. The tributary area consists of approximately 63 acres of residential, industrial (zoned medium manufacturing) and public facility land uses. The station was originally constructed in 1955 and modified in 1961, 1974, and 1995.

It is a wet well – dry well type facility with two 30 hp Wemco EVP 6x11M pumps. The dry well of Pump Station No. 8 is shown on Figure 6-9. Wastewater is pumped north in Center Street and east in Oak Avenue through approximately 3,630 feet of 8-inch ductile iron force main from Pump Station No. 8 to Drainage Area 5. The flow is discharged into Maintenance Access Structure T-001 located at the intersection of Oak Avenue and California Street.

The design information indicates 500 gpm (1.11 cfs) capacity at 65 feet of total dynamic head and 1800 rpm for each pump. The average wastewater flow tributary to the station, based upon May 2014 SCADA records and the City of Los Angeles flow meter data is 52 gpm (0.12 cfs). The peak dry weather flow is 80 gpm (0.18 cfs), and the estimated peak wet weather flow is 101 gpm (0.23 cfs). The pump station has ample firm capacity to handle the estimated peak wet weather flows.

The existing wet well has a surface area of 60 square feet (450 gallons per foot). It has an operating band of 2.7 feet (1215 gallons of storage). One pump would start every 15 minutes if not alternated, and 30 minutes if alternated. The wet well has no additional storage below the invert elevation of the influent sewer.

Fig. 6-8. PUMP STATION NO. 8 SITE
In Center Street, north of Franklin Avenue

Fig. 6-9. PUMP STATION NO. 8
Pump No. 2 Suction and Discharge Piping

The pump station has a portable generator connection/manual transfer switch as well as a hydrant bypass connection, which can be used for bypass pumping with a portable pump. Either a separate engine driven bypass pump or a permanent emergency generator and an automatic transfer switch, as well as sufficient storage for a minimum of 90 minutes of average flow (4,700 gallons) should be provided in a new facility.

The pump station dry well structure has cracks throughout, as shown on Figure 6-10. It indicates a problem with either the original construction, or foundation problems, or both. The pump station should be replaced with a new facility.

When the pump station was upgraded in 1974, the ductile iron force main was not replaced. It is 59 years old, and should be planned for replacement with a 6-inch diameter ceramic epoxy lined ductile iron pipe. The existing force main should be rehabilitated and maintained as a redundant facility.

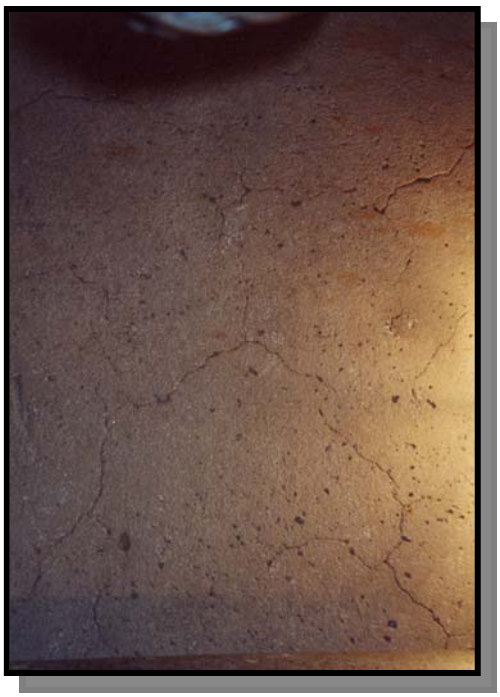


Fig. 6-10. PUMP STATIO NO. 8
Dry Well Wall Cracks

Fig. 6-11. PUMP STATION NO. 9 SITE
In Kansas Street North of El Segundo Blvd

Pump Station No. 9

Pump Station No. 9 is located on the west side of Kansas Street, north of El Segundo Boulevard (101 Kansas Street) as shown on Figure 6-11. It has a tributary area of approximately 35 acres, consisting of industrial (zoned medium manufacturing) and public facility land uses. The station is a wet well – dry well type facility that was originally constructed in 1957 and modified in 1962, 1977, and 1991 It has two 25 hp Wemco EVP 6x11M pumps. The dry well of the pump station is shown on Figure 6-12. Wastewater is pumped approximately 830 feet north along Kansas Street through an 8-inch cast iron force main from Pump Station No. 9 to Drainage Area 4. The flow is discharged into Maintenance Access Structure 4-040 located in Kansas Street just south of Grand Avenue.

Based upon design information, the pumps are capable of delivering 425 gpm (0.95 cfs) at 52 feet of total dynamic head and 1,800 rpm. The average flow tributary to the pump station, based upon May 2014 SCADA data and City of Los Angeles flow meter information, is 25 gpm (0.06 cfs). The peak dry weather flow was calculated at 35 gpm (0.08 cfs). The peak wet weather flow is estimated at 44 gpm (0.1 cfs). The pump station has ample firm capacity to handle the estimated peak wet weather flows.

Fig. 6-12. PUMP STATION NO. 9
Dry Well Pump No. 2 and Discharge Piping

The wet well is 10 feet wide and 10 feet long. With the operating band of 1.9 feet (2 ft to 3.9 ft), one pump will start every 44 minutes, if not alternated. While this is adequate operational storage, there is no emergency storage. When this pump station is upgraded, either a separate engine driven bypass pump or a permanent standby generator with an automatic transfer switch, as well as 2,300 gallons of emergency storage at should be provided.

The force main velocity at the design flow is 2.7 fps, which is less than the minimum desired velocity of 3.0 fps. When Pump Station No.9 was upgraded in 1977, the existing 8-inch cast iron force main was not replaced. It is 57 years old, and has exceeded its useful life. It should be planned for replacement with a smaller ceramic epoxy lined ductile iron pipe. The existing force main should be rehabilitated and maintained as a redundant facility. Pump capacities should be re-evaluated at that time.

Fig. 6-13. PUMP STATION NO. 12 SITE
In Oak Avenue west of Main Street

Pump Station No. 12

Pump Station No. 12 was located on the north side of Oak Avenue, west of Main Street (117 West Oak Street) as shown on Figure 6-13. It had a tributary area of approximately 79 acres, consisting of residential, commercial, and open space land uses. It is was a submersible pump station that

was originally constructed in 1962 and modified in 1974 and 1987. An 8-inch diameter single barrel siphon and a 12-inch air jumper was constructed along Oak Avenue, and the pump station was removed from service in 2003.

Pump Station No. 13

Pump Station No. 13 is located on the northeast corner of Sepulveda Boulevard and Grand Avenue (300 North Sepulveda Boulevard). It has a tributary area of approximately 42 acres. This drainage area consists of corporate offices. It is a wet – dry well type facility that was originally constructed in 1972 and upgraded in 1981 and 2002. It has two 60 hp Wemco EVP 6X11M pumps. Wastewater is pumped approximately 1,430 feet east in Grand Avenue through a 10-inch ductile iron force main. The force main discharges to Maintenance Access Structure CS-065, located on Grand Avenue west of Continental Boulevard.

Based upon field testing of the constructed facility, the pumps are capable of delivering 1,530 gpm (3.41 cfs) at 60 feet of total dynamic head.

The average flow tributary to the pump station, based upon May 2014 SCADA data is 87 gpm (0.20 cfs). The peak dry weather flow is 139 gpm (0.31 cfs). Corresponding peak wet weather flow is estimated to be 173 gpm (0.39 cfs). The pump station has ample firm capacity to handle the estimated peak wet weather flows.

The velocity through the existing 10-inch force main is approximately 5 feet per second, which is in the desired range of 3 to 5 feet per second. It is over 40 years old. When the pump station is upgraded, the pump capacities should be re-evaluated and the force main should be replaced. The existing force main should be rehabilitated and maintained as a redundant facility.

The existing structure has a diameter of 20 feet and a depth of 22 feet. The wet well occupies rear 8.33 feet of the structure below elevation 90.5, which provides 925 gallons of storage per foot. With its operating band of 2.8 ft (2.8 ft to 5.6 ft), it has 2590 gallons of storage. With peak dry weather flows, one pump will start every 20 minutes, and two pumps will start every 40 minutes. It has approximately 30 minutes of average dry weather flow storage between the pump start level and the invert elevation of the influent sewer.

The on-site 150 kW diesel generator with an automatic transfer switch was added in 2002 to operate the pump station in case of a commercial power outage.

Section 7

HYDRAULIC SEWER MODEL

7-1 Hydraulic Model Software

To perform a detailed analysis of the sewer collection system, it is essential to create a mathematical model that is capable of simulating the operating characteristics of the system. The simulations for this study were performed utilizing InfoSewer, which is a GIS based computer program with the ability to perform steady state analyses of the flows in sanitary sewer systems. The program also manages and maintains the database that stores the sewer analysis input and output results. Manning's Equation is used for depth of flow calculations in the gravity sewer pipes.

The sewer system is modeled by entering pipe diameters, lengths, grades, and roughness coefficients as well as land use classifications. The sewer model includes all of the City's existing manholes, sewer pipes (excluding laterals, private sewers, and sewers belonging to other agencies), pump stations, large point source flows, and tributary area boundaries. The model identifies points of connection to regional facilities, belonging to the City of Los Angeles or the County Sanitation District of Los Angeles County (CSDLC).

The model uses the average dry weather flows and determines peak flows based upon relationships specified by the user. Pumped flows and measured flows can be entered at any manhole as a fixed flow.

At the completion of a modeling run, output data is created for viewing on the screen or for printing. Output data for pipes include average and peak flow rate, velocity, pipe capacity, and ratio of flow depth to pipe diameter (d/D). The model input and results are provided in tabular form in Appendix 1 and 2.

7-2 Construction of Model Geometry

Information gathered from the City's latest sewer GIS files, atlas sheets, as-built drawings and interviews with City staff was used to create the model geometry of the existing system. All active sewers owned by the City of El Segundo were included in the hydraulic model. Table 7-1 is a list of the information that was imported into the model from the existing GIS. As-built drawings were used to supplement the sewer GIS when information was found to be missing and for the newer sewers that had not yet been input into the sewer GIS.

Pump stations and force main geometry were input into the hydraulic model based upon as-built drawings and provided pump information.

Detailed system maps are provided in Appendix 3.

Table 7-1
Data Imported from GIS Files to Hydraulic Model

Node Data	Manhole Shapefile Field Title
Unique ID	MH_ID
Rim Elevation (ft)	RIM_ELEV
Invert Elevation (ft)	US_INV_EL
Pipe Data	**Gravity Mains Shapefile Field Title**
Unique ID	PIPE_ID
Upstream Node ID	US_MH_NO
Upstream Invert Elevation (ft)	US_INV_EL
Downstream Node ID	DS_MH_NO
Downstream Invert Elevation (ft)	DS_INV_EL
Pipe Size (in)	DIA_NUM
Pipe Length (ft)	LENGTH

7-3 Split Manholes and Flow Patterns

From the existing sewer GIS and sewer atlas sheets, 20 split manholes (more than one pipe exiting the manhole) were identified in the collection system. Many of these split manholes are located at summits in the upstream portions of the system. Some split manholes were further investigated by City staff due to their potential significance on the hydraulic model results. Details of the more significant split manholes are shown in Table 7-2.

7-4 Model Loads

General

Data collection and review is essential in developing unit flow factors, calibrating the system model, and estimating the average day and peak flows of the system. Often, flow meters are installed for purposes of developing unit flow factors and peaking factors. This method was conducted for the 2002 Sewer Master Plan and resulted in overly conservative factors. A different approach was utilized for this study.

In the 2002 Sewer Master Plan study, flow monitoring data was used to develop unit flow factors and a dry weather peaking factor that the hydraulic model was in turn based upon. The unit flow factors and peaking factor was applied to the system citywide. Over the past 12 years, it has been determined through additional flow monitoring and studies that the loads estimated in the hydraulic model are overly conservative.

Table 7-2
Split Manhole Information

Manhole ID	Location	Description of Flow Paths
1-022	Imperial Ave. West of Virginia St.	Manhole at summit
1-041	Palm Ave and Loma Vista St	Two channels in MH 1-041; Flow from west continues north to MH 1-042; Flow from south continues west to MH 7-173
2-039	Easement between Main St and Richmond St, North of El Segundo Blvd	Manhole at summit
4-005	Sycamore Ave West of Sepulveda Blvd	Manhole at summit
4-009	Palm Ave West of Sepulveda Blvd.	Manhole at summit
5-017	Pine Ave and Maryland St	All flow diverted east to MH 5-018; Pipe to north is overflow pipe
5-022	Mariposa Ave east of Nevada St	Manhole at summit
7-004	Lomita St North of McCarthy Ct	Manhole at summit
7-021	Maple Ave and Sheldon St	Two channels in MH 7-021; Flow from west continues south to MH 7-043; Flow from east continues north to MH 7-022
7-084	Pine Ave and Lomita St	All flow diverted north to MH 7-085; Pipe to west is overflow pipe
7-130	Main St and Franklin Ave	All flow diverted east to MH 7-132; Pipe to south is overflow pipe
7-132	Alley east of Main St and Franklin Ave	All flow diverted east to MH 7-133; Pipe to south is overflow pipe
12-054	Maple Ave and Concord Pl	All flow diverted east to MH 12-055; Pipe to west is overflow pipe
12-057	Maple Ave and Eucalyptus Dr	All flow diverted west to MH 12-058; Pipe to south is overflow pipe
13-004	Grand Ave and Continental Blvd	All flow diverted north to MH CS-068; Pipe to west is overflow pipe
SH-046	Grand Ave and Continental Blvd	All flow diverted north to MH CS-068; Pipe to west is overflow pipe
SH-066	Walnut Ave and Hillcrest St	Manhole at summit
SH-067	Sycamore Ave West of Loma Vista St	Manhole at summit
SH-069	Maple Ave West of Loma Vista St	Manhole at summit
SH-075	Palm Ave West of Loma Vista St	Manhole at summit

For this study, a combination of the following information was utilized to estimate the sewage loads and distribute the loads for each drainage area:

- Permanent flow meter data (2013-2014) at the connections to the City of Los Angeles trunk sewer (Imperial Highway Parshall Flume, Sand Hill Leopold Flume, and Pump Station No. 1 Venturi Meter).
- SCADA data at pump stations (wet well levels, pump on/off times) and pump station plans (wet well geometry)
- Water meter billing data linked to the parcel map

Load Allocation/Distribution

Water billing data (excluding irrigation water, fire water, and construction water) was linked to the City's parcel map. Theissen polygons were created around each sewer manhole. The water data was then allocated to the sewer model manholes. This provided the most accurate spatial distribution of the water use and subsequently sewage generation throughout the system. The allocated water use was decreased to represent sewage generation by matching lift station inflow and the permanent flow meter data (2013-2014).

Existing Average Dry Weather Flows (ADWF)

The three permanent flow meters provided information on the average flows for the westerly portion of the City's sewer system, as shown in Table 5-2.

The Pump Station No. 1 flow meter measures an average of 104,404 gpd of sewage. The loads for this drainage area was set to match this measurement.

The Sand Hill flow meter measures an average of 132,932 gpd of sewage. The Chevron Refinery contributes a large amount of sewage to the Sandhill drainage area at MH SH-007 (El Segundo Boulevard at Whiting Street). The bi-product from a treatment plant located on the Chevron facility is discharged to the City's sewer system at this location. Based on the 2014 Annual Quality Surcharge Fee Billing Information, an average daily flow of 48,455 gpd was applied at MH SH-007 to represent this load on the City's sewer system.

The sewage loads in the County Sanitation (CS) drainage area were set at 90 percent of the average water use, assuming minimal irrigation and outside water use.

The Imperial Highway flow meter measures an average of 1,002,986 gpd of sewage. Drainage Areas 2, 4, 5, 6, 7, 8, and 9 are tributary to this flow meter, as well as the Embassy Suites Hotel and Boeing Facility on Imperial Highway. The total flow minus the Embassy Suites and Boeing Facility sewage generation is estimated at 939,401 gpd. The influent flow to each of the associated pump stations was calculated utilizing the SCADA data (May 2014) and pump station plans. A percentage of the total flow was then assigned to each drainage area. The model average loads for each drainage area was then based on the total sewage generation of 939,401 gpd and the percentage calculated. The average load calculations for the drainage areas tributary to the Imperial Highway flow meter are shown in Table 7-3.

Table 7-3
Average Load Calculations for Drainage Areas
Tributary to Imperial Highway Flow Meter

Pump Station	Influent Flow Calculated for May 2014 (mgd)	Percentage of Total Flow to Imperial Hwy Flow Meter May 2014 (%)	Average Flow Input into Hydraulic Model (mgd)	Comments
2	153,648	16.2	152,540	
4	164,448	17.4	163,262	Excludes PS 9 flows which are tributary to PS 4
5	195,840	20.7	194,428	Pumped to 15" line in Imperial
6	47,520	5.0	47,177	
7	273,456	28.9	271,484	Excludes PS 2 flow which are tributary to PS 7
8	75,600	8.0	75,055	
9	35,712	3.8	35,454	
Total	**946,224**	**100.0**	**939,401**	**Total ADWF of PS 2,4,5,6,7,8,&9**
			1,002,986	**Total ADWF at Sand Hill Meter**

Future Average Dry Weather Flows (ADWF)

The future development loads shown in Table 5-3 were added to the existing system loads to create the future system loads and hydraulic model scenario.

Load Fields

In the model, the loads were generally assigned to fields by drainage area:

Load 1: Pump Station No. 1 Drainage Area
Load 2: Pump Station No. 4 Drainage Area
Load 3: Pump Station No. 5 Drainage Area
Load 4: Pump Station No. 6 Drainage Area
Load 5: Pump Station No. 2 and 7 Drainage Area
Load 6: Pump Station No. 8 Drainage Area
Load 7: Pump Station No. 9 Drainage Area
Load 8: Pump Station No. 13 Drainage Area
Load 9: Sand Hill Drainage Area
Load 10: County Sanitation District Drainage Area and Chevron Facility

Peak Dry Weather Flows (PDWF)

Peak dry weather flows are calculated in the model by a user defined relationship. The peaking formula used in the sewer model is as follows:

$$PDWF = a \times ADWF^{0.92}$$

Where PDWF = Peak Dry Weather flow in mgd

ADWF = Average Dry Weather flow in mgd

a = coefficient

Peaking factors were developed for each drainage area based on the influent flow calculations at the pump stations and/or the flow meter information. The resultant calculated existing coefficient "a" for each drainage area is shown in Table 7-4.

Due to the fact that this calculation is based upon limited data, the coefficient is increased by 10 percent for planning purposes. The increased coefficient is shown in Table 7-4 as the "adjusted existing coefficient". This coefficient was used for the existing conditions hydraulic analysis.

An additional 10 percent was added to the "adjusted existing coefficient" to calculate the "adjusted future coefficient". This coefficient was used for the future conditions hydraulic analysis. This factor accounts for any unaccounted for vacancies and variations in future land use types. It is recommended that the City track any changes in land use, particularly in the commercial/industrial areas of the City, so that high water users and sewage generators can be accounted for and potential capacity deficiencies identified.

The CS drainage area consists of entirely commercial and industrial land uses. The wateruse and sewage generation is very different from the northwest portion of the City. The weekend flows are much less than the weekday flows in most cases due to the fact that the working population is significantly lower on the weekends. Based on a review of recent sewer studies and associated flow monitoring data, the peaking formula used for the CS drainage area is PDWF = 3.0 x ADWF. This will represent a typical 8 hour working period. It will be conservative in most cases in the drainage area but will account for any unaccounted for vacancies and variations in future land use types.

Table 7-4
Peaking Coefficient "a"

Drainage Area or Sewer	ADWF (mgd)	PDWF (mgd)	[1]Calculated Existing Coefficient "a"	[2]Adjusted Existing Coefficient "a"	[3]Adjusted Future Coefficient "a"	Primary Land Use	Notes
1	0.0893	0.1699	1.57	1.73	1.90	SFR, MFR	Based on influent flow calculation at PS 1
2	0.1536	0.2844	1.59	1.75	1.93	Commercial, Industrial	Based on influent flow calculation at PS 2
4	0.2002	0.4565	2.01	2.21	2.43	SFR, MFR, Commercial	Based on influent flow calculation at PS 4
5	0.1958	0.3859	1.73	1.90	2.09	SFR, MFR, Public Facility	Based on influent flow calculation at PS 5
6	0.0475	0.0806	1.33	1.46	1.61	SFR	Based on influent flow calculation at PS 6
7	0.4320	0.7920	1.71	1.89	2.07	SFR, MFR, Commercial, Public Facility	Based on influent flow calculation at PS 7
8	0.0756	0.1166	1.25	1.38	1.52	MFR, Industrial, Public Facility	Based on influent flow calculation at PS 8
9	0.0360	0.0518	1.10	1.21	1.34	Industrial	Based on influent flow calculation at PS 9
13	0.1251	0.1993	1.35	1.48	1.63	Corporate Office	Based on influent flow calculation at PS 13
CS	-	-	-	-	-	Commercial, Industrial	A peaking factor of 3 was implemented in the CS drainage area, representing an 8 hour operation for the industrial area. PDWF=3xADWF
SH	-	-	1.71	1.89	2.07	SFR, MFR	Applied Drainage Area 7 coefficient to SH Drainage Area due to similar land use type; Chevron Treatment Plant Discharge is not peaked
Imperial 15"	0.2630	0.4970	1.70	1.87	2.05	Mixed	Based on flow data provided in *Boeing Company Building S50 Addition Sewer Study* dated Sept. 2013
Imperial 24"	0.9990	2.0800	2.08	2.29	2.52	Mixed	Based on flow data provided in Boeing Company Building S50 Addition Sewer Study dated Sept. 2013

[1] Calculated existing coefficient = PDWF / (ADWF)$^{0.92}$

[2] Adjusted existing coefficient = calculated existing coefficient x 1.10

[3] Adjusted future coefficient = adjusted existing coefficient x 1.10

Section 8

SYSTEM ANALYSIS

8-1 Existing and Projected Sewage Generation

Approximately 2.66 mgd of sewage is generated in the City's existing sewer service area. A total of 1.17 mgd is conveyed to the City of Los Angeles Hyperion Outfall in Imperial Highway. The tributary area is primarily the area of the City located west of Sepulveda Boulevard, including the Chevron facility. A total of 1.49 mgd is conveyed to the CSDLC trunk sewers in and adjacent to Aviation Boulevard. The tributary area is primarily the area of the City located east of Sepulveda Boulevard.

The future sewage loads include the future developments shown in Table 5-3 and on Figure 5-5. The total City sewage generation is estimated at 3.23 mgd. The total conveyed to the City of Los Angeles Hyperion Outfall increases to 1.18 mgd. The total conveyed to the CSDLC trunk sewers increased to 2.05 mgd.

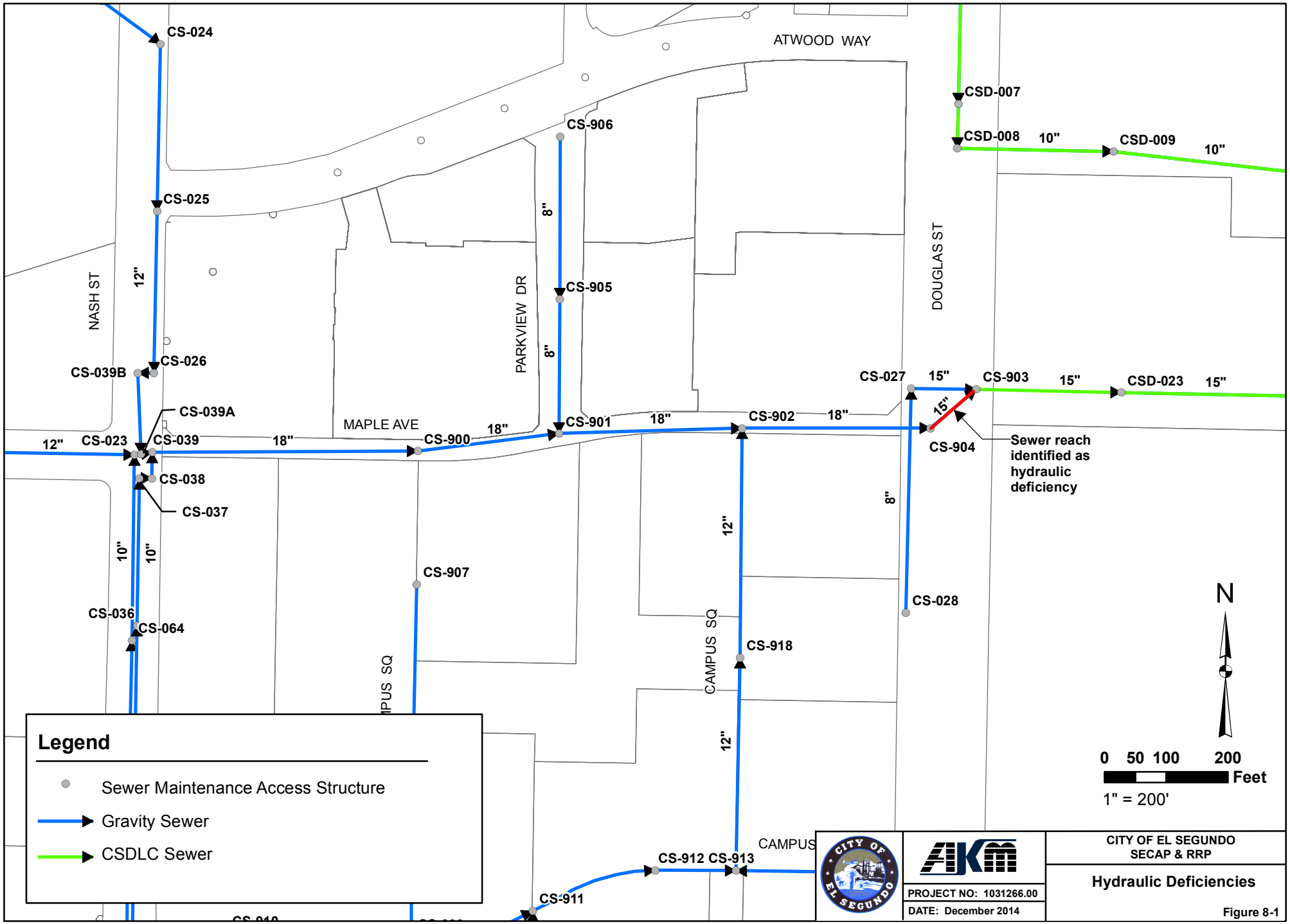
8-2 Existing and Future System Capacity Analysis

Gravity System

The analysis of the City's existing gravity sewer system was based upon the calculated peak dry weather flows. Any segment of sewer pipe with a depth to diameter ratio (d/D) of 0.64 or more was considered a hydraulic deficiency. This allows for 25 percent above the peak dry weather flow for inflow and infiltration (based upon the fact that the full capacity of a circular pipe is the same as when d/D = 0.82).

Only one sewer reach was identified as capacity deficient under existing or future loading conditions and with the existing system geometry (Pump Station No. 7 still in operation). The deficient reach is located in the CS Drainage Area on the east side of the City and tributary to the CSDLC system. It is a 15-inch pipe located in Douglas Street at Maple Avenue (MH CS-904 to MH CS-903), as shown on Figure 8-1. It is the last reach owned by the City prior to entering into the CSDLC 120th Street Extension No. 2 Trunk Sewer. Per the sanitary sewer improvement plans for Tract No. 53570, the sewer in Maple Avenue from Nash Street to Douglas Street are 18-inches in diameter at a slope of 0.0135. At Manhole CS-904, the pipe is downsized to 15-inches in diameter with the same slope of 0.0135. The reason for downsizing the pipe is unknown at this time. It is possible that CSDLC would not allow the City to connect a pipe larger than their trunk sewer.

The hydraulic analysis resulted in an existing d/D ratio of 0.69 and a future d/D ratio of 0.80 for the 15-inch pipe from MH CS-904 to MH CS-903 (see Appendix 1 & 2). The Elevon at Campus El Segundo development is under construction and is planned for completion in 2015. This is the primary reason for the expected increase in flows and the d/D ratio. It is recommended that the City conduct temporary flow monitoring at MH CS-904 after the completion of The Elevon at Campus El Segundo development. If the flows and depths are confirmed, it is recommended that this pipe be replaced with an 18-inch pipe.


CS-024
ATWOOD WAY
CSD-007
CSD-008
10"
CSD-009
10"
CS-906
CS-025
8"
DOUGLAS ST
NASH ST
12"
PARKVIEW DR
CS-905
8"
CS-039B
CS-026
CS-027
15"
CS-903
15"
CSD-023
15"
CS-039A
MAPLE AVE
18"
CS-901
18"
CS-902
18"
15"
12"
CS-023
CS-039
18"
CS-900
18"
CS-904
Sewer reach identified as hydraulic deficiency
CS-038
CS-037
8"
12"
10"
10"
CS-907
CS-028
CS-036
CS-064
CAMPUS SQ
CS-918
12"
CAMPUS
CS-912
CS-913
CS-911
N
0 50 100 200
Feet
1" = 200'
Legend
Sewer Maintenance Access Structure
Gravity Sewer
CSDLC Sewer
CITY OF EL SEGUNDO
SECAP & RRP
Hydraulic Deficiencies
PROJECT NO: 1031266.00
DATE: December 2014
Figure 8-1

As discussed in Section 5-2.2, there is some concerns about the design and planned construction of the Modification of Pump Station No. 1 and No. 7 project. The reaches that become deficient once this project is implemented are shown in Table 8-1.

Table 8-1
Future System Capacity Deficiencies due to Diversion at PS 7

Pipe ID	U/S MH ID	D/S MH ID	Location	Pipe Size (in)	Length (ft)	Slope	PDWF (mgd)	d/D
1-005	1-005	1-006	Oak	18	253	0.0001	0.861	1.00
1-013	1-013	1-015	Easement	18	340	-0.0007	0.894	1.00
1-017	1-017	1-018	Loma Vista	8	322	0.0022	0.517	1.00
1-018	1-018	1-047	Loma Vista	8	213	0.0022	0.530	1.00
1-516	1-516	1-017	Loma Vista	8	16	0.0025	0.514	1.00

Pipe 1-1013 has an inverse slope per survey data

Pump Stations

As discussed in Section 6, the pump stations were all found to have ample firm capacity to handle the estimated existing and future peak wet weather flows. Additional storage capacity and emergency generators are recommended for several of the pump stations. A summary of the pump station improvement recommendations is as follows:

1. The sewers planned to be utilized for diverting the Pump Station No. 7 to Pump Station No. 1 should be studied in detail to eliminate as many of the siphons as possible, and mitigate the capacity deficiencies that will result from this diversion. Consider the alternative of upgrading Pump Station No. 7 and its force main, and constructing a scaled down improvement at Pump Station No. 1.

2. When Pump Station No. 2 is upgraded:
    a. Place all electrical, controls, and telemetry equipment above ground
    b. Equip pump station with a either an engine driven bypass pump or permanent emergency generator and an automatic transfer switch
    c. Add emergency storage capacity of 10,000 gallons
    d. Equip lowest maintenance access structure on the influent sewer with a Smart Cover
    e. Replace existing 8-inch force main with a ceramic epoxy lined ductile iron pipe. Rehabilitate existing force main and maintain it as a redundant facility

3. Pump Station No. 4
    a. Replace existing 12-inch force main with epoxy lined ductile iron pipe. Rehabilitate existing force main and maintain it as a redundant facility

4. When Pump Station No. 5 is upgraded:
    a. Provide 13,000 gallons of emergency storage above the operating band
    b. Equip pump station with a either an engine driven bypass pump or permanent emergency generator and an automatic transfer switch
    c. Replace existing 10-inch force main with a ceramic epoxy lined ductile iron pipe. Rehabilitate existing force main and maintain it as a redundant facility

5. When Pump Station No. 6 is upgraded:
    a. Provide 3,000 gallons of emergency storage above the operating band
    b. Equip pump station with a either an engine driven bypass pump or permanent emergency generator and an automatic transfer switch
    c. Replace existing 6-inch force main with a ceramic epoxy lined ductile iron pipe. Rehabilitate existing force main and maintain it as a redundant facility

6. When Pump Station No. 7 is upgraded:
    a. Replace existing 12-inch force main with a ceramic epoxy lined ductile iron pipe as a backup facility in case it needs to be used in lieu of diverting its flows to Pump Station No. 1. Rehabilitate existing force main and maintain it as a redundant facility

7. When Pump Station No. 8 is upgraded:
    a. Provide 4,700 gallons of emergency storage
    b. Equip pump station with a either an engine driven bypass pump or permanent emergency generator and an automatic transfer switch
    c. Replace existing 6-inch force main with a ceramic epoxy lined ductile iron pipe. Rehabilitate existing force main and maintain it as a redundant facility

8. When Pump Station No. 9 is upgraded:
    a. Provide 2,300 gallons of emergency storage
    b. Equip pump station with a either an engine driven bypass pump or permanent emergency generator and an automatic transfer switch
    c. Replace existing 8-inch force main with smaller diameter ceramic epoxy lined ductile iron pipe. Rehabilitate existing force main and maintain it as a redundant facility
    d. Re-evaluate pump capacities

9. When Pump Station No. 13 is upgraded:
    a. Re-evaluate pump capacities
    b. Replace existing 10-inch force main with ceramic epoxy lined ductile iron pipe. Rehabilitate existing force main and maintain it as a redundant facility

8-3 Condition Assessment

In formulating a capital improvement program, both the hydraulic capacity of the facilities, and their condition have to be considered. In order to assess the condition of its facilities, the City had closed circuit television (CCTV) inspections of 259,589 feet of sewers completed in 2011. The inspections covered the entire system. The work was performed by Advance Sewer Technologies, Inc. (AST). Individual reports were developed for each sewer reach with severity ratings based upon a point value system suggested by AST. The severities ranged from 1 to 5, with 5 being the highest priorities.

The information contained in these reports and the videotapes is essential in assessing the condition of the system. It is also used in formulating facility maintenance recommendations, and the upgrade/replacement portion of the capital improvement program.

8-4 Maintenance

The sewer system is maintained by the City's Public Works Wastewater Division. The maintenance staff primarily consists of a four person crew that is responsible for routinely cleaning sewer lines, checking equipment and recording runtimes at all sewer pump stations, and responding to calls from residents. Although the City does not own the sewer laterals, City staff often respond to calls from residents when there is a problem with individual laterals. It has been a free service provided by the City.

Root intrusion, broken lines, and offset joints have historically been the main problems encountered throughout the City's sewer system. Grease is not typically a problem except for in the downtown areas, such as along Main Street where the majority of the restaurants are located. The City has a root foaming program that helps to temporarily kill the roots that have intruded into the sewer pipes.

A comprehensive maintenance program is an important tool in assuring reliable system operation. This not only includes regular inspections and preventative maintenance, but also good record keeping. Accurate records are the backbone of any maintenance operation. They can be used for many purposes including: scheduling regular maintenance activities; allocating manpower; budgeting; pinpointing persistent problems; tracking equipment performance and maintenance history; and the identification of equipment which may be showing signs of failure. The Sewer Geographic Information System can be used for this purpose.

Inspections of the facilities are of course very important. Regular inspections can help identify and eliminate a potential problem before it creates an emergency situation. The following inspection program is recommended as a minimum for the City's sewer collection system:

Pump Station Inspections:

Daily

- Visit each pump station
- Inspect control panel and verify pump operation

- Check for signs of vandalism
- Log all meter readings
- Note findings

Weekly

- Inspect wet well and dry well for abnormal conditions
- Note findings

Collection System Inspections:

All sewers in the collection system were CCTV inspected in 2011. The severity ratings ranged from 1 to 5, with 5 being the highest priority. Follow-up CCTV inspections should be conducted as follows:

a. Portions of the system with severity ratings of 5 will be inspected **annually** and evaluated to determine if immediate corrective action is needed.

b. Portions of the system with severity ratings of 4 will be CCTV inspected and evaluated once every **three (3) years.**

c. Portions of the system with severity ratings of 3 will be CCTV inspected and evaluated once every **five (5) years.**

d. Portions of the system with severity ratings of 2 or 1 will be CCTV inspected and evaluated once every **ten (10) years.**

e. Portions of the system with **no structural deficiencies** will be CCTV inspected and evaluated once every **ten (10) years.**

f. Portions of the system with identified **Operational and Maintenance** deficiencies will be CCTV inspected and evaluated once every **four (4) years.**

g. **Hot spots**, except siphons, will be CCTV inspected and evaluated **annually**.

h. In the event of a **natural disaster**, such as an earthquake, the CCTV inspection schedule should be adjusted as necessary.

As structural deficiency mitigation projects are implemented, their condition should be reclassified, and they should be included in the appropriate category for follow up CCTV inspection and condition assessment work.

Preventative maintenance is also a crucial element of the maintenance program. Currently, the City contracts Downstream Services Inc. to perform quarterly maintenance inspections for all the sewer pump stations. The inspections include checks of all equipment, such as motors, pumps, compressors, sump pumps, and control panels as well as the wet well structures.

The following provides some additional guidelines for the preventative maintenance activities.

Pump Station Maintenance Activities:

- Pull pumps bi-annually. Inspect impeller and bowls for wear. Change seals or packing as required.
- Exercise valves monthly
- Exercise mechanical equipment which normally does not operate weekly
- Clean wet wells every 6 months, more frequently in areas with grease or sand or where solids accumulate quickly
- Check electrical connections annually

Collection System Maintenance Activities:

- Clean sewers with root intrusion as necessary
- Clean sewers with grease deposits every 60-90 days
- Clean sewers with debris deposits (for low velocity reaches of pipe) every 6 months

Section 9

CAPITAL IMPROVEMENT PROGRAM

9-1 General

The primary goal of the Capital Improvement Program (CIP) is to provide the City of El Segundo with a long range-planning tool for implementing its sewer infrastructure improvements in an orderly manner, and providing a basis for financing of these improvements. To accomplish this goal, the program is phased based upon the implementation cost of the facilities, the quantity of work the City can reasonably administer each year, and the funds available for these projects.

The needed capital improvements were identified as a result of assessment of the system through capacity analyses, video inspections, and physical facility inspections.

9-2 Capital Improvement Project Priorities

The capital improvement projects were selected primarily based upon safety and health concerns and minimizing the possibility of overflows.

Pump station project priorities have been established to:

- Bring existing pump stations that have not been improved in the last 10 years, to current standards
- Eliminate capacity deficiencies
- Eliminate structural problems
- Conduct periodic upgrades of existing pump stations
- Replace force mains that have reached the end of their useful lives

9-3 Capital Improvement Program

The recommended CIP has been based upon the best information currently available. It should be updated as new information becomes available. The project priorities may be adjusted to take advantage of concurrent construction such as street paving projects or adjacent infrastructure work.

The gravity main sewer improvement project related to capacity deficiencies is shown in Table 9-1. Flow monitoring is recommended prior to project implementation. The flow monitoring should be done after the completion of the Elevon at Campus El Segundo development, which is tributary to the deficient sewer reach.

The pump station improvement projects and associated costs are shown in Table 9-2. For the gravity condition related improvement projects, refer to the City of El Segundo Capital Improvement Projects for Sewer System, provided in Appendix 4.

Table 9-1
Capital Improvement Program
Gravity Main Capacity Improvements

Project No.	Description	Ex. Pipe Size (in)	Prop. Pipe Size (in)	Length (ft)	Cons Cost ($)	Engin and Admin Cost ($)	Total Project Cost ($)
G1	Modification of Pump Station No. 1 and No. 7	15	18	90	40,500	14,175	54,675
				Total	**40,500**	**14,175**	**54,675**

9-4 Project Descriptions

Gravity Pipe Capacity Improvement

Project G1 – Replace 90 feet of 15-inch pipe with 18-inch pipe from Manhole CS-904 to Manhole CS-903, located in Douglas Street at Maple Avenue.

Pump Stations and Force Mains

Project PS1 – Pump Station No. 1 Upgrades

The upgrade project has been designed to handle the wastewater flows that are currently tributary to Pump Station No.7 as well. The project will replace the existing pumps with two 1000 gpm capacity screw centrifugal pumps; add operational and emergency wet well capacity in Acacia Park just north of the existing pump station; provide above ground motor control center and pump station control panel at the south east corner of the park; construct a diesel engine operated 1000 gpm capacity standby pump to the west of the new motor control center; and a new 10-inch diameter forcemain along Acacia Avenue, Loma Vista Street, and Imperial Avenue. The new pump station capacity will be greater than the estimated peak wet weather flow from the tributary area of Pump Stations No.1 and No.7, and the velocity in the new force main will be 4.1 fps, which is in the desirable range.

The sewers planned to be utilized for diverting the Pump Station No.7 flows to Pump Station No.1 should be studied in detail to eliminate as many of the siphons as possible, and mitigate the capacity deficiencies that will result from this diversion. The City should consider the alternative of upgrading Pump Station No.7 and its force main, and constructing a scaled down improvement at Pump Station No.1.

Table 9-2
Capital Improvement Program
Pump Station and Force Main Improvements

Project No.	Description	Ex. Pipe Size (in)	Prop. Pipe Size (in)	Length (ft)	Date of Cons	Date of Recent Modifi-cation	Operational Storage (gal)	Emergency Storage (gal)	Permanent Standby Generator or Engine Driven Bypass Pump	Automatic Transfer Switch	Cons Cost ($)	Engin and Admin Cost ($)	Total Cost ($)	Total Project Cost ($)
PS1	Modification of Pump Station No. 1 and No. 7	-	-	-	1988	-					1,629,630	570,370	2,200,000	2,200,000
PS7	PS No. 7 Upgrades				1962	1996	3,000		x		120,000	42,000	162,000	1,596,680
	PS No. 7 FM Replacement	12	12	2460	1962	-					678,960	237,636	916,600	
	PS No. 7 FM Rehabilitation	12	12	2460	1962	-					383,760	134,316	518,080	
PS9	PS No. 9 Upgrades	-	-	-	1957	1988		2,300	x		500,000	175,000	675,000	1,042,600
	PS No.9 FM Replacement	8	8	830	1957	-					166,000	58,100	224,100	
	PS No.9 FM Rehabilitation	8	8	830	1957	-					106,240	37,260	143,500	
PS8	PS No. 8 Replacement	-	-	-	1955	1995		4,700	x		2,000,000	700,000	2,700,000	3,680,100
	PS No.8 FM Replacement	8	8	3630	1955	-					726,000	254,100	980,100	
PS2	PS No. 2 Replacement	-	-	-	1925	1996		10,000	x	x	2,000,000	700,000	2,700,000	2,976,800
	PS No.2 FM Replacement	8	8	625	1976	-					125,000	43,800	168,800	
	PS No.2 FM Rehabilitation	8	8	625	1976	-					80,000	28,000	108,000	
PS4	PS No.4 FM Replacement	12	12	2420	1964	-					667,920	233,780	901,700	1,411,400
	PS No.4 FM Rehabilitation	12	12	2420	1964	-					377,520	132,180	509,700	
PS5	PS No. 5 Upgrades				1954	2004		13,000	x	x	500,000	175,010	675,010	1,636,300
	PS No.5 FM Replacement	10	10	1780	1954	-					445,000	155,790	600,790	
	PS No.5 FM Rehabilitation	10	10	1780	1954	-					267,000	93,500	360,500	
PS 6	PS No. 6 Upgrades				1953	2003		3,000	x		350,000	122,500	472,500	768,200
	PS No.6 FM Replacement	6	6	760	1953	-					136,800	47,900	184,700	
	PS No.6 FM Rehabilitation	6	6	760	1953	-					82,152	28,848	111,000	
PS13	PS No.13 FM Replacement	10	10	1430	1972	-					357,500	125,200	482,700	772,300
	PS No.13 FM Rehabilitation	10	10	1430	1972	-					214,500	75,100	289,600	
										Total	**11,913,982**	**4,170,391**	**16,084,380**	**16,084,380**

Project PS2- Pump Station No. 2 Upgrades

The existing pump station does not have a permanent standby generator with an automatic transfer switch. When it is upgraded, all electrical, controls, and telemetry equipment should be placed above ground. The pump station should be equipped with either an engine driven bypass pump or a permanent emergency generator and an automatic transfer switch. Emergency storage capacity of 10,000 gallons should be added. The most downstream, and the lowest maintenance access structures on the influent sewer should be equipped with Smart Covers to notify the staff of an impending problem when the wastewater level rises above the peak wet weather flow depth. The existing 8-inch force main should be replaced with a ceramic epoxy lined ductile iron pipe. The existing force main should be rehabilitated and maintained as a redundant facility.

Project PS4- Pump Station No. 4 Forcemain Replacement

The existing 12-inch ACP force main should be replaced with a ceramic epoxy lined ductile iron pipe, as it has exceeded its expected useful life. The existing pipe should be rehabilitated and maintained as a redundant facility.

Project PS5- Pump Station No. 5 Upgrades

The pump station has minimal emergency storage. When the pump station is upgraded, it should be provided with 13,000 gallons of emergency storage above the operating band. It should be equipped with an engine driven bypass pump or a permanent emergency generator and an automatic transfer switch. Currently, the pump station has a generator connection and manual transfer switch at the south east corner of Oak Avenue and Center Street. The 10-inch force main should be replaced with a ceramic epoxy lined ductile iron pipe. The existing force main should be rehabilitated and maintained as a redundant facility.

Project PS6- Pump Station No. 6 Upgrades

Pump Station No. 6 does not have sufficient emergency storage. When the pump station is upgraded, it should be provided 3000 gallons of emergency storage above the operating band. The pump station should be equipped with an engine driven bypass pump or a permanent standby generator and an automatic transfer switch. The 6-inch force main should be replaced with a ceramic epoxy lined ductile iron pipe. The existing force main should be rehabilitated and maintained as a redundant facility.

Project PS7- Pump Station No. 7 Upgrades

If Pump Station No.7 is maintained as a permanent back-up facility, it should be upgraded with smaller capacity pumps (800 gpm) and additional operational storage of 3,000 gallons. Because its tributary flows can be diverted to Pump Station No. 1, a permanent emergency generator, or additional emergency storage is not necessary. The 12-inch force main should be replaced with a ceramic epoxy lined ductile iron pipe as a backup facility in case it needs to be used in lieu of diverting its flows to Pump Station No. 1. The existing force main should be rehabilitated and maintained as a redundant facility.

Project PS8- Pump Station No. 8 Upgrades

This pump station should be replaced with a new facility due to structural problems in the existing dry well. An engine driven bypass pump or a permanent standby generator and an automatic transfer switch, as well as sufficient storage for a minimum of 90 minutes of average flow (4,700 gallons) should be provided in a new facility.

The 8-inch force main should be replaced with a smaller diameter ceramic epoxy lined ductile iron pipe. The existing force main should be rehabilitated and maintained as a redundant facility.

Project PS9 – Pump Station No. 9 Upgrades

Although Pump Station No. 9 has adequate operational storage, there is no emergency storage. When this pump station is upgraded, an engine driven bypass pump or a permanent standby generator and an automatic transfer switch, as well as 2,300 gallons of storage at should be provided.

The 8-inch force main should be replaced with a smaller diameter ceramic epoxy lined ductile iron pipe. The existing force main should be rehabilitated and maintained as a redundant facility. Pump capacities should be re-evaluated at that time.

Project PS13 – Pump Station No. 13 Upgrades

The 10-inch force main should be replaced with a smaller diameter ceramic epoxy lined ductile iron pipe. The existing force main should be rehabilitated and maintained as a redundant facility. Pump capacities should be re-evaluated at that time.

APPENDIX 1

MODEL INPUT AND RESULTS
EXISTING CONDITIONS

City of El Segundo
Existing Conditions Hydraulic Model Results
Pipes sorted by U/S MH ID

U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (ft^3/s)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)
1-001	79.00	1-002	74.00	8	285	0.0175	VCP	0.013	1	1.73		0.0032		0.0089	1.41	0.52	0.07	1.0372	1.0284	0.765	0.756
1-002	74.00	1-004	72.60	8	350	0.0040	VCP	0.013	1	1.73		0.0060		0.0156	1.00	0.97	0.12	0.4953	0.4797	0.365	0.350
1-003	81.00	1-004	75.00	8	197	0.0305	VCP	0.013	1	1.73		0.0012		0.0035	1.29	0.30	0.04	1.3666	1.3631	1.008	1.005
1-004	72.60	1-010	71.78	8	142	0.0058	VCP	0.013	1	1.73		0.0078		0.0200	1.22	1.00	0.13	0.5951	0.5751	0.439	0.419
1-005	69.59	1-006	69.56	18	253	0.0001	VCP	0.013	7	1.89		0.0008		0.0027	0.15	0.79	0.04	0.7413	0.7386	0.503	0.500
1-006	69.56	7-178A	62.14	18	18	0.4122		0.013	7	1.89		0.0008		0.0027	0.00	0.00	0.00	43.7053	43.7026	32.240	32.237
1-007	72.00	1-008	68.50	8	121	0.0289	VCP	0.013	1	1.73		0.0013		0.0039	1.30	0.32	0.04	1.3318	1.3279	0.982	0.979
1-008	69.13	1-010	68.58	18	315	0.0017	VCP	0.013	1	1.73		0.0013		0.0039	0.44	0.50	0.03	2.8444	2.8405	2.071	2.067
1-009	78.00	1-010	71.88	8	250	0.0245	VCP	0.013	1	1.73		0.0000		0.0000	0.00	0.00	0.00	1.2252	1.2252	0.904	0.904
1-010	68.58	1-013	67.91	18	340	0.0020	VCP	0.013	1	1.73		0.0117		0.0289	0.84	1.24	0.07	3.0218	2.9929	2.246	2.218
1-011	66.05	1-013	64.00	8	256	0.0080	VCP	0.013	1	1.73		0.0035		0.0095	1.09	0.65	0.08	0.7007	0.6913	0.517	0.508
1-012	79.00	1-013	67.00	8	244	0.0492	VCP	0.013	1	1.73		0.0025		0.0070	1.88	0.37	0.05	1.7366	1.7296	1.281	1.274
1-013	67.91	1-015	68.14	18	340	-0.0007	VCP	0.013	1	1.73		0.0177		0.0423	0.04	18.00	1.00	-0.6463	-0.6886	NA	NA
1-014	90.00	1-015	65.02	8	311	0.0803	VCP	0.013	1	1.73		0.0023		0.0065	2.18	0.32	0.04	2.2193	2.2128	1.637	1.631
1-015	68.14	1-016	67.19	18	361	0.0026	VCP	0.013	1	1.73		0.0231		0.0540	1.12	1.56	0.09	3.4920	3.4380	2.560	2.506
1-016	67.19	1-516	66.71	8	24	0.0200	VCP	0.013	1	1.73	100	0.0231		0.0540	2.54	1.20	0.15	1.1074	1.0534	7.102	7.048
1-017	60.65	1-018	59.95	8	322	0.0022	VCP	0.013	1	1.73		0.0245		0.0569	1.18	2.14	0.27	0.3651	0.3082	0.270	0.213
1-018	59.94	1-047	59.47	8	213	0.0022	VCP	0.013	1	1.73		0.0312		0.0712	1.26	2.39	0.30	0.3678	0.2967	0.271	0.200
1-019	89.06	1-020	72.04	8	335	0.0508	VCP	0.013	1	1.73		0.0034		0.0093	2.07	0.42	0.05	1.7651	1.7558	1.302	1.293
1-020	71.94	1-021	66.20	8	140	0.0410	VCP	0.013	1	1.73		0.0047		0.0125	2.10	0.50	0.06	1.5856	1.5731	1.170	1.157
1-021	66.20	1-018	63.00	8	160	0.0200	VCP	0.013	1	1.73		0.0067		0.0173	1.80	0.70	0.09	1.1074	1.0901	0.817	0.800
1-022	100.20	1-023	73.50	8	290	0.0921	-	0.013	1	1.73	77	0.0036		0.0096	2.57	0.37	0.05	2.3761	2.3664	1.753	1.743
1-022	100.20	12-041	92.00	8	252	0.0325	VCP	0.013	7	1.89	23	0.0011		0.0031	1.27	0.28	0.03	1.4126	1.4094	1.041	1.038
1-023	73.50	1-024	67.38	8	137	0.0447	-	0.013	1	1.73		0.0059		0.0154	2.31	0.55	0.07	1.6551	1.6397	1.221	1.205
1-024	67.38	1-032	60.50	8	154	0.0447	-	0.013	1	1.73		0.0062		0.0161	2.33	0.56	0.07	1.6552	1.6391	1.221	1.205
1-025	122.01	1-026	119.40	8	261	0.0100	VCP	0.013	1	1.73		0.0045		0.0119	1.26	0.69	0.09	0.7831	0.7712	0.578	0.566
1-026	119.40	1-029	84.00	8	300	0.1180	VCP	0.013	1	1.73		0.0105		0.0261	3.80	0.56	0.07	2.6900	2.6638	1.984	1.958
1-027	109.30	1-028	103.41	8	295	0.0200	VCP	0.013	1	1.73		0.0012		0.0036	1.12	0.33	0.04	1.1065	1.1029	0.816	0.813
1-028	104.10	1-029	84.00	8	367	0.0548	VCP	0.013	1	1.73		0.0038		0.0102	2.18	0.43	0.05	1.8326	1.8224	1.352	1.342
1-029	84.00	1-030	73.00	8	170	0.0647	VCP	0.013	1	1.73		0.0178		0.0424	3.56	0.81	0.10	1.9919	1.9495	1.470	1.427
1-030	73.00	1-031	65.00	8	379	0.0211	VCP	0.013	1	1.73		0.0224		0.0526	2.57	1.17	0.15	1.1377	1.0851	0.840	0.787
1-031	65.00	1-032	60.50	8	300	0.0150	-	0.013	1	1.73		0.0248		0.0577	2.34	1.33	0.17	0.9591	0.9014	0.708	0.650
1-032	60.50	1-033	59.44	10	355	0.0030	VCP	0.013	1	1.73		0.0346		0.0783	1.41	2.15	0.21	0.7758	0.6975	0.573	0.494
1-033	59.14	1-048	58.89	18	203	0.0012	VCP	0.013	1	1.73		0.0652		0.1404	1.14	2.96	0.16	2.3889	2.2484	1.763	1.622
1-034	94.67	1-035	77.05	8	280	0.0629	VCP	0.013	1	1.73		0.0033		0.0091	2.21	0.39	0.05	1.9644	1.9553	1.449	1.440
1-035	76.95	1-047	62.38	8	257	0.0567	VCP	0.013	1	1.73		0.0064		0.0166	2.56	0.53	0.07	1.8645	1.8479	1.375	1.359
1-036	106.00	1-037	81.00	8	300	0.0833	VCP	0.013	1	1.73		0.0027		0.0076	2.31	0.34	0.04	2.2605	2.2529	1.667	1.660
1-037	81.00	1-046	66.00	8	392	0.0383	VCP	0.013	1	1.73		0.0059		0.0154	2.18	0.57	0.07	1.5318	1.5165	1.130	1.114
1-038	97.00	1-045	79.00	8	243	0.0741	VCP	0.013	1	1.73		0.0031		0.0084	2.29	0.36	0.05	2.1313	2.1228	1.572	1.564
1-039	119.00	1-044	87.00	8	292	0.1096	VCP	0.013	1	1.73		0.0052		0.0137	3.04	0.42	0.05	2.5923	2.5786	1.912	1.899
1-040	133.00	1-042	96.10	8	275	0.1342	VCP	0.013	1	1.73		0.0024		0.0067	2.62	0.29	0.04	2.8685	2.8618	2.116	2.109
1-041	114.00	1-042	96.00	8	350	0.0514	-	0.013	1	1.73		0.0020		0.0057	1.79	0.33	0.04	1.7758	1.7701	1.310	1.304
1-041	114.00	7-173	88.00	8	226	0.1150	VCP	0.013	7	1.89		0.0010		0.0033	2.01	0.21	0.03	2.6561	2.6527	1.960	1.956

City of El Segundo
Existing Conditions Hydraulic Model Results
Pipes sorted by U/S MH ID

U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (ft^3/s)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)
1-042	114.00	1-043	112.96	8	21	0.0514	-	0.013	1	1.73		0.0062		0.0161	2.45	0.04	0.07	1.7758	1.7597	1.310	1.294
1-043	96.00	1-044	87.00	8	350	0.0257	-	0.013	1	1.73		0.0097		0.0243	2.18	0.77	0.10	1.2557	1.2314	0.926	0.902
1-044	87.00	1-045	79.00	8	350	0.0229	-	0.013	1	1.73		0.0170		0.0407	2.44	1.02	0.13	1.1839	1.1432	0.873	0.833
1-045	79.00	1-046	66.00	8	350	0.0371	-	0.013	1	1.73		0.0234		0.0546	3.16	1.04	0.13	1.5092	1.4546	1.114	1.059
1-046	67.62	1-100	67.59	18	12	0.0023	VCP	0.013	1	1.73		0.0307		0.0701	1.16	1.82	0.10	3.2873	3.2173	2.408	2.338
1-047	59.40	1-049	59.10	8	5	0.0600	VCP	0.013	1	1.73		0.0379		0.0853	4.28	1.15	0.14	1.9181	1.8329	1.415	1.330
1-048	64.95	1-049	64.94	18	8	0.0013	VCP	0.013	1	1.73		0.0665		0.1428	1.16	2.97	0.17	2.4067	2.2639	1.775	1.633
1-049	60.40	WW-001	60.23	18	5	0.0333	VCP	0.013	1	1.73		0.1044		0.2164	4.13	1.65	0.09	12.4220	12.2056	9.163	8.946
1-100	67.59	1-101	67.58	18	3	0.0023	VCP	0.013	1	1.73		0.0307		0.0701	1.16	1.82	0.10	3.2675	3.1974	2.408	2.338
1-101	67.58	1-033	66.82	18	326	0.0023	VCP	0.013	1	1.73		0.0307		0.0701	1.16	1.82	0.10	3.2888	3.2187	2.408	2.338
1-516	60.70	1-017	60.66	8	16	0.0025	CIP	0.013	1	1.73		0.0231		0.0540	1.22	2.01	0.25	0.3915	0.3375	0.288	0.234
2-001	132.50	2-004	106.00	8	373	0.0710	-	0.013	2	1.75		0.0050		0.0134	2.60	0.46	0.06	2.0872	2.0738	1.540	1.526
2-002	98.82	2-003	98.70	12	12	0.0100	VCP	0.013	2	1.75		0.0005		0.0017	0.66	0.02	0.02	2.3088	2.3071	1.702	1.700
2-003	103.21	2-004	102.50	8	290	0.0024	-	0.013	2	1.75		0.0014		0.0042	0.57	0.59	0.07	0.3875	0.3833	0.284	0.279
2-004	102.05	2-010	87.00	8	350	0.0430	-	0.013	2	1.75		0.0065		0.0169	2.34	0.58	0.07	1.6238	1.6069	1.198	1.181
2-005	108.90	2-006	108.38	8	130	0.0040	-	0.013	2	1.75		0.0009		0.0029	0.60	0.44	0.05	0.4953	0.4924	0.365	0.362
2-006	108.38	2-007	87.60	8	381	0.0545	VCP	0.013	2	1.75		0.0021		0.0061	1.86	0.34	0.04	1.8288	1.8227	1.349	1.343
2-007	87.60	2-010	87.00	8	150	0.0040	VCP	0.013	2	1.75		0.0025		0.0071	0.79	0.67	0.08	0.4953	0.4881	0.365	0.358
2-008	135.00	2-009	101.00	8	223	0.1525	VCP	0.013	2	1.75		0.0009		0.0027	2.07	0.18	0.02	3.0577	3.0550	2.256	2.253
2-009	101.00	2-010	87.00	8	150	0.0933	VCP	0.013	2	1.75		0.0033		0.0090	2.53	0.36	0.04	2.3923	2.3833	1.765	1.756
2-010	87.00	2-015	85.60	8	350	0.0040	-	0.013	2	1.75		0.0122		0.0304	1.22	1.34	0.17	0.4953	0.4648	0.365	0.335
2-011	91.00	2-012	89.10	8	475	0.0040	VCP	0.013	2	1.75		0.0016		0.0046	0.69	0.55	0.07	0.4953	0.4906	0.365	0.361
2-012	89.10	2-015	89.04	8	15	0.0040	VCP	0.013	2	1.75		0.0017		0.0049	0.70	0.56	0.07	0.4953	0.4903	0.365	0.360
2-013	127.00	2-014	94.00	8	273	0.1209	VCP	0.013	2	1.75		0.0043		0.0117	2.99	0.38	0.05	2.7226	2.7109	2.009	1.997
2-014	94.00	2-015	89.04	8	100	0.0496	VCP	0.013	2	1.75		0.0051		0.0137	2.31	0.50	0.06	1.7440	1.7303	1.287	1.273
2-015	85.60	2-018	78.00	8	350	0.0217	-	0.013	2	1.75		0.0190		0.0458	2.49	1.09	0.14	1.1539	1.1082	0.851	0.805
2-016	82.00	2-018	78.00	8	490	0.0082	VCP	0.013	2	1.75		0.0015		0.0044	0.87	0.45	0.06	0.7075	0.7031	0.522	0.518
2-017	115.00	2-018	78.00	8	373	0.0992	VCP	0.013	2	1.75		0.0056		0.0149	3.01	0.45	0.06	2.4663	2.4514	1.819	1.804
2-018	78.00	2-026	61.23	8	350	0.0479	-	0.013	2	1.75		0.0270		0.0632	3.61	1.05	0.13	1.7141	1.6509	1.265	1.202
2-019	89.58	2-020	89.00	8	145	0.0040	-	0.013	2	1.75		0.0001		0.0004	0.33	0.17	0.02	0.4953	0.4949	0.365	0.365
2-020	89.00	2-021	63.09	8	371	0.0698	-	0.013	2	1.75		0.0007		0.0022	1.48	0.20	0.02	2.0694	2.0673	1.527	1.524
2-021	63.09	2-022	62.91	8	45	0.0040	VCP	0.013	2	1.75		0.0018		0.0053	0.72	0.58	0.07	0.4953	0.4899	0.365	0.360
2-022	62.81	2-023	62.73	8	17	0.0047	VCP	0.013	2	1.75		0.0018		0.0053	0.76	0.56	0.07	0.5372	0.5319	0.396	0.391
2-023	62.63	2-027	62.16	8	98	0.0048	VCP	0.013	2	1.75		0.0018		0.0053	0.77	0.56	0.07	0.5423	0.5370	0.400	0.395
2-024	98.29	2-025	73.81	8	223	0.1098	-	0.013	2	1.75		0.0024		0.0067	2.45	0.30	0.04	2.5945	2.5878	1.914	1.908
2-025	73.81	2-026	62.45	8	150	0.0757	-	0.013	2	1.75		0.0035		0.0095	2.39	0.39	0.05	2.1550	2.1455	1.590	1.580
2-026	62.45	2-027	62.41	8	15	0.0027	-	0.013	2	1.75		0.0305		0.0706	1.35	2.26	0.28	0.4044	0.3338	0.299	0.228
2-027	60.17	2-063	59.97	8	80	0.0025	-	0.013	2	1.75		0.0323		0.0745	1.34	2.36	0.30	0.3915	0.3171	0.289	0.214
2-028	83.25	2-029	82.04	10	422	0.0029	VCP	0.013	2	1.75		0.0011		0.0033	0.54	0.48	0.05	0.7603	0.7569	0.561	0.558
2-029	81.98	2-033	81.34	10	209	0.0031	VCP	0.013	2	1.75		0.0011		0.0033	0.55	0.47	0.05	0.7857	0.7824	0.580	0.576
2-030	88.00	2-031	82.00	8	221	0.0271	-	0.013	2	1.75	15	0.0001		0.0002	0.53	0.08	0.01	1.2903	1.2901	0.952	0.952
2-030	88.00	2-051	75.00	8	320	0.0406	-	0.013	2	1.75	85	0.0004		0.0012	1.03	0.17	0.02	1.5783	1.5771	1.165	1.163
2-031	82.00	2-034	71.50	8	180	0.0583	VCP	0.013	2	1.75		0.0001		0.0003	0.00	0.00	0.00	1.8913	1.8911	1.395	1.395

City of El Segundo
Existing Conditions Hydraulic Model Results
Pipes sorted by U/S MH ID

U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (ft^3/s)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)
2-032	85.20	2-033	78.80	6	98	0.0653	VCP	0.013	2	1.75		0.0004		0.0012	1.27	0.17	0.03	0.9292	0.9280	0.686	0.684
2-033	78.80	2-034	78.40	8	12	0.0333	-	0.013	2	1.75		0.0015		0.0044	1.42	0.32	0.04	1.4297	1.4253	1.055	1.050
2-034	71.50	2-044	66.00	8	180	0.0306	-	0.013	2	1.75		0.0015		0.0045	1.39	0.34	0.04	1.3688	1.3643	1.010	1.005
2-035	113.00	2-037	108.56	8	175	0.0254	-	0.013	2	1.75		0.0226		0.0535	2.75	1.13	0.14	1.2473	1.1938	0.920	0.867
2-036	125.00	2-037	108.56	8	370	0.0444	VCP	0.013	2	1.75		0.0000		0.0000	0.00	0.00	0.00	1.6506	1.6506	1.217	1.217
2-037	108.56	2-038	104.00	8	180	0.0253	-	0.013	2	1.75		0.0226		0.0535	2.75	1.13	0.14	1.2464	1.1929	0.920	0.866
2-038	104.00	2-040	93.00	8	180	0.0611	-	0.013	2	1.75		0.0233		0.0550	3.78	0.93	0.12	1.9358	1.8808	1.428	1.373
2-039	106.27	2-040	93.00	8	241	0.0551	VCP	0.013	2	1.75	52	0.0002		0.0007	0.96	0.12	0.02	1.8375	1.8368	1.355	1.355
2-039	106.27	7-127	102.07	8	300	0.0140	VCP	0.013	7	1.89	48	0.0002		0.0007	0.60	0.17	0.02	0.9265	0.9258	0.684	0.683
2-040	93.00	2-042	78.70	8	167	0.0856	-	0.013	2	1.75		0.0235		0.0555	4.26	0.86	0.11	2.2915	2.2360	1.691	1.635
2-041	88.00	2-043	78.70	8	307	0.0303	VCP	0.013	2	1.75		0.0034		0.0093	1.73	0.47	0.06	1.3629	1.3536	1.006	0.996
2-042	78.70	2-500	73.42	8	116	0.0455	-	0.013	2	1.75		0.0235		0.0555	3.42	1.00	0.12	1.6707	1.6152	1.233	1.177
2-043	69.00	2-044	66.00	8	180	0.0167	-	0.013	2	1.75		0.0294		0.0682	2.55	1.41	0.18	1.0109	0.9427	0.746	0.678
2-044	66.00	2-047	65.70	8	57	0.0053	VCP	0.013	2	1.75		0.1036		0.2173	2.35	3.43	0.43	0.5681	0.3508	0.419	0.201
2-045	87.30	2-046	82.60	8	200	0.0235	VCP	0.013	2	1.75		0.0013		0.0039	1.21	0.33	0.04	1.2004	1.1966	0.885	0.882
2-046	82.60	2-047	65.70	8	250	0.0676	VCP	0.013	2	1.75		0.0013		0.0039	1.74	0.26	0.03	2.0360	2.0321	1.502	1.498
2-047	71.72	2-048	71.68	10	15	0.0027	VCP	0.013	2	1.75		0.1052		0.2204	1.82	3.76	0.38	0.7332	0.5128	0.541	0.321
2-048	71.67	2-049	71.15	10	175	0.0030	VCP	0.013	2	1.75		0.1052		0.2204	1.89	3.65	0.37	0.7740	0.5535	0.571	0.350
2-049	71.14	2-050	70.24	10	301	0.0030	VCP	0.013	2	1.75		0.1056		0.2213	1.90	3.65	0.37	0.7764	0.5551	0.573	0.351
2-050	69.95	2-051	67.40	10	341	0.0075	VCP	0.013	2	1.75		0.1056		0.2213	2.64	2.87	0.29	1.2278	1.0065	0.905	0.684
2-051	61.03	2-063	59.97	10	260	0.0041	VCP	0.013	2	1.75		0.1200		0.2488	2.19	3.58	0.36	0.9066	0.6577	0.669	0.420
2-052	80.00	2-053	65.17	8	175	0.0847	-	0.013	2	1.75		0.0013		0.0040	1.90	0.25	0.03	2.2796	2.2756	1.682	1.678
2-053	65.17	2-054	64.17	8	248	0.0040	-	0.013	2	1.75		0.0028		0.0077	0.81	0.69	0.09	0.4973	0.4895	0.367	0.359
2-054	64.17	2-059	63.81	10	125	0.0029	VCP	0.013	2	1.75		0.0040		0.0108	0.77	0.83	0.08	0.7620	0.7512	0.562	0.552
2-055	96.00	2-056	73.50	8	250	0.0900	VCP	0.013	2	1.75		0.0000		0.0000	0.00	0.00	0.00	2.3492	2.3492	1.733	1.733
2-056	73.50	2-057	72.20	8	326	0.0040	VCP	0.013	2	1.75		0.0000		0.0000	0.00	0.00	0.00	0.4945	0.4945	0.365	0.365
2-057	72.20	2-058	68.00	8	350	0.0120	-	0.013	2	1.75		0.0000		0.0000	0.00	0.00	0.00	0.8578	0.8578	0.633	0.633
2-058	65.45	2-059	64.03	8	355	0.0040	-	0.013	2	1.75		0.0000		0.0000	0.00	0.00	0.00	0.4953	0.4953	0.365	0.365
2-059	63.81	2-060	63.06	10	260	0.0029	VCP	0.013	2	1.75		0.0055		0.0147	0.85	0.96	0.10	0.7626	0.7479	0.562	0.548
2-060	63.06	2-062	62.11	10	323	0.0029	VCP	0.013	2	1.75		0.0055		0.0147	0.85	0.96	0.10	0.7700	0.7554	0.568	0.553
2-061	93.00	2-062	76.00	8	270	0.0630	-	0.013	2	1.75		0.0037		0.0100	2.28	0.41	0.05	1.9649	1.9549	1.450	1.440
2-062	62.11	2-051	61.03	10	373	0.0029	VCP	0.013	2	1.75		0.0140		0.0345	1.10	1.45	0.14	0.7640	0.7295	0.564	0.529
2-063	59.97	WW-002	55.00	12	15	0.3237		0.013	2	1.75		0.1523		0.3099	10.77	1.27	0.11	13.1364	12.8265	1.341	1.031
2-500	73.42	2-043	69.00	8	97	0.0456	-	0.013	2	1.75		0.0235		0.0555	3.42	1.00	0.12	1.6716	1.6161	1.233	1.178
2-534	111.00	2-058	91.60	8	443	0.0438	VCP	0.013	2	1.75		0.0000		0.0000	0.00	0.00	0.00	1.6387	1.6387	1.209	1.209
4-001	95.58	4-004	94.83	12	310	0.0030	VCP	0.013	4	2.21		0.0072		0.0235	0.97	1.14	0.09	1.9510	1.9275	0.933	0.909
4-002	94.83	4-003	94.08	8	234	0.0039	VCP	0.013	4	2.21		0.0024		0.0086	0.83	0.74	0.09	1.9510	1.9424	0.362	0.353
4-003	94.08	4-004	91.46	8	197	0.0479	VCP	0.013	4	2.21		0.0031		0.0109	2.13	0.46	0.06	3.5690	3.5581	1.264	1.253
4-004	97.63	4-006	93.75	12	378	0.0030	VCP	0.013	4	2.21		0.0103		0.0328	1.06	1.33	0.11	1.6830	1.6502	0.927	0.894
4-005	93.56	4-006	91.06	8	250	0.0553	VCP	0.013	4	2.21	83	0.0038		0.0128	2.35	0.48	0.06	1.3510	1.3382	1.359	1.346
4-005	126.20	5-060	118.50	8	250	0.0308	VCP	0.013	5	1.90	17	0.0008		0.0023	1.13	0.24	0.03	1.3743	1.3720	1.014	1.011
4-006	91.01	4-007	90.23	12	369	0.0030	VCP	0.013	4	2.21		0.0141		0.0437	1.17	1.52	0.13	1.7510	1.7073	0.938	0.895
4-007	90.18	4-008	89.50	12	350	0.0030	VCP	0.013	4	2.21		0.0156		0.0480	1.20	1.60	0.13	1.7650	1.7170	0.933	0.885

City of El Segundo
Existing Conditions Hydraulic Model Results
Pipes sorted by U/S MH ID

U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (ft^3/s)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)
4-008	89.46	4-010	88.97	12	350	0.0030	VCP	0.013	4	2.21		0.0156		0.0480	1.20	1.60	0.13	1.6000	1.5520	0.933	0.885
4-009	107.48	4-010	98.27	8	390	0.0350	VCP	0.013	4	2.21	31	0.0019		0.0062	1.61	0.38	0.05	2.5930	2.5868	1.081	1.075
4-009	125.54	6-002	104.42	8	390	0.0542	VCP	0.013	6	1.46	69	0.0042		0.0091	2.10	0.41	0.05	1.8223	1.8132	1.345	1.336
4-010	98.18	4-011	90.43	12	267	0.0030	VCP	0.013	4	2.21		0.0194		0.0587	1.27	1.76	0.15	2.3790	2.3203	0.933	0.874
4-011	93.29	4-012	90.43	12	265	0.0031	VCP	0.013	4	2.21		0.0195		0.0591	1.29	1.75	0.15	1.2920	1.2329	0.953	0.894
4-012	90.38	4-013	89.65	12	250	0.0029	VCP	0.013	4	2.21		0.0195		0.0591	1.25	1.78	0.15	0.6530	0.5939	0.914	0.855
4-013	89.60	4-014	88.87	12	250	0.0030	VCP	0.013	4	2.21		0.0207		0.0624	1.29	1.81	0.15	0.6530	0.5906	0.933	0.870
4-014	88.82	4-015	88.00	12	250	0.0030	VCP	0.013	4	2.21		0.0220		0.0659	1.31	1.86	0.16	1.7810	1.7151	0.933	0.867
4-015	99.10	4-016	95.07	12	250	0.0030	VCP	0.013	4	2.21		0.0220		0.0659	1.31	1.86	0.16	1.6510	1.5851	0.933	0.867
4-016	94.92	4-027	93.52	12	261	0.0100	VCP	0.013	4	2.21		0.0220		0.0659	2.01	1.39	0.12	0.8250	0.7591	1.706	1.640
4-017	106.00	4-018	98.00	8	200	0.0194	VCP	0.013	4	2.21		0.0006		0.0025	1.00	0.29	0.04	1.8270	1.8245	0.805	0.802
4-018	97.96	4-019	96.00	8	200	0.0125	VCP	0.013	4	2.21		0.0031		0.0110	1.34	0.63	0.08	1.0700	1.0590	0.646	0.635
4-019	95.96	4-020	94.00	12	323	0.0024	VCP	0.013	4	2.21		0.0031		0.0110	0.71	0.83	0.07	1.0700	1.0590	0.837	0.826
4-020	88.00	4-021	85.68	12	277	0.0025	VCP	0.013	4	2.21		0.0083		0.0269	0.94	1.27	0.11	2.9920	2.9651	0.844	0.817
4-021	93.92	4-027	92.70	12	243	0.0020	VCP	0.013	4	2.21		0.0084		0.0273	0.88	1.34	0.11	0.7710	0.7437	0.765	0.737
4-022	92.60	4-023	91.60	8	200	0.0461	VCP	0.013	4	2.21		0.0335		0.0971	4.05	1.31	0.16	0.7640	0.6669	1.240	1.143
4-023	91.50	4-025	90.50	8	200	0.0388	VCP	0.013	4	2.21		0.0338		0.0980	3.82	1.37	0.17	0.7640	0.6660	1.138	1.039
4-024	108.23	4-025	107.10	8	250	0.0114	VCP	0.013	4	2.21		0.0021		0.0074	1.15	0.53	0.07	0.8120	0.8046	0.618	0.610
4-025	107.05	4-026	100.40	8	250	0.0029	VCP	0.013	4	2.21		0.0359		0.1035	1.55	2.69	0.34	2.5440	2.4405	0.312	0.209
4-026	84.79	4-027	81.97	8	250	0.0029	VCP	0.013	4	2.21		0.0385		0.1103	1.58	2.79	0.35	3.5750	3.4647	0.312	0.202
4-027	109.20	4-033	102.50	12	328	0.0025	VCP	0.013	4	2.21		0.0689		0.1885	1.68	3.28	0.27	2.2120	2.0235	0.852	0.663
4-028	94.50	4-029	81.65	8	216	0.0187	VCP	0.013	4	2.21		0.0004		0.0016	0.86	0.23	0.03	2.3950	2.3934	0.789	0.788
4-029	110.00	4-033	103.80	8	300	0.0047	VCP	0.013	4	2.21		0.0008		0.0030	0.64	0.43	0.05	2.6910	2.6880	0.395	0.392
4-030	103.79	4-031	94.26	8	350	0.0229	VCP	0.013	4	2.21		0.0018		0.0066	1.41	0.43	0.05	2.1540	2.1474	0.873	0.867
4-031	94.21	4-032	92.49	8	250	0.0078	VCP	0.013	4	2.21		0.0018		0.0066	0.97	0.55	0.07	1.1210	1.1144	0.511	0.505
4-032	92.44	4-033	82.66	8	250	0.0078	VCP	0.013	4	2.21		0.0037		0.0127	1.18	0.75	0.09	2.9150	2.9023	0.511	0.499
4-033	82.63	4-039	82.01	12	329	0.0071	VCP	0.013	4	2.21		0.0733		0.1996	2.46	2.60	0.22	0.7520	0.5524	1.430	1.231
4-034	105.40	4-035	98.74	8	300	0.0041	VCP	0.013	4	2.21		0.0022		0.0080	0.82	0.70	0.09	1.4700	1.4620	0.368	0.360
4-035	98.54	4-036	97.23	8	250	0.0040	VCP	0.013	4	2.21		0.0035		0.0120	0.92	0.86	0.11	0.7620	0.7500	0.365	0.353
4-036	97.10	4-039	86.40	8	175	0.0057	VCP	0.013	4	2.21		0.0049		0.0165	1.15	0.92	0.11	2.7950	2.7785	0.436	0.420
4-037	107.79	4-038	104.78	8	250	0.0045	VCP	0.013	4	2.21		0.0503		0.1413	1.98	2.83	0.35	1.4900	1.3487	0.388	0.247
4-038	125.98	4-039	104.78	8	150	0.0443	VCP	0.013	4	2.21		0.0550		0.1534	4.58	1.65	0.21	3.4180	3.2646	1.216	1.063
4-039	104.78	4-059	103.91	12	280	0.0101	VCP	0.013	4	2.21		0.1332		0.3459	3.28	3.13	0.26	1.4930	1.1471	1.710	1.364
4-040	103.83	4-060	98.82	8	200	0.0335	VCP	0.013	4	2.21		0.0356		0.1027	3.68	1.45	0.18	1.3490	1.2463	1.057	0.955
4-041	98.73	4-058	97.18	8	327	0.0393	VCP	0.013	4	2.21		0.0471		0.1328	4.20	1.58	0.20	0.8290	0.6962	1.145	1.012
4-042	86.30	4-043	85.10	8	125	0.0496	VCP	0.013	4	2.21		0.0003		0.0011	1.07	0.15	0.02	0.7640	0.7629	1.287	1.286
4-043	85.00	4-044	84.00	8	300	0.0318	VCP	0.013	4	2.21		0.0010		0.0039	1.34	0.31	0.04	0.7640	0.7601	1.030	1.026
4-044	83.90	4-045	81.60	8	200	0.0086	VCP	0.013	4	2.21		0.0028		0.0098	1.13	0.65	0.08	1.1590	1.1492	0.536	0.526
4-045	81.65	4-046	81.53	8	168	0.0582	VCP	0.013	4	2.21		0.0028		0.0098	2.20	0.41	0.05	1.8000	1.7902	1.394	1.384
4-046	81.40	4-058A	78.50	8	160	0.0009	VCP	0.011	4	2.21		0.0032		0.0111	0.54	1.17	0.15	16.9000	16.8889	0.173	0.162
4-047	102.50	4-048	94.50	8	450	0.0148	VCP	0.013	4	2.21		0.0017		0.0063	1.19	0.46	0.06	2.8090	2.8027	0.703	0.696
4-048	126.20	4-049	118.50	8	329	0.0040	VCP	0.013	4	2.21		0.0055		0.0184	1.05	1.05	0.13	2.1210	2.1026	0.365	0.346
4-049	125.54	4-055	104.42	8	200	0.0535	VCP	0.013	4	2.21		0.0121		0.0380	3.22	0.80	0.10	2.8120	2.7740	1.336	1.298

City of El Segundo
Existing Conditions Hydraulic Model Results
Pipes sorted by U/S MH ID

U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (ft^3/s)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)
4-050	106.97	4-052	98.10	8	198	0.0152	VCP	0.013	4	2.21		0.0000		0.0000	0.00	0.00	0.00	3.5990	3.5990	0.712	0.712
4-051	99.30	4-052	98.10	8	265	0.0776	VCP	0.013	4	2.21		0.0042		0.0144	2.73	0.46	0.06	0.7640	0.7496	1.610	1.596
4-052	114.95	4-053	104.00	8	57	0.0153	VCP	0.013	4	2.21		0.0042		0.0144	1.55	0.68	0.09	2.3090	2.2946	0.714	0.699
4-053	98.00	4-054	94.73	8	402	0.0125	VCP	0.013	4	2.21		0.0047		0.0161	1.50	0.75	0.09	1.2070	1.1909	0.645	0.629
4-054	98.06	4-049	94.69	8	329	0.0047	VCP	0.013	4	2.21		0.0063		0.0207	1.15	1.07	0.13	1.2580	1.2373	0.397	0.376
4-055	95.53	4-056	94.73	8	300	0.0040	VCP	0.013	4	2.21		0.0131		0.0410	1.33	1.56	0.19	0.7530	0.7120	0.365	0.324
4-056	94.68	4-057	93.90	8	250	0.0040	VCP	0.013	4	2.21		0.0144		0.0446	1.36	1.62	0.20	0.7490	0.7044	0.365	0.321
4-057	93.85	4-058	93.39	8	250	0.0092	VCP	0.013	4	2.21		0.0152		0.0468	1.85	1.35	0.17	0.7240	0.6772	0.554	0.507
4-058	93.33	4-059	92.80	12	47	0.0102	VCP	0.013	4	2.21		0.0654		0.1797	2.72	2.25	0.19	3.8790	3.6993	1.721	1.541
4-058A	92.75	4-058	92.60	8	160	0.0029	VCP	0.013	4	2.21		0.0032		0.0111	0.81	0.89	0.11	0.7400	0.7289	0.311	0.300
4-059	103.70	WW-004	103.10	12	12	0.0533	VCP	0.013	4	2.21		0.1986		0.4995	6.59	2.48	0.21	0.6960	0.1965	3.931	3.432
4-060	102.85	4-041	101.83	8	148	0.0541	VCP	0.013	4	2.21		0.0458		0.1296	4.67	1.44	0.18	0.7640	0.6344	1.343	1.213
5-001	106.97	5-004	98.10	8	100	0.0887	VCP	0.013	5	1.90		0.0008		0.0026	1.70	0.20	0.03	2.3322	2.3296	1.720	1.718
5-002	99.30	5-004	98.10	8	300	0.0040	VCP	0.013	5	1.90		0.0025		0.0077	0.81	0.69	0.09	0.4953	0.4876	0.365	0.357
5-003	114.95	5-004	104.00	8	300	0.0365	VCP	0.013	5	1.90		0.0020		0.0064	1.64	0.38	0.05	1.4961	1.4897	1.104	1.098
5-004	98.00	5-007	94.73	8	328	0.0100	VCP	0.013	5	1.90		0.0072		0.0204	1.49	0.89	0.11	0.7819	0.7615	0.577	0.556
5-005	98.06	5-007	94.69	8	311	0.0108	VCP	0.013	5	1.90		0.0026		0.0080	1.15	0.56	0.07	0.8152	0.8072	0.601	0.593
5-006	101.32	5-007	100.52	8	206	0.0039	VCP	0.013	5	1.90		0.0017		0.0053	0.71	0.59	0.07	0.4880	0.4827	0.360	0.355
5-007	94.68	5-008	93.90	8	203	0.0038	VCP	0.013	5	1.90		0.0115		0.0313	1.21	1.38	0.17	0.4854	0.4541	0.358	0.327
5-008	93.85	5-009	93.39	8	128	0.0036	VCP	0.013	5	1.90		0.0119		0.0321	1.19	1.42	0.18	0.4694	0.4373	0.346	0.314
5-009	93.33	5-010	92.80	15	147	0.0036	VCP	0.013	5	1.90		0.0159		0.0422	1.19	1.35	0.09	2.5136	2.4714	1.854	1.812
5-010	92.75	5-021	92.60	8	40	0.0038	VCP	0.013	5	1.90		0.0159		0.0422	1.31	1.60	0.20	0.4795	0.4374	0.354	0.311
5-011	103.70	5-012	103.10	8	181	0.0033	VCP	0.013	5	1.90		0.0009		0.0030	0.57	0.46	0.06	0.4509	0.4479	0.333	0.330
5-012	102.85	5-019	101.83	8	255	0.0040	VCP	0.013	5	1.90		0.0036		0.0107	0.89	0.81	0.10	0.4953	0.4846	0.365	0.354
5-013	129.70	5-014	117.20	8	240	0.0521	VCP	0.013	5	1.90		0.0025		0.0078	1.97	0.38	0.05	1.7871	1.7793	1.318	1.311
5-014	117.01	5-018	109.17	8	200	0.0392	VCP	0.013	5	1.90		0.0033		0.0099	1.93	0.46	0.06	1.5504	1.5405	1.144	1.134
5-015	158.00	5-016	152.00	8	239	0.0251	VCP	0.013	5	1.90		0.0016		0.0051	1.34	0.37	0.05	1.2407	1.2357	0.915	0.910
5-016	152.00	5-017	128.00	8	500	0.0480	VCP	0.013	5	1.90		0.0043		0.0126	2.22	0.49	0.06	1.7156	1.7030	1.265	1.253
5-017	128.00	5-018	109.90	8	265	0.0683	VCP	0.013	5	1.90		0.0047		0.0137	2.58	0.47	0.06	2.0465	2.0328	1.510	1.496
5-017	128.00	7-080	106.01	8	262	0.0839	VCP	0.013	7	1.89		0.0013		0.0043	1.94	0.26	0.03	2.2686	2.2644	1.673	1.669
5-018	109.03	5-019	101.75	8	267	0.0273	VCP	0.013	5	1.90		0.0080		0.0224	2.17	0.73	0.09	1.2930	1.2707	0.954	0.932
5-019	101.67	5-020	92.42	8	250	0.0370	VCP	0.013	5	1.90		0.0154		0.0409	2.90	0.91	0.11	1.5063	1.4654	1.111	1.070
5-020	92.32	5-021	91.83	8	81	0.0060	VCP	0.013	5	1.90		0.0161		0.0427	1.55	1.43	0.18	0.6091	0.5664	0.449	0.407
5-021	91.83	5-042	90.75	8	169	0.0064	VCP	0.013	5	1.90		0.0321		0.0803	1.91	1.93	0.24	0.6260	0.5457	0.462	0.382
5-022	158.00	4-048	152.00	8	442	0.0307	VCP	0.013	4	2.21	59	0.0013		0.0047	1.41	0.34	0.04	1.9150	1.9103	1.012	1.007
5-022	112.10	5-023	91.80	8	300	0.0677	VCP	0.013	5	1.90	41	0.0009		0.0028	1.58	0.22	0.03	2.0370	2.0342	1.503	1.501
5-023	91.61	5-042	90.75	8	200	0.0043	VCP	0.013	5	1.90		0.0019		0.0059	0.76	0.60	0.08	0.5135	0.5076	0.379	0.373
5-024	138.21	5-025	132.13	8	211	0.0288	VCP	0.013	5	1.90		0.0022		0.0068	1.54	0.41	0.05	1.3293	1.3225	0.980	0.974
5-025	132.13	5-027	118.40	8	264	0.0520	VCP	0.013	5	1.90		0.0045		0.0130	2.31	0.49	0.06	1.7858	1.7728	1.317	1.304
5-026	157.72	5-027	116.07	8	428	0.0973	VCP	0.013	5	1.90		0.0021		0.0066	2.34	0.31	0.04	2.4428	2.4362	1.802	1.795
5-027	116.07	5-036	96.35	8	290	0.0680	VCP	0.013	5	1.90		0.0080		0.0224	2.99	0.59	0.07	2.0420	2.0197	1.507	1.484
5-028	132.64	5-029	120.60	8	338	0.0356	VCP	0.013	5	1.90		0.0030		0.0089	1.81	0.45	0.06	1.4779	1.4690	1.090	1.081
5-029	120.50	5-033	116.16	8	290	0.0150	VCP	0.013	5	1.90		0.0057		0.0164	1.60	0.73	0.09	0.9580	0.9416	0.706	0.690

City of El Segundo
Existing Conditions Hydraulic Model Results
Pipes sorted by U/S MH ID

U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (ft^3/s)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)
5-030	132.78	5-029	120.60	8	225	0.0541	VCP	0.013	5	1.90		0.0000		0.0000	0.00	0.00	0.00	1.8219	1.8219	1.344	1.344
5-031	127.73	5-032	124.46	8	349	0.0094	VCP	0.013	5	1.90		0.0026		0.0079	1.09	0.58	0.07	0.7580	0.7501	0.559	0.551
5-032	124.14	5-033	116.16	8	338	0.0236	VCP	0.013	5	1.90		0.0045		0.0133	1.76	0.59	0.07	1.2032	1.1900	0.887	0.874
5-033	116.06	5-034	113.48	8	230	0.0112	VCP	0.013	5	1.90		0.0124		0.0334	1.80	1.10	0.14	0.8294	0.7960	0.612	0.579
5-034	113.38	5-035	98.86	8	300	0.0484	VCP	0.013	5	1.90		0.0124		0.0334	2.99	0.77	0.10	1.7228	1.6894	1.271	1.237
5-035	98.86	5-036	96.35	8	314	0.0080	VCP	0.013	5	1.90		0.0162		0.0427	1.72	1.34	0.17	0.7001	0.6574	0.516	0.474
5-036	96.25	5-041	93.78	8	294	0.0084	VCP	0.013	5	1.90		0.0252		0.0644	1.97	1.62	0.20	0.7178	0.6534	0.529	0.465
5-037	108.02	5-038	98.60	8	349	0.0270	VCP	0.013	5	1.90		0.0033		0.0100	1.69	0.50	0.06	1.2865	1.2766	0.949	0.939
5-038	98.50	5-039	96.92	8	393	0.0040	VCP	0.013	5	1.90		0.0033		0.0100	0.87	0.78	0.10	0.4965	0.4866	0.366	0.357
5-039	96.92	5-040	95.35	8	393	0.0040	VCP	0.013	5	1.90		0.0069		0.0194	1.06	1.08	0.14	0.4949	0.4755	0.365	0.346
5-040	95.35	5-041	93.78	8	393	0.0040	VCP	0.013	5	1.90		0.0119		0.0321	1.24	1.38	0.17	0.4949	0.4628	0.365	0.333
5-041	93.68	5-042	90.80	8	299	0.0096	VCP	0.013	5	1.90		0.0380		0.0938	2.31	1.89	0.24	0.7685	0.6748	0.567	0.473
5-042	90.75	5-043	88.78	8	267	0.0074	VCP	0.013	5	1.90		0.0731		0.1713	2.49	2.75	0.34	0.6726	0.5013	0.496	0.325
5-043	88.78	5-046	86.85	8	267	0.0072	VCP	0.013	5	1.90		0.0743		0.1737	2.48	2.79	0.35	0.6658	0.4921	0.491	0.317
5-044	89.53	5-045	88.97	8	139	0.0040		0.013	5	1.90		0.0011		0.0037	0.65	0.49	0.06	0.4965	0.4928	0.366	0.362
5-045	88.97	5-043	88.78	8	48	0.0040	VCP	0.013	5	1.90		0.0011		0.0037	0.64	0.49	0.06	0.4953	0.4916	0.366	0.362
5-046	86.85	5-047	84.84	8	246	0.0082	VCP	0.013	5	1.90		0.0755		0.1763	2.61	2.72	0.34	0.7078	0.5315	0.522	0.346
5-047	84.84	5-050	79.84	8	104	0.0481	VCP	0.013	5	1.90		0.0765		0.1784	4.92	1.74	0.22	1.7170	1.5386	1.267	1.088
5-048	106.07	5-049	81.45	8	300	0.0821	VCP	0.013	5	1.90		0.0014		0.0046	1.98	0.27	0.03	2.2433	2.2387	1.655	1.651
5-049	81.43	5-050	79.35	8	350	0.0059	VCP	0.013	5	1.90		0.0037		0.0111	1.03	0.75	0.09	0.6037	0.5926	0.445	0.434
5-050	79.84	5-112	75.28	8	96	0.0475	VCP	0.013	5	1.90		0.0802		0.1865	4.96	1.79	0.22	1.7067	1.5202	1.259	1.073
5-051	116.74	5-052	114.24	8	115	0.0217	VCP	0.013	5	1.90		0.0008		0.0026	1.05	0.28	0.04	1.1546	1.1519	0.852	0.849
5-052	114.14	5-108	96.50	8	200	0.0882	VCP	0.013	5	1.90		0.0014		0.0045	2.01	0.26	0.03	2.3256	2.3211	1.716	1.711
5-053	116.11	5-055	113.99	8	141	0.0150	VCP	0.013	5	1.90		0.0021		0.0066	1.22	0.47	0.06	0.9602	0.9536	0.708	0.702
5-054	120.14	5-055	114.24	8	410	0.0144	VCP	0.013	5	1.90		0.0092		0.0255	1.81	0.91	0.11	0.9394	0.9139	0.693	0.667
5-055	113.99	5-056	112.13	8	124	0.0150	VCP	0.013	5	1.90		0.0124		0.0334	1.99	1.02	0.13	0.9591	0.9257	0.708	0.674
5-056	112.03	5-057	109.90	8	315	0.0068	VCP	0.013	5	1.90		0.0157		0.0415	1.60	1.38	0.17	0.6439	0.6024	0.475	0.434
5-057	109.80	5-058	108.46	8	335	0.0040	VCP	0.013	5	1.90		0.0170		0.0447	1.36	1.62	0.20	0.4953	0.4506	0.365	0.320
5-058	108.36	5-059	102.75	8	300	0.0187	VCP	0.013	5	1.90		0.0195		0.0508	2.44	1.19	0.15	1.0708	1.0200	0.790	0.739
5-059	102.64	5-108	96.52	8	300	0.0204	VCP	0.013	5	1.90		0.0222		0.0572	2.60	1.23	0.15	1.1185	1.0613	0.825	0.768
5-060	118.40	5-063	114.10	8	250	0.0172	VCP	0.013	5	1.90		0.0028		0.0086	1.39	0.52	0.07	1.0270	1.0184	0.757	0.749
5-061	115.24	5-063	114.10	8	285	0.0040	VCP	0.013	5	1.90		0.0013		0.0043	0.68	0.53	0.07	0.4953	0.4909	0.365	0.361
5-062	114.84	5-063	114.10	8	185	0.0040	VCP	0.013	5	1.90		0.0007		0.0024	0.56	0.40	0.05	0.4953	0.4929	0.365	0.363
5-063	114.02	5-064	112.70	8	335	0.0039	VCP	0.013	5	1.90		0.0060		0.0170	1.02	1.02	0.13	0.4916	0.4745	0.363	0.346
5-064	112.65	5-065	103.95	8	300	0.0290	VCP	0.013	5	1.90		0.0085		0.0236	2.26	0.74	0.09	1.3335	1.3099	0.984	0.960
5-065	103.88	5-067	98.83	8	287	0.0176	VCP	0.013	5	1.90		0.0110		0.0300	2.04	0.93	0.12	1.0387	1.0087	0.767	0.736
5-066	99.90	5-067	98.93	8	221	0.0044	VCP	0.013	5	1.90		0.0008		0.0027	0.60	0.41	0.05	0.5188	0.5161	0.383	0.380
5-067	98.83	5-114	98.60	8	13	0.0177	VCP	0.013	5	1.90		0.0118		0.0320	2.08	0.96	0.12	1.0416	1.0096	0.768	0.736
5-068	108.40	5-069	106.96	8	359	0.0040	VCP	0.013	5	1.90		0.0034		0.0101	0.88	0.79	0.10	0.4960	0.4858	0.366	0.356
5-069	106.96	5-079	97.02	8	345	0.0288	VCP	0.013	5	1.90		0.0057		0.0164	2.02	0.62	0.08	1.3292	1.3128	0.980	0.964
5-070	106.12	5-071	99.80	8	304	0.0208	VCP	0.013	5	1.90		0.0026		0.0080	1.45	0.48	0.06	1.1291	1.1211	0.833	0.825
5-071	99.80	5-077	98.44	8	340	0.0040	VCP	0.013	5	1.90		0.0055		0.0160	1.00	0.98	0.12	0.4953	0.4793	0.365	0.349
5-072	112.13	5-073	106.78	8	267	0.0200	VCP	0.013	5	1.90		0.0000		0.0000	0.00	0.00	0.00	1.1085	1.1085	0.818	0.818

City of El Segundo
Existing Conditions Hydraulic Model Results
Pipes sorted by U/S MH ID

U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (ft^3/s)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)
5-073	106.68	5-076	105.30	8	346	0.0040	VCP	0.013	5	1.90		0.0000		0.0000	0.00	0.00	0.00	0.4945	0.4945	0.365	0.365
5-074	111.58	5-075	100.14	8	307	0.0373	VCP	0.013	5	1.90	62	0.0004		0.0014	1.04	0.19	0.02	1.5116	1.5102	1.115	1.113
5-074	111.58	5-085	95.00	8	300	0.0553	VCP	0.013	5	1.90	38	0.0003		0.0009	1.03	0.14	0.02	1.8409	1.8401	1.605	1.604
5-075	99.65	5-076	98.98	8	167	0.0040	VCP	0.013	5	1.90		0.0004		0.0015	0.49	0.32	0.04	0.4960	0.4945	0.366	0.364
5-076	98.98	5-077	98.34	8	160	0.0040	VCP	0.013	5	1.90		0.0004		0.0015	0.49	0.32	0.04	0.4953	0.4938	0.365	0.364
5-077	98.34	5-079	97.12	8	306	0.0040	VCP	0.013	5	1.90		0.0090		0.0250	1.15	1.22	0.15	0.4945	0.4694	0.365	0.339
5-078	106.08	5-077	98.44	8	329	0.0232	VCP	0.013	5	1.90	62	0.0031		0.0090	1.56	0.49	0.06	1.1933	1.1843	0.880	0.871
5-078	106.80	5-084	96.68	8	290	0.0349	VCP	0.013	5	1.90	38	0.0019		0.0055	1.55	0.36	0.04	1.4628	1.4573	1.079	1.074
5-079	97.02	5-080	95.89	8	283	0.0040	VCP	0.013	5	1.90		0.0159		0.0421	1.34	1.58	0.20	0.4948	0.4527	0.365	0.323
5-080	95.89	5-081	94.76	8	283	0.0040	VCP	0.013	5	1.90		0.0185		0.0484	1.39	1.69	0.21	0.4948	0.4465	0.365	0.317
5-081	94.76	5-083	86.79	8	273	0.0292	VCP	0.013	5	1.90		0.0205		0.0532	2.89	1.09	0.14	1.3380	1.2848	0.987	0.934
5-082	89.62	5-083	86.79	8	211	0.0134	VCP	0.013	5	1.90		0.0002		0.0006	0.56	0.16	0.02	0.9069	0.9063	0.669	0.668
5-083	86.79	5-103	86.50	10	10	0.0290	VCP	0.013	5	1.90		0.0207		0.0536	2.80	1.03	0.10	2.4179	2.3643	1.784	1.730
5-084	96.68	5-096	84.15	8	290	0.0432	VCP	0.013	5	1.90		0.0042		0.0124	2.13	0.50	0.06	1.6277	1.6153	1.201	1.188
5-085	111.58	5-086	95.00	8	300	0.0553	VCP	0.013	5	1.90		0.0024		0.0073	1.97	0.36	0.05	1.8409	1.8337	1.358	1.351
5-086	94.89	5-090	82.46	8	300	0.0414	VCP	0.013	5	1.90		0.0052		0.0152	2.23	0.55	0.07	1.5940	1.5788	1.176	1.160
5-087	115.16	5-088	100.90	8	272	0.0524	VCP	0.013	5	1.90		0.0023		0.0071	1.93	0.37	0.05	1.7930	1.7859	1.323	1.316
5-088	100.80	5-089	83.50	8	250	0.0692	VCP	0.013	5	1.90		0.0038		0.0112	2.43	0.42	0.05	2.0600	2.0488	1.519	1.508
5-089	83.40	5-090	82.10	8	350	0.0037	VCP	0.013	5	1.90		0.0074		0.0208	1.06	1.14	0.14	0.4772	0.4564	0.352	0.331
5-090	82.36	5-091	81.08	8	328	0.0039	VCP	0.013	5	1.90		0.0127		0.0341	1.25	1.43	0.18	0.4892	0.4551	0.361	0.327
5-091	81.08	5-096	81.00	8	21	0.0038	VCP	0.013	5	1.90		0.0127		0.0341	1.24	1.44	0.18	0.4833	0.4492	0.357	0.323
5-092	119.82	5-093	116.78	8	350	0.0087	VCP	0.013	5	1.90		0.0047		0.0136	1.25	0.76	0.09	0.7298	0.7162	0.538	0.525
5-093	116.68	5-094	90.57	8	322	0.0811	VCP	0.013	5	1.90		0.0073		0.0207	3.10	0.54	0.07	2.2299	2.2092	1.645	1.624
5-094	90.47	5-095	87.59	8	230	0.0125	VCP	0.013	5	1.90		0.0089		0.0246	1.70	0.92	0.12	0.8763	0.8517	0.646	0.622
5-095	87.54	5-096	86.00	8	120	0.0128	VCP	0.013	5	1.90		0.0096		0.0265	1.76	0.95	0.12	0.8871	0.8606	0.655	0.628
5-096	81.00	5-103	79.79	8	310	0.0039	VCP	0.013	5	1.90		0.0280		0.0707	1.54	2.06	0.26	0.4892	0.4185	0.361	0.290
5-097	128.00	5-098	120.68	8	350	0.0209	VCP	0.013	5	1.90		0.0029		0.0087	1.49	0.50	0.06	1.1325	1.1238	0.836	0.827
5-098	120.58	5-101	100.62	8	304	0.0657	VCP	0.013	5	1.90		0.0041		0.0122	2.46	0.45	0.06	2.0065	1.9943	1.480	1.468
5-099	120.95	5-098	120.65	8	100	0.0030	VCP	0.013	5	1.90		0.0013		0.0042	0.60	0.56	0.07	0.4289	0.4247	0.317	0.313
5-100	100.95	5-101	100.62	8	108	0.0031	VCP	0.013	5	1.90		0.0016		0.0051	0.65	0.61	0.08	0.4329	0.4278	0.319	0.314
5-101	92.27	5-103	86.25	8	289	0.0208	VCP	0.013	5	1.90		0.0089		0.0245	2.03	0.82	0.10	1.1302	1.1056	0.834	0.809
5-102	99.52	5-101	92.52	8	350	0.0200	VCP	0.013	5	1.90		0.0026		0.0081	1.43	0.49	0.06	1.1074	1.0993	0.817	0.809
5-103	79.79	5-107	78.30	8	372	0.0040	VCP	0.013	5	1.90		0.0575		0.1373	1.88	2.88	0.36	0.4956	0.3583	0.366	0.229
5-104	106.20	5-114	98.68	8	376	0.0200	VCP	0.013	5	1.90		0.0026		0.0079	1.42	0.48	0.06	1.1074	1.0995	0.817	0.809
5-105	100.67	5-106	85.13	8	230	0.0676	VCP	0.013	5	1.90		0.0017		0.0053	1.92	0.30	0.04	2.0355	2.0302	1.501	1.496
5-106	85.04	5-107	83.03	8	150	0.0134	VCP	0.013	5	1.90		0.0029		0.0088	1.28	0.56	0.07	0.9065	0.8977	0.669	0.660
5-107	78.30	5-111	76.99	8	327	0.0040	VCP	0.013	5	1.90		0.0657		0.1552	1.94	3.08	0.38	0.4956	0.3404	0.366	0.211
5-108	96.42	5-109	87.50	8	278	0.0321	VCP	0.013	5	1.90		0.0425		0.1039	3.64	1.47	0.18	1.4027	1.2988	1.035	0.931
5-109	87.42	5-110	80.39	8	285	0.0247	VCP	0.013	5	1.90		0.0449		0.1094	3.37	1.61	0.20	1.2299	1.1205	0.907	0.798
5-110	80.31	5-111	76.93	8	285	0.0119	VCP	0.013	5	1.90		0.0471		0.1143	2.63	1.98	0.25	0.8528	0.7384	0.629	0.515
5-111	76.65	5-112	75.12	8	254	0.0060	VCP	0.013	5	1.90		0.1142		0.2582	2.58	3.64	0.46	0.6078	0.3496	0.446	0.188
5-112	75.12	WW-005	74.20	12	20	0.0460	VCP	0.013	5	1.90		0.1944		0.4212	5.95	2.37	0.20	4.9518	4.5307	3.653	3.232
5-113	99.82	5-114	98.70	8	227	0.0049	VCP	0.013	5	1.90		0.0014		0.0045	0.74	0.52	0.06	0.5500	0.5455	0.406	0.401

City of El Segundo
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U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (ft^3/s)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)
5-114	98.60	5-108	96.76	8	373	0.0049	VCP	0.013	5	1.90		0.0165		0.0435	1.46	1.52	0.19	0.5500	0.5065	0.406	0.362
5-115	111.00	5-116	99.92	8	352	0.0315	VCP	0.013	Imp 15"	1.87		0.0101		0.0273	2.43	0.78	0.10	1.3893	1.3620	1.025	0.998
5-116	99.79	5-117	99.28	8	139	0.0037	VCP	0.013	Imp 15"	1.87		0.0101		0.0273	1.14	1.30	0.16	0.4743	0.4470	0.350	0.322
5-117	99.18	5-118	97.72	8	370	0.0039	VCP	0.013	Imp 15"	1.87		0.0101		0.0273	1.17	1.28	0.16	0.4919	0.4646	0.363	0.335
5-118	97.62	5-119	96.24	8	350	0.0039	VCP	0.013	Imp 15"	1.87		0.0101		0.0273	1.17	1.28	0.16	0.4917	0.4644	0.363	0.335
5-119	96.14	5-120	94.76	8	350	0.0039	VCP	0.013	Imp 15"	1.87		0.0101		0.0273	1.17	1.28	0.16	0.4917	0.4644	0.363	0.335
5-120	94.40	5-121	93.62	15	338	0.0023	VCP	0.013	Imp 15"	1.87		0.2046		0.4343	2.02	4.73	0.32	2.0110	1.5767	1.483	1.049
5-121	93.52	5-122	92.69	15	370	0.0022	VCP	0.013	Imp 15"	1.87		0.2046		0.4343	2.00	4.77	0.32	1.9827	1.5484	1.463	1.028
5-122	92.59	5-123	91.78	15	360	0.0023	VCP	0.013	Imp 15"	1.87		0.2046		0.4343	2.00	4.77	0.32	1.9857	1.5514	1.465	1.030
5-123	91.68	5-124	90.87	15	360	0.0023	VCP	0.013	Imp 15"	1.87		0.2046		0.4343	2.00	4.77	0.32	1.9857	1.5514	1.465	1.030
5-124	90.77	5-125	89.96	15	360	0.0023	VCP	0.013	Imp 15"	1.87		0.2046		0.4343	2.00	4.77	0.32	1.9857	1.5514	1.465	1.030
5-125	89.86	5-126	89.05	15	360	0.0023	VCP	0.013	Imp 15"	1.87		0.2046		0.4343	2.00	4.77	0.32	1.9857	1.5514	1.465	1.030
5-126	88.95	5-127	88.14	15	360	0.0023	VCP	0.013	Imp 15"	1.87		0.2046		0.4343	2.00	4.77	0.32	1.9857	1.5514	1.465	1.030
5-127	88.04	5-128	87.20	15	376	0.0022	VCP	0.013	Imp 15"	1.87		0.2046		0.4343	2.00	4.77	0.32	1.9786	1.5443	1.459	1.025
5-128	87.10	5-129	86.56	15	240	0.0023	VCP	0.013	Imp 15"	1.87		0.2046		0.4343	2.00	4.77	0.32	1.9857	1.5514	1.465	1.030
5-129	86.46	5-130	85.88	15	261	0.0022	VCP	0.013	Imp 15"	1.87		0.2046		0.4343	2.00	4.78	0.32	1.9734	1.5391	1.456	1.021
5-130	85.68	5-131	85.65	15	17	0.0018	VCP	0.013	Imp 15"	1.87		0.2046		0.4343	1.84	5.08	0.34	1.7585	1.3242	1.297	0.863
5-131	85.45	5-132	84.59	15	315	0.0027	VCP	0.013	Imp 15"	1.87		0.2046		0.4343	2.15	4.53	0.30	2.1873	1.7530	1.614	1.180
5-132	84.49	5-133	83.70	15	350	0.0023	VCP	0.013	Imp 15"	1.87		0.2046		0.4343	2.01	4.76	0.32	1.9888	1.5545	1.467	1.033
5-133	83.60	5-134	82.81	15	350	0.0023	VCP	0.013	Imp 15"	1.87		0.2046		0.4343	2.01	4.76	0.32	1.9888	1.5545	1.467	1.033
5-134	82.71	5-135	81.91	15	355	0.0023	VCP	0.013	Imp 15"	1.87		0.2046		0.4343	2.01	4.76	0.32	1.9872	1.5529	1.466	1.032
5-135	81.81	5-136	81.21	15	270	0.0022	VCP	0.013	Imp 15"	1.87		0.2046		0.4343	2.00	4.78	0.32	1.9734	1.5391	1.456	1.021
5-136	81.11	T-532	78.85	15	110	0.0205	VCP	0.013	Imp 15"	1.87		0.2046		0.4343	4.40	2.73	0.18	5.9990	5.5647	4.421	3.986
5-503	88.58	5-049	88.10	8	115	0.0042	VCP	0.013	5	1.90		0.0012		0.0038	0.66	0.49	0.06	0.5059	0.5021	0.373	0.369
5-504	158.50	5-015	158.00	8	50	0.0100	VCP	0.013	5	1.90		0.0002		0.0009	0.58	0.21	0.03	0.7831	0.7822	0.578	0.577
5-914	120.00	5-115	111.10	8	361	0.0247	VCP	0.013	Imp 15"	1.87		0.0101		0.0278	2.24	0.83	0.10	1.2295	1.2018	0.907	0.879
6-001	106.60	6-002	104.40	8	550	0.0040	VCP	0.013	6	1.46		0.0023		0.0054	0.73	0.59	0.07	0.4953	0.4898	0.365	0.360
6-002	104.30	6-003	93.55	8	275	0.0391	VCP	0.013	6	1.46		0.0097		0.0205	2.40	0.64	0.08	1.5483	1.5277	1.142	1.122
6-003	93.39	6-018	87.39	8	250	0.0240	VCP	0.013	6	1.46		0.0146		0.0299	2.27	0.87	0.11	1.2131	1.1832	0.895	0.865
6-004	94.20	6-005	89.49	8	150	0.0314	VCP	0.013	6	1.46		0.0001		0.0003	0.63	0.10	0.01	1.3876	1.3873	1.024	1.023
6-005	89.44	6-007	89.03	8	190	0.0022	VCP	0.013	6	1.46		0.0042		0.0096	0.69	0.89	0.11	0.3638	0.3542	0.268	0.259
6-006	98.84	6-007	89.03	8	210	0.0467	VCP	0.013	6	1.46		0.0047		0.0105	2.08	0.45	0.06	1.6925	1.6820	1.249	1.238
6-007	88.87	6-019A	86.99	8	272	0.0069	VCP	0.013	6	1.46		0.0114		0.0238	1.37	1.05	0.13	0.6510	0.6272	0.480	0.456
6-008	110.55	6-009	96.91	8	275	0.0496	VCP	0.013	6	1.46		0.0026		0.0062	1.81	0.35	0.04	1.7440	1.7378	1.287	1.281
6-009	93.20	6-015	88.06	8	210	0.0245	VCP	0.013	6	1.46		0.0186		0.0374	2.44	0.96	0.12	1.2251	1.1877	0.904	0.866
6-010	111.33	6-011	103.52	8	315	0.0248	VCP	0.013	6	1.46		0.0036		0.0083	1.56	0.47	0.06	1.2330	1.2247	0.909	0.901
6-011	103.48	6-012	95.22	8	300	0.0275	VCP	0.013	6	1.46		0.0077		0.0166	1.99	0.63	0.08	1.2994	1.2828	0.958	0.941
6-012	95.20	6-014	94.40	8	200	0.0040	VCP	0.013	6	1.46		0.0096		0.0204	1.08	1.11	0.14	0.4953	0.4749	0.365	0.345
6-013	98.28	6-014	94.40	8	183	0.0212	VCP	0.013	6	1.46		0.0026		0.0061	1.34	0.42	0.05	1.1402	1.1341	0.842	0.835
6-014	94.33	6-009	93.26	8	267	0.0040	VCP	0.013	6	1.46		0.0150		0.0307	1.22	1.35	0.17	0.4957	0.4651	0.366	0.335
6-015	87.94	6-018	87.14	8	200	0.0040	VCP	0.013	6	1.46		0.0207		0.0411	1.33	1.56	0.19	0.4953	0.4541	0.365	0.324
6-016	88.00	6-017	87.39	8	85	0.0072		0.013	6	1.46		0.0005		0.0014	0.59	0.28	0.03	0.6634	0.6619	0.490	0.488
6-017	87.39	6-018	86.96	8	19	0.0231		0.013	6	1.46		0.0005		0.0014	0.89	0.21	0.03	1.1893	1.1879	0.878	0.877

City of El Segundo
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Pipes sorted by U/S MH ID

U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (ft^3/s)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)
6-018	86.96	6-019	86.80	8	23	0.0070	VCP	0.013	6	1.46		0.0358		0.0682	1.87	1.75	0.22	0.6531	0.5849	0.482	0.414
6-019	86.99	WW-006	82.00	8	10	0.4990		0.013	6	1.46		0.0472		0.0880	9.06	0.70	0.09	5.5316	5.4437	4.080	3.992
6-019A	88.87	6-019	86.99	8	272	0.0069	VCP	0.013	6	1.46		0.0114		0.0238	1.37	1.05	0.13	0.6510	0.6272	0.480	0.456
7-001	112.79	7-002	101.00	8	212	0.0556	VCP	0.013	7	1.89		0.0018		0.0057	1.84	0.33	0.04	1.8467	1.8410	4.080	4.074
7-002	96.29	7-003	95.23	8	262	0.0040	VCP	0.013	7	1.89		0.0033		0.0100	0.87	0.78	0.10	0.4981	0.4881	0.368	0.358
7-003	95.13	7-009	94.32	8	197	0.0041	VCP	0.013	7	1.89		0.0044		0.0129	0.95	0.88	0.11	0.5021	0.4893	0.370	0.357
7-004	120.77	5-092	119.92	8	214	0.0040	VCP	0.011	5	1.90	49	0.0014		0.0042	0.67	0.53	0.07	0.4935	0.4893	0.364	0.360
7-004	120.66	7-006	114.15	8	300	0.0217	VCP	0.013	7	1.89	51	0.0015		0.0044	1.22	0.36	0.04	1.1535	1.1491	0.851	0.847
7-005	30.50	7-006	26.62	8	92	0.0422	VCP	0.013	7	1.89		0.0003		0.0010	0.98	0.16	0.02	1.6081	1.6071	1.187	1.186
7-006	114.10	7-007	104.23	8	290	0.0340	VCP	0.013	7	1.89		0.0025		0.0077	1.70	0.42	0.05	1.4447	1.4370	1.066	1.058
7-007	104.13	7-008	101.53	8	210	0.0124	VCP	0.013	7	1.89		0.0031		0.0094	1.27	0.58	0.07	0.8713	0.8620	0.643	0.634
7-008	101.43	7-009	99.02	8	200	0.0121	VCP	0.013	7	1.89		0.0042		0.0123	1.36	0.67	0.08	0.8596	0.8473	0.634	0.622
7-009	94.22	7-011	93.61	8	153	0.0040	VCP	0.013	7	1.89		0.0086		0.0238	1.13	1.19	0.15	0.4945	0.4706	0.365	0.341
7-010	96.29	7-011	94.95	8	336	0.0040		0.013	7	1.89		0.0023		0.0070	0.78	0.67	0.08	0.4945	0.4875	1.077	1.070
7-011	93.61	7-029	93.00	8	154	0.0040	VCP	0.013	7	1.89		0.0109		0.0296	1.20	1.33	0.17	0.4928	0.4633	0.364	0.334
7-012	129.24	7-013	124.40	8	350	0.0138	VCP	0.013	7	1.89		0.0009		0.0029	0.92	0.33	0.04	0.9209	0.9180	0.679	0.676
7-013	124.30	7-018	118.01	8	161	0.0391	VCP	0.013	7	1.89		0.0013		0.0041	1.47	0.30	0.04	1.5478	1.5437	1.142	1.138
7-014	163.00	7-015	158.39	8	285	0.0162	VCP	0.013	7	1.89		0.0016		0.0052	1.16	0.41	0.05	0.9959	0.9908	0.735	0.730
7-015	158.34	7-016	123.83	8	362	0.0953	VCP	0.013	7	1.89		0.0032		0.0094	2.59	0.36	0.05	2.4178	2.4084	1.784	1.774
7-016	123.83	7-017	122.13	8	400	0.0043	VCP	0.013	7	1.89		0.0055		0.0158	1.02	0.97	0.12	0.5105	0.4947	0.377	0.361
7-017	122.13	7-018	118.15	8	158	0.0252	VCP	0.013	7	1.89		0.0055		0.0158	1.90	0.63	0.08	1.2428	1.2270	0.917	0.901
7-018	118.00	7-019	112.00	8	160	0.0375	-	0.013	7	1.89		0.0070		0.0198	2.34	0.64	0.08	1.5164	1.4966	1.119	1.099
7-019	106.24	7-035	105.94	8	75	0.0040	VCP	0.013	7	1.89		0.0092		0.0254	1.15	1.23	0.15	0.4953	0.4698	0.365	0.340
7-020	107.20	7-019	106.24	8	240	0.0040	VCP	0.013	7	1.89		0.0022		0.0068	0.78	0.65	0.08	0.4953	0.4885	0.365	0.358
7-021	113.00	7-020	107.20	8	205	0.0283	VCP	0.013	7	1.89		0.0002		0.0008	0.79	0.15	0.02	1.3172	1.3164	0.971	0.971
7-021	113.00	7-043	81.00	8	237	0.1350	VCP	0.013	7	1.89		0.0034		0.0101	2.98	0.35	0.04	2.8774	2.8673	2.122	2.112
7-022	122.00	7-021	113.00	8	228	0.0395	-	0.013	7	1.89	19	0.0002		0.0007	0.85	0.13	0.02	1.5558	1.5551	1.148	1.147
7-022	122.00	7-023	121.00	8	122	0.0082	-	0.013	7	1.89	81	0.0009		0.0029	0.77	0.37	0.05	0.7090	0.7061	0.523	0.520
7-023	121.00	7-027	118.00	8	350	0.0086	VCP	0.013	7	1.89		0.0031		0.0092	1.11	0.63	0.08	0.7250	0.7158	0.535	0.526
7-024	123.00	12-016	121.00	8	50	0.0400	VCP	0.013	7	1.89	9	0.0001		0.0002	0.00	0.00	0.00	1.5662	1.5660	1.156	1.155
7-024	123.00	7-027	121.00	8	225	0.0089	VCP	0.013	7	1.89	91	0.0006		0.0020	0.70	0.30	0.04	0.7383	0.7363	0.545	0.543
7-025	151.00	7-026	142.00	8	155	0.0581	VCP	0.013	7	1.89		0.0010		0.0033	1.58	0.25	0.03	1.8869	1.8836	1.392	1.389
7-026	142.00	7-027	118.00	8	350	0.0686	VCP	0.013	7	1.89		0.0030		0.0092	2.28	0.39	0.05	2.0506	2.0414	1.513	1.504
7-027	118.00	7-028	95.00	8	300	0.0767	VCP	0.013	7	1.89		0.0073		0.0204	3.03	0.55	0.07	2.1682	2.1479	1.600	1.579
7-028	95.00	7-029	93.00	8	153	0.0131	VCP	0.013	7	1.89		0.0080		0.0222	1.68	0.87	0.11	0.8953	0.8731	0.661	0.638
7-029	93.00	7-030	85.30	8	185	0.0416	VCP	0.013	7	1.89		0.0198		0.0512	3.23	0.98	0.12	1.5976	1.5464	1.179	1.128
7-030	85.30	7-034	84.80	10	165	0.0030	VCP	0.013	7	1.89		0.0214		0.0551	1.28	1.80	0.18	0.7816	0.7265	0.577	0.521
7-031	107.28	7-032	87.15	8	143	0.1408	VCP	0.013	7	1.89		0.0000		0.0000	0.00	0.00	0.00	2.9380	2.9380	2.168	2.168
7-032	87.15	7-033	85.38	8	177	0.0100	VCP	0.013	7	1.89		0.0004		0.0014	0.66	0.25	0.03	0.7831	0.7817	0.578	0.576
7-033	85.38	7-034	85.10	8	28	0.0100	VCP	0.013	7	1.89		0.0111		0.0300	1.67	1.07	0.13	0.7831	0.7531	0.578	0.548
7-034	84.81	7-036	83.76	10	350	0.0030	VCP	0.013	7	1.89		0.0325		0.0808	1.43	2.18	0.22	0.7777	0.6968	0.574	0.493
7-035	105.94	7-033	85.10	8	280	0.0744	VCP	0.013	7	1.89		0.0107		0.0290	3.34	0.65	0.08	2.1364	2.1073	1.576	1.547
7-036	83.76	7-038	82.70	10	350	0.0030	VCP	0.013	7	1.89		0.0334		0.0828	1.44	2.20	0.22	0.7814	0.6986	0.577	0.494

City of El Segundo
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U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (ft^3/s)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)
7-037	113.00	7-040	102.00	8	245	0.0449	VCP	0.013	7	1.89		0.0004		0.0015	1.13	0.18	0.02	1.6593	1.6578	1.224	1.223
7-038	82.70	7-041	80.54	8	237	0.0091	VCP	0.013	7	1.89		0.0345		0.0855	2.20	1.83	0.23	0.7476	0.6621	0.551	0.466
7-039	124.50	7-040	100.00	8	275	0.0891	VCP	0.013	7	1.89		0.0006		0.0022	1.61	0.19	0.02	2.3373	2.3351	1.724	1.722
7-040	100.00	7-041	86.64	8	229	0.0583	VCP	0.013	7	1.89		0.0011		0.0035	1.61	0.26	0.03	1.8914	1.8879	1.395	1.392
7-041	80.54	7-046	77.99	10	215	0.0119	VCP	0.013	7	1.89		0.0366		0.0902	2.39	1.64	0.16	1.5463	1.4561	1.141	1.051
7-042	119.40	7-021	113.00	8	605	0.0106	VCP	0.013	7	1.89		0.0034		0.0101	1.23	0.63	0.08	0.8054	0.7953	0.594	0.584
7-043	81.00	7-046	78.11	8	113	0.0256	VCP	0.013	7	1.89		0.0052		0.0150	1.88	0.62	0.08	1.2523	1.2373	0.924	0.909
7-044	157.00	7-045	130.00	8	437	0.0618	VCP	0.013	7	1.89		0.0022		0.0068	2.01	0.34	0.04	1.9465	1.9397	1.436	1.429
7-045	130.00	7-048	88.50	8	453	0.0916	VCP	0.013	7	1.89		0.0035		0.0103	2.62	0.38	0.05	2.3702	2.3598	1.748	1.738
7-046	78.11	7-048	77.06	10	350	0.0030	VCP	0.013	7	1.89		0.0418		0.1019	1.53	2.45	0.24	0.7777	0.6757	0.574	0.472
7-047	125.00	7-048	85.50	8	472	0.0837	VCP	0.013	7	1.89		0.0020		0.0062	2.17	0.31	0.04	2.2653	2.2592	1.671	1.665
7-048	77.06	7-051	65.87	10	350	0.0320	VCP	0.013	7	1.89		0.0473		0.1141	3.64	1.44	0.14	2.5387	2.4246	1.873	1.759
7-049	108.00	7-050	82.00	8	220	0.1182	VCP	0.013	7	1.89		0.0013		0.0043	2.19	0.24	0.03	2.6920	2.6878	1.986	1.982
7-050	82.00	7-051	65.87	8	200	0.0807	VCP	0.013	7	1.89		0.0013		0.0043	1.91	0.26	0.03	2.2239	2.2196	1.640	1.636
7-051	65.87	7-059A	65.68	10	62	0.0030		0.013	7	1.89		0.0496		0.1192	1.60	2.65	0.26	0.7771	0.6579	0.573	0.454
7-052	95.00	7-053	72.50	8	220	0.1023	-	0.013	7	1.89		0.0012		0.0039	2.01	0.24	0.03	2.5043	2.5004	1.848	1.844
7-053	70.00	7-059C	64.80	8	200	0.0260	-	0.013	7	1.89		0.0012		0.0039	1.25	0.32	0.04	1.2627	1.2588	0.931	0.927
7-054	73.01	7-055	71.89	8	274	0.0041	VCP	0.013	7	1.89		0.0005		0.0018	0.52	0.35	0.04	0.5007	0.4989	0.369	0.367
7-055	71.79	7-057	70.73	8	263	0.0040	VCP	0.013	7	1.89		0.0005		0.0018	0.52	0.35	0.04	0.4971	0.4953	0.366	0.365
7-056	71.30	7-057	70.73	8	20	0.0285	-	0.013	7	1.89		0.0016		0.0050	1.40	0.36	0.04	1.3220	1.3170	0.975	0.970
7-057	71.30	7-058	66.00	8	185	0.0286	-	0.013	7	1.89		0.0021		0.0065	1.52	0.40	0.05	1.3254	1.3190	0.978	0.971
7-058	66.00	7-059C	64.80	8	182	0.0066	-	0.013	7	1.89		0.0021		0.0065	0.91	0.57	0.07	0.6357	0.6292	0.492	0.486
7-059A	65.68	7-059B	65.63	10	18	0.0030		0.013	7	1.89		0.0496		0.1192	1.59	2.65	0.26	0.7766	0.6574	0.573	0.454
7-059B	65.63	7-059C	64.80	10	277	0.0030		0.013	7	1.89		0.0496		0.1192	1.60	2.65	0.26	0.7774	0.6582	0.575	0.456
7-059C	64.80	7-059D	64.56	10	109	0.0022		0.013	7	1.89		0.0529		0.1264	1.45	2.95	0.30	0.6657	0.5394	0.491	0.365
7-059D	64.56	7-059E	64.51	10	22	0.0022		0.013	7	1.89		0.0529		0.1264	1.45	2.95	0.30	0.6652	0.5388	0.491	0.365
7-059E	64.51	7-147	64.00	10	229	0.0022	VCP	0.013	7	1.89		0.0529		0.1264	1.46	2.94	0.29	0.6694	0.5430	0.494	0.367
7-060	160.00	7-061	158.00	8	150	0.0133	VCP	0.013	7	1.89		0.0006		0.0021	0.82	0.28	0.04	0.9042	0.9022	0.667	0.665
7-061	158.00	7-062	129.00	8	453	0.0640	VCP	0.013	7	1.89		0.0015		0.0048	1.83	0.29	0.04	1.9813	1.9765	1.462	1.457
7-062	129.00	7-063	113.50	8	350	0.0443	VCP	0.013	7	1.89		0.0030		0.0091	1.96	0.43	0.05	1.6479	1.6388	1.216	1.207
7-063	113.50	7-064	96.50	8	355	0.0479	VCP	0.013	7	1.89		0.0034		0.0100	2.07	0.44	0.05	1.7136	1.7036	1.264	1.254
7-064	96.50	7-145	74.94	8	360	0.0599	VCP	0.013	7	1.89		0.0038		0.0111	2.31	0.44	0.05	1.9164	1.9053	1.413	1.402
7-065	124.00	7-066	112.00	8	134	0.0894	-	0.013	7	1.89		0.0018		0.0057	2.17	0.29	0.04	2.3416	2.3359	1.727	1.721
7-066	112.00	7-067	106.77	8	224	0.0234	-	0.013	7	1.89		0.0022		0.0069	1.44	0.44	0.05	1.1971	1.1902	0.884	0.877
7-067	106.77	7-071	106.00	8	192	0.0040	VCP	0.013	7	1.89		0.0022		0.0069	0.78	0.66	0.08	0.4959	0.4890	0.366	0.359
7-068	151.00	7-069	144.00	8	100	0.0700	VCP	0.013	7	1.89		0.0005		0.0017	1.37	0.18	0.02	2.0718	2.0701	1.529	1.527
7-069	144.00	7-070	122.00	8	150	0.1467	VCP	0.013	7	1.89		0.0016		0.0051	2.48	0.25	0.03	2.9990	2.9939	2.212	2.207
7-070	122.00	7-071	106.00	8	159	0.1006	VCP	0.013	7	1.89		0.0026		0.0079	2.50	0.33	0.04	2.4841	2.4762	1.832	1.824
7-071	106.00	7-073	100.00	8	350	0.0171	VCP	0.013	7	1.89		0.0051		0.0147	1.63	0.67	0.08	1.0253	1.0106	0.756	0.741
7-072	129.86	7-062	129.00	8	215	0.0040	VCP	0.013	7	1.89	51	0.0015		0.0046	0.69	0.55	0.07	0.4953	0.4907	0.365	0.361
7-072	129.86	7-073	100.00	8	283	0.1055	VCP	0.013	7	1.89	49	0.0015		0.0044	2.12	0.25	0.03	2.5436	2.5392	1.876	1.872
7-073	100.00	7-075	91.60	8	350	0.0240	VCP	0.013	7	1.89		0.0066		0.0186	1.96	0.69	0.09	1.2131	1.1946	0.895	0.877
7-074	111.00	7-075	91.60	8	443	0.0438	VCP	0.013	7	1.89		0.0033		0.0099	2.00	0.45	0.06	1.6387	1.6288	1.209	1.199

City of El Segundo
Existing Conditions Hydraulic Model Results
Pipes sorted by U/S MH ID

U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (ft^3/s)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)
7-075	91.60	7-077	86.00	8	355	0.0158	VCP	0.013	7	1.89		0.0099		0.0270	1.90	0.91	0.11	0.9835	0.9565	0.726	0.699
7-076	91.38	7-077	86.00	8	448	0.0120	-	0.013	7	1.89		0.0026		0.0078	1.19	0.54	0.07	0.8581	0.8503	0.633	0.626
7-077	86.00	7-140	82.42	8	360	0.0099	VCP	0.013	7	1.89		0.0126		0.0339	1.73	1.14	0.14	0.7809	0.7470	0.576	0.542
7-078	113.49	7-080	112.15	8	168	0.0080	VCP	0.013	7	1.89		0.0008		0.0028	0.75	0.37	0.05	0.6994	0.6965	0.516	0.513
7-079	112.02	7-080	111.90	8	32	0.0038	VCP	0.013	7	1.89		0.0005		0.0016	0.49	0.34	0.04	0.4795	0.4779	0.354	0.352
7-080	112.15	7-081	111.59	12	181	0.0031	VCP	0.013	7	1.89		0.0026		0.0080	0.70	0.68	0.06	1.2842	1.2762	0.949	0.941
7-081	105.47	7-087	104.92	12	178	0.0031	VCP	0.013	7	1.89		0.0026		0.0080	0.70	0.68	0.06	1.2834	1.2754	0.947	0.939
7-082	160.00	7-083	149.00	8	342	0.0322	-	0.013	7	1.89		0.0008		0.0025	1.18	0.25	0.03	1.4044	1.4019	1.036	1.034
7-083	149.00	7-084	134.00	8	500	0.0300	-	0.013	7	1.89		0.0030		0.0090	1.70	0.47	0.06	1.3563	1.3473	1.000	0.991
7-084	134.00	7-085	123.00	8	200	0.0550	-	0.013	7	1.89		0.0041		0.0120	2.30	0.46	0.06	1.8365	1.8245	1.601	1.589
7-084	134.00	7-094	109.00	8	350	0.0714	VCP	0.013	7	1.89		0.0000		0.0000	0.00	0.00	0.00	2.0929	2.0929	1.544	1.544
7-085	123.00	7-087	104.92	8	52	0.3477	-	0.013	7	1.89		0.0041		0.0120	4.36	0.30	0.04	4.6174	4.6054	4.026	4.014
7-086	118.07	7-087	111.27	8	34	0.2000	VCP	0.013	7	1.89		0.0006		0.0020	2.07	0.15	0.02	3.5020	3.5001	2.583	2.581
7-087	104.92	7-088	103.50	12	190	0.0075	VCP	0.013	7	1.89		0.0073		0.0204	1.27	0.86	0.07	1.9960	1.9755	1.472	1.452
7-088	103.50	7-089	101.99	12	110	0.0137	VCP	0.013	7	1.89		0.0080		0.0222	1.61	0.77	0.06	2.7051	2.6829	1.996	1.974
7-089	101.99	7-095	100.54	12	108	0.0134	VCP	0.013	7	1.89		0.0080		0.0222	1.60	0.78	0.06	2.6752	2.6530	1.974	1.952
7-090	141.92	7-091	135.20	8	80	0.0840	VCP	0.013	7	1.89		0.0002		0.0007	1.14	0.11	0.01	2.2696	2.2688	1.675	1.674
7-091	135.00	7-092	111.00	8	212	0.1132	VCP	0.013	7	1.89		0.0009		0.0030	1.93	0.20	0.03	2.6348	2.6318	1.943	1.941
7-092	111.00	7-098	104.00	8	130	0.0538	VCP	0.013	7	1.89		0.0019		0.0060	1.84	0.34	0.04	1.8171	1.8111	1.340	1.334
7-093	116.00	7-094	111.00	8	150	0.0333	VCP	0.013	7	1.89	27	0.0008		0.0025	1.20	0.25	0.03	1.4297	1.4272	1.055	1.052
7-093	116.00	7-098	104.00	8	350	0.0343	VCP	0.013	7	1.89	73	0.0023		0.0068	1.64	0.40	0.05	1.4500	1.4432	1.070	1.063
7-094	109.00	7-095	100.54	8	33	0.2564	VCP	0.013	7	1.89		0.0008		0.0028	2.51	0.16	0.02	3.9649	3.9621	2.925	2.922
7-095	100.10	7-096	98.82	12	137	0.0093	VCP	0.013	7	1.89		0.0088		0.0243	1.45	0.88	0.07	2.2317	2.2074	1.646	1.622
7-096	98.20	7-097	95.50	12	359	0.0075		0.013	7	1.89		0.0088		0.0243	1.34	0.93	0.08	2.0023	1.9780	1.475	1.450
7-097	91.75	7-106	91.50	12	117	0.0021	VCP	0.013	7	1.89		0.0115		0.0312	0.93	1.41	0.12	1.0672	1.0361	0.787	0.756
7-098	104.00	7-101	92.87	8	175	0.0636	-	0.013	7	1.89		0.0055		0.0158	2.63	0.51	0.06	1.9748	1.9590	1.457	1.441
7-099	111.90	7-100	97.80	6	127	0.1110	VCP	0.013	7	1.89		0.0007		0.0025	1.90	0.20	0.03	1.2115	1.2090	0.894	0.892
7-100	97.80	7-101	92.89	6	103	0.0477	VCP	0.013	7	1.89		0.0017		0.0053	1.77	0.35	0.06	0.7939	0.7886	0.586	0.580
7-101	92.87	7-105	92.17	8	175	0.0040	-	0.013	7	1.89		0.0072		0.0202	1.08	1.10	0.14	0.4953	0.4751	0.365	0.345
7-102	128.82	7-103	118.18	6	175	0.0608	VCP	0.013	7	1.89		0.0005		0.0018	1.38	0.20	0.03	0.8966	0.8948	0.661	0.659
7-103	112.00	7-104	93.00	8	192	0.0990	-	0.013	7	1.89		0.0017		0.0054	2.20	0.28	0.03	2.4634	2.4580	1.817	1.812
7-104	93.00	7-105	92.17	8	150	0.0055	-	0.013	7	1.89		0.0029		0.0086	0.93	0.68	0.08	0.5825	0.5739	0.430	0.421
7-105	92.17	7-106	91.67	8	41	0.0122	-	0.013	7	1.89		0.0101		0.0275	1.74	0.98	0.12	0.8648	0.8373	0.638	0.610
7-106	91.50	7-107	91.24	12	87	0.0030	VCP	0.013	7	1.89		0.0216		0.0555	1.25	1.71	0.14	1.2622	1.2067	0.931	0.876
7-107	91.24	7-108	90.80	12	146	0.0030	VCP	0.013	7	1.89		0.0216		0.0555	1.25	1.71	0.14	1.2675	1.2120	0.935	0.880
7-108	90.80	7-112	90.32	12	162	0.0030	VCP	0.013	7	1.89		0.0227		0.0582	1.26	1.76	0.15	1.2568	1.1986	0.927	0.869
7-109	99.40	7-108	90.74	8	218	0.0397	VCP	0.013	7	1.89		0.0011		0.0037	1.43	0.29	0.04	1.5608	1.5570	1.151	1.147
7-110	112.09	7-109	107.99	6	60	0.0683	VCP	0.013	7	1.89		0.0003		0.0010	1.20	0.15	0.02	0.9505	0.9495	0.701	0.700
7-111	106.30	7-112	90.32	8	203	0.0787	VCP	0.013	7	1.89		0.0012		0.0040	1.86	0.26	0.03	2.1971	2.1930	1.621	1.617
7-112	90.32	7-113	89.19	12	371	0.0030	VCP	0.013	7	1.89		0.0240		0.0611	1.29	1.79	0.15	1.2742	1.2131	0.940	0.879
7-113	89.19	7-120	87.81	12	450	0.0031	VCP	0.013	7	1.89		0.0240		0.0611	1.30	1.79	0.15	1.2786	1.2175	0.949	0.888
7-114	155.00	7-115	147.80	8	345	0.0209	-	0.013	7	1.89		0.0021		0.0065	1.36	0.43	0.05	1.1313	1.1248	0.834	0.828
7-115	147.80	7-116	129.40	8	350	0.0526	-	0.013	7	1.89		0.0037		0.0109	2.19	0.45	0.06	1.7955	1.7846	1.324	1.313

City of El Segundo
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Pipes sorted by U/S MH ID

U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (ft^3/s)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)
7-116	129.40	7-117	114.00	8	350	0.0440	-	0.013	7	1.89		0.0059		0.0167	2.35	0.57	0.07	1.6426	1.6259	1.212	1.195
7-117	114.00	7-118	102.20	8	350	0.0337	-	0.013	7	1.89		0.0067		0.0189	2.22	0.64	0.08	1.4378	1.4189	1.061	1.042
7-118	102.20	7-119	88.75	8	250	0.0538	-	0.013	7	1.89		0.0069		0.0193	2.63	0.58	0.07	1.8163	1.7970	1.340	1.320
7-119	88.75	7-120	88.02	8	183	0.0040	-	0.013	7	1.89		0.0069		0.0193	1.06	1.08	0.14	0.4946	0.4752	0.366	0.346
7-120	87.81	7-136	86.91	12	300	0.0030	VCP	0.013	7	1.89		0.0309		0.0770	1.38	2.01	0.17	1.2646	1.1876	0.933	0.856
7-121	111.36	7-122	110.00	8	339	0.0040	-	0.013	7	1.89		0.0015		0.0049	0.70	0.56	0.07	0.4960	0.4911	0.366	0.361
7-122	110.00	7-125	107.61	8	175	0.0137	-	0.013	7	1.89		0.0018		0.0057	1.13	0.45	0.06	0.9151	0.9095	0.675	0.670
7-123	125.00	7-124	110.36	8	250	0.0586	VCP	0.013	7	1.89		0.0006		0.0022	1.40	0.21	0.03	1.8950	1.8928	1.398	1.396
7-124	110.36	7-125	107.21	8	315	0.0100	VCP	0.013	7	1.89		0.0021		0.0064	1.05	0.51	0.06	0.7831	0.7767	0.578	0.571
7-125	107.21	7-126	101.25	8	180	0.0331	-	0.013	7	1.89		0.0056		0.0162	2.11	0.60	0.07	1.4249	1.4088	1.051	1.035
7-126	101.25	7-128	96.33	8	180	0.0273	-	0.013	7	1.89		0.0056		0.0162	1.97	0.63	0.08	1.2946	1.2785	0.955	0.939
7-127	102.07	7-128	96.75	8	395	0.0135	VCP	0.013	7	1.89		0.0009		0.0029	0.92	0.33	0.04	0.9088	0.9058	0.670	0.667
7-128	96.33	7-129	92.00	8	167	0.0259	-	0.013	7	1.89		0.0065		0.0185	2.01	0.68	0.08	1.2609	1.2425	0.930	0.912
7-129	92.00	7-130	89.51	10	395	0.0063	-	0.013	7	1.89		0.0065		0.0185	1.19	0.89	0.09	1.1273	1.1088	0.832	0.813
7-130	90.51	2-041	88.00	8	234	0.0107	VCP	0.013	2	1.75		0.0034		0.0093	1.20	0.60	0.08	0.8110	0.8017	0.598	0.588
7-130	89.51	7-132	88.87	10	213	0.0030	-	0.013	7	1.89		0.0090		0.0248	1.01	1.22	0.12	0.7783	0.7535	0.574	0.549
7-131	90.37	7-132	88.87	8	374	0.0040	VCP	0.013	7	1.89		0.0023		0.0070	0.78	0.66	0.08	0.4959	0.4889	0.366	0.359
7-132	88.87	2-043	69.00	8	541	0.0367	VCP	0.013	2	1.75		0.0023		0.0066	1.66	0.38	0.05	1.5007	1.4942	1.104	1.098
7-132	88.87	7-133	88.29	10	180	0.0032	-	0.013	7	1.89		0.0113		0.0305	1.10	1.33	0.13	0.8060	0.7754	0.595	0.564
7-133	88.29	7-136	86.91	10	458	0.0030	VCP	0.013	7	1.89		0.0122		0.0327	1.09	1.40	0.14	0.7794	0.7467	0.575	0.543
7-134	96.49	7-135	94.26	10	447	0.0050	VCP	0.013	7	1.89		0.1523		0.3347	2.56	3.98	0.40	1.0028	0.6681	0.740	0.405
7-135	94.26	7-136	92.80	10	7	0.2086	VCP	0.013	7	1.89		0.1523		0.3347	9.68	1.54	0.15	6.4843	6.1496	4.783	4.449
7-136	86.91	7-138	86.56	12	84	0.0042	VCP	0.013	7	1.89		0.1972		0.4243	2.53	4.38	0.37	1.4903	1.0660	1.099	0.675
7-137	89.00	7-138	86.89	8	188	0.0112	-	0.013	7	1.89		0.0027		0.0081	1.17	0.56	0.07	0.8296	0.8215	0.612	0.604
7-138	86.56	7-139	84.42	12	538	0.0040	VCP	0.013	7	1.89		0.1998		0.4296	2.50	4.47	0.37	1.4561	1.0265	1.074	0.645
7-139	84.42	7-140	82.42	12	500	0.0040	VCP	0.013	7	1.89		0.2050		0.4399	2.52	4.52	0.38	1.4602	1.0203	1.077	0.638
7-140	82.42	7-145	74.94	12	498	0.0150	VCP	0.013	7	1.89		0.2207		0.4707	4.13	3.31	0.28	2.8296	2.3588	2.088	1.617
7-141	100.00	7-142	92.00	8	500	0.0160	VCP	0.013	7	1.89		0.0020		0.0061	1.22	0.45	0.06	0.9905	0.9844	0.731	0.725
7-142	92.00	7-143	80.54	8	223	0.0514	VCP	0.013	7	1.89		0.0026		0.0079	1.98	0.39	0.05	1.7752	1.7672	1.309	1.301
7-143	80.54	7-144	76.00	8	275	0.0165	VCP	0.013	7	1.89		0.0030		0.0091	1.39	0.54	0.07	1.0062	0.9970	0.742	0.733
7-144	76.00	7-145	75.27	8	180	0.0041	VCP	0.013	7	1.89		0.0030		0.0091	0.85	0.75	0.09	0.4987	0.4896	0.368	0.359
7-145	81.30	7-146A	80.51	10	47	0.0169		0.013	7	1.89		0.2275		0.4841	4.41	3.49	0.35	1.8481	1.3640	1.362	0.878
7-146A	80.41	7-146B	80.13	15	70	0.0040		0.013	7	1.89		0.2275		0.4841	2.54	4.35	0.29	2.6440	2.1599	1.953	1.469
7-146B	80.03	7-146C	78.70	15	306	0.0043	VCP	0.013	7	1.89		0.2275		0.4841	2.62	4.25	0.28	2.7595	2.2755	2.025	1.541
7-146C	78.60	7-146D	78.42	15	70	0.0026		0.013	7	1.89		0.2275		0.4841	2.17	4.87	0.32	2.1229	1.6389	1.575	1.091
7-146D	78.32	7-147	70.08	10	178	0.0462	VCP	0.013	7	1.89		0.2275		0.4841	6.33	2.69	0.27	3.0518	2.5678	2.251	1.767
7-147	64.00	7-156	63.55	18	393	0.0011	VCP	0.013	7	1.89		0.2806		0.5871	1.69	6.20	0.34	2.3047	1.7176	1.666	1.079
7-148	102.00	7-149	83.00	8	458	0.0415	VCP	0.013	7	1.89		0.0011		0.0035	1.43	0.28	0.03	1.5950	1.5914	1.177	1.173
7-149	83.00	7-150	68.00	8	333	0.0450	VCP	0.013	7	1.89		0.0011		0.0035	1.47	0.27	0.03	1.6620	1.6585	1.226	1.223
7-150	68.00	7-156	67.19	8	201	0.0040	VCP	0.013	7	1.89		0.0014		0.0043	0.68	0.53	0.07	0.4971	0.4928	0.366	0.362
7-151	65.47	7-153	64.70	12	350	0.0022	VCP	0.013	7	1.89		0.0020		0.0063	0.58	0.66	0.05	1.0829	1.0766	0.799	0.793
7-152	79.69	7-209	79.50	6	21	0.0090	VCP	0.013	7	1.89		0.0013		0.0042	0.93	0.47	0.08	0.3459	0.3416	0.255	0.251
7-153	73.00	7-155	72.82	8	43	0.0042	VCP	0.013	7	1.89		0.0057		0.0163	1.03	0.98	0.12	0.5066	0.4903	0.374	0.357

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U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (ft^3/s)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)
7-154	70.58	7-154B	70.21	12	43	0.0087		0.013	7	1.89		0.0022		0.0069	0.96	0.50	0.04	2.1537	2.1468	1.588	1.581
7-154A	70.32	7-154B	70.22	12	19	0.0053	VCP	0.013	7	1.89		0.0721		0.1681	2.12	2.56	0.21	1.6812	1.5131	1.240	1.072
7-154B	70.21	7-155	70.04	12	86	0.0020		0.013	7	1.89		0.0743		0.1729	1.50	3.33	0.28	1.0252	0.8522	0.762	0.589
7-155	64.32	7-156	63.55	12	350	0.0022	VCP	0.013	7	1.89		0.0817		0.1886	1.60	3.39	0.28	1.0829	0.8943	0.799	0.610
7-155C	66.00	7-154A	62.20	8	71		VCP	0.013	7	1.89		0.0721		0.1681	8-inch siphon						
7-156	63.55	7-158	63.10	18	352	0.0013	VCP	0.013	7	1.89		0.3658		0.7493	1.88	6.85	0.38	2.4339	1.6846	1.795	1.046
7-157	75.00	7-156	72.00	8	164	0.0183	VCP	0.013	7	1.89		0.0022		0.0068	1.32	0.46	0.06	1.0591	1.0523	0.781	0.775
7-158	63.10	7-162	62.29	18	677	0.0012	VCP	0.013	7	1.89		0.3658		0.7493	1.83	6.98	0.39	2.3546	1.6053	1.737	0.988
7-159	87.00	7-157	75.00	8	188	0.0638	VCP	0.013	7	1.89		0.0022		0.0068	2.03	0.34	0.04	1.9784	1.9716	1.459	1.453
7-160	97.00	7-159	87.00	8	147	0.0680	VCP	0.013	7	1.89		0.0012		0.0037	1.73	0.25	0.03	2.0424	2.0387	1.517	1.513
7-160	97.00	7-161	95.00	8	145	0.0138	VCP	0.013	7	1.89		0.0005		0.0017	0.78	0.25	0.03	0.9197	0.9180	0.679	0.677
7-161	95.00	7-162	77.00	8	223	0.0807	VCP	0.013	7	1.89		0.0019		0.0060	2.12	0.30	0.04	2.2248	2.2188	1.641	1.635
7-162	77.00	7-163	62.86	8	163	0.0865		0.013	7	1.89	55	0.3677		0.7529	9.13	3.15	0.39	2.3033	1.5504	1.699	0.946
7-164	99.00	12-040	92.80	8	155	0.0400	VCP	0.013	7	1.89	45	0.0013		0.0039	1.46	0.29	0.04	1.5662	1.5622	2.176	2.172
7-164	99.00	7-165	95.00	8	350	0.0114	VCP	0.013	7	1.89		0.0016		0.0048	1.01	0.43	0.05	0.8371	0.8324	0.618	0.613
7-165	95.00	7-168	86.00	8	350	0.0257	VCP	0.013	7	1.89		0.0034		0.0102	1.68	0.51	0.06	1.2557	1.2455	0.926	0.916
7-166	107.00	12-048	72.00	8	300	0.1167	VCP	0.013	7	1.89	14	0.0001		0.0002	0.00	0.00	0.00	2.6747	2.6745	0.926	0.926
7-166	107.00	7-165	95.00	8	224	0.0536		0.013	7	1.89	86	0.0003		0.0011	1.10	0.15	0.02	1.8125	1.8114	1.337	1.336
7-167	102.00	12-052	72.00	8	385	0.0779	VCP	0.013	7	1.89	31	0.0006		0.0017	1.44	0.17	0.02	2.1859	2.1842	1.337	1.335
7-167	102.00	7-168	86.00	8	375	0.0427	VCP	0.013	7	1.89	69	0.0012		0.0039	1.49	0.29	0.04	1.6175	1.6136	1.193	1.189
7-168	81.90	7-170	80.50	8	350	0.0040	VCP	0.013	7	1.89		0.0064		0.0182	1.04	1.05	0.13	0.4953	0.4770	0.365	0.347
7-169	88.30	7-170	82.87	8	225	0.0241	VCP	0.013	7	1.89		0.0008		0.0027	1.09	0.28	0.03	1.2165	1.2138	0.898	0.895
7-170	80.50	7-172	68.60	8	350	0.0340	VCP	0.013	7	1.89		0.0084		0.0232	2.37	0.71	0.09	1.4439	1.4207	1.065	1.042
7-171	96.00	7-154	82.00	6	400	0.0350	VCP	0.013	7	1.89	54	0.0022		0.0066	1.70	0.42	0.07	0.6802	0.6737	0.502	0.495
7-171	96.00	7-172	68.60	6	501	0.0547	VCP	0.013	7	1.89	46	0.0019		0.0056	1.90	0.35	0.06	0.8503	0.8447	0.628	0.622
7-172	68.60	7-180	62.76	8	350	0.0167	VCP	0.013	7	1.89		0.0111		0.0300	2.00	0.95	0.12	1.0115	0.9816	0.746	0.717
7-173	88.00	7-176	75.00	8	257	0.0506	VCP	0.013	7	1.89		0.0016		0.0051	1.72	0.31	0.04	1.7612	1.7561	1.299	1.294
7-174	125.10	7-175	116.00	8	273	0.0333	VCP	0.013	7	1.89		0.0017		0.0055	1.52	0.36	0.05	1.4297	1.4242	1.055	1.049
7-175	116.00	7-176	75.00	8	532	0.0771	VCP	0.013	7	1.89		0.0041		0.0120	2.58	0.43	0.05	2.1739	2.1619	1.604	1.592
7-176	75.00	7-177	62.58	8	183	0.0679	VCP	0.013	7	1.89		0.0069		0.0194	2.86	0.55	0.07	2.0400	2.0207	1.505	1.486
7-177	69.83	7-178C	69.82	18	7	0.0012		0.013	7	1.89		0.0546		0.1301	1.12	0.24	0.16	2.3874	2.2572	1.740	1.609
7-180	62.25	7-177	62.05	18	167	0.0012	VCP	0.013	7	1.89		0.0477		0.1150	1.07	2.71	0.15	2.3557	2.2408	1.738	1.623
7-181	95.00	7-182	93.86	8	285	0.0040	VCP	0.013	7	1.89		0.0005		0.0018	0.52	0.35	0.04	0.4953	0.4935	0.365	0.363
7-182	86.10	7-185	85.00	8	325	0.0034	VCP	0.013	7	1.89		0.0013		0.0042	0.63	0.54	0.07	0.4556	0.4514	0.337	0.333
7-183	99.00	7-184	86.10	8	225	0.0573	VCP	0.013	7	1.89		0.0013		0.0043	1.70	0.28	0.04	1.8750	1.8708	1.383	1.379
7-184	86.10	7-185	85.00	8	275	0.0040	VCP	0.013	7	1.89		0.0023		0.0070	0.78	0.66	0.08	0.4953	0.4883	0.365	0.358
7-185	85.00	7-190	74.45	8	175	0.0603	-	0.013	7	1.89		0.0036		0.0106	2.28	0.43	0.05	1.9227	1.9121	1.419	1.408
7-186	101.53	7-187	79.00	8	435	0.0518	VCP	0.013	7	1.89		0.0012		0.0038	1.59	0.28	0.03	1.7821	1.7783	1.315	1.311
7-187	79.00	7-190	74.45	8	175	0.0260	VCP	0.013	7	1.89		0.0025		0.0078	1.55	0.45	0.06	1.2627	1.2549	0.931	0.924
7-188	95.00	7-189	75.25	8	300	0.0658	VCP	0.013	7	1.89	45	0.0021		0.0061	1.99	0.32	0.04	2.0092	2.0031	1.482	1.476
7-188	95.00	7-204	89.00	8	499	0.0120	VCP	0.013	7	1.89	55	0.0026		0.0075	1.17	0.53	0.07	0.8587	0.8512	0.633	0.626
7-189	75.25	7-190	74.45	8	200	0.0040	VCP	0.013	7	1.89		0.0043		0.0126	0.94	0.88	0.11	0.4953	0.4826	0.365	0.353
7-190	74.45	7-192	73.73	8	180	0.0040	VCP	0.013	7	1.89		0.0104		0.0284	1.19	1.30	0.16	0.4953	0.4668	0.365	0.337

City of El Segundo
Existing Conditions Hydraulic Model Results
Pipes sorted by U/S MH ID

U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (ft^3/s)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)
7-191	111.20	7-192	74.18	8	610	0.0607	VCP	0.013	7	1.89		0.0018		0.0057	1.89	0.32	0.04	1.9291	1.9234	1.423	1.417
7-192	73.60	7-194	71.62	10	500	0.0040	VCP	0.013	7	1.89		0.0123		0.0329	1.21	1.31	0.13	0.8935	0.8605	0.659	0.626
7-193	86.00	7-194	85.66	8	85	0.0040	-	0.013	7	1.89		0.0005		0.0016	0.50	0.33	0.04	0.4953	0.4937	0.365	0.364
7-194	71.62	7-203	70.90	10	175	0.0041	VCP	0.013	7	1.89		0.0127		0.0341	1.23	1.32	0.13	0.9107	0.8767	0.672	0.638
7-195	119.60	7-196	95.60	8	600	0.0400	VCP	0.013	7	1.89		0.0062		0.0175	2.30	0.59	0.07	1.5662	1.5487	1.156	1.138
7-196	90.00	7-197	83.31	8	169	0.0396	VCP	0.013	7	1.89		0.0069		0.0194	2.37	0.63	0.08	1.5580	1.5386	1.149	1.130
7-197	83.31	7-203	81.99	8	331	0.0040	VCP	0.013	7	1.89		0.0084		0.0233	1.12	1.18	0.15	0.4945	0.4712	0.365	0.341
7-199	121.99	7-201	92.00	8	373	0.0804	VCP	0.013	7	1.89		0.0023		0.0071	2.23	0.33	0.04	2.2204	2.2133	1.638	1.631
7-200	117.00	7-201	92.00	8	275	0.0909	VCP	0.013	7	1.89		0.0001		0.0005	1.01	0.09	0.01	2.3611	2.3606	1.742	1.741
7-201	93.00	7-202	82.60	8	175	0.0594	VCP	0.013	7	1.89		0.0000		0.0000	0.00	0.00	0.00	1.9090	1.9090	1.408	1.408
7-201	92.00	7-207	75.00	8	500	0.0340	VCP	0.013	7	1.89		0.0041		0.0121	1.95	0.52	0.06	1.4439	1.4318	1.065	1.053
7-202	82.60	7-203	81.00	8	175	0.0091	VCP	0.013	7	1.89		0.0006		0.0020	0.72	0.31	0.04	0.7488	0.7467	0.553	0.551
7-202A	83.10	7-202	82.60	8	127	0.0039		0.013	7	1.89		0.0006		0.0020	0.53	0.37	0.05	0.4904	0.4884	0.361	0.359
7-203	70.90	7-205	68.90	10	500	0.0040	VCP	0.013	7	1.89		0.0231		0.0589	1.44	1.74	0.17	0.8980	0.8391	0.662	0.604
7-204	86.67	7-205	71.49	8	355	0.0428	VCP	0.013	7	1.89		0.0026		0.0078	1.85	0.40	0.05	1.6193	1.6115	1.194	1.187
7-205	68.90	7-206A	68.00	10	182	0.0049		0.013	7	1.89		0.0278		0.0700	1.63	1.79	0.18	0.9989	0.9288	0.733	0.663
7-206	77.73	7-206A	68.20	6	334	0.0285	VCP	0.013	7	1.89		0.0027		0.0082	1.70	0.49	0.08	0.6143	0.6061	0.452	0.444
7-206A	68.90	7-207	68.00	10	168	0.0054	VCP	0.013	7	1.89		0.0305		0.0763	1.72	1.83	0.18	1.0398	0.9634	0.751	0.675
7-207	67.50	7-208	66.17	10	333	0.0040	VCP	0.013	7	1.89		0.0363		0.0894	1.63	2.13	0.21	0.8973	0.8079	0.662	0.572
7-208	66.17	7-180	62.25	10	200	0.0196	VCP	0.013	7	1.89		0.0366		0.0902	2.85	1.45	0.15	1.9878	1.8976	1.466	1.376
7-209	79.50	7-153	75.00	8	548	0.0082	VCP	0.013	7	1.89		0.0037		0.0109	1.15	0.69	0.09	0.7096	0.6987	0.524	0.513
7-300	62.25	7-177	62.05	18	167	0.0012	VCP	0.013	7	1.89		0.0000		0.0000	0.00	0.00	0.00	2.3557	2.3557	1.740	1.740
7-501	42.49	7-012	41.78	8	41	0.0173	VCP	0.013	7	1.89		0.0002		0.0006	0.63	0.16	0.02	1.0305	1.0298	0.760	0.759
7-524	69.15	7-178C	67.70	8	349	0.0042	VCP	0.013	7	1.89		0.0016		0.0050	0.72	0.56	0.07	0.5047	0.4997	0.374	0.369
7-533	89.00	7-137	86.89	8	188	0.0112	VCP	0.013	7	1.89		0.0027		0.0081	1.17	0.56	0.07	0.8296	0.8215	0.611	0.603
8-001	140.00	8-002	132.00	8	205	0.0390	VCP	0.013	8	1.38		0.0300		0.0548	3.22	1.03	0.13	1.5469	1.4921	1.141	1.087
8-002	124.95	8-003	120.05	8	290	0.0169	VCP	0.013	8	1.38		0.0300		0.0548	2.40	1.26	0.16	1.0179	0.9631	0.751	0.696
8-003	119.95	8-007	113.05	8	200	0.0345	VCP	0.013	8	1.38		0.0301		0.0550	3.09	1.06	0.13	1.4545	1.3995	1.073	1.018
8-004	115.93	8-007	113.38	8	52	0.0490	VCP	0.013	8	1.38		0.0002		0.0006	0.87	0.11	0.01	1.7341	1.7335	1.279	1.278
8-005	131.22	8-006	116.62	8	230	0.0635	VCP	0.013	8	1.38		0.0027		0.0060	1.96	0.32	0.04	1.9730	1.9669	1.456	1.449
8-006	111.21	8-007	107.40	8	373	0.0102	VCP	0.013	8	1.38		0.0080		0.0163	1.40	0.79	0.10	0.7914	0.7751	0.584	0.567
8-007	107.28	8-008	106.32	8	98	0.0098	VCP	0.013	8	1.38		0.0384		0.0687	2.12	1.61	0.20	0.7750	0.7063	0.572	0.503
8-008	106.32	8-009	96.00	8	165	0.0625	VCP	0.013	8	1.38		0.0384		0.0687	4.07	1.03	0.13	1.9584	1.8897	1.445	1.376
8-009	95.90	8-014	83.00	8	270	0.0478	VCP	0.013	8	1.38		0.0384		0.0687	3.70	1.09	0.14	1.7117	1.6429	1.263	1.194
8-010	139.40	8-011	127.25	8	227	0.0535	VCP	0.013	8	1.38		0.0022		0.0049	1.73	0.30	0.04	1.8117	1.8068	1.337	1.332
8-011	127.00	8-013	118.90	8	261	0.0310	VCP	0.013	8	1.38		0.0042		0.0091	1.73	0.46	0.06	1.3795	1.3704	1.018	1.009
8-012	140.00	8-013	118.87	8	250	0.0845	VCP	0.013	8	1.38		0.0006		0.0015	1.42	0.16	0.02	2.2766	2.2751	1.680	1.678
8-013	118.67	8-014	85.00	8	250	0.1347	VCP	0.013	8	1.38		0.0097		0.0195	3.63	0.47	0.06	2.8738	2.8543	2.120	2.100
8-014	82.90	8-039	79.80	8	176	0.0176	VCP	0.013	8	1.38		0.0510		0.0892	2.82	1.58	0.20	1.0393	0.9500	0.766	0.677
8-015	133.80	8-016	123.10	8	187	0.0572	VCP	0.013	8	1.38		0.0003		0.0009	1.06	0.14	0.02	1.8732	1.8723	1.382	1.381
8-016	123.00	8-017	109.00	8	150	0.0933	VCP	0.013	8	1.38		0.0008		0.0018	1.56	0.17	0.02	2.3923	2.3905	1.765	1.763
8-017	109.00	8-018	91.00	8	135	0.1333	VCP	0.013	8	1.38		0.0014		0.0034	2.12	0.21	0.03	2.8594	2.8560	2.110	2.106
8-018	90.90	8-031	85.90	8	165	0.0303	VCP	0.013	8	1.38		0.0016		0.0038	1.31	0.31	0.04	1.3632	1.3594	1.006	1.002

City of El Segundo
Existing Conditions Hydraulic Model Results
Pipes sorted by U/S MH ID

U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (ft^3/s)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)
8-019	133.08	8-020	123.98	8	226	0.0403	VCP	0.013	8	1.38		0.0000		0.0000	0.00	0.00	0.00	1.5713	1.5713	1.159	1.159
8-020	123.91	8-021	121.90	8	271	0.0074	VCP	0.013	8	1.38		0.0003		0.0007	0.47	0.19	0.02	0.6744	0.6737	0.498	0.497
8-021	121.77	8-022	108.63	8	264	0.0498	VCP	0.013	8	1.38		0.0013		0.0031	1.47	0.25	0.03	1.7470	1.7439	1.289	1.286
8-022	108.53	8-023	107.00	8	186	0.0082	VCP	0.013	8	1.38		0.0013		0.0031	0.79	0.38	0.05	0.7102	0.7071	0.524	0.521
8-023	106.88	8-028	105.00	8	200	0.0094	VCP	0.013	8	1.38		0.0026		0.0058	0.99	0.50	0.06	0.7592	0.7535	0.560	0.555
8-024	118.62	8-025	117.40	8	244	0.0050	VCP	0.013	8	1.38		0.0017		0.0039	0.71	0.48	0.06	0.5537	0.5498	0.408	0.405
8-025	117.40	8-026	116.00	8	280	0.0050	VCP	0.013	8	1.38		0.0017		0.0039	0.71	0.48	0.06	0.5537	0.5498	0.408	0.405
8-026	115.97	8-027	111.83	8	123	0.0337	VCP	0.013	8	1.38		0.0020		0.0046	1.45	0.33	0.04	1.4367	1.4320	1.060	1.055
8-027	110.96	8-028	105.00	8	174	0.0343	VCP	0.013	8	1.38		0.0031		0.0068	1.64	0.40	0.05	1.4493	1.4425	1.069	1.062
8-028	104.87	8-030	87.01	8	329	0.0543	VCP	0.013	8	1.38		0.0058		0.0122	2.29	0.47	0.06	1.8245	1.8124	1.346	1.334
8-029	87.60	8-030	87.00	8	144	0.0042	VCP	0.013	8	1.38		0.0021		0.0048	0.71	0.55	0.07	0.5055	0.5007	0.373	0.368
8-029A	87.95	8-029	87.60	8	88	0.0040	DIP	0.013	8	1.38		0.0021		0.0048	0.70	0.56	0.07	0.4939	0.4891	0.366	0.361
8-029B	93.15	8-029A	92.00	8	206	0.0056	VCP	0.013	8	1.38		0.0017		0.0040	0.74	0.47	0.06	0.5851	0.5811	0.432	0.428
8-030	86.90	8-031	85.90	8	220	0.0045	VCP	0.013	8	1.38		0.0082		0.0165	1.06	0.97	0.12	0.5280	0.5114	0.390	0.373
8-031	85.80	8-040	77.40	8	355	0.0237	VCP	0.013	8	1.38		0.0098		0.0196	1.99	0.71	0.09	1.2046	1.1850	0.889	0.869
8-032	99.96	8-036	96.04	8	215	0.0182	VCP	0.013	8	1.38		0.0015		0.0035	1.08	0.34	0.04	1.0574	1.0538	0.780	0.777
8-033	129.66	8-035	117.21	8	287	0.0434	VCP	0.013	8	1.38		0.0047		0.0100	2.00	0.45	0.06	1.6310	1.6209	1.203	1.193
8-034	149.00	8-035	121.68	8	180	0.1518	VCP	0.013	8	1.38		0.0035		0.0077	2.85	0.30	0.04	3.0508	3.0431	2.250	2.243
8-035	117.00	8-036	96.04	8	264	0.0794	VCP	0.013	8	1.38		0.0083		0.0168	2.89	0.50	0.06	2.2065	2.1897	1.628	1.611
8-036	95.99	8-037	95.00	8	250	0.0040	VCP	0.013	8	1.38		0.0098		0.0196	1.06	1.09	0.14	0.4928	0.4732	0.363	0.344
8-037	95.30	8-038	81.60	8	200	0.0685	VCP	0.013	8	1.38		0.0134		0.0261	3.14	0.63	0.08	2.0495	2.0234	1.512	1.486
8-038	81.60	8-039	79.80	8	190	0.0095	VCP	0.013	8	1.38		0.0140		0.0272	1.59	1.03	0.13	0.7622	0.7350	0.563	0.536
8-039	79.80	WW-008	73.50	8	15	0.4200	VCP	0.013	8	1.38		0.0650		0.1116	9.17	0.82	0.10	5.0749	4.9633	3.744	3.633
8-040	77.40	WW-008	73.50	10	15	0.2600	VCP	0.013	8	1.38		0.0098		0.0196	4.43	0.38	0.04	7.2397	7.2201	5.341	5.322
8-511	95.30	8-512	94.50	8	160	0.0050	VCP	0.013	8	1.38		0.0017		0.0040	0.71	0.48	0.06	0.5537	0.5497	0.408	0.404
8-512	94.30	8-029B	93.15	8	220	0.0052	VCP	0.013	8	1.38		0.0017		0.0040	0.72	0.48	0.06	0.5662	0.5622	0.418	0.414
8-513	104.08	8-512	94.30	8	330	0.0296	VCP	0.013	8	1.38		0.0000		0.0000	0.00	0.00	0.00	1.3481	1.3481	0.995	0.995
8-522	111.50	8-027	110.96	8	35	0.0154	VCP	0.013	8	1.38		0.0011		0.0025	0.92	0.30	0.04	0.9727	0.9702	0.717	0.715
9-001	96.90	9-002	85.42	8	303	0.0379	VCP	0.013	9	1.21		0.0018		0.0035	1.39	0.28	0.04	1.5242	1.5207	1.125	1.121
9-002	85.32	9-003A	83.11	8	225	0.0098	VCP	0.013	9	1.21		0.0044		0.0082	1.12	0.58	0.07	0.7761	0.7679	0.573	0.564
9-003	82.97	9-004A	80.70	8	329	0.0069	VCP	0.013	9	1.21		0.0269		0.0435	1.64	1.40	0.18	0.6505	0.6070	0.480	0.436
9-003A	83.11	9-003	82.90	8	30	0.0070		0.013	9	1.21		0.0044		0.0082	1.00	0.63	0.08	0.6552	0.6470	0.484	0.476
9-004	80.66	9-007	79.04	8	325	0.0050	VCP	0.013	9	1.21		0.0329		0.0523	1.54	1.66	0.21	0.5529	0.5006	0.408	0.356
9-004A	82.97	9-004	80.70	8	329	0.0069	VCP	0.013	9	1.21		0.0277		0.0447	1.65	1.42	0.18	0.6505	0.6058	0.480	0.435
9-005	114.49	9-006	100.72	8	211	0.0653	VCP	0.013	9	1.21		0.0003		0.0008	1.06	0.13	0.02	2.0005	1.9997	1.476	1.475
9-006	100.46	9-007	79.04	8	329	0.0651	VCP	0.013	9	1.21		0.0005		0.0011	1.17	0.15	0.02	1.9981	1.9970	1.474	1.473
9-007	78.94	9-013	78.72	8	42	0.0052	VCP	0.013	9	1.21		0.0337		0.0535	1.58	1.66	0.21	0.5667	0.5133	0.418	0.365
9-008	95.75	9-011	91.24	8	329	0.0137	VCP	0.013	9	1.21		0.0006		0.0013	0.71	0.22	0.03	0.9168	0.9156	0.677	0.675
9-009	92.48	9-011	91.24	8	169	0.0073	VCP	0.013	9	1.21		0.0006		0.0013	0.57	0.26	0.03	0.6708	0.6695	0.495	0.494
9-010	116.52	9-011	91.24	8	329	0.0768	VCP	0.013	9	1.21		0.0003		0.0006	1.04	0.11	0.01	2.1707	2.1701	1.601	1.601
9-011	91.24	9-012	88.85	8	296	0.0081	VCP	0.013	9	1.21		0.0018		0.0035	0.81	0.41	0.05	0.7037	0.7001	0.520	0.516
9-012	88.69	9-013	78.72	8	190	0.0525	VCP	0.013	9	1.21		0.0018		0.0035	1.56	0.26	0.03	1.7938	1.7903	1.324	1.320
9-013	78.72	WW-009	78.50	8	10	0.0220		0.013	9	1.21		0.0355		0.0560	2.65	1.20	0.15	1.1615	1.1055	0.857	0.801

City of El Segundo
Existing Conditions Hydraulic Model Results
Pipes sorted by U/S MH ID

U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (ft^3/s)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)
9-031	94.63	9-032	92.18	8	245	0.0100		0.013	9	1.21		0.0024		0.0047	0.95	0.44	0.06	0.7826	0.7779	0.577	0.573
9-032	92.08	9-033	90.10	8	398	0.0050		0.013	9	1.21		0.0024		0.0047	0.75	0.52	0.07	0.5525	0.5479	0.409	0.404
9-033	90.00	9-034	89.07	8	186	0.0050		0.013	9	1.21		0.0225		0.0369	1.39	1.40	0.17	0.5536	0.5166	0.409	0.372
9-034	88.97	9-003	88.48	8	11	0.0454		0.013	9	1.21		0.0225		0.0369	3.02	0.82	0.10	1.6680	1.6311	1.231	1.194
9-100	96.52	9-031	94.73	8	180	0.0100	VCP	0.013	9	1.21		0.0024		0.0047	0.95	0.44	0.06	0.7818	0.7771	0.577	0.573
9-101	96.69	9-100	96.62	8	7	0.0104		0.013	9	1.21		0.0024		0.0047	0.97	0.44	0.05	0.8004	0.7958	0.589	0.584
9-102	99.02	9-101	96.79	8	279	0.0080	VCP	0.013	9	1.21		0.0024		0.0047	0.88	0.47	0.06	0.7003	0.6957	0.517	0.512
9-103	99.39	9-102	99.27	8	33	0.0036	VCP	0.013	9	1.21		0.0024		0.0047	0.67	0.56	0.07	0.4701	0.4654	0.347	0.342
12-001	146.00	12-013	137.29	8	188	0.0463	VCP	0.013	7	1.89		0.0017		0.0052	1.68	0.33	0.04	1.6855	1.6803	1.244	1.238
12-002	139.74	12-003	134.45	6	258	0.0205	VCP	0.013	7	1.89		0.0009		0.0030	1.12	0.33	0.05	0.5207	0.5176	0.384	0.381
12-003	133.00	12-004	129.00	8	95	0.0421	VCP	0.013	7	1.89		0.0010		0.0033	1.41	0.27	0.03	1.6068	1.6035	1.185	1.182
12-003	133.00	12-017	132.00	8	100	0.0100	VCP	0.013	7	1.89		0.0005		0.0016	0.69	0.27	0.03	0.7831	0.7815	0.578	0.576
12-004	129.00	12-005	104.00	8	252	0.0992	VCP	0.013	7	1.89		0.0018		0.0056	2.24	0.28	0.04	2.4665	2.4608	1.819	1.814
12-005	104.00	12-006	93.00	8	317	0.0347	VCP	0.013	7	1.89		0.0086		0.0237	2.41	0.71	0.09	1.4587	1.4350	1.076	1.052
12-006	93.00	12-010	92.54	8	95	0.0048	VCP	0.013	7	1.89		0.0094		0.0258	1.24	1.19	0.15	0.5449	0.5191	0.402	0.376
12-007	123.53	12-008	109.80	8	268	0.0512	VCP	0.013	7	1.89		0.0011		0.0036	1.55	0.27	0.03	1.7724	1.7689	1.307	1.304
12-008	109.72	12-025	79.58	8	305	0.0988	VCP	0.013	7	1.89		0.0022		0.0068	2.37	0.31	0.04	2.4616	2.4548	1.816	1.809
12-009	110.32	12-010	92.54	8	305	0.0583	VCP	0.013	7	1.89		0.0006		0.0020	1.36	0.20	0.02	1.8907	1.8887	1.395	1.393
12-010	92.54	12-012	91.00	8	318	0.0048	VCP	0.013	7	1.89		0.0124		0.0333	1.34	1.34	0.17	0.5449	0.5117	0.402	0.369
12-011	94.00	12-012	91.00	8	197	0.0152	VCP	0.013	7	1.89	20	0.0007		0.0021	0.87	0.28	0.03	0.9663	0.9642	0.713	0.711
12-011	94.00	12-032	90.00	8	150	0.0267	VCP	0.013	7	1.89	80	0.0028		0.0084	1.60	0.46	0.06	1.2788	1.2703	0.944	0.935
12-012	91.00	12-037	79.00	8	237	0.0506	VCP	0.013	7	1.89		0.0146		0.0387	3.18	0.82	0.10	1.7621	1.7233	1.300	1.261
12-013	137.29	12-200	124.00	8	100	0.1329	VCP	0.013	7	1.89		0.0028		0.0084	2.80	0.32	0.04	2.8547	2.8463	2.106	2.098
12-014	145.42	12-013	139.79	8	367	0.0153	VCP	0.013	7	1.89	64	0.0011		0.0035	1.01	0.35	0.04	0.9699	0.9664	0.715	0.712
12-014	143.00	12-015	128.18	8	180	0.0823	VCP	0.013	7	1.89	36	0.0006		0.0020	1.52	0.18	0.02	2.2469	2.2450	1.658	1.656
12-015	128.18	12-016	121.10	8	150	0.0472	VCP	0.013	7	1.89		0.0006		0.0021	1.29	0.21	0.03	1.7013	1.6991	1.255	1.253
12-016	121.00	12-023	104.00	8	430	0.0395	VCP	0.013	7	1.89		0.0025		0.0076	1.78	0.40	0.05	1.5570	1.5494	1.149	1.141
12-017	132.00	12-023	100.00	8	250	0.1280	VCP	0.013	7	1.89		0.0015		0.0046	2.30	0.24	0.03	2.8016	2.7970	2.067	2.062
12-018	136.53	12-019	132.84	8	250	0.0148	VCP	0.013	7	1.89		0.0011		0.0037	1.02	0.36	0.05	0.9514	0.9476	0.702	0.698
12-019	132.74	12-021	110.54	8	300	0.0740	VCP	0.013	7	1.89		0.0024		0.0073	2.19	0.34	0.04	2.1302	2.1229	1.572	1.565
12-020	124.00	12-057	122.00	8	175	0.0114	VCP	0.013	7	1.89		0.0029		0.0088	1.21	0.58	0.07	0.8371	0.8284	0.618	0.609
12-021	124.00	12-020	108.60	8	156	0.0987	VCP	0.013	7	1.89		0.0026		0.0079	2.48	0.33	0.04	2.4604	2.4524	1.815	1.807
12-022	104.00	12-023	100.00	8	350	0.0114	VCP	0.013	7	1.89		0.0013		0.0040	0.95	0.40	0.05	0.8371	0.8331	0.618	0.614
12-023	100.00	12-024	99.55	8	75	0.0060	VCP	0.013	7	1.89		0.0052		0.0150	1.13	0.87	0.11	0.6066	0.5916	0.447	0.432
12-024	99.55	12-031	75.60	8	375	0.0639	VCP	0.013	7	1.89		0.0073		0.0205	2.85	0.57	0.07	1.9790	1.9585	1.460	1.440
12-025	79.54	12-031	75.62	8	40	0.0980	VCP	0.013	7	1.89		0.0022		0.0068	2.36	0.31	0.04	2.4514	2.4446	1.807	1.800
12-026	96.09	12-028	87.44	8	235	0.0368	VCP	0.013	7	1.89		0.0006		0.0022	1.19	0.23	0.03	1.5024	1.5002	1.108	1.106
12-027	109.20	12-028	87.56	8	218	0.0993	VCP	0.013	7	1.89		0.0009		0.0029	1.83	0.21	0.03	2.4672	2.4643	1.820	1.817
12-028	87.16	12-029	76.90	8	325	0.0316	VCP	0.013	7	1.89		0.0019		0.0058	1.52	0.38	0.05	1.3913	1.3855	1.026	1.021
12-029	76.69	12-030	75.77	8	235	0.0039	VCP	0.013	7	1.89		0.0026		0.0080	0.81	0.71	0.09	0.4900	0.4820	0.360	0.352
12-030	75.75	12-031	75.61	8	40	0.0035	VCP	0.013	7	1.89		0.0026		0.0080	0.78	0.73	0.09	0.4633	0.4553	0.342	0.334
12-031	75.60	12-036	68.60	8	280	0.0250	VCP	0.013	7	1.89		0.0122		0.0327	2.36	0.90	0.11	1.2382	1.2054	0.913	0.880
12-032	90.00	12-036	68.60	8	350	0.0611	VCP	0.013	7	1.89		0.0074		0.0208	2.82	0.58	0.07	1.9363	1.9155	1.428	1.408

City of El Segundo
Existing Conditions Hydraulic Model Results
Pipes sorted by U/S MH ID

U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (ft^3/s)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)
12-033	85.00	12-034	77.00	8	200	0.0400	VCP	0.013	7	1.89	38	0.0009		0.0028	1.32	0.25	0.03	1.5662	1.5634	1.156	1.153
12-033	85.00	12-060	81.00	8	150	0.0267	VCP	0.013	7	1.89	62	0.0015		0.0045	1.33	0.35	0.04	1.2788	1.2742	0.944	0.939
12-034	77.00	12-035	69.40	8	150	0.0507	VCP	0.013	7	1.89		0.0030		0.0089	2.04	0.41	0.05	1.7626	1.7537	1.300	1.291
12-035	69.40	12-036	68.60	8	200	0.0040	VCP	0.013	7	1.89		0.0044		0.0129	0.94	0.89	0.11	0.4953	0.4824	0.365	0.352
12-036	68.60	12-050	67.48	8	316	0.0035	VCP	0.013	7	1.89		0.0240		0.0612	1.43	1.96	0.24	0.4662	0.4050	0.341	0.280
12-037	79.00	12-039	78.78	8	55	0.0040	VCP	0.013	7	1.89		0.0146		0.0387	1.31	1.51	0.19	0.4953	0.4565	0.365	0.326
12-038	86.40	12-039	77.85	6	300	0.0285	VCP	0.013	7	1.89		0.0008		0.0028	1.22	0.29	0.05	0.6138	0.6111	0.452	0.449
12-039	78.78	12-043	78.18	8	150	0.0040	VCP	0.013	7	1.89		0.0154		0.0407	1.33	1.55	0.19	0.4953	0.4545	0.365	0.324
12-040	92.80	12-041	92.00	8	142	0.0056	VCP	0.013	7	1.89		0.0041		0.0119	1.04	0.79	0.10	0.5878	0.5758	0.434	0.422
12-041	92.00	12-042	90.00	8	300	0.0067	VCP	0.013	7	1.89		0.0052		0.0148	1.17	0.84	0.11	0.6394	0.6245	0.472	0.457
12-042	90.00	12-043	78.18	8	333	0.0355	VCP	0.013	7	1.89		0.0069		0.0195	2.28	0.64	0.08	1.4753	1.4558	1.088	1.069
12-043	78.17	12-046	76.85	8	331	0.0040	VCP	0.013	7	1.89		0.0232		0.0592	1.48	1.87	0.23	0.4945	0.4353	0.365	0.305
12-044	98.30	12-045	80.00	8	210	0.0871	VCP	0.013	7	1.89		0.0015		0.0049	2.05	0.27	0.03	2.3116	2.3068	1.706	1.701
12-045	79.82	12-046	76.90	8	225	0.0130	VCP	0.013	7	1.89		0.0015		0.0049	1.06	0.42	0.05	0.8921	0.8872	0.658	0.653
12-046	76.76	12-047	76.20	8	140	0.0040	VCP	0.013	7	1.89		0.0260		0.0657	1.52	1.97	0.25	0.4953	0.4295	0.365	0.299
12-047	76.20	12-049	67.62	8	210	0.0409	VCP	0.013	7	1.89		0.0263		0.0665	3.47	1.12	0.14	1.5828	1.5164	1.168	1.101
12-048	72.00	12-049	67.62	8	158	0.0277	VCP	0.013	7	1.89		0.0016		0.0050	1.39	0.36	0.05	1.3038	1.2988	0.962	0.957
12-049	67.62	12-050	67.32	12	127	0.0024		0.013	7	1.89		0.0292		0.0732	1.25	2.08	0.17	1.1221	1.0490	0.828	0.755
12-050	67.32	12-052	66.50	12	350	0.0023	VCP	0.013	7	1.89		0.0564		0.1343	1.49	2.81	0.23	1.1175	0.9833	0.825	0.690
12-051	79.00	12-052	77.00	8	165	0.0121	VCP	0.013	7	1.89		0.0017		0.0054	1.06	0.45	0.06	0.8621	0.8567	0.636	0.631
12-052	66.55	12-056	65.78	12	350	0.0022	VCP	0.013	7	1.89		0.0604		0.1429	1.48	2.94	0.25	1.0829	0.9400	0.799	0.656
12-053	101.80	12-054	101.13	6	225	0.0030	VCP	0.013	7	1.89		0.0007		0.0024	0.53	0.46	0.08	0.1984	0.1961	0.147	0.145
12-054	95.43	12-055	73.00	8	268	0.0837	VCP	0.013	7	1.89		0.0026		0.0078	2.33	0.34	0.04	2.2654	2.2576	1.670	1.663
12-054	96.00	7-169	92.36	8	132	0.0276	VCP	0.013	7	1.89		0.0000		0.0000	0.00	0.00	0.00	1.3004	1.3004	0.959	0.959
12-055	73.00	12-056	68.00	8	142	0.0352	VCP	0.013	7	1.89		0.0032		0.0097	1.84	0.46	0.06	1.4694	1.4597	1.084	1.074
12-056	65.78	12-061	65.47	12	142	0.0022	VCP	0.013	7	1.89		0.0643		0.1513	1.50	3.04	0.25	1.0788	0.9275	0.796	0.644
12-057	122.00	12-058	111.00	8	290	0.0379	VCP	0.013	7	1.89		0.0031		0.0094	1.87	0.45	0.06	1.5251	1.5157	1.125	1.116
12-057	122.00	7-056	79.00	8	350	0.1229	-	0.013	7	1.89		0.0006		0.0021	1.78	0.17	0.02	2.7448	2.7427	2.025	2.023
12-058	111.00	12-059	99.00	8	200	0.0600	VCP	0.013	7	1.89		0.0046		0.0134	2.45	0.48	0.06	1.9181	1.9048	1.414	1.401
12-059	99.00	12-060	81.00	8	240	0.0750	VCP	0.013	7	1.89		0.0051		0.0148	2.73	0.47	0.06	2.1445	2.1297	1.581	1.566
12-060	65.47	12-061	64.70	12	173	0.0044		0.013	7	1.89		0.0066		0.0187	1.03	0.93	0.08	1.5383	1.5196	1.077	1.058
12-061	65.47	7-155C	64.70	12	340	0.0023	VCP	0.013	7	1.89		0.0721		0.1681	1.57	3.17	0.26	1.0987	0.9306	0.810	0.642
12-200	124.00	12-005	104.00	8	283	0.0707	VCP	0.013	7	1.89		0.0046		0.0135	2.59	0.46	0.06	2.0817	2.0683	1.536	1.522
13-001	105.02	13-002	103.19	21	315	0.0058	VCP	0.013	13	3.00		0.0191		0.0573	1.47	1.28	0.06	7.8265	7.7691	5.7735	5.7162
13-002	103.19	13-003	101.45	21	300	0.0058	VCP	0.013	13	3.00		0.0264		0.0791	1.62	1.49	0.07	7.8201	7.7410	5.7690	5.6899
13-003	101.45	13-004	99.73	21	300	0.0057	VCP	0.013	13	3.00		0.0264		0.0791	1.61	1.49	0.07	7.7750	7.6959	5.7354	5.6563
13-004	99.21	13-005	97.54	27	293	0.0057	VCP	0.013	13	1.48		0.0064		0.0141	0.92	0.63	0.02	15.1522	15.1381	11.1780	11.1639
13-004	99.51	CS-068	99.33	18	31	0.0058	VCP	0.013	CS	3.00		0.0410		0.1229	1.89	1.91	0.11	5.1871	5.0642	3.8268	3.7039
13-005	96.73	13-006	95.75	27	295	0.0033	VCP	0.013	13	1.48		0.0064		0.0141	0.76	0.71	0.03	11.5679	11.5537	8.5339	8.5198
13-006	95.75	13-007	94.77	27	295	0.0033	VCP	0.013	13	1.48		0.0256		0.0508	1.13	1.29	0.05	11.5679	11.5171	8.5339	8.4831
13-007	94.77	13-008	93.79	27	295	0.0033	VCP	0.013	13	1.48		0.0302		0.0592	1.18	1.39	0.05	11.5679	11.5087	8.5339	8.4748
13-008	93.79	13-009	92.76	27	311	0.0033	VCP	0.013	13	1.48		0.1253		0.2189	1.75	2.58	0.10	11.5502	11.3313	8.5204	8.3014
13-009	92.76	WW-013	75.00	39	74	0.2385	VCP	0.013	13	1.48		0.1253		0.2189	7.34	0.86	0.02	261.3133	261.0944	192.7714	192.5524

City of El Segundo
Existing Conditions Hydraulic Model Results
Pipes sorted by U/S MH ID

U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (ft^3/s)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)
CS-001	96.41	CS-002	95.40	8	300	0.0034	VCP	0.013	CS	3.00		0.0083		0.0248	1.08	1.27	0.16	0.4544	0.4296	0.3370	0.3122
CS-002	95.48	CS-003	94.20	8	430	0.0030	VCP	0.013	CS	3.00		0.0235		0.0705	1.40	2.20	0.27	0.4272	0.3567	0.3154	0.2449
CS-003	94.16	CS-005	93.42	8	252	0.0029	VCP	0.013	CS	3.00		0.0242		0.0725	1.40	2.24	0.28	0.4243	0.3518	0.3128	0.2403
CS-004	93.63	CS-005	93.42	8	75	0.0028	VCP	0.013	CS	3.00		0.0033		0.0099	0.77	0.85	0.11	0.4144	0.4044	0.3057	0.2958
CS-005	93.38	CS-006	92.83	8	178	0.0031	VCP	0.013	CS	3.00		0.0275		0.0825	1.48	2.36	0.29	0.4353	0.3528	0.3212	0.2387
CS-006	92.79	CS-007	92.10	8	228	0.0030	VCP	0.013	CS	3.00		0.0275		0.0825	1.47	2.37	0.30	0.4308	0.3483	0.3180	0.2355
CS-007	92.08	CS-015	90.48	8	400	0.0040	CIP	0.013	CS	3.00		0.0275		0.0825	1.63	2.21	0.28	0.4953	0.4128	0.3652	0.2827
CS-008	114.20	CS-009	104.00	6	144	0.0708	VCP	0.013	CS	3.00		0.0015		0.0044	1.92	0.29	0.05	0.9677	0.9634	0.7142	0.7098
CS-009	104.00	CS-010	97.79	8	127	0.0489	VCP	0.013	CS	3.00		0.0025		0.0075	1.91	0.38	0.05	1.7316	1.7241	1.2778	1.2703
CS-010	97.59	CS-011	97.03	8	30	0.0187	VCP	0.013	CS	3.00		0.0025		0.0075	1.37	0.48	0.06	1.0699	1.0624	0.7892	0.7817
CS-011	91.28	CS-013	90.93	8	48	0.0073	VCP	0.013	CS	3.00		0.0038		0.0114	1.12	0.73	0.09	0.6687	0.6573	0.4931	0.4818
CS-012	101.38	CS-014A	98.52	6	290	0.0099	VCP	0.013	CS	3.00		0.0060		0.0181	1.48	0.91	0.15	0.3611	0.3430	0.2663	0.2482
CS-013	90.93	CS-015	90.47	8	65	0.0071	VCP	0.013	CS	3.00		0.0163		0.0490	1.71	1.48	0.18	0.6588	0.6097	0.4860	0.4370
CS-014	98.48	CS-013	95.62	6	290	0.0099	VCP	0.013	CS	3.00		0.0126		0.0377	1.84	1.31	0.22	0.3611	0.3234	0.2663	0.2286
CS-014A	101.38	CS-014	98.52	6	290	0.0099	VCP	0.013	CS	3.00		0.0126		0.0377	1.84	1.31	0.22	0.3611	0.3234	0.2664	0.2287
CS-015	90.47	CS-016	88.99	8	205	0.0072	VCP	0.013	CS	3.00		0.0438		0.1315	2.29	2.41	0.30	0.6654	0.5338	0.4906	0.3590
CS-016	88.99	CS-017	86.69	8	320	0.0072	VCP	0.013	CS	3.00		0.0440		0.1320	2.29	2.42	0.30	0.6639	0.5319	0.4899	0.3579
CS-017	86.69	CS-018	86.49	8	30	0.0067	VCP	0.013	CS	3.00		0.0440		0.1320	2.23	2.47	0.31	0.6394	0.5074	0.4718	0.3398
CS-018	86.49	CS-019	85.44	15	290	0.0036	VCP	0.013	CS	3.00		0.1485		0.4455	2.39	4.27	0.28	2.5189	2.0734	1.8533	1.4078
CS-019	85.34	CS-020	84.08	15	320	0.0039	VCP	0.013	CS	3.00		0.1650		0.4951	2.54	4.41	0.29	2.6268	2.1317	1.9282	1.4331
CS-020	83.98	CS-021	82.72	15	310	0.0041	VCP	0.013	CS	3.00		0.1661		0.4983	2.58	4.39	0.29	2.6688	2.1706	1.9771	1.4788
CS-021	82.62	CS-022	81.32	15	330	0.0039	VCP	0.013	CS	3.00		0.1683		0.5049	2.56	4.46	0.30	2.6274	2.1225	1.9282	1.4232
CS-022	80.77	CS-023	79.92	12	298	0.0029	VCP	0.013	CS	3.00		0.1702		0.5105	2.31	5.38	0.45	1.2331	0.7226	0.9094	0.3988
CS-023	84.35	CS-039A	84.30	15	6	0.0087		0.013	CS	3.00		0.2111		0.6332	3.62	4.09	0.27	3.9036	3.2704	2.8800	2.2468
CS-024	86.96	CS-025	86.08	12	271	0.0032	VCP	0.013	CS	3.00		0.1806		0.5419	2.47	5.37	0.45	1.3157	0.7737	0.9708	0.4288
CS-025	85.78	CS-026	84.33	12	271	0.0054	VCP	0.013	CS	3.00		0.1806		0.5419	2.96	4.67	0.39	1.6888	1.1469	1.2461	0.7041
CS-026	84.58	CS-039B	84.53	15	26	0.0019		0.013	CS	3.00		0.1814		0.5441	2.02	5.58	0.37	1.8457	1.3017	1.3464	0.8023
CS-027	82.62	CS-903	82.34	15	105	0.0027	VCP	0.013	CS	3.00		0.0000		0.0000	0.00	0.00	0.00	2.1577	2.1577	1.6042	1.6042
CS-028	83.37	CS-027	82.26	8	363	0.0031	VCP	0.013	CS	3.00		0.0000		0.0000	0.00	0.00	0.00	0.4330	0.4330	0.3251	0.3251
CS-029	91.30	CS-030	90.12	8	300	0.0039	VCP	0.013	CS	3.00		0.0037		0.0110	0.89	0.83	0.10	0.4911	0.4801	0.3626	0.3516
CS-030	90.02	CS-032	88.84	8	300	0.0039	VCP	0.013	CS	3.00		0.0228		0.0683	1.53	2.02	0.25	0.4911	0.4228	0.3626	0.2942
CS-031A	88.62	CS-033	87.88	8	376	0.0020	VCP	0.013	CS	3.00		0.0015		0.0046	0.54	0.65	0.08	0.3474	0.3428	0.2578	0.2531
CS-032	87.56	CS-033	87.39	10	88	0.0019	VCP	0.013	CS	3.00		0.0228		0.0683	1.16	2.23	0.22	0.6240	0.5557	0.4602	0.3918
CS-033	87.39	CS-034	86.75	10	322	0.0020	VCP	0.013	CS	3.00		0.0243		0.0730	1.20	2.29	0.23	0.6330	0.5600	0.4673	0.3943
CS-034	86.75	CS-035	86.10	10	325	0.0020	VCP	0.013	CS	3.00		0.0243		0.0730	1.20	2.29	0.23	0.6350	0.5620	0.4686	0.3956
CS-035	86.10	CS-036	85.61	10	245	0.0020	VCP	0.013	CS	3.00		0.0248		0.0744	1.21	2.31	0.23	0.6350	0.5606	0.4686	0.3942
CS-036	85.61	CS-037	85.12	10	240	0.0020	VCP	0.013	CS	3.00		0.0248		0.0744	1.21	2.30	0.23	0.6415	0.5672	0.4731	0.3987
CS-037	85.12	CS-038	85.08	10	21	0.0019	VCP	0.013	CS	3.00		0.0248		0.0744	1.19	2.34	0.23	0.6197	0.5453	0.4569	0.3826
CS-038	85.08	CS-039	84.85	10	115	0.0020	VCP	0.013	CS	3.00		0.0248		0.0744	1.21	2.31	0.23	0.6350	0.5606	0.4686	0.3942
CS-039	84.15	CS-900	83.58	18	425	0.0013	VCP	0.013	CS	3.00		0.4172		1.2517	2.19	9.02	0.50	2.4937	1.2421	1.8101	0.5584
CS-039A	84.27	CS-039	84.15	15	14	0.0088	VCP	0.013	CS	3.00		0.3924		1.1773	4.33	5.63	0.38	3.9308	2.7535	2.8973	1.7200
CS-039B	84.52	CS-039A	84.30	15	6	0.0383	VCP	0.013	CS	3.00		0.1814		0.5441	5.85	2.62	0.17	8.1883	7.6442	6.0437	5.4996
CS-040	118.67	CS-041	113.27	6	270	0.0200	VCP	0.013	CS	3.00		0.0155		0.0464	2.51	1.22	0.20	0.5142	0.4678	0.3794	0.3330

City of El Segundo
Existing Conditions Hydraulic Model Results
Pipes sorted by U/S MH ID

U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (ft^3/s)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)
CS-041	113.27	CS-042	111.67	6	70	0.0229	VCP	0.013	CS	3.00		0.0155		0.0464	2.64	1.18	0.20	0.5497	0.5033	0.4052	0.3589
CS-042	111.44	CS-043	99.91	8	326	0.0354	VCP	0.013	CS	3.00		0.0198		0.0593	3.19	1.10	0.14	1.4727	1.4134	1.0865	1.0272
CS-043	99.71	CS-044	99.66	8	13	0.0038	VCP	0.013	CS	3.00		0.0205		0.0614	1.47	1.92	0.24	0.4856	0.4242	0.3581	0.2966
CS-044	99.46	CS-045	98.26	8	300	0.0040	VCP	0.013	CS	3.00		0.0205		0.0614	1.49	1.90	0.24	0.4953	0.4338	0.3652	0.3038
CS-045	92.83	CS-046	92.39	8	114	0.0039	VCP	0.013	CS	3.00		0.0205		0.0614	1.48	1.92	0.24	0.4865	0.4251	0.3587	0.2973
CS-046	92.37	CS-047	90.97	8	350	0.0040	VCP	0.013	CS	3.00		0.0226		0.0677	1.54	2.00	0.25	0.4953	0.4276	0.3652	0.2975
CS-047	90.97	CS-048	88.71	8	350	0.0065	VCP	0.013	CS	3.00		0.0935		0.2806	2.71	3.74	0.47	0.6293	0.3487	0.4641	0.1835
CS-048	88.71	CS-018	86.49	8	350	0.0063	VCP	0.013	CS	3.00		0.1030		0.3089	2.76	3.98	0.50	0.6237	0.3147	0.4602	0.1513
CS-049	98.24	CS-050	97.49	8	160	0.0047	VCP	0.013	CS	3.00		0.0288		0.0865	1.75	2.17	0.27	0.5361	0.4496	0.3955	0.3090
CS-050	97.49	CS-051	96.87	8	155	0.0040	VCP	0.013	CS	3.00		0.0288		0.0865	1.65	2.26	0.28	0.4953	0.4088	0.3652	0.2787
CS-051	96.87	CS-052A	96.61	8	68	0.0038	VCP	0.013	CS	3.00		0.0288		0.0865	1.63	2.29	0.29	0.4853	0.3988	0.3574	0.2709
CS-052	95.57	CS-053	94.81	8	190	0.0040		0.013	CS	3.00		0.0288		0.0865	1.65	2.26	0.28	0.4953	0.4088	0.3665	0.2799
CS-052A	96.50	CS-052	95.57	8	235	0.0040		0.013	CS	3.00		0.0288		0.0865	1.64	2.27	0.28	0.4926	0.4061	0.3658	0.2792
CS-053	94.81	CS-054	94.77	8	11	0.0035		0.013	CS	3.00		0.0288		0.0865	1.58	2.34	0.29	0.4657	0.3792	0.3413	0.2548
CS-054	88.77	CS-055	87.38	8	350	0.0040	VCP	0.013	CS	3.00		0.0346		0.1037	1.73	2.49	0.31	0.4935	0.3898	0.3639	0.2602
CS-055	87.38	CS-058	86.74	8	160	0.0040	VCP	0.013	CS	3.00		0.0346		0.1037	1.74	2.48	0.31	0.4953	0.3915	0.3652	0.2614
CS-056	99.16	CS-057	98.88	8	93	0.0030	VCP	0.013	CS	3.00		0.0007		0.0022	0.50	0.42	0.05	0.4297	0.4274	0.3167	0.3145
CS-057	98.73	CS-058	92.88	8	300	0.0195	VCP	0.013	CS	3.00		0.0007		0.0022	0.96	0.27	0.03	1.0935	1.0913	0.8066	0.8044
CS-058	86.74	CS-059	85.98	8	190	0.0040	VCP	0.013	CS	3.00		0.0353		0.1060	1.75	2.51	0.31	0.4953	0.3893	0.3652	0.2592
CS-059	85.90	CS-059A	85.01	8	241	0.0037	VCP	0.013	CS	3.00		0.0368		0.1105	1.72	2.62	0.33	0.4759	0.3654	0.3509	0.2405
CS-059A	84.50	CS-059B	84.22	8	80	0.0035	VCP	0.013	CS	3.00		0.0368		0.1105	1.68	2.66	0.33	0.4633	0.3528	0.3413	0.2308
CS-059B	84.89	CS-059C	84.77	8	33	0.0036	VCP	0.013	CS	3.00		0.0368		0.1105	1.71	2.63	0.33	0.4722	0.3617	0.3470	0.2366
CS-059C	84.77	CS-060	84.50	8	68	0.0040	VCP	0.013	CS	3.00		0.0368		0.1105	1.76	2.57	0.32	0.4934	0.3830	0.3658	0.2553
CS-060	84.50	CS-061	84.22	8	80	0.0035	VCP	0.013	CS	3.00		0.0368		0.1105	1.68	2.66	0.33	0.4633	0.3528	0.3419	0.2314
CS-061	84.02	CS-062	83.06	10	275	0.0035	VCP	0.013	CS	3.00		0.0368		0.1105	1.65	2.45	0.25	0.8389	0.7284	0.6192	0.5087
CS-062	83.06	CS-063	81.98	10	300	0.0036	VCP	0.013	CS	3.00		0.0368		0.1105	1.67	2.43	0.24	0.8519	0.7414	0.6282	0.5177
CS-063	81.98	CS-064	80.90	10	300	0.0036	VCP	0.013	CS	3.00		0.0409		0.1227	1.72	2.56	0.26	0.8519	0.7292	0.6282	0.5055
CS-064	80.90	CS-023	79.82	10	300	0.0036	VCP	0.013	CS	3.00		0.0409		0.1227	1.72	2.56	0.26	0.8519	0.7292	0.6282	0.5055
CS-065	99.50	CS-068	99.33	18	60	0.0028	VCP	0.013	CS	3.00		0.1372		0.4115	2.11	4.10	0.23	3.6234	3.2120	2.6732	2.2617
CS-066	103.24	CS-067	102.04	8	300	0.0040	VCP	0.013	CS	3.00		0.0089		0.0266	1.17	1.26	0.16	0.4953	0.4686	0.3652	0.3385
CS-067	102.04	CS-068	100.85	8	300	0.0040	VCP	0.013	CS	3.00		0.0466		0.1397	1.88	2.91	0.36	0.4932	0.3535	0.3639	0.2242
CS-068	99.13	CS-069	98.36	18	246	0.0031	VCP	0.013	CS	3.00		0.2247		0.6740	2.51	5.13	0.28	3.8084	3.1344	2.8095	2.1355
CS-069	98.16	CS-070	97.34	18	259	0.0032	VCP	0.013	CS	3.00		0.2247		0.6740	2.52	5.11	0.28	3.8302	3.1562	2.8257	2.1517
CS-070	97.14	CS-071	96.35	18	250	0.0032	VCP	0.013	CS	3.00		0.2247		0.6740	2.52	5.11	0.28	3.8266	3.1526	2.8231	2.1491
CS-071	96.15	CS-074	95.21	18	294	0.0032	VCP	0.013	CS	3.00		0.2400		0.7199	2.58	5.27	0.29	3.8491	3.1292	2.8393	2.1193
CS-072	96.98	CS-073	95.86	8	350	0.0032	VCP	0.013	CS	3.00		0.0243		0.0730	1.45	2.20	0.27	0.4430	0.3699	0.3270	0.2540
CS-073	95.78	CS-074	95.62	8	50	0.0032	VCP	0.013	CS	3.00		0.0243		0.0730	1.45	2.20	0.27	0.4430	0.3699	0.3270	0.2540
CS-074	95.01	CS-076	91.44	15	318	0.0112	VCP	0.013	CS	3.00		0.2643		0.7930	4.23	4.29	0.29	4.4354	3.6425	3.2723	2.4793
CS-075	92.96	CS-077	90.83	8	213	0.0100	VCP	0.013	CS	3.00		0.0010		0.0031	0.84	0.36	0.05	0.7831	0.7800	0.5778	0.5747
CS-076	91.24	CS-085	87.88	15	300	0.0112	VCP	0.013	CS	3.00		0.2643		0.7930	4.23	4.30	0.29	4.4302	3.6372	3.2684	2.4754
CS-077	90.83	CS-086	88.72	8	210	0.0100	VCP	0.013	CS	3.00		0.0022		0.0065	1.05	0.52	0.06	0.7849	0.7785	0.5791	0.5726
CS-078	95.41	CS-079	93.59	8	184	0.0099	VCP	0.013	CS	3.00		0.0003		0.0010	0.60	0.22	0.03	0.7788	0.7778	0.5746	0.5735
CS-079	93.22	CS-080	90.96	8	321	0.0070	VCP	0.013	CS	3.00		0.0053		0.0158	1.22	0.86	0.11	0.6571	0.6413	0.4847	0.4689

City of El Segundo
Existing Conditions Hydraulic Model Results
Pipes sorted by U/S MH ID

U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (ft^3/s)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)
CS-080	90.37	CS-081	90.30	8	27	0.0026	VCP	0.013	CS	3.00		0.0099		0.0297	1.04	1.48	0.18	0.3987	0.3690	0.2941	0.2644
CS-081	90.42	CS-082	90.11	15	102	0.0030	VCP	0.013	CS	3.00		0.0099		0.0297	1.01	1.19	0.08	2.3078	2.2781	1.7024	1.6727
CS-082	90.11	CS-083	89.21	15	200	0.0045	VCP	0.013	CS	3.00		0.0099		0.0297	1.16	1.09	0.07	2.8082	2.7785	2.0714	2.0417
CS-083	89.21	CS-084	88.31	15	300	0.0030	VCP	0.013	CS	3.00		0.0099		0.0297	1.00	1.20	0.08	2.2929	2.2631	1.6914	1.6617
CS-084	88.31	CS-085	87.56	15	250	0.0030	VCP	0.013	CS	3.00		0.0110		0.0330	1.04	1.26	0.08	2.2929	2.2599	1.6914	1.6584
CS-085	87.56	CS-086	87.54	15	8	0.0025	VCP	0.013	CS	3.00		0.2753		0.8259	2.48	6.55	0.44	2.0931	1.2671	1.5440	0.7181
CS-086	87.54	CS-087	86.51	15	342	0.0030	VCP	0.013	CS	3.00		0.2775		0.8324	2.66	6.24	0.42	2.2973	1.4649	1.6946	0.8622
CS-087	86.51	CS-088	85.61	15	300	0.0030	VCP	0.013	CS	3.00		0.2951		0.8854	2.70	6.47	0.43	2.2929	1.4074	1.6914	0.8060
CS-088	85.61	CS-089	84.71	15	300	0.0030	VCP	0.013	CS	3.00		0.2967		0.8901	2.71	6.49	0.43	2.2929	1.4028	1.6914	0.8013
CS-089	84.71	CS-093	84.07	15	244	0.0026	VCP	0.013	CS	3.00		0.2973		0.8918	2.58	6.74	0.45	2.1439	1.2521	1.5815	0.6897
CS-090	87.84	CS-091	87.17	10	133	0.0050	VCP	0.013	CS	3.00		0.0206		0.0618	1.58	1.68	0.17	1.0077	0.9459	0.7433	0.6815
CS-091	87.15	CS-092	85.58	10	315	0.0050	VCP	0.013	CS	3.00		0.0216		0.0648	1.60	1.72	0.17	1.0024	0.9375	0.7394	0.6746
CS-092	85.56	CS-093	84.07	10	320	0.0047	VCP	0.013	CS	3.00		0.0216		0.0648	1.56	1.75	0.18	0.9688	0.9040	0.7148	0.6500
CS-093	84.07	CS-094	83.93	15	56	0.0025	VCP	0.013	CS	3.00		0.3189		0.9566	2.58	7.12	0.47	2.0931	1.1364	1.5440	0.5874
CS-094	83.19	CS-095	81.62	15	301	0.0052	VCP	0.013	CS	3.00		0.3189		0.9566	3.38	5.80	0.39	3.0233	2.0667	2.2304	1.2738
CS-095	81.62	CS-098	80.10	15	295	0.0052	VCP	0.013	CS	3.00		0.3201		0.9604	3.37	5.83	0.39	3.0049	2.0445	2.2169	1.2564
CS-096	82.09	CS-097	81.28	12	203	0.0040	VCP	0.013	CS	3.00		0.0054		0.0162	0.95	0.89	0.07	1.4584	1.4422	1.0761	1.0599
CS-097	81.28	CS-098	80.46	12	204	0.0040	VCP	0.013	CS	3.00		0.0081		0.0242	1.08	1.07	0.09	1.4638	1.4396	1.0800	1.0558
CS-098	80.13	CS-099	79.95	15	32	0.0056	VCP	0.013	CS	3.00		0.3282		0.9846	3.50	5.77	0.38	3.1396	2.1550	2.3164	1.3318
CS-099	79.88	CS-100	79.42	15	235	0.0020	VCP	0.013	CS	3.00		0.3282		0.9846	2.37	7.78	0.52	1.8521	0.8675	1.3663	0.3817
CS-100	79.42	CS-101	78.53	15	254	0.0035	VCP	0.013	CS	3.00		0.3282		0.9846	2.95	6.57	0.44	2.4780	1.4933	1.8278	0.8432
CS-101	78.53	CS-102	77.62	15	261	0.0035	VCP	0.013	CS	3.00		0.3282		0.9846	2.94	6.58	0.44	2.4718	1.4872	1.8233	0.8386
CS-102	77.62	CS-103	76.30	15	375	0.0035	VCP	0.013	CS	3.00		0.3282		0.9846	2.95	6.56	0.44	2.4836	1.4990	1.8323	0.8477
CS-103	76.30	CS-104	75.52	15	226	0.0035	VCP	0.013	CS	3.00		0.3282		0.9846	2.93	6.60	0.44	2.4593	1.4747	1.8142	0.8296
CS-104	75.52	CS-105	75.00	15	94	0.0055	VCP	0.013	CS	3.00		0.3282		0.9846	3.48	5.80	0.39	3.1135	2.1289	2.2970	1.3124
CS-105	74.70	CSD-041	74.29	18	376	0.0011	VCP	0.013	CS	3.00		0.3282		0.9846	1.90	8.34	0.46	2.2478	1.2632	1.6661	0.6815
CS-106	88.80	CS-107	87.96	8	350	0.0024	VCP	0.013	CS	3.00		0.0180		0.0540	1.20	2.03	0.25	0.3836	0.3296	0.2831	0.2291
CS-107	87.96	CS-108	87.12	8	380	0.0022	VCP	0.013	CS	3.00		0.0350		0.1050	1.41	2.92	0.37	0.3682	0.2632	0.2715	0.1665
CS-108	87.12	CS-109	86.29	8	348	0.0024	VCP	0.013	CS	3.00		0.0400		0.1200	1.50	3.08	0.38	0.3824	0.2624	0.2824	0.1624
CS-109	86.29	CS-509	86.10	8	81	0.0023	VCP	0.013	CS	3.00		0.0400		0.1200	1.49	3.09	0.39	0.3793	0.2593	0.2799	0.1599
CS-110	86.06	CS-111	84.39	8	346	0.0048	VCP	0.013	CS	3.00		0.0930		0.2791	2.43	4.06	0.51	0.5440	0.2650	0.4014	0.1223
CS-111	84.39	CS-112	82.16	8	346	0.0064	VCP	0.013	CS	3.00		0.0930		0.2791	2.70	3.73	0.47	0.6287	0.3496	0.4641	0.1850
CS-112	81.97	CS-113	80.31	10	346	0.0048	VCP	0.013	CS	3.00		0.0941		0.2824	2.41	3.67	0.37	0.9834	0.7011	0.7258	0.4435
CS-113	80.12	CS-114	78.72	12	351	0.0040	VCP	0.013	CS	3.00		0.0963		0.2888	2.24	3.62	0.30	1.4581	1.1693	1.0755	0.7866
CS-114	78.44	CS-115	77.15	15	322	0.0040	VCP	0.013	CS	3.00		0.0973		0.2918	2.20	3.36	0.22	2.6476	2.3557	1.9532	1.6613
CS-115	77.15	CS-121	76.90	15	58	0.0043	VCP	0.013	CS	3.00		0.0973		0.2918	2.26	3.29	0.22	2.7593	2.4675	2.0246	1.7328
CS-116	85.00	CS-117	83.84	10	294	0.0039	VCP	0.013	CS	3.00		0.0055		0.0165	0.98	0.95	0.09	0.8918	0.8753	0.6579	0.6414
CS-117	83.74	CS-118	82.58	10	294	0.0039	VCP	0.013	CS	3.00		0.0060		0.0181	1.01	0.99	0.10	0.8918	0.8737	0.6579	0.6398
CS-118	82.48	CS-119	81.32	10	295	0.0039	VCP	0.013	CS	3.00		0.0079		0.0236	1.09	1.12	0.11	0.8903	0.8667	0.6567	0.6330
CS-119	81.12	CS-120	80.25	10	221	0.0039	VCP	0.013	CS	3.00		0.0103		0.0309	1.18	1.27	0.13	0.8908	0.8600	0.6573	0.6264
CS-120	80.15	CS-121	77.36	10	221	0.0126	VCP	0.013	CS	3.00		0.0103		0.0309	1.77	0.96	0.10	1.5953	1.5644	1.1769	1.1461
CS-121	76.90	CS-122	75.31	15	396	0.0040	VCP	0.013	CS	3.00		0.1076		0.3227	2.26	3.53	0.24	2.6526	2.3299	1.9570	1.6343
CS-122	75.19	CS-123	73.51	15	351	0.0048	VCP	0.013	CS	3.00		0.1102		0.3306	2.43	3.42	0.23	2.8961	2.5656	2.1367	1.8062

City of El Segundo
Existing Conditions Hydraulic Model Results
Pipes sorted by U/S MH ID

U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (ft^3/s)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)
CS-123	73.24	CS-124	72.54	18	346	0.0020	VCP	0.013	CS	3.00		0.1130		0.3391	1.77	4.04	0.22	3.0618	2.7228	2.2589	1.9198
CS-124	72.54	CS-125	71.84	18	346	0.0020	VCP	0.013	CS	3.00		0.1155		0.3465	1.78	4.09	0.23	3.0618	2.7153	2.2589	1.9124
CS-125	71.84	CS-126	71.14	18	346	0.0020	VCP	0.013	CS	3.00		0.1155		0.3465	1.78	4.09	0.23	3.0618	2.7153	2.2589	1.9124
CS-126	70.90	CSD-048	70.43	21	234	0.0020	VCP	0.013	CS	3.00		0.4462		1.3386	2.57	7.76	0.37	4.6019	3.2633	3.3869	2.0483
CS-127	93.05	CS-128	91.20	8	285	0.0065	VCP	0.013	CS	3.00		0.0211		0.0634	1.79	1.71	0.21	0.6309	0.5676	0.4653	0.4020
CS-128	91.10	CS-129	89.72	8	211	0.0065	VCP	0.013	CS	3.00		0.0211		0.0634	1.80	1.71	0.21	0.6333	0.5699	0.4673	0.4039
CS-129	89.42	CS-130	88.68	8	115	0.0064	VCP	0.013	CS	3.00		0.0211		0.0634	1.78	1.72	0.21	0.6282	0.5648	0.4634	0.4000
CS-130	88.38	CS-131	87.00	8	305	0.0045	VCP	0.013	CS	3.00		0.0255		0.0765	1.66	2.06	0.26	0.5267	0.4503	0.3884	0.3120
CS-131	86.00	CS-133	81.86	12	313	0.0132	VCP	0.013	CS	3.00		0.0255		0.0765	2.31	1.40	0.12	2.6553	2.5788	1.9570	1.8805
CS-132	81.26	CS-133	81.21	12	23	0.0022	VCP	0.013	CS	3.00		0.0052		0.0156	0.76	1.01	0.08	1.0765	1.0609	0.7943	0.7787
CS-133	81.20	CS-134	81.10	15	98	0.0010	VCP	0.013	CS	3.00		0.0307		0.0921	0.97	2.67	0.18	1.3372	1.2451	0.9863	0.8942
CS-134	81.01	CS-135	80.53	15	261	0.0018	VCP	0.013	CS	3.00		0.0307		0.0921	1.19	2.31	0.15	1.7952	1.7031	1.3243	1.2322
CS-135	80.43	CS-136	80.04	15	212	0.0018	VCP	0.013	CS	3.00		0.0703		0.2108	1.52	3.47	0.23	1.7955	1.5847	1.3243	1.1135
CS-136	80.04	CS-137	79.86	15	92	0.0020	VCP	0.013	CS	3.00		0.0729		0.2188	1.57	3.48	0.23	1.8516	1.6328	1.3663	1.1475
CS-137	79.86	CS-138	79.64	15	96	0.0023	STEEL	0.013	CS	3.00		0.0729		0.2188	1.66	3.35	0.22	2.0040	1.7851	1.4781	1.2593
CS-138	79.64	CS-139	79.58	15	33	0.0018	VCP	0.013	CS	3.00		0.0787		0.2362	1.56	3.69	0.25	1.7850	1.5488	1.3165	1.0803
CS-139	79.58	CS-140	79.42	18	80	0.0020	VCP	0.013	CS	3.00		0.0787		0.2362	1.58	3.39	0.19	3.0443	2.8081	2.2459	2.0097
CS-140	79.17	CS-141	78.50	18	337	0.0020	VCP	0.013	CS	3.00		0.0787		0.2362	1.58	3.40	0.19	3.0352	2.7990	2.2388	2.0026
CS-141	78.50	CS-142	77.84	18	330	0.0020	VCP	0.013	CS	3.00		0.0787		0.2362	1.58	3.39	0.19	3.0443	2.8081	2.2459	2.0097
CS-142	77.84	CS-143	77.37	18	237	0.0020	VCP	0.013	CS	3.00		0.0787		0.2362	1.58	3.40	0.19	3.0314	2.7952	2.2363	2.0000
CS-143	77.37	CS-144	76.69	18	343	0.0020	VCP	0.013	CS	3.00		0.0787		0.2362	1.58	3.40	0.19	3.0309	2.7947	2.2363	2.0000
CS-144	76.68	CS-145	71.20	18	330	0.0166	VCP	0.013	CS	3.00		0.0787		0.2362	3.33	2.03	0.11	8.7721	8.5359	6.4716	6.2353
CS-145	71.10	CS-146	70.61	21	330	0.0015	VCP	0.013	CS	3.00		0.1951		0.5853	1.82	5.46	0.26	3.9567	3.3715	2.9188	2.3335
CS-146	70.61	CS-147	70.28	21	277	0.0012	VCP	0.013	CS	3.00		0.1951		0.5853	1.69	5.77	0.27	3.5442	2.9589	2.6143	2.0291
CS-147	70.28	CS-148	70.10	21	156	0.0012	VCP	0.013	CS	3.00		0.1951		0.5853	1.67	5.82	0.28	3.4879	2.9027	2.5730	1.9877
CS-148	70.10	CS-149	69.77	21	271	0.0012	VCP	0.013	CS	3.00		0.1955		0.5864	1.70	5.75	0.27	3.5832	2.9968	2.6434	2.0570
CS-149	69.77	CS-151	69.44	21	274	0.0012	VCP	0.013	CS	3.00		0.1965		0.5896	1.70	5.78	0.28	3.5635	2.9739	2.6286	2.0389
CS-151	69.44	CS-152	69.27	21	144	0.0012	VCP	0.013	CS	3.00		0.1965		0.5896	1.68	5.81	0.28	3.5281	2.9385	2.6027	2.0131
CS-152	69.27	CS-153	68.92	21	293	0.0012	VCP	0.013	CS	3.00		0.2009		0.6028	1.70	5.86	0.28	3.5489	2.9461	2.6182	2.0154
CS-153	68.92	CS-154	68.61	21	254	0.0012	VCP	0.013	CS	3.00		0.2009		0.6028	1.71	5.82	0.28	3.5872	2.9844	2.6467	2.0438
CS-154	68.61	CS-155	68.54	21	57	0.0012	VCP	0.013	CS	3.00		0.2033		0.6100	1.72	5.85	0.28	3.5984	2.9884	2.6544	2.0444
CS-155	68.54	CS-156	68.29	21	209	0.0012	VCP	0.013	CS	3.00		0.2033		0.6100	1.71	5.89	0.28	3.5513	2.9413	2.6202	2.0101
CS-156	68.29	CS-157	67.92	21	309	0.0012	VCP	0.013	CS	3.00		0.2033		0.6100	1.71	5.89	0.28	3.5532	2.9432	2.6215	2.0114
CS-157	67.92	CS-158	67.56	21	300	0.0012	VCP	0.013	CS	3.00		0.2040		0.6121	1.71	5.89	0.28	3.5570	2.9449	2.6240	2.0119
CS-158	67.56	CS-159	67.19	21	306	0.0012	VCP	0.013	CS	3.00		0.2079		0.6236	1.73	5.94	0.28	3.5706	2.9470	2.6337	2.0101
CS-159	67.19	CS-160	66.84	21	294	0.0012	VCP	0.013	CS	3.00		0.2079		0.6236	1.72	5.96	0.28	3.5429	2.9193	2.6137	1.9901
CS-160	66.84	CSD-058	66.74	21	81	0.0012	VCP	0.013	CS	3.00		0.2079		0.6236	1.74	5.91	0.28	3.6079	2.9843	2.6615	2.0379
CS-161	77.45	CS-162	76.06	8	346	0.0040	VCP	0.013	CS	3.00		0.0087		0.0261	1.16	1.25	0.16	0.4963	0.4702	0.3665	0.3403
CS-162	76.06	CS-163	73.42	8	346	0.0076	VCP	0.013	CS	3.00		0.0093		0.0280	1.49	1.10	0.14	0.6840	0.6560	0.5048	0.4768
CS-163	73.21	CS-169	71.75	10	365	0.0040	VCP	0.013	CS	3.00		0.0157		0.0471	1.35	1.56	0.16	0.8980	0.8509	0.6625	0.6153
CS-164	78.74	CS-166	77.32	8	296	0.0048	VCP	0.013	CS	3.00		0.0017		0.0050	0.75	0.54	0.07	0.5424	0.5374	0.4001	0.3951
CS-165	78.50	CS-166	77.32	8	246	0.0048	VCP	0.013	CS	3.00		0.0018		0.0053	0.77	0.56	0.07	0.5423	0.5371	0.4001	0.3948
CS-166	77.22	CS-167	76.01	8	199	0.0061	VCP	0.013	CS	3.00		0.0041		0.0124	1.08	0.79	0.10	0.6106	0.5982	0.4505	0.4380

City of El Segundo
Existing Conditions Hydraulic Model Results
Pipes sorted by U/S MH ID

U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (ft^3/s)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)
CS-167	76.01	CS-168	74.83	8	193	0.0061	VCP	0.013	CS	3.00		0.0054		0.0163	1.17	0.90	0.11	0.6123	0.5960	0.4518	0.4355
CS-168	74.83	CS-163	73.48	8	223	0.0061	VCP	0.013	CS	3.00		0.0054		0.0163	1.17	0.90	0.11	0.6093	0.5930	0.4492	0.4329
CS-169	71.57	CS-170	70.97	12	214	0.0028	VCP	0.013	CS	3.00		0.0157		0.0471	1.16	1.61	0.13	1.2225	1.1754	0.9016	0.8545
CS-170	70.97	CS-171	70.22	12	263	0.0029	VCP	0.013	CS	3.00		0.0157		0.0471	1.17	1.60	0.13	1.2329	1.1858	0.9094	0.8622
CS-171	70.22	CS-172	69.47	12	264	0.0028	VCP	0.013	CS	3.00		0.0280		0.0840	1.39	2.12	0.18	1.2306	1.1466	0.9081	0.8241
CS-172	69.47	CS-173	68.84	12	193	0.0033	VCP	0.013	CS	3.00		0.0280		0.0840	1.46	2.05	0.17	1.3191	1.2351	0.9734	0.8893
CS-173	68.84	CS-174	68.41	12	131	0.0033	VCP	0.013	CS	3.00		0.0280		0.0840	1.46	2.05	0.17	1.3228	1.2388	0.9759	0.8919
CS-174	68.41	CS-175	68.07	12	104	0.0033	VCP	0.013	CS	3.00		0.0280		0.0840	1.46	2.05	0.17	1.3201	1.2361	0.9740	0.8900
CS-175	67.45	CSD-052	66.81	21	347	0.0018	VCP	0.013	CS	3.00		0.4742		1.4226	2.53	8.20	0.39	4.4098	2.9872	3.2141	1.7915
CS-176	120.92	CS-177	109.09	12	348	0.0340	VCP	0.013	CS	3.00		0.0000		0.0000	0.00	0.00	0.00	4.2569	4.2569	3.1404	3.1404
CS-177	106.10	CS-178	105.20	12	139	0.0065	VCP	0.013	CS	3.00		0.0000		0.0000	0.00	0.00	0.00	1.8578	1.8578	1.3708	1.3708
CS-178	105.20	CS-179	101.48	12	127	0.0293	VCP	0.013	CS	3.00		0.0694		0.2082	4.12	1.87	0.16	3.9514	3.7432	2.9149	2.7066
CS-179	101.48	CS-180	94.05	12	256	0.0290	VCP	0.013	CS	3.00		0.0694		0.2082	4.11	1.88	0.16	3.9333	3.7251	2.9020	2.6937
CS-180	93.94	CS-181	86.76	12	250	0.0287	VCP	0.013	CS	3.00		0.0694		0.2082	4.09	1.88	0.16	3.9127	3.7045	2.8864	2.6782
CS-181	86.74	CS-182	85.25	12	296	0.0050	VCP	0.013	CS	3.00		0.0694		0.2082	2.21	2.89	0.24	1.6381	1.4298	1.2086	1.0004
CS-182	85.25	CS-186	83.74	12	298	0.0051	VCP	0.013	CS	3.00		0.0694		0.2082	2.22	2.88	0.24	1.6435	1.4353	1.2125	1.0043
CS-183	86.60	CS-184	85.76	10	280	0.0030	VCP	0.013	CS	3.00		0.0000		0.0000	0.00	0.00	0.00	0.7777	0.7777	0.5739	0.5739
CS-184	85.76	CS-185	84.72	10	343	0.0030	VCP	0.013	CS	3.00		0.0099		0.0297	1.06	1.33	0.13	0.7818	0.7521	0.5765	0.5468
CS-185	84.72	CS-186	83.77	10	296	0.0032	VCP	0.013	CS	3.00		0.0269		0.0808	1.46	2.14	0.21	0.8044	0.7236	0.5933	0.5126
CS-186	83.74	CS-187	82.19	12	309	0.0050	VCP	0.013	CS	3.00		0.1160		0.3480	2.56	3.76	0.31	1.6352	1.2872	1.2060	0.8581
CS-187	82.19	CS-191	80.64	12	306	0.0051	VCP	0.013	CS	3.00		0.1160		0.3480	2.57	3.75	0.31	1.6432	1.2952	1.2125	0.8645
CS-188	83.70	CS-189	82.78	10	303	0.0030	VCP	0.013	CS	3.00		0.0090		0.0271	1.04	1.27	0.13	0.7824	0.7553	0.5772	0.5501
CS-189	82.78	CS-190	81.73	10	346	0.0030	VCP	0.013	CS	3.00		0.0250		0.0750	1.40	2.09	0.21	0.7822	0.7071	0.5772	0.5021
CS-190	81.73	CS-191	80.60	10	346	0.0033	VCP	0.013	CS	3.00		0.0250		0.0750	1.44	2.05	0.21	0.8114	0.7364	0.5985	0.5235
CS-191	80.64	CS-192	79.00	12	321	0.0051	VCP	0.013	CS	3.00		0.1475		0.4426	2.76	4.24	0.35	1.6503	1.2077	1.2177	0.7751
CS-192	79.00	CS-193	77.25	12	346	0.0051	VCP	0.013	CS	3.00		0.1495		0.4486	2.76	4.29	0.36	1.6420	1.1934	1.2112	0.7626
CS-193	77.25	CS-204	75.62	12	326	0.0050	VCP	0.013	CS	3.00		0.1536		0.4608	2.76	4.36	0.36	1.6326	1.1718	1.2041	0.7433
CS-194	87.45	CS-195	86.35	8	276	0.0040	VCP	0.013	CS	3.00		0.0037		0.0112	0.90	0.83	0.10	0.4944	0.4832	0.3645	0.3534
CS-195	86.25	CS-196	84.92	8	332	0.0040	VCP	0.013	CS	3.00		0.0076		0.0229	1.12	1.17	0.15	0.4956	0.4727	0.3658	0.3429
CS-196	84.82	CS-197	83.66	8	290	0.0040	VCP	0.013	CS	3.00		0.0076		0.0229	1.12	1.17	0.15	0.4953	0.4724	0.3652	0.3423
CS-197	83.56	CS-198	82.80	8	200	0.0038	VCP	0.013	CS	3.00		0.0174		0.0521	1.40	1.77	0.22	0.4827	0.4307	0.3561	0.3041
CS-198	82.82	CS-199	82.21	8	166	0.0037	VCP	0.013	CS	3.00		0.0584		0.1751	1.94	3.36	0.42	0.4747	0.2996	0.3503	0.1752
CS-199	82.15	CS-200	81.52	8	166	0.0038	VCP	0.013	CS	3.00		0.0584		0.1751	1.97	3.33	0.42	0.4824	0.3073	0.3561	0.1811
CS-200	81.49	CS-201	80.72	10	244	0.0032	VCP	0.013	CS	3.00		0.0584		0.1751	1.81	3.18	0.32	0.7976	0.6225	0.5881	0.4131
CS-201	80.71	CS-202	80.19	10	148	0.0035	VCP	0.013	CS	3.00		0.0611		0.1834	1.91	3.17	0.32	0.8416	0.6582	0.6211	0.4377
CS-202	80.19	CS-203	79.70	10	153	0.0032	VCP	0.013	CS	3.00		0.0611		0.1834	1.85	3.25	0.32	0.8035	0.6201	0.5927	0.4092
CS-203	79.69	CS-204	78.74	10	300	0.0032	VCP	0.013	CS	3.00		0.0631		0.1894	1.86	3.31	0.33	0.7990	0.6096	0.5894	0.4001
CS-204	72.03	CS-205A	71.74	12	68	0.0043	VCP	0.013	CS	3.00		0.2167		0.6502	2.86	5.51	0.46	1.5078	0.8576	1.1123	0.4621
CS-205	71.31	CS-206	69.87	15	296	0.0049	VCP	0.013	CS	3.00		0.2540		0.7619	3.10	5.23	0.35	2.9198	2.1579	2.1542	1.3922
CS-205A	71.74	CS-205	71.31	15	100	0.0043	VCP	0.013	CS	3.00		0.2540		0.7619	2.96	5.40	0.36	2.7451	1.9831	2.0246	1.2627
CS-206	69.87	CS-207	68.62	15	257	0.0049	VCP	0.013	CS	3.00		0.2540		0.7619	3.10	5.23	0.35	2.9195	2.1575	2.1535	1.3916
CS-207	68.62	CS-208	68.43	15	40	0.0048	VCP	0.013	CS	3.00		0.2540		0.7619	3.07	5.26	0.35	2.8851	2.1232	2.1283	1.3664
CS-208	68.43	CS-209	66.89	15	330	0.0047	VCP	0.013	CS	3.00		0.2540		0.7619	3.05	5.29	0.35	2.8597	2.0978	2.1096	1.3476

City of El Segundo
Existing Conditions Hydraulic Model Results
Pipes sorted by U/S MH ID

U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (ft^3/s)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)
CS-209	66.89	CS-210	65.33	15	297	0.0053	VCP	0.013	CS	3.00		0.2540		0.7619	3.18	5.12	0.34	3.0339	2.2720	2.2382	1.4763
CS-210	65.29	CS-520	64.27	15	17	0.0600	VCP	0.013	CS	3.00		0.2540		0.7619	7.58	2.77	0.18	10.2540	9.4920	7.5645	6.8025
CS-211	79.21	CS-212	77.39	8	350	0.0052	VCP	0.013	CS	3.00		0.0000		0.0000	0.00	0.00	0.00	0.5647	0.5647	0.4169	0.4169
CS-212	77.28	CS-213	75.47	8	350	0.0052	VCP	0.013	CS	3.00		0.0000		0.0000	0.00	0.00	0.00	0.5631	0.5631	0.4156	0.4156
CS-213	75.37	CS-214	73.55	8	350	0.0052	VCP	0.013	CS	3.00		0.0000		0.0000	0.00	0.00	0.00	0.5647	0.5647	0.4169	0.4169
CS-214	73.45	CS-215	70.47	8	397	0.0075	VCP	0.013	CS	3.00		0.0195		0.0584	1.84	1.59	0.20	0.6782	0.6199	0.4997	0.4413
CS-215	66.82	CSD-061	66.00	8	43	0.0190	VCP	0.013	CS	3.00		0.0195		0.0584	2.55	1.26	0.16	1.0782	1.0199	0.7963	0.7380
CS-519	80.22	CS-211	79.31	8	175	0.0052	VCP	0.013	CS	3.00		0.0000		0.0000	0.00	0.00	0.00	0.5647	0.5647	0.4169	0.4169
CS-528	91.01	CS-080	90.46	15	174	0.0032	VCP	0.013	CS	3.00		0.0046		0.0139	0.81	0.83	0.06	2.3535	2.3396	1.7360	1.7221
CS-529	91.46	CS-528	91.01	8	150	0.0030	VCP	0.013	CS	3.00		0.0046		0.0139	0.87	0.99	0.12	0.4289	0.4150	0.3167	0.3028
CS-532	87.41	CS-024	87.10	12	116	0.0027	VCP	0.013	CS	3.00		0.1593		0.4779	2.22	5.28	0.44	1.1935	0.7156	0.8803	0.4024
CS-535	78.96	CS-536	77.78	8	296	0.0040	VCP	0.013	CS	3.00		0.0175		0.0525	1.43	1.76	0.22	0.4944	0.4420	0.3645	0.3121
CS-536	77.68	CS-537A	76.54	8	140	0.0081	VCP	0.013	CS	3.00		0.0373		0.1118	2.29	2.15	0.27	0.7066	0.5949	0.5198	0.4081
CS-537A	77.68	CS-205A	76.54	8	150	0.0076	VCP	0.013	CS	3.00		0.0373		0.1118	2.23	2.19	0.27	0.6827	0.5709	0.5040	0.3922
CS-900	83.57	CS-901	83.27	18	220	0.0014		0.013	CS	3.00		0.4172		1.2517	2.20	8.98	0.50	2.5115	1.2598	1.8792	0.6275
CS-901	83.27	CS-902	82.87	18	294	0.0014		0.013	CS	3.00		0.4184		1.2551	2.20	9.00	0.50	2.5113	1.2562	1.8792	0.6241
CS-902	82.87	CS-904	82.48	18	287	0.0014		0.013	CS	3.00		0.4226		1.2678	2.20	9.05	0.50	2.5097	1.2419	1.8792	0.6114
CS-904	82.47	CS-903	82.35	15	90	0.0013		0.013	CS	3.00		0.4226		1.2678	2.16	10.41	0.69	1.5310	0.2632	1.1131	-0.1547
CS-905	89.12	CS-901	83.47	8	216	0.0262		0.013	CS	3.00		0.0012		0.0035	1.22	0.31	0.04	1.2665	1.2630	0.5040	0.5005
CS-906	95.27	CS-905	89.22	8	263	0.0230		0.013	CS	3.00		0.0004		0.0011	0.83	0.19	0.02	1.1877	1.1866	0.9346	0.9334
CS-907	94.92	CS-908	91.39	8	411	0.0086		0.013	CS	3.00		0.0000		0.0000	0.00	0.00	0.00	0.7262	0.7262	0.5357	0.5357
CS-908	91.29	CS-909	89.61	8	165	0.0102		0.013	CS	3.00		0.0000		0.0000	0.00	0.00	0.00	0.7903	0.7903	0.5832	0.5832
CS-909	89.51	CS-911	88.12	10	200	0.0069		0.013	CS	3.00		0.0000		0.0000	0.00	0.00	0.00	1.1828	1.1828	0.8698	0.8698
CS-910	93.46	CS-909	89.61	8	296	0.0130		0.013	CS	3.00		0.0000		0.0000	0.00	0.00	0.00	0.8925	0.8925	0.6581	0.6581
CS-911	88.02	CS-912	86.95	10	215	0.0050		0.013	CS	3.00		0.0005		0.0016	0.52	0.30	0.03	1.0006	0.9990	0.7402	0.7386
CS-912	86.85	CS-913	86.31	10	110	0.0049		0.013	CS	3.00		0.0005		0.0016	0.52	0.30	0.03	0.9953	0.9937	0.7330	0.7314
CS-913	86.21	CS-918	84.52	12	351	0.0048		0.013	CS	3.00		0.0009		0.0028	0.60	0.38	0.03	1.6021	1.5992	1.1794	1.1765
CS-914	88.72	CS-913	86.31	8	241	0.0100		0.013	CS	3.00		0.0004		0.0012	0.64	0.24	0.03	0.7835	0.7822	0.5774	0.5762
CS-915	89.33	CS-914	88.82	8	51	0.0099		0.013	CS	3.00		0.0004		0.0012	0.63	0.24	0.03	0.7793	0.7781	0.5746	0.5733
CS-916	92.04	CS-911	88.12	8	327	0.0120		0.013	CS	3.00		0.0005		0.0016	0.73	0.26	0.03	0.8574	0.8558	0.6322	0.6306
CS-917	92.50	CS-915	89.53	8	307	0.0097		0.013	CS	3.00		0.0004		0.0012	0.63	0.24	0.03	0.7705	0.7693	0.5688	0.5676
CS-918	84.42	CS-902	82.91	12	351	0.0043		0.013	CS	3.00		0.0009		0.0028	0.58	0.39	0.03	1.5148	1.5120	1.1174	1.1146
SH-001	120.00	SH-002	116.00	8	308	0.0130	VCP	0.013	SH	1.89		0.0035		0.0103	1.33	0.60	0.08	0.8924	0.8821	0.659	0.648
SH-002	111.00	SH-004	99.60	8	350	0.0326	VCP	0.013	SH	1.89		0.0035		0.0103	1.83	0.49	0.06	1.4133	1.4029	1.043	1.032
SH-003	106.50	SH-004	99.60	8	308	0.0224	VCP	0.013	SH	1.89		0.0025		0.0077	1.47	0.46	0.06	1.1721	1.1644	0.865	0.857
SH-004	99.60	SH-008	87.81	8	350	0.0337	VCP	0.013	SH	1.89		0.0063		0.0178	2.18	0.62	0.08	1.4372	1.4195	1.061	1.043
SH-005	112.30	SH-006	102.00	8	142	0.0725	VCP	0.013	SH	1.89		0.0000		0.0000	0.00	0.00	0.00	2.1090	2.1090	1.556	1.556
SH-006	102.00	SH-007	97.20	8	160	0.0300	VCP	0.013	SH	1.89		0.0000		0.0000	0.00	0.00	0.00	1.3563	1.3563	1.000	1.000
SH-007	97.10	SH-008	94.10	8	180	0.0167	VCP	0.013	SH	1.89		0.0000	0.0485	0.0485	2.31	1.19	0.15	1.0109	0.9625	0.746	0.697
SH-008	87.81	SH-012	86.72	10	263	0.0041	VCP	0.013	SH	1.89		0.0075	0.0485	0.0695	1.53	1.87	0.19	0.9140	0.8445	0.674	0.605
SH-009	92.35	SH-010	90.91	8	363	0.0040	VCP	0.013	SH	1.89		0.0029		0.0088	0.84	0.74	0.09	0.4932	0.4844	0.364	0.355
SH-010	90.91	SH-012	90.20	8	178	0.0040	VCP	0.013	SH	1.89		0.0044		0.0128	0.94	0.89	0.11	0.4946	0.4817	0.365	0.352
SH-011	104.00	SH-010	94.00	8	238	0.0420	VCP	0.013	SH	1.89	55	0.0015		0.0045	1.55	0.31	0.04	1.6051	1.6007	1.184	1.180

City of El Segundo
Existing Conditions Hydraulic Model Results
Pipes sorted by U/S MH ID

U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (ft^3/s)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)
SH-011	104.00	SH-027	100.00	8	141	0.0284	VCP	0.013	SH	1.89	45	0.0012		0.0037	1.27	0.31	0.04	1.3189	1.3153	0.973	0.969
SH-012	86.72	SH-026	85.59	10	378	0.0030	VCP	0.013	SH	1.89		0.0137	0.0485	0.0848	1.45	2.23	0.22	0.7763	0.6915	0.573	0.488
SH-013	123.00	SH-023	110.00	8	235	0.0553	VCP	0.013	SH	1.89		0.0016		0.0050	1.76	0.31	0.04	1.8418	1.8368	1.358	1.353
SH-014	106.00	SH-023	105.52	8	120	0.0040	VCP	0.013	SH	1.89		0.0012		0.0040	0.66	0.51	0.06	0.4953	0.4913	0.366	0.362
SH-015	101.86	SH-024	100.60	8	324	0.0039	VCP	0.013	SH	1.89		0.0014		0.0045	0.68	0.55	0.07	0.4883	0.4838	0.360	0.355
SH-016	125.00	SH-017	118.00	8	285	0.0246	VCP	0.013	SH	1.89		0.0010		0.0031	1.15	0.30	0.04	1.2272	1.2241	0.905	0.902
SH-017	118.00	SH-018	116.80	8	300	0.0040	VCP	0.013	SH	1.89		0.0052		0.0150	0.98	0.95	0.12	0.4953	0.4803	0.365	0.350
SH-018	116.80	SH-024	100.60	8	200	0.0810	VCP	0.013	SH	1.89		0.0063		0.0178	2.96	0.51	0.06	2.2287	2.2109	1.644	1.626
SH-019	128.00	SH-020	115.00	8	300	0.0433	VCP	0.013	SH	1.89		0.0012		0.0040	1.51	0.29	0.04	1.6301	1.6261	1.203	1.199
SH-020	115.00	SH-021	113.04	8	400	0.0049	VCP	0.013	SH	1.89		0.0029		0.0088	0.90	0.70	0.09	0.5482	0.5394	0.405	0.396
SH-021	113.04	SH-022	95.00	8	500	0.0361	VCP	0.013	SH	1.89		0.0055		0.0158	2.16	0.58	0.07	1.4874	1.4716	1.097	1.082
SH-022	95.00	SH-026	93.00	8	200	0.0100	VCP	0.013	SH	1.89		0.0069		0.0195	1.47	0.87	0.11	0.7831	0.7635	0.578	0.558
SH-023	105.52	SH-024	100.60	8	175	0.0281	VCP	0.013	SH	1.89		0.0028		0.0085	1.64	0.46	0.06	1.3130	1.3045	0.969	0.960
SH-024	100.60	SH-025	98.90	8	175	0.0097	VCP	0.013	SH	1.89		0.0105		0.0285	1.63	1.05	0.13	0.7718	0.7433	0.569	0.541
SH-025	98.90	SH-026	97.10	8	175	0.0103	VCP	0.013	SH	1.89		0.0105		0.0285	1.66	1.04	0.13	0.7942	0.7656	0.586	0.558
SH-026	85.59	SH-027	85.07	10	178	0.0029	VCP	0.013	SH	1.89		0.0311	0.0485	0.1260	1.61	2.74	0.27	0.7674	0.6414	0.566	0.440
SH-027	85.07	SH-028	83.89	10	395	0.0030	VCP	0.013	SH	1.89		0.0323	0.0485	0.1288	1.63	2.76	0.28	0.7760	0.6472	0.573	0.444
SH-028	83.89	SH-032	83.40	10	157	0.0031	VCP	0.013	SH	1.89		0.0323	0.0485	0.1288	1.66	2.72	0.27	0.7932	0.6644	0.585	0.456
SH-029	114.05	SH-030	113.00	8	315	0.0033	VCP	0.013	SH	1.89		0.0006		0.0020	0.50	0.39	0.05	0.4521	0.4501	0.333	0.331
SH-030	113.00	SH-031	110.00	8	377	0.0080	VCP	0.013	SH	1.89		0.0023		0.0070	1.00	0.57	0.07	0.6985	0.6915	0.515	0.508
SH-031	108.00	SH-032	83.40	8	395	0.0623	VCP	0.013	SH	1.89		0.0044		0.0129	2.45	0.46	0.06	1.9542	1.9414	1.442	1.429
SH-032	83.40	SH-037	82.72	12	305	0.0022	VCP	0.013	SH	1.89		0.0380	0.0485	0.1416	1.48	2.92	0.24	1.0902	0.9485	0.804	0.662
SH-033	112.00	SH-034	106.00	8	135	0.0444	VCP	0.013	SH	1.89		0.0005		0.0018	1.19	0.20	0.02	1.6509	1.6491	1.218	1.216
SH-034	106.00	SH-037	93.00	8	157	0.0828	VCP	0.013	SH	1.89		0.0005		0.0018	1.48	0.17	0.02	2.2533	2.2516	1.662	1.661
SH-035	119.00	SH-036	117.00	8	225	0.0089	VCP	0.013	SH	1.89	50	0.0010		0.0031	0.81	0.38	0.05	0.7383	0.7352	0.545	0.542
SH-035	119.00	SH-045	107.00	8	275	0.0436	VCP	0.013	SH	1.89	50	0.0010		0.0031	1.41	0.26	0.03	1.6358	1.6327	1.207	1.204
SH-036	117.00	SH-037	93.00	8	500	0.0480	VCP	0.013	SH	1.89		0.0030		0.0090	2.01	0.42	0.05	1.7156	1.7066	1.265	1.256
SH-037	82.72	SH-039	82.03	12	313	0.0022	VCP	0.013	SH	1.89		0.0417	0.0485	0.1500	1.50	3.02	0.25	1.0840	0.9340	0.799	0.650
SH-038	101.71	SH-039	95.62	8	192	0.0317	VCP	0.013	SH	1.89		0.0011		0.0037	1.33	0.30	0.04	1.3946	1.3909	1.029	1.025
SH-039	82.03	SH-042	80.93	12	500	0.0022	VCP	0.013	SH	1.89		0.0438	0.0485	0.1547	1.51	3.06	0.26	1.0829	0.9282	0.799	0.644
SH-040	109.50	SH-042	99.00	8	175	0.0600	VCP	0.013	SH	1.89		0.0007		0.0025	1.47	0.22	0.03	1.9181	1.9156	1.415	1.412
SH-041	103.31	SH-043	99.22	8	241	0.0170	VCP	0.013	SH	1.89		0.0012		0.0038	1.07	0.35	0.04	1.0201	1.0163	0.752	0.749
SH-042	80.93	SH-043	80.88	12	20	0.0025	VCP	0.013	SH	1.89		0.0445	0.0485	0.1564	1.59	2.98	0.25	1.1544	0.9980	0.852	0.695
SH-043	80.88	SH-048	79.78	12	500	0.0022	VCP	0.013	SH	1.89		0.0457	0.0485	0.1590	1.52	3.11	0.26	1.0829	0.9240	0.799	0.640
SH-044	115.41	SH-045	107.00	8	235	0.0358	VCP	0.013	SH	1.89		0.0006		0.0020	1.14	0.22	0.03	1.4814	1.4794	1.093	1.091
SH-045	107.00	SH-047	97.00	8	148	0.0676	VCP	0.013	SH	1.89		0.0016		0.0050	1.89	0.29	0.04	2.0355	2.0305	1.501	1.496
SH-046	120.00	1-041	114.00	8	199	0.0302	-	0.013	7	1.89	30	0.0006		0.0019	1.06	0.22	0.03	1.3597	1.3578	1.003	1.001
SH-046	120.00	SH-047	97.00	8	333	0.0691	VCP	0.013	SH	1.89	70	0.0014		0.0044	1.83	0.27	0.03	2.0580	2.0536	0.366	0.361
SH-047	97.00	SH-048	86.00	8	185	0.0595	VCP	0.013	SH	1.89		0.0040		0.0117	2.34	0.45	0.06	1.9095	1.8978	1.409	1.397
SH-048	79.78	SH-058	79.10	12	310	0.0022	VCP	0.013	SH	1.89		0.0508	0.0485	0.1703	1.55	3.22	0.27	1.0813	0.9110	0.798	0.627
SH-049	139.94	SH-050	138.50	8	305	0.0047	VCP	0.013	SH	1.89		0.0020		0.0063	0.80	0.61	0.08	0.5381	0.5318	0.397	0.391
SH-050	132.00	SH-051	131.40	8	150	0.0040	VCP	0.013	SH	1.89		0.0028		0.0083	0.82	0.72	0.09	0.4953	0.4869	0.365	0.357
SH-051	131.40	SH-054	111.00	8	250	0.0816	VCP	0.013	SH	1.89		0.0032		0.0096	2.47	0.38	0.05	2.2369	2.2273	1.650	1.640

City of El Segundo
Existing Conditions Hydraulic Model Results
Pipes sorted by U/S MH ID

U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (ft^3/s)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)
SH-052	115.96	SH-053	115.00	8	240	0.0040	VCP	0.013	SH	1.89		0.0012		0.0037	0.65	0.49	0.06	0.4953	0.4915	0.365	0.361
SH-053	115.00	SH-054	111.00	8	250	0.0160	VCP	0.013	SH	1.89		0.0024		0.0073	1.29	0.49	0.06	0.9905	0.9832	0.731	0.724
SH-054	111.00	SH-055	104.00	8	200	0.0350	VCP	0.013	SH	1.89		0.0061		0.0173	2.19	0.61	0.08	1.4650	1.4477	1.081	1.063
SH-055	104.00	SH-058	95.00	8	300	0.0300	VCP	0.013	SH	1.89		0.0061		0.0173	2.08	0.63	0.08	1.3563	1.3390	1.000	0.983
SH-056	128.22	SH-057	127.01	8	265	0.0046	VCP	0.013	SH	1.89		0.0022		0.0067	0.81	0.63	0.08	0.5291	0.5224	0.390	0.384
SH-057	127.01	SH-058	95.00	8	257	0.1246	VCP	0.013	SH	1.89		0.0031		0.0094	2.83	0.34	0.04	2.7636	2.7543	2.039	2.030
SH-058	79.10	SH-063	78.51	12	266	0.0022	VCP	0.013	SH	1.89		0.0629	0.0485	0.1968	1.63	3.46	0.29	1.0874	0.8905	0.802	0.605
SH-059	106.28	SH-061	104.65	8	326	0.0050	VCP	0.013	SH	1.89		0.0010		0.0032	0.66	0.43	0.05	0.5537	0.5506	0.408	0.405
SH-060	118.95	SH-061	104.95	8	140	0.1000	VCP	0.013	SH	1.89		0.0007		0.0024	1.74	0.19	0.02	2.4763	2.4739	1.827	1.825
SH-061	104.95	SH-062	94.95	8	100	0.1000	VCP	0.013	SH	1.89		0.0017		0.0053	2.20	0.27	0.03	2.4763	2.4710	1.827	1.822
SH-062	94.95	SH-058	94.00	8	236	0.0040	VCP	0.013	SH	1.89		0.0025		0.0077	0.81	0.69	0.09	0.4968	0.4892	0.366	0.359
SH-063	78.51	SH-064	77.29	12	555	0.0022	VCP	0.013	SH	1.89		0.0629	0.0485	0.1968	1.62	3.47	0.29	1.0825	0.8856	0.799	0.602
SH-064	77.29	SH-065	76.57	12	182	0.0040	VCP	0.013	SH	1.89		0.0635	0.0485	0.1981	2.00	2.99	0.25	1.4522	1.2540	1.072	0.873
SH-065	76.49	SH-080	76.23	12	60	0.0043	VCP	0.013	SH	1.89		0.0635	0.0485	0.1981	2.07	2.93	0.24	1.5198	1.3217	1.121	0.923
SH-066	114.00	1-028	104.10	8	330	0.0300	VCP	0.013	1	1.73	33	0.0010		0.0028	1.19	0.27	0.03	1.3563	1.3535	1.000	0.998
SH-066	114.00	1-036	106.00	8	157	0.0510	VCP	0.013	1	1.73	33	0.0010		0.0028	1.44	0.24	0.03	1.7677	1.7649	1.304	1.301
SH-066	114.00	SH-068	101.80	8	350	0.0349	VCP	0.013	SH	1.89	34	0.0011		0.0032	1.31	0.28	0.03	1.4620	1.4588	1.079	1.075
SH-067	105.00	1-038	97.00	8	250	0.0320	VCP	0.013	1	1.73	75	0.0017		0.0047	1.43	0.34	0.04	1.4008	1.3961	1.033	1.029
SH-067	105.00	SH-068	101.80	8	357	0.0090	VCP	0.013	SH	1.89	25	0.0006		0.0017	0.67	0.28	0.04	0.7414	0.7397	0.549	0.547
SH-068	101.80	SH-071	100.40	8	350	0.0040	VCP	0.013	SH	1.89		0.0028		0.0084	0.83	0.73	0.09	0.4953	0.4868	0.365	0.357
SH-069	130.00	1-039	119.00	8	200	0.0550	VCP	0.013	1	1.73	68	0.0022		0.0060	1.86	0.33	0.04	1.8365	1.8305	1.355	1.349
SH-069	130.00	SH-070	126.00	8	150	0.0267	VCP	0.013	SH	1.89	32	0.0010		0.0031	1.18	0.29	0.04	1.2788	1.2757	0.945	0.942
SH-070	126.00	SH-071	106.00	8	207	0.0966	VCP	0.013	SH	1.89		0.0010		0.0034	1.90	0.22	0.03	2.4341	2.4307	1.795	1.792
SH-071	100.40	SH-074	98.74	8	370	0.0045	VCP	0.013	SH	1.89		0.0046		0.0134	0.99	0.88	0.11	0.5245	0.5112	0.387	0.374
SH-072	131.80	SH-073	127.70	8	150	0.0273	VCP	0.013	SH	1.89		0.0005		0.0019	1.02	0.23	0.03	1.2946	1.2928	0.955	0.953
SH-073	127.70	SH-074	98.72	8	334	0.0868	VCP	0.013	SH	1.89		0.0013		0.0042	1.96	0.25	0.03	2.3066	2.3024	1.702	1.698
SH-074	98.74	SH-077	94.00	8	330	0.0144	VCP	0.013	SH	1.89		0.0067		0.0189	1.65	0.79	0.10	0.9385	0.9196	0.692	0.673
SH-075	131.00	1-041	114.00	8	202	0.0842	VCP	0.013	1	1.73	79	0.0017		0.0048	2.01	0.27	0.03	2.2717	2.2669	1.676	1.671
SH-075	131.00	SH-076	130.05	8	240	0.0040	VCP	0.013	SH	1.89	21	0.0005		0.0014	0.48	0.31	0.04	0.4927	0.4913	0.366	0.364
SH-076	130.05	SH-077	94.00	8	407	0.0886	VCP	0.013	SH	1.89		0.0022		0.0067	2.27	0.31	0.04	2.3306	2.3239	1.719	1.713
SH-077	94.00	SH-078	88.00	8	118	0.0508	VCP	0.013	SH	1.89		0.0091		0.0250	2.79	0.66	0.08	1.7658	1.7408	1.303	1.278
SH-078	88.00	SH-079	82.00	8	208	0.0288	VCP	0.013	SH	1.89		0.0094		0.0259	2.32	0.77	0.10	1.3300	1.3041	0.981	0.955
SH-079	76.84	SH-080	75.60	12	62	0.0200	VCP	0.013	SH	1.89		0.0094		0.0259	1.92	0.76	0.06	3.2651	3.2392	2.409	2.383

APPENDIX 2

MODEL INPUT AND RESULTS
FUTURE CONDITIONS

City of El Segundo
Future Conditions Hydraulic Model Results - with PS 7 bypassed and PS 1 improvements implemented
Pipes sorted by U/S MH ID

Pipe ID	U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (mgd)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)	Comments
1-001	1-001	79.00	1-002	74.00	8	285	0.0175	VCP	0.013	1	2.07		0.0032		0.0106	1.49	0.57	0.07	1.0372	1.0266	0.7652	0.7546	
1-002	1-002	74.00	1-004	72.60	8	350	0.0040	VCP	0.013	1	2.07		0.0060		0.0186	1.05	1.06	0.13	0.4953	0.4766	0.3652	0.3465	
1-003	1-003	81.00	1-004	75.00	8	197	0.0305	VCP	0.013	1	2.07		0.0012		0.0042	1.36	0.32	0.04	1.3666	1.3624	1.0083	1.0041	
1-004	1-004	72.60	1-010	71.78	8	142	0.0058	VCP	0.013	1	2.07		0.0078		0.0239	1.29	1.09	0.14	0.5951	0.5712	0.4388	0.4149	
1-005	1-005	69.59	1-006	69.56	18	253	0.0001	VCP	0.013	7	2.07		0.4231		0.9381	0.82	18.00	1.00	0.7413	-0.1969	0.5026	-0.4356	
1-006	1-006	69.56	7-178A	62.14	18	18	0.4122		0.013	7	2.07		0.4231		0.9381	15.48	1.82	0.10	43.7053	42.7672	32.2402	31.3020	
1-007	1-007	72.00	1-008	68.50	8	121	0.0289	VCP	0.013	1	2.07		0.0013		0.0046	1.38	0.34	0.04	1.3318	1.3272	0.9824	0.9778	
1-008	1-008	69.13	1-010	68.58	18	315	0.0017	VCP	0.013	1	2.07		0.4244		0.9408	2.24	7.13	0.40	2.8444	1.9036	2.0707	1.1299	
1-009	1-009	78.00	1-010	71.88	8	250	0.0245	VCP	0.013	1	2.07		0.0000		0.0000	0.00	0.00	0.00	1.2252	1.2252	0.9042	0.9042	
1-010	1-010	68.58	1-013	67.91	18	340	0.0020	VCP	0.013	1	2.07		0.4348		0.9620	2.35	6.98	0.39	3.0218	2.0598	2.2464	1.2844	
1-011	1-011	66.05	1-013	64.00	8	256	0.0080	VCP	0.013	1	2.07		0.0035		0.0113	1.15	0.71	0.09	0.7007	0.6894	0.5171	0.5057	
1-012	1-012	79.00	1-013	67.00	8	244	0.0492	VCP	0.013	1	2.07		0.0025		0.0084	1.98	0.40	0.05	1.7366	1.7282	1.2810	1.2726	
1-013	1-013	67.91	1-015	68.14	18	340	-0.0007	VCP	0.013	1	2.07		0.4408		0.9742	0.85	18.00	1.00	NA	NA	NA	NA	Adverse slope
1-014	1-014	90.00	1-015	65.02	8	311	0.0803	VCP	0.013	1	2.07		0.0023		0.0078	2.30	0.35	0.04	2.2193	2.2115	1.6371	1.6293	
1-015	1-015	68.14	1-016	67.19	18	361	0.0026	VCP	0.013	1	2.07		0.4462		0.9852	2.63	6.54	0.36	3.4920	2.5069	2.5603	1.5751	
1-016A	1-016	67.19	1-102	67.11	18	19	0.0042		0.013	1	2.07		0.2062		0.4553	2.50	3.90	0.22	4.4272	3.9719	3.2544	2.7991	
1-016	1-016	67.19	1-516	66.71	8	24	0.0200	VCP	0.013	1	2.07	100	0.2400		0.5299	4.85	3.90	0.49	1.1074	0.5775	7.1017	6.5718	
1-017	1-017	60.65	1-018	59.95	8	322	0.0022	VCP	0.013	1	2.07		0.2413		0.5597	2.48	8.00	1.00	0.3651	-0.1946	0.2695	-0.2902	D/S of split at 1-016
1-018	1-018	59.94	1-047	59.47	8	213	0.0022	VCP	0.013	1	2.07		0.2481		0.5740	2.54	8.00	1.00	0.3678	-0.2062	0.2715	-0.3026	D/S of split at 1-016
1-019	1-019	89.06	1-020	72.04	8	335	0.0508	VCP	0.013	1	2.07		0.0034		0.0111	2.18	0.45	0.06	1.7651	1.7540	1.3023	1.2912	
1-020	1-020	71.94	1-021	66.20	8	140	0.0410	VCP	0.013	1	2.07		0.0047		0.0149	2.22	0.55	0.07	1.5856	1.5707	1.1698	1.1549	
1-021	1-021	66.20	1-018	63.00	8	160	0.0200	VCP	0.013	1	2.07		0.0067		0.0207	1.91	0.76	0.09	1.1074	1.0867	0.8169	0.7962	
1-022	1-022	100.20	1-023	73.50	8	290	0.0921	-	0.013	1	2.07	77	0.0036		0.0115	2.71	0.40	0.05	2.3761	2.3646	1.7528	1.7413	
12-822	1-022	100.20	12-041	92.00	8	252	0.0325	VCP	0.013	7	2.07	23	0.0011		0.0034	1.31	0.29	0.04	1.4126	1.4091	1.0411	1.0377	
1-023	1-023	73.50	1-024	67.38	8	137	0.0447	-	0.013	1	2.07		0.0059		0.0185	2.43	0.59	0.07	1.6551	1.6366	1.2209	1.2024	
1-024	1-024	67.38	1-032	60.50	8	154	0.0447	-	0.013	1	2.07		0.0062		0.0192	2.47	0.61	0.08	1.6552	1.6359	1.2209	1.2017	
1-025	1-025	122.01	1-026	119.40	8	261	0.0100	VCP	0.013	1	2.07		0.0045		0.0142	1.34	0.75	0.09	0.7831	0.7689	0.5778	0.5636	
1-026	1-026	119.40	1-029	84.00	8	300	0.1180	VCP	0.013	1	2.07		0.0105		0.0313	4.01	0.61	0.08	2.6900	2.6587	1.9842	1.9529	
1-027	1-027	109.30	1-028	103.41	8	295	0.0200	VCP	0.013	1	2.07		0.0012		0.0043	1.18	0.36	0.05	1.1065	1.1022	0.8163	0.8120	
1-028	1-028	104.10	1-029	84.00	8	367	0.0548	VCP	0.013	1	2.07		0.0038		0.0122	2.31	0.47	0.06	1.8326	1.8204	1.3521	1.3399	
1-029	1-029	84.00	1-030	73.00	8	170	0.0647	VCP	0.013	1	2.07		0.0178		0.0508	3.76	0.88	0.11	1.9919	1.9412	1.4697	1.4189	
1-030	1-030	73.00	1-031	65.00	8	379	0.0211	VCP	0.013	1	2.07		0.0224		0.0630	2.71	1.28	0.16	1.1377	1.0748	0.8396	0.7766	
1-031	1-031	65.00	1-032	60.50	8	300	0.0150	-	0.013	1	2.07		0.0248		0.0690	2.47	1.45	0.18	0.9591	0.8901	0.7077	0.6387	
1-032	1-032	60.50	1-033	59.44	10	355	0.0030	VCP	0.013	1	2.07		0.0346		0.0937	1.49	2.35	0.23	0.7758	0.6821	0.5726	0.4789	
1-033	1-033	59.14	1-048	58.89	18	203	0.0012	VCP	0.013	1	2.07		0.2714		0.6236	1.76	6.28	0.35	2.3889	1.7652	1.7625	1.1389	
1-034	1-034	94.67	1-035	77.05	8	280	0.0629	VCP	0.013	1	2.07		0.0033		0.0109	2.34	0.43	0.05	1.9644	1.9535	1.4490	1.4381	
1-035	1-035	76.95	1-047	62.38	8	257	0.0567	VCP	0.013	1	2.07		0.0064		0.0198	2.70	0.58	0.07	1.8645	1.8447	1.3754	1.3555	
1-036	1-036	106.00	1-037	81.00	8	300	0.0833	VCP	0.013	1	2.07		0.0027		0.0091	2.44	0.37	0.05	2.2605	2.2514	1.6675	1.6584	
1-037	1-037	81.00	1-046	66.00	8	392	0.0383	VCP	0.013	1	2.07		0.0059		0.0184	2.30	0.62	0.08	1.5318	1.5134	1.1298	1.1114	
1-038	1-038	97.00	1-045	79.00	8	243	0.0741	VCP	0.013	1	2.07		0.0031		0.0101	2.41	0.40	0.05	2.1313	2.1212	1.5725	1.5624	
1-039	1-039	119.00	1-044	87.00	8	292	0.1096	VCP	0.013	1	2.07		0.0052		0.0164	3.21	0.45	0.06	2.5923	2.5759	1.9124	1.8961	
1-040	1-040	133.00	1-042	96.10	8	275	0.1342	VCP	0.013	1	2.07		0.0024		0.0080	2.77	0.31	0.04	2.8685	2.8604	2.1160	2.1080	
1-041	1-041	114.00	1-042	96.00	8	350	0.0514	-	0.013	1	2.07		0.0020		0.0069	1.89	0.36	0.05	1.7758	1.7690	1.3101	1.3032	
1-841	1-041	114.00	7-173	88.00	8	226	0.1150	VCP	0.013	7	2.07		0.0010		0.0036	2.06	0.22	0.03	2.6561	2.6524	1.9596	1.9560	
1-042	1-042	114.00	1-043	96.00	8	21	0.0514	-	0.013	1	2.07		0.0062		0.0193	6.89	0.30	0.04	7.2499	7.2306	1.3104	1.2911	
1-043	1-043	96.00	1-044	87.00	8	350	0.0257	-	0.013	1	2.07		0.0097		0.0291	2.30	0.84	0.11	1.2557	1.2266	0.9259	0.8968	
1-044	1-044	87.00	1-045	79.00	8	350	0.0229	-	0.013	1	2.07		0.0170		0.0487	2.58	1.11	0.14	1.1839	1.1352	0.8732	0.8245	
1-045	1-045	79.00	1-046	66.00	8	350	0.0371	-	0.013	1	2.07		0.0234		0.0653	3.34	1.13	0.14	1.5092	1.4439	1.1136	1.0483	
1-046	1-046	67.62	1-100	67.59	18	12	0.0023	VCP	0.013	1	2.07		0.0307		0.0838	1.23	1.98	0.11	3.2873	3.2035	2.4077	2.3238	

City of El Segundo
Future Conditions Hydraulic Model Results - with PS 7 bypassed and PS 1 improvements implemented
Pipes sorted by U/S MH ID

Pipe ID	U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (mgd)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)	Comments
1-047	1-047	59.40	1-049	59.10	8	5	0.0600	VCP	0.013	1	2.07		0.2548		0.5884	7.48	3.04	0.38	1.9181	1.3297	1.4148	0.8264	
1-048	1-048	64.95	1-049	64.94	18	8	0.0013	VCP	0.013	1	2.07		0.2726		0.6262	1.77	6.26	0.35	2.4067	1.7805	1.7754	1.1492	
1-049	1-049	60.40	WW-001	56.00	18	5	0.0333	VCP	0.013	1	2.07		0.5275		1.1492	21.44	1.68	0.09	63.8573	62.7081	9.1627	8.0136	
1-100	1-100	67.59	1-101	67.58	18	3	0.0023	VCP	0.013	1	2.07		0.1403		0.3399	1.85	3.92	0.22	3.2675	2.9276	2.4077	2.0678	
1-101	1-101	67.58	1-033	66.82	18	326	0.0023	VCP	0.013	1	2.07		0.2368		0.5501	2.14	4.98	0.28	3.2888	2.7387	2.4077	1.8576	
1-102A	1-102	67.11	1-100	65.53	12	38	0.0413		0.013	1	2.07		0.1097		0.2576	12-inch siphon							
1-102B	1-102	67.11	1-101	65.53	10	39	0.0401		0.013	1	2.07		0.0965		0.2267	10-inch siphon							
1-516	1-516	60.70	1-017	60.66	8	16	0.0025	CIP	0.013	1	2.07		0.2400		0.5569	2.47	8.00	1.00	0.3915	-0.1653	0.2880	-0.2689	D/S of split at 1-016
2-001	2-001	132.50	2-004	106.00	8	373	0.0710	-	0.013	2	1.93		0.0050		0.0148	2.68	0.48	0.06	2.0872	2.0724	1.5395	1.5247	
2-002	2-002	98.82	2-003	91.75	12	12	0.0100	VCP	0.013	2	1.93		0.0005		0.0019	0.00	0.00	0.00	17.7217	17.7198	1.7021	1.7002	
2-003	2-003	103.21	2-004	102.50	8	290	0.0024	-	0.013	2	1.93		0.0014		0.0046	0.58	0.61	0.08	0.3875	0.3828	0.2837	0.2790	
2-004	2-004	102.05	2-010	87.00	8	350	0.0430	-	0.013	2	1.93		0.0065		0.0186	2.41	0.60	0.08	1.6238	1.6052	1.1983	1.1796	
2-005	2-005	108.90	2-006	108.38	8	130	0.0040	-	0.013	2	1.93		0.0009		0.0032	0.62	0.46	0.06	0.4953	0.4921	0.3652	0.3620	
2-006	2-006	108.38	2-007	87.60	8	381	0.0545	VCP	0.013	2	1.93		0.0021		0.0067	1.92	0.35	0.04	1.8288	1.8221	1.3489	1.3422	
2-007	2-007	87.60	2-010	87.00	8	150	0.0040	VCP	0.013	2	1.93		0.0025		0.0078	0.81	0.70	0.09	0.4953	0.4874	0.3652	0.3573	
2-008	2-008	135.00	2-009	101.00	8	223	0.1525	VCP	0.013	2	1.93		0.0009		0.0030	2.14	0.19	0.02	3.0577	3.0547	2.2556	2.2527	
2-009	2-009	101.00	2-010	87.00	8	150	0.0933	VCP	0.013	2	1.93		0.0033		0.0099	2.61	0.37	0.05	2.3923	2.3824	1.7651	1.7552	
2-010	2-010	87.00	2-015	85.60	8	350	0.0040	-	0.013	2	1.93		0.0122		0.0336	1.25	1.41	0.18	0.4953	0.4617	0.3652	0.3316	
2-011	2-011	91.00	2-012	89.10	8	475	0.0040	VCP	0.013	2	1.93		0.0016		0.0051	0.71	0.57	0.07	0.4953	0.4901	0.3652	0.3601	
2-012	2-012	89.10	2-015	89.04	8	15	0.0040	VCP	0.013	2	1.93		0.0017		0.0054	0.72	0.59	0.07	0.4953	0.4898	0.3652	0.3597	
2-013	2-013	127.00	2-014	94.00	8	273	0.1209	VCP	0.013	2	1.93		0.0043		0.0129	3.09	0.40	0.05	2.7226	2.7097	2.0087	1.9959	
2-014	2-014	94.00	2-015	89.04	8	100	0.0496	VCP	0.013	2	1.93		0.0051		0.0151	2.38	0.53	0.07	1.7440	1.7289	1.2868	1.2717	
2-015	2-015	85.60	2-018	78.00	8	350	0.0217	-	0.013	2	1.93		0.0190		0.0505	2.56	1.14	0.14	1.1539	1.1035	0.8512	0.8007	
2-016	2-016	82.00	2-018	78.00	8	490	0.0082	VCP	0.013	2	1.93		0.0015		0.0048	0.90	0.47	0.06	0.7075	0.7027	0.5222	0.5174	
2-017	2-017	115.00	2-018	78.00	8	373	0.0992	VCP	0.013	2	1.93		0.0056		0.0164	3.10	0.47	0.06	2.4663	2.4499	1.8194	1.8029	
2-018	2-018	78.00	2-026	61.23	8	350	0.0479	-	0.013	2	1.93		0.0270		0.0697	3.72	1.10	0.14	1.7141	1.6444	1.2648	1.1952	
2-019	2-019	89.58	2-020	89.00	8	145	0.0040	-	0.013	2	1.93		0.0001		0.0004	0.33	0.18	0.02	0.4953	0.4948	0.3652	0.3647	
2-020	2-020	89.00	2-021	63.09	8	371	0.0698	-	0.013	2	1.93		0.0007		0.0024	1.53	0.21	0.03	2.0694	2.0670	1.5266	1.5242	
2-021	2-021	63.09	2-022	62.91	8	45	0.0040	VCP	0.013	2	1.93		0.0018		0.0059	0.74	0.61	0.08	0.4953	0.4894	0.3652	0.3593	
2-022	2-022	62.81	2-023	62.73	8	17	0.0047	VCP	0.013	2	1.93		0.0018		0.0059	0.79	0.59	0.07	0.5372	0.5313	0.3962	0.3903	
2-023	2-023	62.63	2-027	62.16	8	98	0.0048	VCP	0.013	2	1.93		0.0018		0.0059	0.79	0.59	0.07	0.5423	0.5364	0.4001	0.3942	
2-024	2-024	98.29	2-025	73.81	8	223	0.1098	-	0.013	2	1.93		0.0024		0.0074	2.52	0.31	0.04	2.5945	2.5871	1.9144	1.9070	
2-025	2-025	73.81	2-026	62.45	8	150	0.0757	-	0.013	2	1.93		0.0035		0.0105	2.47	0.40	0.05	2.1550	2.1445	1.5899	1.5794	
2-026	2-026	62.45	2-027	62.41	8	15	0.0027	-	0.013	2	1.93		0.0305		0.0778	1.38	2.38	0.30	0.4044	0.3266	0.2986	0.2208	
2-027	2-027	60.17	2-063	59.97	8	80	0.0025	-	0.013	2	1.93		0.0323		0.0821	1.37	2.49	0.31	0.3915	0.3094	0.2889	0.2068	
2-028	2-028	83.25	2-029	82.04	10	422	0.0029	VCP	0.013	2	1.93		0.0011		0.0037	0.55	0.50	0.05	0.7603	0.7566	0.5610	0.5573	
2-029	2-029	81.98	2-033	81.34	10	209	0.0031	VCP	0.013	2	1.93		0.0011		0.0037	0.57	0.49	0.05	0.7857	0.7820	0.5797	0.5761	
2-030	2-030	88.00	2-031	82.00	8	221	0.0271	-	0.013	2	1.93	15	0.0001		0.0002	0.54	0.09	0.01	1.2903	1.2900	0.9520	0.9518	
2-830	2-030	88.00	2-051	75.00	8	320	0.0406	-	0.013	2	1.93	85	0.0004		0.0014	1.06	0.18	0.02	1.5783	1.5770	1.1647	1.1633	
2-031	2-031	82.00	2-034	71.50	8	180	0.0583	VCP	0.013	2	1.93		0.0001		0.0003	0.00	0.00	0.00	1.8913	1.8910	1.3954	1.3951	
2-032	2-032	85.20	2-033	78.80	6	98	0.0653	VCP	0.013	2	1.93		0.0004		0.0014	1.31	0.17	0.03	0.9292	0.9278	0.6857	0.6844	
2-033	2-033	78.80	2-034	78.40	8	12	0.0333	-	0.013	2	1.93		0.0015		0.0048	1.46	0.34	0.04	1.4297	1.4249	1.0548	1.0500	
2-034	2-034	71.50	2-044	66.00	8	180	0.0306	-	0.013	2	1.93		0.0015		0.0050	1.43	0.35	0.04	1.3688	1.3638	1.0095	1.0045	
2-035	2-035	113.00	2-037	108.56	8	175	0.0254	-	0.013	2	1.93		0.0226		0.0590	2.83	1.18	0.15	1.2473	1.1883	0.9204	0.8614	
2-036	2-036	125.00	2-037	108.56	8	370	0.0444	VCP	0.013	2	1.93		0.0000		0.0000	0.00	0.00	0.00	1.6506	1.6506	1.2168	1.2168	
2-037	2-037	108.56	2-038	104.00	8	180	0.0253	-	0.013	2	1.93		0.0226		0.0590	2.83	1.18	0.15	1.2464	1.1874	0.9197	0.8607	
2-038	2-038	104.00	2-040	93.00	8	180	0.0611	-	0.013	2	1.93		0.0233		0.0607	3.89	0.97	0.12	1.9358	1.8751	1.4284	1.3677	
2-039	2-039	106.27	2-040	93.00	8	241	0.0551	VCP	0.013	2	1.93	52	0.0002		0.0008	0.99	0.13	0.02	1.8375	1.8367	1.3553	1.3545	
2-839	2-039	106.27	7-127	102.07	8	300	0.0140	VCP	0.013	7	2.07	48	0.0002		0.0008	0.62	0.18	0.02	0.9265	0.9258	0.6840	0.6832	

City of El Segundo
Future Conditions Hydraulic Model Results - with PS 7 bypassed and PS 1 improvements implemented
Pipes sorted by U/S MH ID

Pipe ID	U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (mgd)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)	Comments
2-040	2-040	93.00	2-042	78.70	8	167	0.0856	-	0.013	2	1.93		0.0235		0.0612	4.39	0.90	0.11	2.2915	2.2303	1.6908	1.6295	
2-041	2-041	88.00	2-043	78.70	8	307	0.0303	VCP	0.013	2	1.93		0.0034		0.0102	1.78	0.49	0.06	1.3629	1.3527	1.0057	0.9954	
2-042	2-042	78.70	2-500	73.42	8	116	0.0455	-	0.013	2	1.93		0.0235		0.0612	3.52	1.05	0.13	1.6707	1.6095	1.2325	1.1713	
2-043	2-043	69.00	2-044	66.00	8	180	0.0167	-	0.013	2	1.93		0.0294		0.0752	2.63	1.48	0.18	1.0109	0.9357	0.7458	0.6706	
2-044	2-044	66.00	2-047	65.70	8	57	0.0053	VCP	0.013	2	1.93		0.1036		0.2397	2.41	3.63	0.45	0.5681	0.3284	0.4188	0.1791	
2-045	2-045	87.30	2-046	82.60	8	200	0.0235	VCP	0.013	2	1.93		0.0013		0.0042	1.25	0.35	0.04	1.2004	1.1962	0.8855	0.8812	
2-046	2-046	82.60	2-047	65.70	8	250	0.0676	VCP	0.013	2	1.93		0.0013		0.0042	1.80	0.27	0.03	2.0360	2.0317	1.5020	1.4978	
2-047	2-047	71.72	2-048	71.68	10	15	0.0027	VCP	0.013	2	1.93		0.1052		0.2431	1.87	3.96	0.40	0.7332	0.4901	0.5410	0.2979	
2-048	2-048	71.67	2-049	71.15	10	175	0.0030	VCP	0.013	2	1.93		0.1052		0.2431	1.94	3.85	0.38	0.7740	0.5308	0.5707	0.3276	
2-049	2-049	71.14	2-050	70.24	10	301	0.0030	VCP	0.013	2	1.93		0.1056		0.2440	1.95	3.85	0.39	0.7764	0.5323	0.5726	0.3286	
2-050	2-050	69.95	2-051	67.40	10	341	0.0075	VCP	0.013	2	1.93		0.1056		0.2440	2.71	3.02	0.30	1.2278	0.9838	0.9055	0.6614	
2-051	2-051	61.03	2-063	59.97	10	260	0.0041	VCP	0.013	2	1.93		0.1200		0.2744	2.25	3.77	0.38	0.9066	0.6321	0.6689	0.3945	
2-052	2-052	80.00	2-053	65.17	8	175	0.0847	-	0.013	2	1.93		0.0013		0.0044	1.96	0.26	0.03	2.2796	2.2752	1.6817	1.6773	
2-053	2-053	65.17	2-054	64.17	8	248	0.0040	-	0.013	2	1.93		0.0028		0.0085	0.83	0.73	0.09	0.4973	0.4887	0.3671	0.3586	
2-054	2-054	64.17	2-059	63.81	10	125	0.0029	VCP	0.013	2	1.93		0.0040		0.0119	0.79	0.87	0.09	0.7620	0.7501	0.5623	0.5504	
2-055	2-055	96.00	2-056	73.50	8	250	0.0900	VCP	0.013	2	1.93		0.0000		0.0000	0.00	0.00	0.00	2.3492	2.3492	1.7334	1.7334	
2-056	2-056	73.50	2-057	72.20	8	326	0.0040	VCP	0.013	2	1.93		0.0000		0.0000	0.00	0.00	0.00	0.4945	0.4945	0.3645	0.3645	
2-057	2-057	72.20	2-058	68.00	8	350	0.0120	-	0.013	2	1.93		0.0000		0.0000	0.00	0.00	0.00	0.8578	0.8578	0.6327	0.6327	
2-058	2-058	65.45	2-059	64.03	8	355	0.0040	-	0.013	2	1.93		0.0000		0.0000	0.00	0.00	0.00	0.4953	0.4953	0.3652	0.3652	
2-059	2-059	63.81	2-060	63.06	10	260	0.0029	VCP	0.013	2	1.93		0.0055		0.0162	0.87	1.01	0.10	0.7626	0.7464	0.5623	0.5461	
2-060	2-060	63.06	2-062	62.11	10	323	0.0029	VCP	0.013	2	1.93		0.0055		0.0162	0.88	1.00	0.10	0.7700	0.7538	0.5681	0.5520	
2-061	2-061	93.00	2-062	76.00	8	270	0.0630	-	0.013	2	1.93		0.0037		0.0111	2.35	0.43	0.05	1.9649	1.9539	1.4497	1.4386	
2-062	2-062	62.11	2-051	61.03	10	373	0.0029	VCP	0.013	2	1.93		0.0140		0.0380	1.13	1.52	0.15	0.7640	0.7260	0.5636	0.5256	
2-063	2-063	59.97	WW-002	55.00	12	15	0.3237		0.013	2	1.93		0.1523		0.3418	11.09	1.33	0.11	13.1364	12.7946	1.3411	0.9993	
2-500	2-500	73.42	2-043	69.00	8	97	0.0456	-	0.013	2	1.93		0.0235		0.0612	3.52	1.05	0.13	1.6716	1.6104	1.2332	1.1720	
2-534	2-534	111.00	2-058	91.60	8	443	0.0438	VCP	0.013	2	1.93		0.0000		0.0000	0.00	0.00	0.00	1.6387	1.6387	1.2093	1.2093	
4-001	4-001	103.95	4-004	103.02	12	310	0.0030	VCP	0.013	4	2.43		0.0072		0.0259	0.99	1.19	0.10	1.2646	1.2387	0.9326	0.9068	
4-002	4-002	119.57	4-003	118.65	8	234	0.0039	VCP	0.013	4	2.43		0.0024		0.0095	0.85	0.77	0.10	0.4910	0.4815	0.3619	0.3525	
4-003	4-003	118.55	4-004	109.12	8	197	0.0479	VCP	0.013	4	2.43		0.0031		0.0120	2.19	0.48	0.06	1.7133	1.7013	1.2642	1.2522	
4-004	4-004	103.02	4-006	101.90	12	378	0.0030	VCP	0.013	4	2.43		0.0103		0.0360	1.09	1.40	0.12	1.2568	1.2207	0.9268	0.8908	
4-005	4-005	126.20	4-006	112.37	8	250	0.0553	VCP	0.013	4	2.43	83	0.0038		0.0141	2.42	0.50	0.06	1.8418	1.8277	1.3586	1.3444	
4-805	4-005	126.20	5-060	118.50	8	250	0.0308	VCP	0.013	5	2.09	17	0.0008		0.0025	1.16	0.25	0.03	1.3743	1.3718	1.0138	1.0113	
4-006	4-006	101.90	4-007	100.78	12	369	0.0030	VCP	0.013	4	2.43		0.0141		0.0480	1.20	1.59	0.13	1.2720	1.2240	0.9384	0.8904	
4-007	4-007	100.78	4-008	99.73	12	350	0.0030	VCP	0.013	4	2.43		0.0156		0.0527	1.23	1.67	0.14	1.2646	1.2118	0.9326	0.8799	
4-008	4-008	99.73	4-010	98.68	12	350	0.0030	VCP	0.013	4	2.43		0.0156		0.0527	1.23	1.67	0.14	1.2646	1.2118	0.9326	0.8799	
4-009	4-009	125.43	4-010	111.77	8	390	0.0350	VCP	0.013	4	2.43	31	0.0019		0.0068	1.65	0.39	0.05	1.4655	1.4587	1.0813	1.0745	
4-809	4-009	125.54	6-002	104.42	8	390	0.0542	VCP	0.013	6	1.61	69	0.0042		0.0101	2.17	0.43	0.05	1.8223	1.8122	1.3450	1.3349	
4-010	4-010	98.68	4-011	97.88	12	267	0.0030	VCP	0.013	4	2.43		0.0194		0.0646	1.31	1.84	0.15	1.2638	1.1992	0.9326	0.8681	
4-011	4-011	97.88	4-012	97.05	12	265	0.0031	VCP	0.013	4	2.43		0.0195		0.0650	1.33	1.83	0.15	1.2921	1.2271	0.9533	0.8883	
4-012	4-012	97.05	4-013	96.33	12	250	0.0029	VCP	0.013	4	2.43		0.0195		0.0650	1.29	1.87	0.16	1.2390	1.1740	0.9139	0.8489	
4-013	4-013	96.33	4-014	95.58	12	250	0.0030	VCP	0.013	4	2.43		0.0207		0.0686	1.33	1.90	0.16	1.2646	1.1960	0.9326	0.8640	
4-014	4-014	95.58	4-015	94.83	12	250	0.0030	VCP	0.013	4	2.43		0.0220		0.0725	1.35	1.95	0.16	1.2646	1.1921	0.9326	0.8602	
4-015	4-015	94.83	4-016	94.08	12	250	0.0030	VCP	0.013	4	2.43		0.0220		0.0725	1.35	1.95	0.16	1.2646	1.1921	0.9326	0.8602	
4-016	4-016	94.08	4-027	91.46	12	261	0.0100	VCP	0.013	4	2.43		0.0220		0.0725	2.07	1.46	0.12	2.3132	2.2407	1.7063	1.6338	
4-017	4-017	97.63	4-018	93.75	8	200	0.0194	VCP	0.013	4	2.43		0.0006		0.0028	1.03	0.30	0.04	1.0907	1.0879	0.8047	0.8019	
4-018	4-018	93.56	4-019	91.06	8	200	0.0125	VCP	0.013	4	2.43		0.0031		0.0121	1.37	0.66	0.08	0.8755	0.8634	0.6457	0.6336	
4-019	4-019	91.01	4-020	90.23	12	323	0.0024	VCP	0.013	4	2.43		0.0031		0.0121	0.73	0.87	0.07	1.1346	1.1225	0.8370	0.8249	
4-020	4-020	90.18	4-021	89.50	12	277	0.0025	VCP	0.013	4	2.43		0.0083		0.0296	0.96	1.33	0.11	1.1439	1.1144	0.8441	0.8145	
4-021	4-021	89.46	4-027	88.97	12	243	0.0020	VCP	0.013	4	2.43		0.0084		0.0300	0.90	1.40	0.12	1.0368	1.0067	0.7646	0.7346	

City of El Segundo
Future Conditions Hydraulic Model Results - with PS 7 bypassed and PS 1 improvements implemented
Pipes sorted by U/S MH ID

Pipe ID	U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (mgd)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)	Comments
4-022	4-022	107.48	4-023	98.27	8	200	0.0461	VCP	0.013	4	2.43		0.0335		0.1068	4.17	1.37	0.17	1.6804	1.5737	1.2396	1.1329	
4-023	4-023	98.18	4-025	90.43	8	200	0.0388	VCP	0.013	4	2.43		0.0338		0.1078	3.93	1.43	0.18	1.5415	1.4337	1.1375	1.0297	
4-024	4-024	93.29	4-025	90.43	8	250	0.0114	VCP	0.013	4	2.43		0.0021		0.0082	1.18	0.56	0.07	0.8376	0.8294	0.6179	0.6097	
4-025	4-025	90.38	4-026	89.65	8	250	0.0029	VCP	0.013	4	2.43		0.0359		0.1138	1.59	2.83	0.35	0.4232	0.3094	0.3122	0.1984	
4-026	4-026	89.60	4-027	88.87	8	250	0.0029	VCP	0.013	4	2.43		0.0385		0.1213	1.62	2.93	0.37	0.4232	0.3018	0.3122	0.1909	
4-027	4-027	88.82	4-033	88.00	12	328	0.0025	VCP	0.013	4	2.43		0.0689		0.2073	1.72	3.44	0.29	1.1544	0.9471	0.8518	0.6445	
4-028	4-028	99.10	4-029	95.07	8	216	0.0187	VCP	0.013	4	2.43		0.0004		0.0018	0.88	0.24	0.03	1.0696	1.0678	0.7892	0.7874	
4-029	4-029	94.92	4-033	93.52	8	300	0.0047	VCP	0.013	4	2.43		0.0008		0.0033	0.66	0.45	0.06	0.5349	0.5317	0.3949	0.3916	
4-030	4-030	106.00	4-031	98.00	8	350	0.0229	VCP	0.013	4	2.43		0.0018		0.0072	1.45	0.45	0.06	1.1839	1.1767	0.8732	0.8660	
4-031	4-031	97.96	4-032	96.00	8	250	0.0078	VCP	0.013	4	2.43		0.0018		0.0072	1.00	0.58	0.07	0.6934	0.6862	0.5112	0.5040	
4-032	4-032	95.96	4-033	94.00	8	250	0.0078	VCP	0.013	4	2.43		0.0037		0.0139	1.22	0.79	0.10	0.6934	0.6794	0.5112	0.4973	
4-033	4-033	88.00	4-039	85.68	12	329	0.0071	VCP	0.013	4	2.43		0.0733		0.2195	2.53	2.73	0.23	1.9388	1.7193	1.4303	1.2108	
4-034	4-034	93.92	4-035	92.70	8	300	0.0041	VCP	0.013	4	2.43		0.0022		0.0088	0.84	0.74	0.09	0.4994	0.4906	0.3684	0.3596	
4-035	4-035	92.60	4-036	91.60	8	250	0.0040	VCP	0.013	4	2.43		0.0035		0.0132	0.95	0.90	0.11	0.4953	0.4820	0.3652	0.3519	
4-036	4-036	91.50	4-039	90.50	8	175	0.0057	VCP	0.013	4	2.43		0.0049		0.0182	1.18	0.96	0.12	0.5920	0.5738	0.4362	0.4180	
4-037	4-037	108.23	4-038	107.10	8	250	0.0045	VCP	0.013	4	2.43		0.0503		0.1554	2.03	2.98	0.37	0.5265	0.3711	0.3884	0.2330	
4-038	4-038	107.05	4-039	100.40	8	150	0.0443	VCP	0.013	4	2.43		0.0550		0.1687	4.70	1.73	0.22	1.6488	1.4802	1.2164	1.0477	
4-039	4-039	84.79	4-059	81.97	12	280	0.0101	VCP	0.013	4	2.43		0.1332		0.3803	3.37	3.29	0.27	2.3170	1.9367	1.7095	1.3292	
4-040	4-040	109.20	4-060	102.50	8	200	0.0335	VCP	0.013	4	2.43		0.0356		0.1129	3.79	1.52	0.19	1.4333	1.3204	1.0574	0.9445	
4-041	4-041	94.50	4-058	81.65	8	327	0.0393	VCP	0.013	4	2.43		0.0471		0.1461	4.32	1.66	0.21	1.5523	1.4063	1.1453	0.9992	
4-042	4-042	110.00	4-043	103.80	8	125	0.0496	VCP	0.013	4	2.43		0.0003		0.0012	1.10	0.16	0.02	1.7440	1.7428	1.2868	1.2856	
4-043	4-043	103.79	4-044	94.26	8	300	0.0318	VCP	0.011	4	2.43		0.0010		0.0042	1.38	0.32	0.04	1.3957	1.3914	1.0296	1.0253	
4-044	4-044	94.21	4-045	92.49	8	200	0.0086	VCP	0.013	4	2.43		0.0028		0.0108	1.16	0.68	0.08	0.7262	0.7154	0.5358	0.5250	
4-045	4-045	92.44	4-046	82.66	8	168	0.0582	VCP	0.013	4	2.43		0.0028		0.0108	2.27	0.43	0.05	1.8894	1.8786	1.3941	1.3833	
4-046	4-046	82.63	4-058A	82.48	8	160	0.0009	VCP	0.013	4	2.43		0.0032		0.0122	0.56	1.23	0.15	0.2398	0.2276	0.1728	0.1606	
4-047	4-047	105.40	4-048	98.74	8	450	0.0148	VCP	0.013	4	2.43		0.0017		0.0069	1.23	0.48	0.06	0.9527	0.9458	0.7025	0.6957	
4-048	4-048	98.54	4-049	97.23	8	329	0.0040	VCP	0.013	4	2.43		0.0055		0.0202	1.08	1.10	0.14	0.4941	0.4739	0.3645	0.3443	
4-049	4-049	97.10	4-055	86.40	8	200	0.0535	VCP	0.013	4	2.43		0.0121		0.0418	3.32	0.84	0.10	1.8113	1.7695	1.3359	1.2942	
4-050	4-050	107.79	4-052	104.78	8	198	0.0152	VCP	0.013	4	2.43		0.0000		0.0000	0.00	0.00	0.00	0.9655	0.9655	0.7122	0.7122	
4-051	4-051	123.55	4-052	102.99	8	265	0.0776	VCP	0.013	4	2.43		0.0042		0.0158	2.81	0.48	0.06	2.1812	2.1654	1.6099	1.5941	
4-052	4-052	104.78	4-053	103.91	8	57	0.0153	VCP	0.013	4	2.43		0.0042		0.0158	1.60	0.71	0.09	0.9674	0.9516	0.7135	0.6977	
4-053	4-053	103.83	4-054	98.82	8	402	0.0125	VCP	0.013	4	2.43		0.0047		0.0177	1.54	0.79	0.10	0.8742	0.8565	0.6450	0.6273	
4-054	4-054	98.73	4-049	97.18	8	329	0.0047	VCP	0.013	4	2.43		0.0063		0.0228	1.18	1.12	0.14	0.5375	0.5147	0.3968	0.3740	
4-055	4-055	86.30	4-056	85.10	8	300	0.0040	VCP	0.013	4	2.43		0.0131		0.0451	1.37	1.63	0.20	0.4953	0.4502	0.3652	0.3201	
4-056	4-056	85.00	4-057	84.00	8	250	0.0040	VCP	0.013	4	2.43		0.0144		0.0491	1.40	1.70	0.21	0.4953	0.4462	0.3652	0.3161	
4-057	4-057	83.90	4-058	81.60	8	250	0.0092	VCP	0.013	4	2.43		0.0152		0.0515	1.91	1.42	0.18	0.7511	0.6996	0.5539	0.5024	
4-058	4-058	82.01	4-059	81.53	12	47	0.0102	VCP	0.013	4	2.43		0.0654		0.1976	2.80	2.36	0.20	2.3332	2.1356	1.7208	1.5232	
4-058A	4-058A	82.48	4-058	82.01	8	160	0.0029	VCP	0.013	4	2.43		0.0032		0.0122	0.83	0.93	0.12	0.4244	0.4123	0.3110	0.2989	
4-059	4-059	88.64	WW-004	88.00	12	12	0.0533		0.013	4	2.43		0.1986		0.5492	6.78	2.60	0.22	5.3319	4.7827	3.9312	3.3820	
4-060	4-060	102.50	4-041	94.50	8	148	0.0541	VCP	0.013	4	2.43		0.0458		0.1425	4.80	1.51	0.19	1.8206	1.6782	1.3430	1.2006	
5-001	5-001	106.97	5-004	98.10	8	100	0.0887	VCP	0.013	5	2.09		0.0008		0.0029	1.76	0.21	0.03	2.3322	2.3293	1.7205	1.7176	
5-002	5-002	99.30	5-004	98.10	8	300	0.0040	VCP	0.013	5	2.09		0.0025		0.0085	0.83	0.73	0.09	0.4953	0.4868	0.3652	0.3567	
5-003	5-003	114.95	5-004	104.00	8	300	0.0365	VCP	0.013	5	2.09		0.0020		0.0070	1.69	0.40	0.05	1.4961	1.4891	1.1039	1.0969	
5-004	5-004	98.00	5-007	94.73	8	328	0.0100	VCP	0.013	5	2.09		0.0072		0.0225	1.53	0.93	0.12	0.7819	0.7594	0.5765	0.5541	
5-005	5-005	98.06	5-007	94.69	8	311	0.0108	VCP	0.013	5	2.09		0.0026		0.0088	1.19	0.58	0.07	0.8152	0.8064	0.6011	0.5923	
5-006	5-006	101.32	5-007	100.52	8	206	0.0039	VCP	0.013	5	2.09		0.0017		0.0059	0.73	0.62	0.08	0.4880	0.4821	0.3600	0.3541	
5-007	5-007	94.68	5-008	93.90	8	203	0.0038	VCP	0.013	5	2.09		0.0115		0.0345	1.24	1.44	0.18	0.4854	0.4510	0.3581	0.3236	
5-008	5-008	93.85	5-009	93.39	8	128	0.0036	VCP	0.013	5	2.09		0.0119		0.0353	1.22	1.48	0.19	0.4694	0.4341	0.3464	0.3111	
5-009	5-009	93.33	5-010	92.80	15	147	0.0036	VCP	0.013	5	2.09		0.0159		0.0464	1.22	1.41	0.09	2.5136	2.4672	1.8543	1.8079	

City of El Segundo
Future Conditions Hydraulic Model Results - with PS 7 bypassed and PS 1 improvements implemented
Pipes sorted by U/S MH ID

Pipe ID	U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (mgd)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)	Comments
5-010	5-010	92.75	5-021	92.60	8	40	0.0038	VCP	0.013	5	2.09		0.0159		0.0464	1.35	1.68	0.21	0.4795	0.4332	0.3535	0.3072	
5-011	5-011	103.70	5-012	103.10	8	181	0.0033	VCP	0.013	5	2.09		0.0009		0.0033	0.58	0.49	0.06	0.4509	0.4476	0.3329	0.3296	
5-012	5-012	102.85	5-019	101.83	8	255	0.0040	VCP	0.013	5	2.09		0.0036		0.0117	0.91	0.85	0.11	0.4953	0.4835	0.3652	0.3534	
5-013	5-013	129.70	5-014	117.20	8	240	0.0521	VCP	0.013	5	2.09		0.0025		0.0085	2.03	0.40	0.05	1.7871	1.7786	1.3185	1.3099	
5-014	5-014	117.01	5-018	109.17	8	200	0.0392	VCP	0.013	5	2.09		0.0033		0.0109	1.98	0.48	0.06	1.5504	1.5395	1.1440	1.1331	
5-015	5-015	158.00	5-016	152.00	8	239	0.0251	VCP	0.013	5	2.09		0.0016		0.0056	1.38	0.39	0.05	1.2407	1.2352	0.9152	0.9096	
5-016	5-016	152.00	5-017	128.00	8	500	0.0480	VCP	0.013	5	2.09		0.0043		0.0139	2.29	0.51	0.06	1.7156	1.7018	1.2655	1.2516	
5-017	5-017	128.00	5-018	109.90	8	265	0.0683	VCP	0.013	5	2.09		0.0047		0.0151	2.66	0.49	0.06	2.0465	2.0314	1.5098	1.4947	
7-817	5-017	128.00	7-080	106.01	8	262	0.0839	VCP	0.013	7	2.07		0.0013		0.0047	2.00	0.27	0.03	2.2686	2.2640	1.6733	1.6686	
5-018	5-018	109.03	5-019	101.75	8	267	0.0273	VCP	0.013	5	2.09		0.0080		0.0246	2.24	0.77	0.10	1.2930	1.2684	0.9540	0.9293	
5-019	5-019	101.67	5-020	92.42	8	250	0.0370	VCP	0.013	5	2.09		0.0154		0.0450	2.98	0.95	0.12	1.5063	1.4613	1.1110	1.0660	
5-020	5-020	92.32	5-021	91.83	8	81	0.0060	VCP	0.013	5	2.09		0.0161		0.0469	1.60	1.50	0.19	0.6091	0.5621	0.4492	0.4022	
5-021	5-021	91.83	5-042	90.75	8	169	0.0064	VCP	0.013	5	2.09		0.0321		0.0883	1.96	2.03	0.25	0.6260	0.5377	0.4621	0.3738	
5-822	5-022	112.20	4-048	98.64	8	442	0.0307	VCP	0.013	4	2.43	59	0.0013		0.0052	1.45	0.36	0.04	1.3716	1.3664	1.0121	1.0070	
5-022	5-022	112.10	5-023	91.80	8	300	0.0677	VCP	0.013	5	2.09	41	0.0009		0.0031	1.63	0.23	0.03	2.0370	2.0339	1.5034	1.5003	
5-023	5-023	91.61	5-042	90.75	8	200	0.0043	VCP	0.013	5	2.09		0.0019		0.0065	0.79	0.63	0.08	0.5135	0.5070	0.3787	0.3722	
5-024	5-024	138.21	5-025	132.13	8	211	0.0288	VCP	0.013	5	2.09		0.0022		0.0075	1.59	0.43	0.05	1.3293	1.3218	0.9805	0.9730	
5-025	5-025	132.13	5-027	118.40	8	264	0.0520	VCP	0.013	5	2.09		0.0045		0.0143	2.38	0.51	0.06	1.7858	1.7715	1.3172	1.3028	
5-026	5-026	157.72	5-027	116.07	8	428	0.0973	VCP	0.013	5	2.09		0.0021		0.0073	2.40	0.32	0.04	2.4428	2.4355	1.8019	1.7946	
5-027	5-027	116.07	5-036	96.35	8	290	0.0680	VCP	0.013	5	2.09		0.0080		0.0246	3.07	0.62	0.08	2.0420	2.0174	1.5066	1.4820	
5-028	5-028	132.64	5-029	120.60	8	338	0.0356	VCP	0.013	5	2.09		0.0030		0.0098	1.86	0.47	0.06	1.4779	1.4681	1.0903	1.0805	
5-029	5-029	120.50	5-033	116.16	8	290	0.0150	VCP	0.013	5	2.09		0.0057		0.0180	1.65	0.76	0.10	0.9580	0.9400	0.7064	0.6884	
5-030	5-030	132.78	5-029	120.60	8	225	0.0541	VCP	0.013	5	2.09		0.0000		0.0000	0.00	0.00	0.00	1.8219	1.8219	1.3443	1.3443	
5-031	5-031	127.73	5-032	124.46	8	349	0.0094	VCP	0.013	5	2.09		0.0026		0.0087	1.13	0.60	0.08	0.7580	0.7493	0.5591	0.5503	
5-032	5-032	124.14	5-033	116.16	8	338	0.0236	VCP	0.013	5	2.09		0.0045		0.0146	1.82	0.62	0.08	1.2032	1.1886	0.8874	0.8728	
5-033	5-033	116.06	5-034	113.48	8	230	0.0112	VCP	0.013	5	2.09		0.0124		0.0367	1.85	1.15	0.14	0.8294	0.7927	0.6121	0.5754	
5-034	5-034	113.38	5-035	98.86	8	300	0.0484	VCP	0.013	5	2.09		0.0124		0.0367	3.08	0.81	0.10	1.7228	1.6861	1.2707	1.2340	
5-035	5-035	98.86	5-036	96.35	8	314	0.0080	VCP	0.013	5	2.09		0.0162		0.0470	1.76	1.40	0.18	0.7001	0.6532	0.5164	0.4694	
5-036	5-036	96.25	5-041	93.78	8	294	0.0084	VCP	0.013	5	2.09		0.0252		0.0708	2.03	1.70	0.21	0.7178	0.6469	0.5293	0.4585	
5-037	5-037	108.02	5-038	98.60	8	349	0.0270	VCP	0.013	5	2.09		0.0033		0.0109	1.74	0.52	0.07	1.2865	1.2756	0.9488	0.9378	
5-038	5-038	98.50	5-039	96.92	8	393	0.0040	VCP	0.013	5	2.09		0.0033		0.0109	0.90	0.82	0.10	0.4965	0.4856	0.3665	0.3555	
5-039	5-039	96.92	5-040	95.35	8	393	0.0040	VCP	0.013	5	2.09		0.0069		0.0214	1.09	1.13	0.14	0.4949	0.4736	0.3652	0.3438	
5-040	5-040	95.35	5-041	93.78	8	393	0.0040	VCP	0.013	5	2.09		0.0119		0.0353	1.27	1.45	0.18	0.4949	0.4596	0.3652	0.3298	
5-041	5-041	93.68	5-042	90.80	8	299	0.0096	VCP	0.013	5	2.09		0.0380		0.1031	2.37	1.98	0.25	0.7685	0.6654	0.5668	0.4637	
5-042	5-042	90.75	5-043	88.78	8	267	0.0074	VCP	0.013	5	2.09		0.0731		0.1884	2.56	2.90	0.36	0.6726	0.4842	0.4964	0.3080	
5-043	5-043	88.78	5-046	86.85	8	267	0.0072	VCP	0.013	5	2.09		0.0743		0.1911	2.55	2.93	0.37	0.6658	0.4747	0.4912	0.3001	
5-044	5-044	89.53	5-045	88.97	8	139	0.0040		0.013	5	2.09		0.0011		0.0041	0.66	0.51	0.06	0.4965	0.4924	0.3658	0.3617	
5-045	5-045	88.97	5-043	88.78	8	48	0.0040	VCP	0.013	5	2.09		0.0011		0.0041	0.66	0.51	0.06	0.4953	0.4912	0.3658	0.3617	
5-046	5-046	86.85	5-047	84.84	8	246	0.0082	VCP	0.013	5	2.09		0.0755		0.1940	2.68	2.86	0.36	0.7078	0.5139	0.5222	0.3283	
5-047	5-047	84.84	5-050	79.84	8	104	0.0481	VCP	0.013	5	2.09		0.0765		0.1963	5.06	1.83	0.23	1.7170	1.5207	1.2668	1.0705	
5-048	5-048	106.07	5-049	81.45	8	300	0.0821	VCP	0.013	5	2.09		0.0014		0.0051	2.03	0.28	0.04	2.2433	2.2382	1.6552	1.6501	
5-049	5-049	81.43	5-050	79.35	8	350	0.0059	VCP	0.013	5	2.09		0.0037		0.0122	1.06	0.79	0.10	0.6037	0.5914	0.4453	0.4331	
5-050	5-050	79.84	5-112	75.28	8	96	0.0475	VCP	0.013	5	2.09		0.0802		0.2051	5.10	1.87	0.23	1.7067	1.5016	1.2590	1.0539	
5-051	5-051	116.74	5-052	114.24	8	115	0.0217	VCP	0.013	5	2.09		0.0008		0.0029	1.08	0.30	0.04	1.1546	1.1517	0.8518	0.8489	
5-052	5-052	114.14	5-108	96.50	8	200	0.0882	VCP	0.013	5	2.09		0.0014		0.0050	2.07	0.27	0.03	2.3256	2.3207	1.7160	1.7110	
5-053	5-053	116.11	5-055	113.99	8	141	0.0150	VCP	0.013	5	2.09		0.0021		0.0073	1.26	0.50	0.06	0.9602	0.9529	0.7084	0.7011	
5-054	5-054	120.14	5-055	114.24	8	410	0.0144	VCP	0.013	5	2.09		0.0092		0.0281	1.86	0.95	0.12	0.9394	0.9113	0.6928	0.6648	
5-055	5-055	113.99	5-056	112.13	8	124	0.0150	VCP	0.013	5	2.09		0.0124		0.0367	2.05	1.07	0.13	0.9591	0.9223	0.7077	0.6710	
5-056	5-056	112.03	5-057	109.90	8	315	0.0068	VCP	0.013	5	2.09		0.0157		0.0457	1.65	1.44	0.18	0.6439	0.5982	0.4750	0.4294	

City of El Segundo
Future Conditions Hydraulic Model Results - with PS 7 bypassed and PS 1 improvements implemented
Pipes sorted by U/S MH ID

Pipe ID	U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (mgd)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)	Comments
5-057	5-057	109.80	5-058	108.46	8	335	0.0040	VCP	0.013	5	2.09		0.0170		0.0491	1.40	1.70	0.21	0.4953	0.4461	0.3652	0.3160	
5-058	5-058	108.36	5-059	102.75	8	300	0.0187	VCP	0.013	5	2.09		0.0195		0.0559	2.51	1.24	0.16	1.0708	1.0149	0.7898	0.7339	
5-059	5-059	102.64	5-108	96.52	8	300	0.0204	VCP	0.013	5	2.09		0.0222		0.0629	2.68	1.29	0.16	1.1185	1.0555	0.8253	0.7624	
5-060	5-060	118.40	5-063	114.10	8	250	0.0172	VCP	0.013	5	2.09		0.0028		0.0095	1.43	0.54	0.07	1.0270	1.0175	0.7575	0.7480	
5-061	5-061	115.24	5-063	114.10	8	285	0.0040	VCP	0.013	5	2.09		0.0013		0.0047	0.70	0.55	0.07	0.4953	0.4905	0.3652	0.3604	
5-062	5-062	114.84	5-063	114.10	8	185	0.0040	VCP	0.013	5	2.09		0.0007		0.0026	0.58	0.42	0.05	0.4953	0.4926	0.3652	0.3625	
5-063	5-063	114.02	5-064	112.70	8	335	0.0039	VCP	0.013	5	2.09		0.0060		0.0187	1.05	1.07	0.13	0.4916	0.4728	0.3626	0.3438	
5-064	5-064	112.65	5-065	103.95	8	300	0.0290	VCP	0.013	5	2.09		0.0085		0.0260	2.32	0.77	0.10	1.3335	1.3075	0.9837	0.9577	
5-065	5-065	103.88	5-067	98.83	8	287	0.0176	VCP	0.013	5	2.09		0.0110		0.0330	2.10	0.98	0.12	1.0387	1.0057	0.7665	0.7335	
5-066	5-066	99.90	5-067	98.93	8	221	0.0044	VCP	0.013	5	2.09		0.0008		0.0029	0.62	0.43	0.05	0.5188	0.5159	0.3826	0.3797	
5-067	5-067	98.83	5-114	98.60	8	13	0.0177	VCP	0.013	5	2.09		0.0118		0.0352	2.14	1.01	0.13	1.0416	1.0064	0.7685	0.7333	
5-068	5-068	108.40	5-069	106.96	8	359	0.0040	VCP	0.013	5	2.09		0.0034		0.0112	0.90	0.83	0.10	0.4960	0.4848	0.3658	0.3547	
5-069	5-069	106.96	5-079	97.02	8	345	0.0288	VCP	0.013	5	2.09		0.0057		0.0180	2.07	0.65	0.08	1.3292	1.3112	0.9805	0.9624	
5-070	5-070	106.12	5-071	99.80	8	304	0.0208	VCP	0.013	5	2.09		0.0026		0.0088	1.49	0.50	0.06	1.1291	1.1203	0.8331	0.8243	
5-071	5-071	99.80	5-077	98.44	8	340	0.0040	VCP	0.013	5	2.09		0.0055		0.0175	1.03	1.03	0.13	0.4953	0.4777	0.3652	0.3476	
5-072	5-072	112.13	5-073	106.78	8	267	0.0200	VCP	0.013	5	2.09		0.0000		0.0000	0.00	0.00	0.00	1.1085	1.1085	0.8176	0.8176	
5-073	5-073	106.68	5-076	105.30	8	346	0.0040	VCP	0.013	5	2.09		0.0000		0.0000	0.00	0.00	0.00	0.4945	0.4945	0.3645	0.3645	
5-074	5-074	111.58	5-075	100.14	8	307	0.0373	VCP	0.013	5	2.09	62	0.0004		0.0016	1.07	0.19	0.02	1.5116	1.5101	1.1149	1.1133	
5-874	5-074	111.58	5-085	95.00	8	300	0.0553	VCP	0.013	5	2.09	38	0.0003		0.0010	1.06	0.14	0.02	1.8409	1.8400	1.6048	1.6038	
5-075	5-075	99.65	5-076	98.98	8	167	0.0040	VCP	0.013	5	2.09		0.0004		0.0016	0.50	0.33	0.04	0.4960	0.4944	0.3658	0.3642	
5-076	5-076	98.98	5-077	98.34	8	160	0.0040	VCP	0.013	5	2.09		0.0004		0.0016	0.50	0.33	0.04	0.4953	0.4936	0.3652	0.3636	
5-077	5-077	98.34	5-079	97.12	8	306	0.0040	VCP	0.013	5	2.09		0.0090		0.0275	1.18	1.28	0.16	0.4945	0.4669	0.3645	0.3370	
5-878	5-078	106.08	5-077	98.44	8	329	0.0232	VCP	0.013	5	2.09	62	0.0031		0.0099	1.60	0.52	0.06	1.1933	1.1835	0.8803	0.8704	
5-078	5-078	106.80	5-084	96.68	8	290	0.0349	VCP	0.013	5	2.09	38	0.0019		0.0060	1.59	0.37	0.05	1.4628	1.4568	1.0793	1.0733	
5-079	5-079	97.02	5-080	95.89	8	283	0.0040	VCP	0.013	5	2.09		0.0159		0.0464	1.38	1.65	0.21	0.4948	0.4485	0.3652	0.3188	
5-080	5-080	95.89	5-081	94.76	8	283	0.0040	VCP	0.013	5	2.09		0.0185		0.0532	1.43	1.77	0.22	0.4948	0.4416	0.3652	0.3120	
5-081	5-081	94.76	5-083	86.79	8	273	0.0292	VCP	0.013	5	2.09		0.0205		0.0585	2.97	1.14	0.14	1.3380	1.2794	0.9869	0.9284	
5-082	5-082	89.62	5-083	86.79	8	211	0.0134	VCP	0.013	5	2.09		0.0002		0.0007	0.58	0.17	0.02	0.9069	0.9062	0.6689	0.6683	
5-083	5-083	86.79	5-103	86.50	10	10	0.0290	VCP	0.013	5	2.09		0.0207		0.0590	2.88	1.08	0.11	2.4179	2.3589	1.7838	1.7249	
5-084	5-084	96.68	5-096	84.15	8	290	0.0432	VCP	0.013	5	2.09		0.0042		0.0136	2.19	0.52	0.06	1.6277	1.6141	1.2009	1.1872	
5-875	5-085	111.58	5-086	95.00	8	300	0.0553	VCP	0.011	5	2.09		0.0024		0.0080	2.03	0.38	0.05	1.8409	1.8329	1.3579	1.3499	
5-086	5-086	94.89	5-090	82.46	8	300	0.0414	VCP	0.013	5	2.09		0.0052		0.0167	2.30	0.58	0.07	1.5940	1.5773	1.1756	1.1590	
5-087	5-087	115.16	5-088	100.90	8	272	0.0524	VCP	0.013	5	2.09		0.0023		0.0078	1.98	0.38	0.05	1.7930	1.7851	1.3230	1.3152	
5-088	5-088	100.80	5-089	83.50	8	250	0.0692	VCP	0.013	5	2.09		0.0038		0.0123	2.51	0.44	0.06	2.0600	2.0477	1.5195	1.5072	
5-089	5-089	83.40	5-090	82.10	8	350	0.0037	VCP	0.013	5	2.09		0.0074		0.0229	1.09	1.19	0.15	0.4772	0.4543	0.3522	0.3293	
5-090	5-090	82.36	5-091	81.08	8	328	0.0039	VCP	0.013	5	2.09		0.0127		0.0375	1.28	1.50	0.19	0.4892	0.4517	0.3606	0.3231	
5-091	5-091	81.08	5-096	81.00	8	21	0.0038	VCP	0.013	5	2.09		0.0127		0.0375	1.27	1.51	0.19	0.4833	0.4458	0.3568	0.3193	
5-092	5-092	119.82	5-093	116.78	8	350	0.0087	VCP	0.013	5	2.09		0.0047		0.0150	1.29	0.79	0.10	0.7298	0.7148	0.5384	0.5234	
5-093	5-093	116.68	5-094	90.57	8	322	0.0811	VCP	0.013	5	2.09		0.0073		0.0227	3.19	0.57	0.07	2.2299	2.2072	1.6449	1.6222	
5-094	5-094	90.47	5-095	87.59	8	230	0.0125	VCP	0.013	5	2.09		0.0089		0.0271	1.75	0.96	0.12	0.8763	0.8492	0.6463	0.6193	
5-095	5-095	87.54	5-096	86.00	8	120	0.0128	VCP	0.013	5	2.09		0.0096		0.0292	1.81	0.99	0.12	0.8871	0.8579	0.6547	0.6255	
5-096	5-096	81.00	5-103	79.79	8	310	0.0039	VCP	0.013	5	2.09		0.0280		0.0778	1.59	2.16	0.27	0.4892	0.4114	0.3606	0.2828	
5-097	5-097	128.00	5-098	120.68	8	350	0.0209	VCP	0.013	5	2.09		0.0029		0.0096	1.53	0.52	0.07	1.1325	1.1229	0.8357	0.8261	
5-098	5-098	120.58	5-101	100.62	8	304	0.0657	VCP	0.013	5	2.09		0.0041		0.0134	2.53	0.47	0.06	2.0065	1.9931	1.4801	1.4666	
5-099	5-099	120.95	5-098	120.65	8	100	0.0030	VCP	0.013	5	2.09		0.0013		0.0046	0.62	0.58	0.07	0.4289	0.4243	0.3167	0.3121	
5-100	5-100	100.95	5-101	100.62	8	108	0.0031	VCP	0.013	5	2.09		0.0016		0.0056	0.67	0.64	0.08	0.4329	0.4273	0.3193	0.3137	
5-101	5-101	92.27	5-103	86.25	8	289	0.0208	VCP	0.013	5	2.09		0.0089		0.0270	2.09	0.85	0.11	1.1302	1.1032	0.8337	0.8067	
5-102	5-102	99.52	5-101	92.52	8	350	0.0200	VCP	0.013	5	2.09		0.0026		0.0089	1.47	0.51	0.06	1.1074	1.0985	0.8169	0.8080	
5-103	5-103	79.79	5-107	78.30	8	372	0.0040	VCP	0.013	5	2.09		0.0575		0.1510	1.93	3.03	0.38	0.4956	0.3446	0.3658	0.2148	

City of El Segundo
Future Conditions Hydraulic Model Results - with PS 7 bypassed and PS 1 improvements implemented
Pipes sorted by U/S MH ID

Pipe ID	U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (mgd)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)	Comments
5-104	5-104	106.20	5-114	98.68	8	376	0.0200	VCP	0.013	5	2.09		0.0026		0.0087	1.46	0.50	0.06	1.1074	1.0988	0.8169	0.8083	
5-105	5-105	100.67	5-106	85.13	8	230	0.0676	VCP	0.013	5	2.09		0.0017		0.0058	1.98	0.31	0.04	2.0355	2.0296	1.5014	1.4956	
5-106	5-106	85.04	5-107	83.03	8	150	0.0134	VCP	0.013	5	2.09		0.0029		0.0097	1.32	0.58	0.07	0.9065	0.8968	0.6689	0.6593	
5-107	5-107	78.30	5-111	76.99	8	327	0.0040	VCP	0.013	5	2.09		0.0657		0.1708	1.99	3.24	0.40	0.4956	0.3249	0.3658	0.1951	
5-108	5-108	96.42	5-109	87.50	8	278	0.0321	VCP	0.013	5	2.09		0.0425		0.1142	3.74	1.54	0.19	1.4027	1.2884	1.0348	0.9205	
5-109	5-109	87.42	5-110	80.39	8	285	0.0247	VCP	0.013	5	2.09		0.0449		0.1203	3.46	1.69	0.21	1.2299	1.1095	0.9074	0.7871	
5-110	5-110	80.31	5-111	76.93	8	285	0.0119	VCP	0.013	5	2.09		0.0471		0.1258	2.71	2.08	0.26	0.8528	0.7270	0.6289	0.5031	
5-111	5-111	76.65	5-112	75.12	8	254	0.0060	VCP	0.013	5	2.09		0.1142		0.2840	2.65	3.85	0.48	0.6078	0.3237	0.4464	0.1624	
5-112	5-112	75.12	WW-005	74.20	12	20	0.0460	VCP	0.013	5	2.09		0.1944		0.4633	6.12	2.48	0.21	4.9518	4.4886	3.6530	3.1897	
5-113	5-113	99.82	5-114	98.70	8	227	0.0049	VCP	0.013	5	2.09		0.0014		0.0050	0.76	0.54	0.07	0.5500	0.5451	0.4059	0.4009	
5-114	5-114	98.60	5-108	96.76	8	373	0.0049	VCP	0.013	5	2.09		0.0165		0.0479	1.50	1.60	0.20	0.5500	0.5021	0.4059	0.3580	
5-115	5-115	111.00	5-116	99.92	8	352	0.0315	VCP	0.013	Imp 15"	2.05		0.0118		0.0345	2.60	0.87	0.11	1.3893	1.3549	1.0251	0.9906	
5-116	5-116	99.79	5-117	99.28	8	139	0.0037	VCP	0.013	Imp 15"	2.05		0.0118		0.0345	1.22	1.46	0.18	0.4743	0.4399	0.3497	0.3152	
5-117	5-117	99.18	5-118	97.72	8	370	0.0039	VCP	0.013	Imp 15"	2.05		0.0118		0.0345	1.26	1.43	0.18	0.4919	0.4574	0.3626	0.3281	
5-118	5-118	97.62	5-119	96.24	8	350	0.0039	VCP	0.013	Imp 15"	2.05		0.0118		0.0345	1.26	1.43	0.18	0.4917	0.4573	0.3626	0.3281	
5-119	5-119	96.14	5-120	94.76	8	350	0.0039	VCP	0.013	Imp 15"	2.05		0.0118		0.0345	1.26	1.43	0.18	0.4917	0.4573	0.3626	0.3281	
5-120	5-120	94.40	5-121	93.62	15	338	0.0023	VCP	0.013	Imp 15"	2.05		0.2062		0.4797	2.08	4.99	0.33	2.0110	1.5313	1.4833	1.0036	
5-121	5-121	93.52	5-122	92.69	15	370	0.0022	VCP	0.013	Imp 15"	2.05		0.2062		0.4797	2.06	5.02	0.33	1.9827	1.5030	1.4626	0.9829	
5-122	5-122	92.59	5-123	91.78	15	360	0.0023	VCP	0.013	Imp 15"	2.05		0.2062		0.4797	2.06	5.02	0.33	1.9857	1.5060	1.4646	0.9849	
5-123	5-123	91.68	5-124	90.87	15	360	0.0023	VCP	0.013	Imp 15"	2.05		0.2062		0.4797	2.06	5.02	0.33	1.9857	1.5060	1.4646	0.9849	
5-124	5-124	90.77	5-125	89.96	15	360	0.0023	VCP	0.013	Imp 15"	2.05		0.2062		0.4797	2.06	5.02	0.33	1.9857	1.5060	1.4646	0.9849	
5-125	5-125	89.86	5-126	89.05	15	360	0.0023	VCP	0.013	Imp 15"	2.05		0.2062		0.4797	2.06	5.02	0.33	1.9857	1.5060	1.4646	0.9849	
5-126	5-126	88.95	5-127	88.14	15	360	0.0023	VCP	0.013	Imp 15"	2.05		0.2062		0.4797	2.06	5.02	0.33	1.9857	1.5060	1.4646	0.9849	
5-127	5-127	88.04	5-128	87.20	15	376	0.0022	VCP	0.013	Imp 15"	2.05		0.2062		0.4797	2.06	5.03	0.34	1.9786	1.4989	1.4594	0.9797	
5-128	5-128	87.10	5-129	86.56	15	240	0.0023	VCP	0.013	Imp 15"	2.05		0.2062		0.4797	2.06	5.02	0.33	1.9857	1.5060	1.4646	0.9849	
5-129	5-129	86.46	5-130	85.88	15	261	0.0022	VCP	0.013	Imp 15"	2.05		0.2062		0.4797	2.05	5.04	0.34	1.9734	1.4937	1.4555	0.9758	
5-130	5-130	85.68	5-131	85.65	15	17	0.0018	VCP	0.013	Imp 15"	2.05		0.2062		0.4797	1.89	5.35	0.36	1.7585	1.2789	1.2972	0.8175	
5-131	5-131	85.45	5-132	84.59	15	315	0.0027	VCP	0.013	Imp 15"	2.05		0.2062		0.4797	2.21	4.77	0.32	2.1873	1.7076	1.6138	1.1342	
5-132	5-132	84.49	5-133	83.70	15	350	0.0023	VCP	0.013	Imp 15"	2.05		0.2062		0.4797	2.06	5.02	0.33	1.9888	1.5091	1.4671	0.9875	
5-133	5-133	83.60	5-134	82.81	15	350	0.0023	VCP	0.013	Imp 15"	2.05		0.2062		0.4797	2.06	5.02	0.33	1.9888	1.5091	1.4671	0.9875	
5-134	5-134	82.71	5-135	81.91	15	355	0.0023	VCP	0.013	Imp 15"	2.05		0.2062		0.4797	2.06	5.02	0.33	1.9872	1.5076	1.4658	0.9862	
5-135	5-135	81.81	5-136	81.21	15	270	0.0022	VCP	0.013	Imp 15"	2.05		0.2062		0.4797	2.05	5.04	0.34	1.9734	1.4937	1.4555	0.9758	
5-136	5-136	81.11	T-532	78.85	15	110	0.0205	VCP	0.013	Imp 15"	2.05		0.2062		0.4797	4.53	2.87	0.19	5.9990	5.5194	4.4208	3.9411	
5-503	5-503	88.58	5-049	88.10	8	115	0.0042	VCP	0.013	5	2.09		0.0012		0.0042	0.68	0.52	0.06	0.5059	0.5017	0.3729	0.3687	
5-504	5-504	158.50	5-015	158.00	8	50	0.0100	VCP	0.013	5	2.09		0.0002		0.0010	0.59	0.22	0.03	0.7831	0.7821	0.5778	0.5768	
5-914	5-914	120.00	5-115	111.10	8	361	0.0247	VCP	0.013	Imp 15"	2.05		0.0118		0.0351	2.40	0.93	0.12	1.2295	1.1944	0.9068	0.8717	
6-001	6-001	106.60	6-002	104.40	8	550	0.0040	VCP	0.013	6	1.61		0.0023		0.0060	0.75	0.62	0.08	0.4953	0.4893	0.3652	0.3592	
6-002	6-002	104.30	6-003	93.55	8	275	0.0391	VCP	0.013	6	1.61		0.0097		0.0226	2.47	0.68	0.08	1.5483	1.5256	1.1420	1.1194	
6-003	6-003	93.39	6-018	87.39	8	250	0.0240	VCP	0.013	6	1.61		0.0146		0.0330	2.34	0.91	0.11	1.2131	1.1802	0.8951	0.8622	
6-004	6-004	94.20	6-005	89.49	8	150	0.0314	VCP	0.013	6	1.61		0.0001		0.0004	0.65	0.10	0.01	1.3876	1.3873	1.0238	1.0234	
6-005	6-005	89.44	6-007	89.03	8	190	0.0022	VCP	0.013	6	1.61		0.0042		0.0105	0.71	0.94	0.12	0.3638	0.3532	0.2682	0.2577	
6-006	6-006	98.84	6-007	89.03	8	210	0.0467	VCP	0.013	6	1.61		0.0047		0.0116	2.15	0.47	0.06	1.6925	1.6809	1.2487	1.2371	
6-007	6-007	88.87	6-019A	86.99	8	272	0.0069	VCP	0.013	6	1.61		0.0114		0.0262	1.41	1.10	0.14	0.6510	0.6248	0.4802	0.4540	
6-008	6-008	110.55	6-009	96.91	8	275	0.0496	VCP	0.013	6	1.61		0.0026		0.0068	1.87	0.36	0.05	1.7440	1.7372	1.2868	1.2800	
6-009	6-009	93.20	6-015	88.06	8	210	0.0245	VCP	0.013	6	1.61		0.0186		0.0413	2.51	1.01	0.13	1.2251	1.1839	0.9035	0.8623	
6-010	6-010	111.33	6-011	103.52	8	315	0.0248	VCP	0.013	6	1.61		0.0036		0.0091	1.60	0.49	0.06	1.2330	1.2239	0.9094	0.9002	
6-011	6-011	103.48	6-012	95.22	8	300	0.0275	VCP	0.013	6	1.61		0.0077		0.0183	2.05	0.66	0.08	1.2994	1.2811	0.9576	0.9393	
6-012	6-012	95.20	6-014	94.40	8	200	0.0040	VCP	0.013	6	1.61		0.0096		0.0225	1.11	1.16	0.15	0.4953	0.4728	0.3652	0.3427	
6-013	6-013	98.28	6-014	94.40	8	183	0.0212	VCP	0.013	6	1.61		0.0026		0.0068	1.38	0.44	0.06	1.1402	1.1335	0.8415	0.8347	

City of El Segundo
Future Conditions Hydraulic Model Results - with PS 7 bypassed and PS 1 improvements implemented
Pipes sorted by U/S MH ID

Pipe ID	U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (mgd)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)	Comments
6-014	6-014	94.33	6-009	93.26	8	267	0.0040	VCP	0.013	6	1.61		0.0150		0.0338	1.26	1.42	0.18	0.4957	0.4619	0.3658	0.3320	
6-015	6-015	87.94	6-018	87.14	8	200	0.0040	VCP	0.013	6	1.61		0.0207		0.0454	1.37	1.64	0.20	0.4953	0.4499	0.3652	0.3198	
6-016	6-016	88.00	6-017	87.39	8	85	0.0072		0.013	6	1.61		0.0005		0.0016	0.61	0.29	0.04	0.6634	0.6618	0.4896	0.4880	
6-017	6-017	87.39	6-018	86.96	8	19	0.0231		0.013	6	1.61		0.0005		0.0016	0.92	0.22	0.03	1.1893	1.1877	0.8784	0.8768	
6-018	6-018	86.96	6-019	86.80	8	23	0.0070	VCP	0.013	6	1.61		0.0358		0.0752	1.93	1.83	0.23	0.6531	0.5779	0.4822	0.4069	
6-019	6-019	86.99	WW-006	82.00	8	10	0.4990		0.013	6	1.61		0.0472		0.0970	9.33	0.74	0.09	5.5316	5.4346	4.0795	3.9825	
6-019A	6-019A	88.87	6-019	86.99	8	272	0.0069	VCP	0.013	6	1.61		0.0114		0.0262	1.41	1.10	0.14	0.6510	0.6248	0.4795	0.4533	
7-001	7-001	112.79	7-002	101.00	8	212	0.0556	VCP	0.013	7	2.07		0.0018		0.0063	1.89	0.34	0.04	1.8467	1.8404	4.0795	4.0733	
7-002	7-002	96.29	7-003	95.23	8	262	0.0040	VCP	0.013	7	2.07		0.0033		0.0109	0.90	0.82	0.10	0.4981	0.4872	0.3678	0.3568	
7-003	7-003	95.13	7-009	94.32	8	197	0.0041	VCP	0.013	7	2.07		0.0044		0.0141	0.98	0.92	0.12	0.5021	0.4880	0.3703	0.3562	
7-804	7-004	120.77	5-092	119.92	8	214	0.0040	VCP	0.013	7	2.07	49	0.0014		0.0046	0.69	0.55	0.07	0.4935	0.4889	0.3639	0.3592	
7-004	7-004	120.66	7-006	114.15	8	300	0.0217	VCP	0.013	7	2.07	51	0.0015		0.0048	1.26	0.37	0.05	1.1535	1.1487	0.8512	0.8464	
7-005	7-005	30.50	7-006	26.62	8	92	0.0422	VCP	0.013	7	2.07		0.0003		0.0011	1.01	0.16	0.02	1.6081	1.6070	1.1866	1.1855	
7-006	7-006	114.10	7-007	104.23	8	290	0.0340	VCP	0.013	7	2.07		0.0025		0.0084	1.74	0.44	0.05	1.4447	1.4363	1.0658	1.0574	
7-007	7-007	104.13	7-008	101.53	8	210	0.0124	VCP	0.013	7	2.07		0.0031		0.0103	1.30	0.61	0.08	0.8713	0.8611	0.6431	0.6328	
7-008	7-008	101.43	7-009	99.02	8	200	0.0121	VCP	0.013	7	2.07		0.0042		0.0135	1.40	0.70	0.09	0.8596	0.8461	0.6340	0.6206	
7-009	7-009	94.22	7-011	93.61	8	153	0.0040	VCP	0.013	7	2.07		0.0086		0.0261	1.16	1.25	0.16	0.4945	0.4684	0.3645	0.3384	
7-010	7-010	96.29	7-011	94.95	8	336	0.0040		0.013	7	2.07		0.0023		0.0077	0.81	0.70	0.09	0.4945	0.4868	1.0771	1.0694	
7-011	7-011	93.61	7-029	93.00	8	154	0.0040	VCP	0.013	7	2.07		0.0109		0.0324	1.23	1.39	0.17	0.4928	0.4604	0.3639	0.3315	
7-012	7-012	129.24	7-013	124.40	8	350	0.0138	VCP	0.013	7	2.07		0.0009		0.0032	0.95	0.34	0.04	0.9209	0.9177	0.6793	0.6761	
7-013	7-013	124.30	7-018	118.01	8	161	0.0391	VCP	0.013	7	2.07		0.0013		0.0045	1.51	0.32	0.04	1.5478	1.5433	1.1420	1.1375	
7-014	7-014	163.00	7-015	158.39	8	285	0.0162	VCP	0.013	7	2.07		0.0016		0.0057	1.19	0.43	0.05	0.9959	0.9903	0.7349	0.7292	
7-015	7-015	158.34	7-016	123.83	8	362	0.0953	VCP	0.013	7	2.07		0.0032		0.0103	2.66	0.38	0.05	2.4178	2.4075	1.7838	1.7735	
7-016	7-016	123.83	7-017	122.13	8	400	0.0043	VCP	0.013	7	2.07		0.0055		0.0173	1.05	1.01	0.13	0.5105	0.4932	0.3768	0.3595	
7-017	7-017	122.13	7-018	118.15	8	158	0.0252	VCP	0.013	7	2.07		0.0055		0.0173	1.96	0.66	0.08	1.2428	1.2255	0.9171	0.8998	
7-018	7-018	118.00	7-019	112.00	8	160	0.0375	-	0.013	7	2.07		0.0070		0.0217	2.41	0.67	0.08	1.5164	1.4947	1.1188	1.0971	
7-019	7-019	106.24	7-035	105.94	8	75	0.0040	VCP	0.013	7	2.07		0.0092		0.0278	1.18	1.29	0.16	0.4953	0.4674	0.3652	0.3373	
7-020	7-020	107.20	7-019	106.24	8	240	0.0040	VCP	0.013	7	2.07		0.0022		0.0074	0.80	0.68	0.09	0.4953	0.4878	0.3652	0.3577	
7-021	7-021	113.00	7-020	107.20	8	205	0.0283	VCP	0.013	7	2.07		0.0002		0.0008	0.81	0.16	0.02	1.3172	1.3163	0.9714	0.9706	
7-821	7-021	113.00	7-043	81.00	8	237	0.1350	VCP	0.013	7	2.07		0.0034		0.0111	3.06	0.36	0.05	2.8774	2.8663	2.1225	2.1114	
7-822	7-022	122.00	7-021	113.00	8	228	0.0395	-	0.013	7	2.07	19	0.0002		0.0007	0.87	0.14	0.02	1.5558	1.5551	1.1479	1.1471	
7-022	7-022	122.00	7-023	121.00	8	122	0.0082	-	0.013	7	2.07	81	0.0009		0.0032	0.79	0.39	0.05	0.7090	0.7058	0.5229	0.5197	
7-023	7-023	121.00	7-027	118.00	8	350	0.0086	VCP	0.013	7	2.07		0.0031		0.0101	1.14	0.66	0.08	0.7250	0.7149	0.5351	0.5251	
7-824	7-024	123.00	12-016	121.00	8	50	0.0400	VCP	0.013	7	2.07	9	0.0001		0.0002	0.00	0.00	0.00	1.5662	1.5659	1.1556	1.1554	
7-024	7-024	123.00	7-027	121.00	8	225	0.0089	VCP	0.013	7	2.07	91	0.0006		0.0021	0.72	0.32	0.04	0.7383	0.7361	0.5448	0.5427	
7-025	7-025	151.00	7-026	142.00	8	155	0.0581	VCP	0.013	7	2.07		0.0010		0.0036	1.62	0.26	0.03	1.8869	1.8833	1.3922	1.3885	
7-026	7-026	142.00	7-027	118.00	8	350	0.0686	VCP	0.013	7	2.07		0.0030		0.0100	2.35	0.40	0.05	2.0506	2.0405	1.5130	1.5030	
7-027	7-027	118.00	7-028	95.00	8	300	0.0767	VCP	0.013	7	2.07		0.0073		0.0223	3.11	0.57	0.07	2.1682	2.1459	1.5996	1.5773	
7-028	7-028	95.00	7-029	93.00	8	153	0.0131	VCP	0.013	7	2.07		0.0080		0.0243	1.72	0.91	0.11	0.8953	0.8710	0.6605	0.6362	
7-029	7-029	93.00	7-030	85.30	8	185	0.0416	VCP	0.013	7	2.07		0.0198		0.0560	3.32	1.03	0.13	1.5976	1.5415	1.1789	1.1228	
7-030	7-030	85.30	7-034	84.80	10	165	0.0030	VCP	0.013	7	2.07		0.0214		0.0604	1.31	1.88	0.19	0.7816	0.7212	0.5765	0.5162	
7-031	7-031	107.28	7-032	87.15	8	143	0.1408	VCP	0.013	7	2.07		0.0000		0.0000	0.00	0.00	0.00	2.9380	2.9380	2.1677	2.1677	
7-032	7-032	87.15	7-033	85.38	8	177	0.0100	VCP	0.013	7	2.07		0.0004		0.0015	0.68	0.26	0.03	0.7831	0.7816	0.5778	0.5763	
7-033	7-033	85.38	7-034	85.10	8	28	0.0100	VCP	0.013	7	2.07		0.0111		0.0329	1.72	1.12	0.14	0.7831	0.7502	0.5778	0.5449	
7-034	7-034	84.81	7-036	83.76	10	350	0.0030	VCP	0.013	7	2.07		0.0325		0.0885	1.47	2.28	0.23	0.7777	0.6891	0.5739	0.4854	
7-035	7-035	105.94	7-033	85.10	8	280	0.0744	VCP	0.013	7	2.07		0.0107		0.0318	3.43	0.68	0.09	2.1364	2.1045	1.5764	1.5445	
7-036	7-036	83.76	7-038	82.70	10	350	0.0030	VCP	0.013	7	2.07		0.0334		0.0907	1.48	2.30	0.23	0.7814	0.6907	0.5765	0.4859	
7-037	7-037	113.00	7-040	102.00	8	245	0.0449	VCP	0.013	7	2.07		0.0004		0.0016	1.17	0.19	0.02	1.6593	1.6576	1.2241	1.2225	
7-038	7-038	82.70	7-041	80.54	8	237	0.0091	VCP	0.013	7	2.07		0.0345		0.0936	2.26	1.91	0.24	0.7476	0.6540	0.5513	0.4577	

City of El Segundo
Future Conditions Hydraulic Model Results - with PS 7 bypassed and PS 1 improvements implemented
Pipes sorted by U/S MH ID

Pipe ID	U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (mgd)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)	Comments
7-039	7-039	124.50	7-040	100.00	8	275	0.0891	VCP	0.013	7	2.07		0.0006		0.0024	1.66	0.19	0.02	2.3373	2.3349	1.7244	1.7220	
7-040	7-040	100.00	7-041	86.64	8	229	0.0583	VCP	0.013	7	2.07		0.0011		0.0038	1.65	0.27	0.03	1.8914	1.8876	1.3954	1.3916	
7-041	7-041	80.54	7-046	77.99	10	215	0.0119	VCP	0.013	7	2.07		0.0366		0.0987	2.46	1.71	0.17	1.5463	1.4475	1.1407	1.0420	
7-042	7-042	119.40	7-021	113.00	8	605	0.0106	VCP	0.013	7	2.07		0.0034		0.0111	1.26	0.66	0.08	0.8054	0.7943	0.5940	0.5829	
7-043	7-043	81.00	7-046	78.11	8	113	0.0256	VCP	0.013	7	2.07		0.0052		0.0165	1.94	0.64	0.08	1.2523	1.2359	0.9236	0.9071	
7-044	7-044	157.00	7-045	130.00	8	437	0.0618	VCP	0.013	7	2.07		0.0022		0.0074	2.06	0.36	0.04	1.9465	1.9391	1.4361	1.4287	
7-045	7-045	130.00	7-048	88.50	8	453	0.0916	VCP	0.013	7	2.07		0.0035		0.0113	2.69	0.40	0.05	2.3702	2.3589	1.7483	1.7370	
7-046	7-046	78.11	7-048	77.06	10	350	0.0030	VCP	0.013	7	2.07		0.0418		0.1116	1.57	2.56	0.26	0.7777	0.6660	0.5739	0.4623	
7-047	7-047	125.00	7-048	85.50	8	472	0.0837	VCP	0.013	7	2.07		0.0020		0.0068	2.23	0.32	0.04	2.2653	2.2586	1.6714	1.6646	
7-048	7-048	77.06	7-051	65.87	10	350	0.0320	VCP	0.013	7	2.07		0.0473		0.1250	3.74	1.51	0.15	2.5387	2.4138	1.8730	1.7481	
7-049	7-049	108.00	7-050	82.00	8	220	0.1182	VCP	0.013	7	2.07		0.0013		0.0047	2.25	0.25	0.03	2.6920	2.6874	1.9861	1.9815	
7-050	7-050	82.00	7-051	65.87	8	200	0.0807	VCP	0.013	7	2.07		0.0013		0.0047	1.97	0.27	0.03	2.2239	2.2192	1.6403	1.6357	
7-051A	7-051	65.87	7-059A	65.68	10	62	0.0030		0.013	7	2.07		0.0496		0.1305	1.64	2.77	0.28	0.7771	0.6466	0.5731	0.4426	
7-052	7-052	95.00	7-053	72.50	8	220	0.1023	-	0.013	7	2.07		0.0012		0.0042	2.07	0.25	0.03	2.5043	2.5001	1.8478	1.8436	
7-053	7-053	70.00	7-059C	64.80	8	200	0.0260	-	0.013	7	2.07		0.0012		0.0042	1.29	0.34	0.04	1.2627	1.2585	0.9313	0.9271	
7-054	7-054	73.01	7-055	71.89	8	274	0.0041	VCP	0.013	7	2.07		0.0005		0.0020	0.54	0.36	0.05	0.5007	0.4987	0.3690	0.3671	
7-055	7-055	71.79	7-057	70.73	8	263	0.0040	VCP	0.013	7	2.07		0.0005		0.0020	0.53	0.37	0.05	0.4971	0.4952	0.3665	0.3645	
7-056	7-056	71.30	7-057	70.73	8	20	0.0285	-	0.013	7	2.07		0.0016		0.0054	1.43	0.37	0.05	1.3220	1.3166	0.9753	0.9699	
7-057	7-057	71.30	7-058	66.00	8	185	0.0286	-	0.013	7	2.07		0.0021		0.0071	1.56	0.42	0.05	1.3254	1.3184	0.9779	0.9708	
7-058	7-058	66.00	7-059C	64.80	8	182	0.0066	-	0.013	7	2.07		0.0021		0.0071	0.93	0.59	0.07	0.6357	0.6286	0.4925	0.4854	
7-059A	7-059A	65.68	7-059B	65.63	10	18	0.0030		0.013	7	2.07		0.0496		0.1305	1.64	2.77	0.28	0.7766	0.6461	0.5731	0.4426	
7-051	7-059B	65.63	7-059C	64.80	10	277	0.0030		0.013	7	2.07		0.0496		0.1305	1.64	2.77	0.28	0.7774	0.6469	0.5752	0.4447	
7-059C	7-059C	64.80	7-059D	64.56	10	109	0.0022		0.013	7	2.07		0.0529		0.1384	1.49	3.09	0.31	0.6657	0.5273	0.4910	0.3526	
7-059D	7-059D	64.56	7-059E	64.51	10	22	0.0022		0.013	7	2.07		0.0529		0.1384	1.49	3.10	0.31	0.6652	0.5267	0.4910	0.3526	
7-059	7-059E	64.51	7-147	64.00	10	229	0.0022	VCP	0.013	7	2.07		0.0529		0.1384	1.50	3.09	0.31	0.6694	0.5310	0.4938	0.3554	
7-060	7-060	160.00	7-061	158.00	8	150	0.0133	VCP	0.013	7	2.07		0.0006		0.0022	0.84	0.29	0.04	0.9042	0.9020	0.6670	0.6648	
7-061	7-061	158.00	7-062	129.00	8	453	0.0640	VCP	0.013	7	2.07		0.0015		0.0053	1.88	0.30	0.04	1.9813	1.9761	1.4620	1.4567	
7-062	7-062	129.00	7-063	113.50	8	350	0.0443	VCP	0.013	7	2.07		0.0030		0.0100	2.02	0.45	0.06	1.6479	1.6379	1.2157	1.2057	
7-063	7-063	113.50	7-064	96.50	8	355	0.0479	VCP	0.013	7	2.07		0.0034		0.0110	2.13	0.46	0.06	1.7136	1.7026	1.2642	1.2532	
7-064	7-064	96.50	7-145	74.94	8	360	0.0599	VCP	0.013	7	2.07		0.0038		0.0122	2.37	0.46	0.06	1.9164	1.9042	1.4135	1.4013	
7-065	7-065	124.00	7-066	112.00	8	134	0.0894	-	0.013	7	2.07		0.0018		0.0063	2.23	0.30	0.04	2.3416	2.3353	1.7266	1.7203	
7-066	7-066	112.00	7-067	106.77	8	224	0.0234	-	0.013	7	2.07		0.0022		0.0076	1.48	0.45	0.06	1.1971	1.1895	0.8842	0.8766	
7-067	7-067	106.77	7-071	106.00	8	192	0.0040	VCP	0.013	7	2.07		0.0022		0.0076	0.80	0.69	0.09	0.4959	0.4884	0.3658	0.3583	
7-068	7-068	151.00	7-069	144.00	8	100	0.0700	VCP	0.013	7	2.07		0.0005		0.0019	1.41	0.18	0.02	2.0718	2.0700	1.5285	1.5267	
7-069	7-069	144.00	7-070	122.00	8	150	0.1467	VCP	0.013	7	2.07		0.0016		0.0056	2.55	0.26	0.03	2.9990	2.9934	2.2123	2.2068	
7-070	7-070	122.00	7-071	106.00	8	159	0.1006	VCP	0.013	7	2.07		0.0026		0.0087	2.57	0.34	0.04	2.4841	2.4754	1.8323	1.8236	
7-071	7-071	106.00	7-073	100.00	8	350	0.0171	VCP	0.013	7	2.07		0.0051		0.0161	1.67	0.70	0.09	1.0253	1.0092	0.7562	0.7401	
7-872	7-072	129.86	7-062	129.00	8	215	0.0040	VCP	0.013	7	2.07	51	0.0015		0.0050	0.71	0.57	0.07	0.4953	0.4902	0.3652	0.3601	
7-072	7-072	129.86	7-073	100.00	8	283	0.1055	VCP	0.013	7	2.07	49	0.0015		0.0048	2.18	0.26	0.03	2.5436	2.5388	1.8763	1.8714	
7-073	7-073	100.00	7-075	91.60	8	350	0.0240	VCP	0.013	7	2.07		0.0066		0.0203	2.02	0.72	0.09	1.2131	1.1928	0.8951	0.8748	
7-074	7-074	111.00	7-075	91.60	8	443	0.0438	VCP	0.013	7	2.07		0.0033		0.0109	2.06	0.47	0.06	1.6387	1.6279	1.2093	1.1984	
7-075	7-075	91.60	7-077	86.00	8	355	0.0158	VCP	0.013	7	2.07		0.0099		0.0296	1.95	0.95	0.12	0.9835	0.9539	0.7258	0.6962	
7-076	7-076	91.38	7-077	86.00	8	448	0.0120	-	0.013	7	2.07		0.0026		0.0086	1.22	0.56	0.07	0.8581	0.8495	0.6334	0.6248	
7-077	7-077	86.00	7-140	82.42	8	360	0.0099	VCP	0.013	7	2.07		0.0126		0.0371	1.78	1.19	0.15	0.7809	0.7438	0.5759	0.5387	
7-078	7-078	113.49	7-080	112.15	8	168	0.0080	VCP	0.013	7	2.07		0.0008		0.0031	0.78	0.38	0.05	0.6994	0.6963	0.5158	0.5127	
7-079	7-079	112.02	7-080	111.90	8	32	0.0038	VCP	0.013	7	2.07		0.0005		0.0018	0.50	0.35	0.04	0.4795	0.4778	0.3535	0.3518	
7-080	7-080	112.15	7-081	111.59	12	181	0.0031	VCP	0.013	7	2.07		0.0026		0.0088	0.72	0.71	0.06	1.2842	1.2754	0.9490	0.9402	
7-081	7-081	105.47	7-087	104.92	12	178	0.0031	VCP	0.013	7	2.07		0.0026		0.0088	0.72	0.71	0.06	1.2834	1.2746	0.9469	0.9381	
7-082	7-082	160.00	7-083	149.00	8	342	0.0322	-	0.013	7	2.07		0.0008		0.0028	1.22	0.26	0.03	1.4044	1.4016	1.0360	1.0333	

City of El Segundo
Future Conditions Hydraulic Model Results - with PS 7 bypassed and PS 1 improvements implemented
Pipes sorted by U/S MH ID

Pipe ID	U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (mgd)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)	Comments
7-083	7-083	149.00	7-084	134.00	8	500	0.0300	-	0.013	7	2.07		0.0030		0.0099	1.75	0.49	0.06	1.3563	1.3465	1.0005	0.9906	
7-084	7-084	134.00	7-085	123.00	8	200	0.0550	-	0.013	7	2.07		0.0041		0.0131	2.36	0.48	0.06	1.8365	1.8233	1.6009	1.5878	
7-884	7-084	134.00	7-094	109.00	8	350	0.0714	VCP	0.013	7	2.07		0.0000		0.0000	0.00	0.00	0.00	2.0929	2.0929	1.5440	1.5440	
7-085	7-085	123.00	7-087	104.92	8	52	0.3477	-	0.013	7	2.07		0.0041		0.0131	4.48	0.31	0.04	4.6174	4.6043	4.0259	4.0128	
7-086	7-086	118.07	7-087	111.27	8	34	0.2000	VCP	0.013	7	2.07		0.0006		0.0022	2.13	0.15	0.02	3.5020	3.4999	2.5833	2.5812	
7-087	7-087	104.92	7-088	103.50	12	190	0.0075	VCP	0.013	7	2.07		0.0073		0.0224	1.31	0.89	0.07	1.9960	1.9736	1.4723	1.4499	
7-088	7-088	103.50	7-089	101.99	12	110	0.0137	VCP	0.013	7	2.07		0.0080		0.0243	1.66	0.80	0.07	2.7051	2.6808	1.9958	1.9715	
7-089	7-089	101.99	7-095	100.54	12	108	0.0134	VCP	0.013	7	2.07		0.0080		0.0243	1.64	0.81	0.07	2.6752	2.6509	1.9738	1.9496	
7-090	7-090	141.92	7-091	135.20	8	80	0.0840	VCP	0.013	7	2.07		0.0002		0.0008	1.17	0.12	0.01	2.2696	2.2688	1.6746	1.6738	
7-091	7-091	135.00	7-092	111.00	8	212	0.1132	VCP	0.013	7	2.07		0.0009		0.0033	1.98	0.21	0.03	2.6348	2.6315	1.9435	1.9402	
7-092	7-092	111.00	7-098	104.00	8	130	0.0538	VCP	0.013	7	2.07		0.0019		0.0066	1.90	0.35	0.04	1.8171	1.8105	1.3405	1.3339	
7-093	7-093	116.00	7-094	111.00	8	150	0.0333	VCP	0.013	7	2.07	27	0.0008		0.0028	1.23	0.26	0.03	1.4297	1.4269	1.0548	1.0520	
7-893	7-093	116.00	7-098	104.00	8	350	0.0343	VCP	0.013	7	2.07	73	0.0023		0.0074	1.68	0.41	0.05	1.4500	1.4425	1.0697	1.0622	
7-094	7-094	109.00	7-095	100.54	8	33	0.2564	VCP	0.013	7	2.07		0.0008		0.0031	2.58	0.17	0.02	3.9649	3.9618	2.9252	2.9222	
7-095	7-095	100.10	7-096	98.82	12	137	0.0093	VCP	0.013	7	2.07		0.0088		0.0266	1.49	0.92	0.08	2.2317	2.2051	1.6462	1.6195	
7-096	7-096	98.20	7-097	95.50	12	359	0.0075		0.013	7	2.07		0.0088		0.0266	1.38	0.97	0.08	2.0023	1.9756	1.4746	1.4479	
7-097	7-097	91.75	7-106	91.50	12	117	0.0021	VCP	0.013	7	2.07		0.0115		0.0341	0.96	1.47	0.12	1.0672	1.0331	0.7872	0.7531	
7-098	7-098	104.00	7-101	92.87	8	175	0.0636	-	0.013	7	2.07		0.0055		0.0174	2.70	0.53	0.07	1.9748	1.9575	1.4568	1.4394	
7-099	7-099	111.90	7-100	97.80	6	127	0.1110	VCP	0.013	7	2.07		0.0007		0.0028	1.95	0.21	0.04	1.2115	1.2088	0.8942	0.8915	
7-100	7-100	97.80	7-101	92.89	6	103	0.0477	VCP	0.013	7	2.07		0.0017		0.0058	1.82	0.36	0.06	0.7939	0.7881	0.5856	0.5798	
7-101	7-101	92.87	7-105	92.17	8	175	0.0040	-	0.013	7	2.07		0.0072		0.0221	1.11	1.15	0.14	0.4953	0.4731	0.3652	0.3430	
7-102	7-102	128.82	7-103	118.18	6	175	0.0608	VCP	0.013	7	2.07		0.0005		0.0019	1.42	0.21	0.03	0.8966	0.8946	0.6612	0.6593	
7-103	7-103	112.00	7-104	93.00	8	192	0.0990	-	0.013	7	2.07		0.0017		0.0059	2.27	0.29	0.04	2.4634	2.4575	1.8174	1.8116	
7-104	7-104	93.00	7-105	92.17	8	150	0.0055	-	0.013	7	2.07		0.0029		0.0094	0.96	0.71	0.09	0.5825	0.5731	0.4298	0.4204	
7-105	7-105	92.17	7-106	91.67	8	41	0.0122	-	0.013	7	2.07		0.0101		0.0301	1.79	1.02	0.13	0.8648	0.8347	0.6379	0.6078	
7-106	7-106	91.50	7-107	91.24	12	87	0.0030	VCP	0.013	7	2.07		0.0216		0.0608	1.28	1.79	0.15	1.2622	1.2014	0.9313	0.8706	
7-107	7-107	91.24	7-108	90.80	12	146	0.0030	VCP	0.013	7	2.07		0.0216		0.0608	1.29	1.79	0.15	1.2675	1.2067	0.9352	0.8745	
7-108	7-108	90.80	7-112	90.32	12	162	0.0030	VCP	0.013	7	2.07		0.0227		0.0637	1.30	1.84	0.15	1.2568	1.1931	0.9268	0.8631	
7-109	7-109	99.40	7-108	90.74	8	218	0.0397	VCP	0.013	7	2.07		0.0011		0.0041	1.47	0.30	0.04	1.5608	1.5567	1.1506	1.1465	
7-110	7-110	112.09	7-109	107.99	6	60	0.0683	VCP	0.013	7	2.07		0.0003		0.0011	1.23	0.15	0.03	0.9505	0.9494	0.7013	0.7002	
7-111	7-111	106.30	7-112	90.32	8	203	0.0787	VCP	0.013	7	2.07		0.0012		0.0044	1.92	0.27	0.03	2.1971	2.1927	1.6210	1.6165	
7-112	7-112	90.32	7-113	89.19	12	371	0.0030	VCP	0.013	7	2.07		0.0240		0.0669	1.33	1.87	0.16	1.2742	1.2073	0.9397	0.8728	
7-113	7-113	89.19	7-120	87.81	12	450	0.0031	VCP	0.013	7	2.07		0.0240		0.0669	1.33	1.87	0.16	1.2786	1.2116	0.9490	0.8820	
7-114	7-114	155.00	7-115	147.80	8	345	0.0209	-	0.013	7	2.07		0.0021		0.0071	1.40	0.45	0.06	1.1313	1.1241	0.8344	0.8273	
7-115	7-115	147.80	7-116	129.40	8	350	0.0526	-	0.013	7	2.07		0.0037		0.0119	2.26	0.47	0.06	1.7955	1.7836	1.3243	1.3124	
7-116	7-116	129.40	7-117	114.00	8	350	0.0440	-	0.013	7	2.07		0.0059		0.0183	2.42	0.59	0.07	1.6426	1.6243	1.2118	1.1935	
7-117	7-117	114.00	7-118	102.20	8	350	0.0337	-	0.013	7	2.07		0.0067		0.0207	2.29	0.67	0.08	1.4378	1.4171	1.0606	1.0399	
7-118	7-118	102.20	7-119	88.75	8	250	0.0538	-	0.013	7	2.07		0.0069		0.0212	2.71	0.61	0.08	1.8163	1.7951	1.3398	1.3186	
7-119	7-119	88.75	7-120	88.02	8	183	0.0040	-	0.013	7	2.07		0.0069		0.0212	1.09	1.13	0.14	0.4946	0.4734	0.3658	0.3446	
7-120	7-120	87.81	7-136	86.91	12	300	0.0030	VCP	0.013	7	2.07		0.0309		0.0844	1.41	2.10	0.17	1.2646	1.1802	0.9326	0.8483	
7-121	7-121	111.36	7-122	110.00	8	339	0.0040	-	0.013	7	2.07		0.0015		0.0053	0.72	0.58	0.07	0.4960	0.4907	0.3658	0.3605	
7-122	7-122	110.00	7-125	107.61	8	175	0.0137	-	0.013	7	2.07		0.0018		0.0062	1.16	0.47	0.06	0.9151	0.9089	0.6754	0.6692	
7-123	7-123	125.00	7-124	110.36	8	250	0.0586	VCP	0.013	7	2.07		0.0006		0.0024	1.44	0.21	0.03	1.8950	1.8926	1.3982	1.3958	
7-124	7-124	110.36	7-125	107.21	8	315	0.0100	VCP	0.013	7	2.07		0.0021		0.0070	1.08	0.53	0.07	0.7831	0.7761	0.5778	0.5708	
7-125	7-125	107.21	7-126	101.25	8	180	0.0331	-	0.013	7	2.07		0.0056		0.0177	2.17	0.63	0.08	1.4249	1.4072	1.0509	1.0332	
7-126	7-126	101.25	7-128	96.33	8	180	0.0273	-	0.013	7	2.07		0.0056		0.0177	2.03	0.65	0.08	1.2946	1.2770	0.9553	0.9376	
7-127	7-127	102.07	7-128	96.75	8	395	0.0135	VCP	0.013	7	2.07		0.0009		0.0032	0.94	0.35	0.04	0.9088	0.9056	0.6702	0.6670	
7-128	7-128	96.33	7-129	92.00	8	167	0.0259	-	0.013	7	2.07		0.0065		0.0202	2.07	0.71	0.09	1.2609	1.2407	0.9300	0.9098	
7-129	7-129	92.00	7-130	89.51	10	395	0.0063	-	0.013	7	2.07		0.0065		0.0202	1.23	0.93	0.09	1.1273	1.1071	0.8318	0.8116	

City of El Segundo
Future Conditions Hydraulic Model Results - with PS 7 bypassed and PS 1 improvements implemented
Pipes sorted by U/S MH ID

Pipe ID	U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (mgd)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)	Comments
7-830	7-130	90.51	2-041	88.00	8	234	0.0107	VCP	0.013	2	1.93		0.0034		0.0102	1.24	0.63	0.08	0.8110	0.8008	0.5976	0.5874	
7-130	7-130	89.51	7-132	88.87	10	213	0.0030	-	0.013	7	2.07		0.0090		0.0272	1.03	1.28	0.13	0.7783	0.7511	0.5739	0.5468	
7-131	7-131	90.37	7-132	88.87	8	374	0.0040	VCP	0.013	7	2.07		0.0023		0.0077	0.81	0.69	0.09	0.4959	0.4882	0.3658	0.3581	
7-832	7-132	88.87	2-043	69.00	8	541	0.0367	VCP	0.013	2	1.93		0.0023		0.0073	1.71	0.40	0.05	1.5007	1.4935	1.1045	1.0972	
7-132	7-132	88.87	7-133	88.29	10	180	0.0032	-	0.013	7	2.07		0.0113		0.0334	1.13	1.39	0.14	0.8060	0.7725	0.5946	0.5612	
7-133	7-133	88.29	7-136	86.91	10	458	0.0030	VCP	0.013	7	2.07		0.0122		0.0358	1.12	1.46	0.15	0.7794	0.7436	0.5752	0.5394	
7-134	7-134	96.49	7-135	94.26	10	447	0.0050	VCP	0.013	7	2.07		0.1523		0.3666	2.62	4.18	0.42	1.0028	0.6363	0.7400	0.3735	
7-135	7-135	94.26	7-136	92.80	10	7	0.2086	VCP	0.013	7	2.07		0.1523		0.3666	9.94	1.61	0.16	6.4843	6.1177	4.7834	4.4168	
7-136	7-136	86.91	7-138	86.56	12	84	0.0042	VCP	0.013	7	2.07		0.1972		0.4647	2.59	4.60	0.38	1.4903	1.0256	1.0994	0.6346	
7-137	7-137	89.00	7-138	86.89	8	188	0.0112	-	0.013	7	2.07		0.0027		0.0089	1.20	0.58	0.07	0.8296	0.8207	0.6121	0.6032	
7-138	7-138	86.56	7-139	84.42	12	538	0.0040	VCP	0.013	7	2.07		0.1998		0.4705	2.56	4.69	0.39	1.4561	0.9856	1.0742	0.6037	
7-139	7-139	84.42	7-140	82.42	12	500	0.0040	VCP	0.013	7	2.07		0.2050		0.4818	2.58	4.74	0.40	1.4602	0.9785	1.0774	0.5957	
7-140	7-140	82.42	7-145	74.94	12	498	0.0150	VCP	0.013	7	2.07		0.2207		0.5156	4.24	3.47	0.29	2.8296	2.3140	2.0876	1.5720	
7-141	7-141	100.00	7-142	92.00	8	500	0.0160	VCP	0.013	7	2.07		0.0020		0.0067	1.25	0.47	0.06	0.9905	0.9838	0.7310	0.7243	
7-142	7-142	92.00	7-143	80.54	8	223	0.0514	VCP	0.013	7	2.07		0.0026		0.0087	2.03	0.40	0.05	1.7752	1.7665	1.3094	1.3007	
7-143	7-143	80.54	7-144	76.00	8	275	0.0165	VCP	0.013	7	2.07		0.0030		0.0100	1.43	0.56	0.07	1.0062	0.9962	0.7420	0.7320	
7-144	7-144	76.00	7-145	75.27	8	180	0.0041	VCP	0.013	7	2.07		0.0030		0.0100	0.88	0.78	0.10	0.4987	0.4887	0.3678	0.3578	
7-145A	7-145	81.30	7-146A	80.51	10	47	0.0169		0.013	7	2.07		0.2275		0.5302	4.53	3.67	0.37	1.8481	1.3179	1.3622	0.8321	
7-146A	7-146A	80.41	7-146B	80.13	15	70	0.0040		0.013	7	2.07		0.2275		0.5302	2.60	4.56	0.30	2.6440	2.1138	1.9526	1.4225	
7-145	7-146B	80.03	7-146C	78.70	15	306	0.0043	VCP	0.013	7	2.07		0.2275		0.5302	2.69	4.46	0.30	2.7595	2.2294	2.0246	1.4945	
7-146C	7-146C	78.60	7-146D	78.42	15	70	0.0026		0.013	7	2.07		0.2275		0.5302	2.22	5.11	0.34	2.1229	1.5928	1.5754	1.0452	
7-146	7-146D	78.32	7-147	70.08	10	178	0.0462	VCP	0.013	7	2.07		0.2275		0.5302	6.49	2.82	0.28	3.0518	2.5217	2.2507	1.7206	
7-147	7-147	64.00	7-156	63.55	18	393	0.0011	VCP	0.013	7	2.07		0.2806		0.6430	1.73	6.50	0.36	2.3047	1.6617	1.6661	1.0231	
7-148	7-148	102.00	7-149	83.00	8	458	0.0415	VCP	0.013	7	2.07		0.0011		0.0038	1.47	0.29	0.04	1.5950	1.5911	1.1769	1.1731	
7-149	7-149	83.00	7-150	68.00	8	333	0.0450	VCP	0.013	7	2.07		0.0011		0.0038	1.51	0.28	0.04	1.6620	1.6581	1.2261	1.2222	
7-150	7-150	68.00	7-156	67.19	8	201	0.0040	VCP	0.013	7	2.07		0.0014		0.0048	0.70	0.55	0.07	0.4971	0.4923	0.3665	0.3617	
7-151	7-151	65.47	7-153	64.70	12	350	0.0022	VCP	0.013	7	2.07		0.0020		0.0069	0.60	0.69	0.06	1.0829	1.0760	0.7988	0.7919	
7-152	7-152	79.69	7-209	79.50	6	21	0.0090	VCP	0.013	7	2.07		0.0013		0.0047	0.96	0.49	0.08	0.3459	0.3412	0.2553	0.2506	
7-153	7-153	73.00	7-155	72.82	8	43	0.0042	VCP	0.013	7	2.07		0.0057		0.0179	1.06	1.03	0.13	0.5066	0.4887	0.3736	0.3557	
7-154	7-154	70.58	7-154B	70.21	12	43	0.0087		0.013	7	2.07		0.0022		0.0076	0.99	0.52	0.04	2.1537	2.1462	1.5883	1.5807	
7-155B	7-154A	70.32	7-154B	70.22	12	19	0.0053	VCP	0.013	7	2.07		0.0721		0.1841	2.17	2.68	0.22	1.6812	1.4970	1.2398	1.0557	
7-155A	7-154B	70.21	7-155	70.04	12	86	0.0020		0.013	7	2.07		0.0743		0.1894	1.54	3.49	0.29	1.0252	0.8358	0.7618	0.5723	
7-155	7-155	64.32	7-156	63.55	12	350	0.0022	VCP	0.013	7	2.07		0.0817		0.2066	1.64	3.55	0.30	1.0829	0.8764	0.7988	0.5923	
7-155C	7-155C	66.00	7-154A	62.20	8	71		VCP	0.013	7	2.07		0.0721		0.1841	8-inch siphon							
7-156	7-156	63.55	7-158	63.10	18	352	0.0013	VCP	0.013	7	2.07		0.3658		0.8207	1.92	7.20	0.40	2.4339	1.6132	1.7955	0.9748	
7-157	7-157	75.00	7-156	72.00	8	164	0.0183	VCP	0.013	7	2.07		0.0022		0.0074	1.35	0.48	0.06	1.0591	1.0517	0.7814	0.7740	
7-158	7-158	63.10	7-162	62.29	18	677	0.0012	VCP	0.013	7	2.07		0.3658		0.8207	1.88	7.33	0.41	2.3546	1.5339	1.7373	0.9166	
7-159	7-159	87.00	7-157	75.00	8	188	0.0638	VCP	0.013	7	2.07		0.0022		0.0074	2.09	0.36	0.04	1.9784	1.9710	1.4594	1.4520	
7-860	7-160	97.00	7-159	87.00	8	147	0.0680	VCP	0.013	7	2.07		0.0012		0.0041	1.78	0.27	0.03	2.0424	2.0383	1.5169	1.5128	
7-160	7-160	97.00	7-161	95.00	8	145	0.0138	VCP	0.013	7	2.07		0.0005		0.0018	0.80	0.27	0.03	0.9197	0.9178	0.6786	0.6768	
7-161	7-161	95.00	7-162	77.00	8	223	0.0807	VCP	0.013	7	2.07		0.0019		0.0065	2.18	0.32	0.04	2.2248	2.2183	1.6410	1.6345	
7-162A	7-162	77.00	7-163	62.86	8	163	0.0865		0.013	7	2.07	55	0.3677		0.8246	9.36	3.31	0.41	2.3033	1.4787	1.6992	0.8746	
7-163	7-163	70.13	7-301	70.11	18	17	0.0012		0.013	7	2.07		0.8246		0.3677	1.86	0.62	0.41	2.3299	1.9622	1.7395	1.3718	
12-864	7-164	99.00	12-040	92.80	8	155	0.0400	VCP	0.013	7	2.07	45	0.0013		0.0043	1.50	0.31	0.04	1.5662	1.5619	1.1556	1.1513	
7-164	7-164	99.00	7-165	95.00	8	350	0.0114	VCP	0.013	7	2.07		0.0016		0.0052	1.03	0.45	0.06	0.8371	0.8319	0.6179	0.6126	
7-165	7-165	95.00	7-168	86.00	8	350	0.0257	VCP	0.013	7	2.07		0.0034		0.0112	1.73	0.54	0.07	1.2557	1.2445	0.9262	0.9150	
12-866	7-166	107.00	12-048	72.00	8	300	0.1167	VCP	0.013	7	2.07	14	0.0001		0.0002	0.00	0.00	0.00	2.6747	2.6745	1.9732	1.9730	
7-166	7-166	107.00	7-165	95.00	8	224	0.0536		0.013	7	2.07	86	0.0003		0.0012	1.13	0.16	0.02	1.8125	1.8112	1.3372	1.3360	
12-867	7-167	102.00	12-052	72.00	8	385	0.0779		0.013	7	2.07	31	0.0006		0.0019	1.48	0.18	0.02	2.1859	2.1840	1.6126	1.6107	

City of El Segundo
Future Conditions Hydraulic Model Results - with PS 7 bypassed and PS 1 improvements implemented
Pipes sorted by U/S MH ID

Pipe ID	U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (mgd)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)	Comments
7-167	7-167	102.00	7-168	86.00	8	375	0.0427	VCP	0.013	7	2.07	69	0.0012		0.0042	1.53	0.30	0.04	1.6175	1.6133	1.1931	1.1889	
7-168	7-168	81.90	7-170	80.50	8	350	0.0040	VCP	0.013	7	2.07		0.0064		0.0200	1.07	1.10	0.14	0.4953	0.4753	0.3652	0.3452	
7-169	7-169	88.30	7-170	82.87	8	225	0.0241	VCP	0.013	7	2.07		0.0008		0.0029	1.12	0.29	0.04	1.2165	1.2136	0.8977	0.8948	
7-170	7-170	80.50	7-172	68.60	8	350	0.0340	VCP	0.013	7	2.07		0.0084		0.0254	2.44	0.74	0.09	1.4439	1.4185	1.0651	1.0397	
7-871	7-171	96.00	7-154	82.00	6	400	0.0350	VCP	0.013	7	2.07	54	0.0022		0.0072	1.75	0.44	0.07	0.6802	0.6730	0.5015	0.4943	
7-171	7-171	96.00	7-172	68.60	6	501	0.0547	VCP	0.013	7	2.07	46	0.0019		0.0061	1.95	0.36	0.06	0.8503	0.8442	0.6276	0.6214	
7-172	7-172	68.60	7-180	62.76	8	350	0.0167	VCP	0.013	7	2.07		0.0111		0.0328	2.05	0.99	0.12	1.0115	0.9787	0.7465	0.7137	
7-173	7-173	88.00	7-176	75.00	8	257	0.0506	VCP	0.013	7	2.07		0.0016		0.0055	1.76	0.33	0.04	1.7612	1.7557	1.2991	1.2935	
7-174	7-174	125.10	7-175	116.00	8	273	0.0333	VCP	0.013	7	2.07		0.0017		0.0060	1.56	0.38	0.05	1.4297	1.4237	1.0548	1.0488	
7-175	7-175	116.00	7-176	75.00	8	532	0.0771	VCP	0.013	7	2.07		0.0041		0.0131	2.65	0.45	0.06	2.1739	2.1608	1.6035	1.5904	
7-176	7-176	75.00	7-177	62.58	8	183	0.0679	VCP	0.013	7	2.07		0.0069		0.0212	2.94	0.58	0.07	2.0400	2.0188	1.5053	1.4840	
7-177A	7-177	69.83	7-178C	67.70	18	7	0.0012		0.013	7	2.07		0.4223		0.9366	14.03	1.95	0.11	38.0165	37.0799	1.7395	0.8030	
7-178A	7-178A	70.52	1-008	69.33	8	28	0.0419		0.013	7	2.07		0.3014		0.6682	6.78	0.30	0.45	1.6025	0.9342	1.1822	0.5140	
7-178B	7-178A	70.52	1-008	70.42	12	28	0.0036		0.013	7	2.07		0.1217		0.2699	2.11	0.30	0.30	1.3765	1.1066	1.0224	0.7525	
7-525N	7-178C	62.05	1-005	61.63	18	350	0.0012		0.013	7	2.07		0.4231		0.9381	1.95	0.66	0.44	2.3581	1.4199	1.7395	0.8014	
7-180	7-180	62.25	7-177	62.05	18	167	0.0012	VCP	0.013	7	2.07		0.0477		0.1259	1.10	2.83	0.16	2.3557	2.2298	1.7379	1.6120	
7-181	7-181	95.00	7-182	93.86	8	285	0.0040	VCP	0.013	7	2.07		0.0005		0.0020	0.53	0.37	0.05	0.4953	0.4933	0.3652	0.3632	
7-182	7-182	86.10	7-185	85.00	8	325	0.0034	VCP	0.013	7	2.07		0.0013		0.0046	0.65	0.57	0.07	0.4556	0.4510	0.3370	0.3324	
7-183	7-183	99.00	7-184	86.10	8	225	0.0573	VCP	0.013	7	2.07		0.0013		0.0047	1.75	0.29	0.04	1.8750	1.8704	1.3831	1.3785	
7-184	7-184	86.10	7-185	85.00	8	275	0.0040	VCP	0.013	7	2.07		0.0023		0.0076	0.80	0.69	0.09	0.4953	0.4876	0.3652	0.3576	
7-185	7-185	85.00	7-190	74.45	8	175	0.0603	-	0.013	7	2.07		0.0036		0.0116	2.34	0.44	0.06	1.9227	1.9111	1.4187	1.4071	
7-186	7-186	101.53	7-187	79.00	8	435	0.0518	VCP	0.013	7	2.07		0.0012		0.0042	1.63	0.29	0.04	1.7821	1.7779	1.3146	1.3104	
7-187	7-187	79.00	7-190	74.45	8	175	0.0260	VCP	0.013	7	2.07		0.0025		0.0085	1.59	0.47	0.06	1.2627	1.2542	0.9313	0.9228	
7-188	7-188	95.00	7-189	75.25	8	300	0.0658	VCP	0.013	7	2.07	45	0.0021		0.0067	2.05	0.34	0.04	2.0092	2.0025	1.4820	1.4753	
7-888	7-188	95.00	7-204	89.00	8	499	0.0120	VCP	0.013	7	2.07	55	0.0026		0.0082	1.20	0.55	0.07	0.8587	0.8505	0.6334	0.6252	
7-189	7-189	75.25	7-190	74.45	8	200	0.0040	VCP	0.013	7	2.07		0.0043		0.0139	0.96	0.92	0.11	0.4953	0.4814	0.3652	0.3513	
7-190	7-190	74.45	7-192	73.73	8	180	0.0040	VCP	0.013	7	2.07		0.0104		0.0311	1.22	1.36	0.17	0.4953	0.4641	0.3652	0.3340	
7-191	7-191	111.20	7-192	74.18	8	610	0.0607	VCP	0.013	7	2.07		0.0018		0.0062	1.95	0.33	0.04	1.9291	1.9229	1.4232	1.4170	
7-192	7-192	73.60	7-194	71.62	10	500	0.0040	VCP	0.013	7	2.07		0.0123		0.0361	1.24	1.37	0.14	0.8935	0.8574	0.6592	0.6232	
7-193	7-193	86.00	7-194	85.66	8	85	0.0040	-	0.013	7	2.07		0.0005		0.0017	0.51	0.35	0.04	0.4953	0.4935	0.3652	0.3634	
7-194	7-194	71.62	7-203	70.90	10	175	0.0041	VCP	0.013	7	2.07		0.0127		0.0373	1.27	1.38	0.14	0.9107	0.8734	0.6722	0.6349	
7-195	7-195	119.60	7-196	95.60	8	600	0.0400	VCP	0.013	7	2.07		0.0062		0.0191	2.37	0.62	0.08	1.5662	1.5470	1.1556	1.1365	
7-196	7-196	90.00	7-197	83.31	8	169	0.0396	VCP	0.013	7	2.07		0.0069		0.0213	2.44	0.65	0.08	1.5580	1.5367	1.1491	1.1279	
7-197	7-197	83.31	7-203	81.99	8	331	0.0040	VCP	0.013	7	2.07		0.0084		0.0255	1.15	1.23	0.15	0.4945	0.4690	0.3645	0.3390	
7-199	7-199	121.99	7-201	92.00	8	373	0.0804	VCP	0.013	7	2.07		0.0023		0.0078	2.30	0.34	0.04	2.2204	2.2127	1.6384	1.6306	
7-200	7-200	117.00	7-201	92.00	8	275	0.0909	VCP	0.013	7	2.07		0.0001		0.0005	1.03	0.09	0.01	2.3611	2.3606	1.7418	1.7413	
7-201	7-201	93.00	7-202	82.60	8	175	0.0594	VCP	0.013	7	2.07		0.0000		0.0000	0.00	0.00	0.00	1.9090	1.9090	1.4083	1.4083	
7-801	7-201	92.00	7-207	75.00	8	500	0.0340	VCP	0.013	7	2.07		0.0041		0.0133	2.00	0.54	0.07	1.4439	1.4307	1.0651	1.0519	
7-202	7-202	82.60	7-203	81.00	8	175	0.0091	VCP	0.013	7	2.07		0.0006		0.0022	0.74	0.32	0.04	0.7488	0.7465	0.5526	0.5504	
7-202A	7-202A	83.10	7-202	82.60	8	127	0.0039		0.013	7	2.07		0.0006		0.0022	0.55	0.39	0.05	0.4904	0.4882	0.3614	0.3592	
7-203	7-203	70.90	7-205	68.90	10	500	0.0040	VCP	0.013	7	2.07		0.0231		0.0645	1.48	1.81	0.18	0.8980	0.8335	0.6625	0.5980	
7-204	7-204	86.67	7-205	71.49	8	355	0.0428	VCP	0.013	7	2.07		0.0026		0.0086	1.90	0.42	0.05	1.6193	1.6107	1.1944	1.1858	
7-205A	7-205	68.90	7-206A	68.00	10	182	0.0049		0.013	7	2.07		0.0278		0.0767	1.68	1.87	0.19	0.9989	0.9222	0.7330	0.6562	
7-206	7-206	77.73	7-206A	68.20	6	334	0.0285	VCP	0.013	7	2.07		0.0027		0.0090	1.75	0.51	0.08	0.6143	0.6053	0.4522	0.4431	
7-205	7-206A	68.90	7-207	68.00	10	168	0.0054	VCP	0.013	7	2.07		0.0305		0.0836	1.77	1.92	0.19	1.0398	0.9562	0.7510	0.6674	
7-207	7-207	67.50	7-208	66.17	10	333	0.0040	VCP	0.013	7	2.07		0.0363		0.0979	1.67	2.23	0.22	0.8973	0.7994	0.6618	0.5639	
7-208	7-208	66.17	7-180	62.25	10	200	0.0196	VCP	0.013	7	2.07		0.0366		0.0988	2.93	1.52	0.15	1.9878	1.8890	1.4665	1.3677	
7-209	7-209	79.50	7-153	75.00	8	548	0.0082	VCP	0.013	7	2.07		0.0037		0.0120	1.18	0.72	0.09	0.7096	0.6976	0.5235	0.5116	
7-300	7-300	62.25	7-177	62.05	18	167	0.0012	VCP	0.013	7	2.07		0.3677		0.8246	1.88	7.35	0.41	2.3557	1.5311	1.7395	0.9149	

City of El Segundo
Future Conditions Hydraulic Model Results - with PS 7 bypassed and PS 1 improvements implemented
Pipes sorted by U/S MH ID

Pipe ID	U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (mgd)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)	Comments
7-301	7-301	70.1	7-302	70.04	12	48	0.0012	VCP	0.013	7	2.07		0.3677		0.8246	12-inch siphon							
7-302	7-302	70.05	7-300	70.10	18	15	-0.0034	VCP	0.013	7	2.07		0.3677		0.8246	18-inch siphon							
7-501	7-501	42.49	7-012	41.78	8	41	0.0173	VCP	0.013	7	2.07		0.0002		0.0007	0.65	0.16	0.02	1.0305	1.0298	0.7601	0.7594	
7-524	7-524	69.15	7-178C	67.70	8	349	0.0042	VCP	0.013	7	2.07		0.0008		0.0028	0.60	0.43	0.05	0.5047	0.5019	0.3744	0.3716	
7-533	7-533	89.00	7-137	86.89	8	188	0.0112	VCP	0.013	7	2.07		0.0027		0.0089	1.20	0.58	0.07	0.8296	0.8207	0.6108	0.6019	
8-001	8-001	140.00	8-002	132.00	8	205	0.0390	VCP	0.013	8	1.52		0.0300		0.0604	3.32	1.08	0.13	1.5469	1.4866	1.1414	1.0810	
8-002	8-002	124.95	8-003	120.05	8	290	0.0169	VCP	0.013	8	1.52		0.0300		0.0604	2.47	1.32	0.17	1.0179	0.9575	0.7510	0.6906	
8-003	8-003	119.95	8-007	113.05	8	200	0.0345	VCP	0.013	8	1.52		0.0301		0.0606	3.18	1.11	0.14	1.4545	1.3939	1.0729	1.0123	
8-004	8-004	115.93	8-007	113.38	8	52	0.0490	VCP	0.013	8	1.52		0.0002		0.0006	0.89	0.12	0.01	1.7341	1.7335	1.2791	1.2784	
8-005	8-005	131.22	8-006	116.62	8	230	0.0635	VCP	0.013	8	1.52		0.0027		0.0067	2.02	0.34	0.04	1.9730	1.9663	1.4555	1.4488	
8-006	8-006	111.21	8-007	107.40	8	373	0.0102	VCP	0.013	8	1.52		0.0080		0.0179	1.44	0.83	0.10	0.7914	0.7735	0.5836	0.5657	
8-007	8-007	107.28	8-008	106.32	8	98	0.0098	VCP	0.013	8	1.52		0.0384		0.0757	2.18	1.69	0.21	0.7750	0.6994	0.5720	0.4963	
8-008	8-008	106.32	8-009	96.00	8	165	0.0625	VCP	0.013	8	1.52		0.0384		0.0757	4.19	1.07	0.13	1.9584	1.8827	1.4445	1.3688	
8-009	8-009	95.90	8-014	83.00	8	270	0.0478	VCP	0.013	8	1.52		0.0384		0.0757	3.81	1.15	0.14	1.7117	1.6360	1.2629	1.1872	
8-010	8-010	139.40	8-011	127.25	8	227	0.0535	VCP	0.013	8	1.52		0.0022		0.0054	1.78	0.32	0.04	1.8117	1.8063	1.3366	1.3312	
8-011	8-011	127.00	8-013	118.90	8	261	0.0310	VCP	0.013	8	1.52		0.0042		0.0100	1.78	0.49	0.06	1.3795	1.3695	1.0179	1.0080	
8-012	8-012	140.00	8-013	118.87	8	250	0.0845	VCP	0.013	8	1.52		0.0006		0.0017	1.46	0.17	0.02	2.2766	2.2749	1.6798	1.6781	
8-013	8-013	118.67	8-014	85.00	8	250	0.1347	VCP	0.013	8	1.52		0.0097		0.0215	3.74	0.49	0.06	2.8738	2.8523	2.1199	2.0985	
8-014	8-014	82.90	8-039	79.80	8	176	0.0176	VCP	0.013	8	1.52		0.0510		0.0983	2.90	1.66	0.21	1.0393	0.9410	0.7661	0.6678	
8-015	8-015	133.80	8-016	123.10	8	187	0.0572	VCP	0.013	8	1.52		0.0003		0.0010	1.09	0.14	0.02	1.8732	1.8722	1.3818	1.3808	
8-016	8-016	123.00	8-017	109.00	8	150	0.0933	VCP	0.013	8	1.52		0.0008		0.0020	1.60	0.18	0.02	2.3923	2.3903	1.7651	1.7631	
8-017	8-017	109.00	8-018	91.00	8	135	0.1333	VCP	0.013	8	1.52		0.0014		0.0037	2.18	0.22	0.03	2.8594	2.8557	2.1096	2.1059	
8-018	8-018	90.90	8-031	85.90	8	165	0.0303	VCP	0.013	8	1.52		0.0016		0.0042	1.35	0.32	0.04	1.3632	1.3590	1.0057	1.0015	
8-019	8-019	133.08	8-020	123.98	8	226	0.0403	VCP	0.013	8	1.52		0.0000		0.0000	0.00	0.00	0.00	1.5713	1.5713	1.1592	1.1592	
8-020	8-020	123.91	8-021	121.90	8	271	0.0074	VCP	0.013	8	1.52		0.0003		0.0007	0.49	0.20	0.03	0.6744	0.6737	0.4977	0.4969	
8-021	8-021	121.77	8-022	108.63	8	264	0.0498	VCP	0.013	8	1.52		0.0013		0.0034	1.52	0.26	0.03	1.7470	1.7436	1.2888	1.2853	
8-022	8-022	108.53	8-023	107.00	8	186	0.0082	VCP	0.013	8	1.52		0.0013		0.0034	0.81	0.40	0.05	0.7102	0.7068	0.5242	0.5207	
8-023	8-023	106.88	8-028	105.00	8	200	0.0094	VCP	0.013	8	1.52		0.0026		0.0063	1.02	0.52	0.06	0.7592	0.7529	0.5604	0.5540	
8-024	8-024	118.62	8-025	117.40	8	244	0.0050	VCP	0.013	8	1.52		0.0017		0.0043	0.73	0.50	0.06	0.5537	0.5494	0.4085	0.4042	
8-025	8-025	117.40	8-026	116.00	8	280	0.0050	VCP	0.013	8	1.52		0.0017		0.0043	0.73	0.50	0.06	0.5537	0.5494	0.4085	0.4042	
8-026	8-026	115.97	8-027	111.83	8	123	0.0337	VCP	0.013	8	1.52		0.0020		0.0051	1.49	0.35	0.04	1.4367	1.4315	1.0600	1.0549	
8-027	8-027	110.96	8-028	105.00	8	174	0.0343	VCP	0.013	8	1.52		0.0031		0.0075	1.69	0.41	0.05	1.4493	1.4418	1.0690	1.0615	
8-028	8-028	104.87	8-030	87.01	8	329	0.0543	VCP	0.013	8	1.52		0.0058		0.0134	2.36	0.49	0.06	1.8245	1.8111	1.3463	1.3329	
8-029	8-029	87.60	8-030	87.00	8	144	0.0042	VCP	0.013	8	1.52		0.0021		0.0053	0.73	0.58	0.07	0.5055	0.5002	0.3729	0.3677	
8-029A	8-029A	87.95	8-029	87.60	8	88	0.0040	DIP	0.013	8	1.52		0.0021		0.0053	0.72	0.58	0.07	0.4939	0.4886	0.3658	0.3605	
8-029B	8-029B	93.15	8-029A	92.00	8	206	0.0056	VCP	0.013	8	1.52		0.0017		0.0044	0.76	0.49	0.06	0.5851	0.5807	0.4320	0.4276	
8-030	8-030	86.90	8-031	85.90	8	220	0.0045	VCP	0.013	8	1.52		0.0082		0.0182	1.09	1.02	0.13	0.5280	0.5097	0.3897	0.3715	
8-031	8-031	85.80	8-040	77.40	8	355	0.0237	VCP	0.013	8	1.52		0.0098		0.0216	2.04	0.74	0.09	1.2046	1.1830	0.8887	0.8671	
8-032	8-032	99.96	8-036	96.04	8	215	0.0182	VCP	0.013	8	1.52		0.0015		0.0039	1.11	0.35	0.04	1.0574	1.0535	0.7801	0.7762	
8-033	8-033	129.66	8-035	117.21	8	287	0.0434	VCP	0.013	8	1.52		0.0047		0.0111	2.06	0.47	0.06	1.6310	1.6199	1.2034	1.1924	
8-034	8-034	149.00	8-035	121.68	8	180	0.1518	VCP	0.013	8	1.52		0.0035		0.0084	2.93	0.31	0.04	3.0508	3.0423	2.2505	2.2420	
8-035	8-035	117.00	8-036	96.04	8	264	0.0794	VCP	0.013	8	1.52		0.0083		0.0185	2.97	0.52	0.06	2.2065	2.1880	1.6281	1.6096	
8-036	8-036	95.99	8-037	95.00	8	250	0.0040	VCP	0.013	8	1.52		0.0098		0.0216	1.09	1.14	0.14	0.4928	0.4712	0.3632	0.3417	
8-037	8-037	95.30	8-038	81.60	8	200	0.0685	VCP	0.013	8	1.52		0.0134		0.0288	3.23	0.66	0.08	2.0495	2.0207	1.5117	1.4830	
8-038	8-038	81.60	8-039	79.80	8	190	0.0095	VCP	0.013	8	1.52		0.0140		0.0300	1.64	1.08	0.14	0.7622	0.7322	0.5630	0.5331	
8-039	8-039	79.80	WW-008	73.50	8	15	0.4200	VCP	0.013	8	1.52		0.0650		0.1229	9.44	0.86	0.11	5.0749	4.9520	3.7441	3.6212	
8-040	8-040	77.40	WW-008	73.50	10	15	0.2600	VCP	0.013	8	1.52		0.0098		0.0216	4.56	0.40	0.04	7.2397	7.2181	5.3411	5.3196	
8-511	8-511	95.30	8-512	94.50	8	160	0.0050	VCP	0.013	8	1.52		0.0017		0.0044	0.74	0.51	0.06	0.5537	0.5493	0.4085	0.4041	
8-512	8-512	94.30	8-029B	93.15	8	220	0.0052	VCP	0.013	8	1.52		0.0017		0.0044	0.75	0.50	0.06	0.5662	0.5618	0.4175	0.4131	

City of El Segundo
Future Conditions Hydraulic Model Results - with PS 7 bypassed and PS 1 improvements implemented
Pipes sorted by U/S MH ID

Pipe ID	U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (mgd)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)	Comments
8-513	8-513	104.08	8-512	94.30	8	330	0.0296	VCP	0.013	8	1.52		0.0000		0.0000	0.00	0.00	0.00	1.3481	1.3481	0.9947	0.9947	
8-522	8-522	111.50	8-027	110.96	8	35	0.0154	VCP	0.013	8	1.52		0.0011		0.0028	0.95	0.31	0.04	0.9727	0.9699	0.7174	0.7146	
9-001	9-001	96.90	9-002	85.42	8	303	0.0379	VCP	0.013	9	1.34		0.0018		0.0039	1.43	0.30	0.04	1.5242	1.5203	1.1246	1.1207	
9-002	9-002	85.32	9-003A	83.11	8	225	0.0098	VCP	0.013	9	1.34		0.0044		0.0090	1.16	0.61	0.08	0.7761	0.7671	0.5726	0.5636	
9-003	9-003	82.97	9-004A	80.70	8	329	0.0069	VCP	0.013	9	1.34		0.0269		0.0481	1.69	1.47	0.18	0.6505	0.6023	0.4796	0.4314	
9-003A	9-003A	83.11	9-003	82.90	8	30	0.0070		0.013	9	1.34		0.0044		0.0090	1.03	0.66	0.08	0.6552	0.6461	0.4838	0.4748	
9-004	9-004	80.66	9-007	79.04	8	325	0.0050	VCP	0.013	9	1.34		0.0329		0.0579	1.59	1.75	0.22	0.5529	0.4949	0.4078	0.3499	
9-004A	9-004A	82.97	9-004	80.70	8	329	0.0069	VCP	0.013	9	1.34		0.0277		0.0495	1.70	1.49	0.19	0.6505	0.6010	0.4795	0.4300	
9-005	9-005	114.49	9-006	100.72	8	211	0.0653	VCP	0.013	9	1.34		0.0003		0.0009	1.10	0.13	0.02	2.0005	1.9996	1.4755	1.4747	
9-006	9-006	100.46	9-007	79.04	8	329	0.0651	VCP	0.013	9	1.34		0.0005		0.0012	1.21	0.15	0.02	1.9981	1.9969	1.4742	1.4730	
9-007	9-007	78.94	9-013	78.72	8	42	0.0052	VCP	0.013	9	1.34		0.0337		0.0592	1.63	1.75	0.22	0.5667	0.5075	0.4182	0.3590	
9-008	9-008	95.75	9-011	91.24	8	329	0.0137	VCP	0.013	9	1.34		0.0006		0.0014	0.74	0.23	0.03	0.9168	0.9154	0.6767	0.6753	
9-009	9-009	92.48	9-011	91.24	8	169	0.0073	VCP	0.013	9	1.34		0.0006		0.0014	0.59	0.27	0.03	0.6708	0.6694	0.4951	0.4937	
9-010	9-010	116.52	9-011	91.24	8	329	0.0768	VCP	0.013	9	1.34		0.0003		0.0007	1.07	0.11	0.01	2.1707	2.1700	1.6013	1.6006	
9-011	9-011	91.24	9-012	88.85	8	296	0.0081	VCP	0.013	9	1.34		0.0018		0.0039	0.84	0.43	0.05	0.7037	0.6997	0.5198	0.5159	
9-012	9-012	88.69	9-013	78.72	8	190	0.0525	VCP	0.013	9	1.34		0.0018		0.0039	1.61	0.28	0.03	1.7938	1.7899	1.3237	1.3197	
9-013	9-013	78.72	WW-009	78.50	8	10	0.0220		0.013	9	1.34		0.0355		0.0621	2.74	1.26	0.16	1.1615	1.0994	0.8568	0.7947	
9-031	9-031	94.63	9-032	92.18	8	245	0.0100		0.013	9	1.34		0.0024		0.0052	0.98	0.46	0.06	0.7826	0.7774	0.5774	0.5723	
9-032	9-032	92.08	9-033	90.10	8	398	0.0050		0.013	9	1.34		0.0024		0.0052	0.77	0.55	0.07	0.5525	0.5474	0.4090	0.4038	
9-033	9-033	90.00	9-034	89.07	8	186	0.0050		0.013	9	1.34		0.0225		0.0409	1.44	1.47	0.18	0.5536	0.5127	0.4090	0.3681	
9-034	9-034	88.97	9-003	88.48	8	11	0.0454		0.013	9	1.34		0.0225		0.0409	3.11	0.86	0.11	1.6680	1.6271	1.2312	1.1903	
9-100	9-100	96.52	9-031	94.73	8	180	0.0100	VCP	0.013	9	1.34		0.0024		0.0052	0.98	0.46	0.06	0.7818	0.7766	0.5774	0.5723	
9-101	9-101	96.69	9-100	96.62	8	7	0.0104		0.013	9	1.34		0.0024		0.0052	1.00	0.46	0.06	0.8004	0.7953	0.5890	0.5838	
9-102	9-102	99.02	9-101	96.79	8	279	0.0080	VCP	0.013	9	1.34		0.0024		0.0052	0.91	0.49	0.06	0.7003	0.6952	0.5170	0.5118	
9-103	9-103	99.39	9-102	99.27	8	33	0.0036	VCP	0.013	9	1.34		0.0024		0.0052	0.69	0.59	0.07	0.4701	0.4649	0.3470	0.3419	
12-001	12-001	146.00	12-013	137.29	8	188	0.0463	VCP	0.013	7	2.07		0.0017		0.0057	1.73	0.34	0.04	1.6855	1.6798	1.2435	1.2378	
12-002	12-002	139.74	12-003	134.45	6	258	0.0205	-	0.013	7	2.07		0.0009		0.0033	1.15	0.34	0.06	0.5207	0.5174	0.3845	0.3812	
12-003	12-003	133.00	12-004	129.00	8	95	0.0421	VCP	0.013	7	2.07		0.0010		0.0036	1.45	0.28	0.04	1.6068	1.6032	1.1853	1.1817	
12-803	12-003	133.00	12-017	132.00	8	100	0.0100	VCP	0.013	7	2.07		0.0005		0.0018	0.71	0.28	0.04	0.7831	0.7813	0.5778	0.5760	
12-004	12-004	129.00	12-005	104.00	8	252	0.0992	VCP	0.013	7	2.07		0.0018		0.0062	2.30	0.30	0.04	2.4665	2.4603	1.8194	1.8132	
12-005	12-005	104.00	12-006	93.00	8	317	0.0347	VCP	0.013	7	2.07		0.0086		0.0260	2.47	0.74	0.09	1.4587	1.4327	1.0761	1.0501	
12-006	12-006	93.00	12-010	92.54	8	95	0.0048	VCP	0.013	7	2.07		0.0094		0.0283	1.27	1.24	0.15	0.5449	0.5166	0.4020	0.3737	
12-007	12-007	123.53	12-008	109.80	8	268	0.0512	VCP	0.013	7	2.07		0.0011		0.0039	1.59	0.28	0.03	1.7724	1.7685	1.3075	1.3036	
12-008	12-008	109.72	12-025	79.58	8	305	0.0988	VCP	0.013	7	2.07		0.0022		0.0075	2.44	0.32	0.04	2.4616	2.4542	1.8161	1.8087	
12-009	12-009	110.32	12-010	92.54	8	305	0.0583	VCP	0.013	7	2.07		0.0006		0.0022	1.40	0.21	0.03	1.8907	1.8885	1.3947	1.3925	
12-010	12-010	92.54	12-012	91.00	8	318	0.0048	VCP	0.013	7	2.07		0.0124		0.0364	1.37	1.40	0.18	0.5449	0.5085	0.4020	0.3656	
12-011	12-011	94.00	12-012	91.00	8	197	0.0152	VCP	0.013	7	2.07	20	0.0007		0.0023	0.89	0.29	0.04	0.9663	0.9640	0.7129	0.7106	
12-811	12-011	94.00	12-032	90.00	8	150	0.0267	VCP	0.013	7	2.07	80	0.0028		0.0092	1.65	0.48	0.06	1.2788	1.2695	0.9436	0.9344	
12-012	12-012	91.00	12-037	79.00	8	237	0.0506	VCP	0.013	7	2.07		0.0146		0.0424	3.27	0.86	0.11	1.7621	1.7197	1.2997	1.2573	
12-013	12-013	137.29	12-200	124.00	8	100	0.1329	VCP	0.013	7	2.07		0.0028		0.0092	2.88	0.33	0.04	2.8547	2.8455	2.1063	2.0971	
12-814	12-014	145.42	12-013	139.79	8	367	0.0153	VCP	0.013	7	2.07	64	0.0011		0.0038	1.04	0.37	0.05	0.9699	0.9661	0.7155	0.7116	
12-014	12-014	143.00	12-015	128.18	8	180	0.0823	VCP	0.013	7	2.07	36	0.0006		0.0022	1.56	0.19	0.02	2.2469	2.2448	1.6578	1.6556	
12-015	12-015	128.18	12-016	121.10	8	150	0.0472	VCP	0.013	7	2.07		0.0006		0.0023	1.32	0.22	0.03	1.7013	1.6989	1.2551	1.2528	
12-016	12-016	121.00	12-023	104.00	8	430	0.0395	VCP	0.013	7	2.07		0.0025		0.0084	1.83	0.42	0.05	1.5570	1.5487	1.1485	1.1401	
12-017	12-017	132.00	12-023	100.00	8	250	0.1280	VCP	0.013	7	2.07		0.0015		0.0051	2.37	0.25	0.03	2.8016	2.7965	2.0669	2.0618	
12-018	12-018	136.53	12-019	132.84	8	250	0.0148	VCP	0.013	7	2.07		0.0011		0.0041	1.05	0.38	0.05	0.9514	0.9473	0.7019	0.6978	
12-019	12-019	132.74	12-021	110.54	8	300	0.0740	VCP	0.013	7	2.07		0.0024		0.0080	2.25	0.36	0.04	2.1302	2.1222	1.5718	1.5638	
12-820	12-020	124.00	12-057	122.00	8	175	0.0114	VCP	0.013	7	2.07		0.0029		0.0096	1.24	0.60	0.08	0.8371	0.8276	0.6179	0.6083	
12-020	12-021	124.00	12-020	108.60	8	156	0.0987	VCP	0.013	7	2.07		0.0026		0.0087	2.55	0.35	0.04	2.4604	2.4517	1.8149	1.8062	

City of El Segundo
Future Conditions Hydraulic Model Results - with PS 7 bypassed and PS 1 improvements implemented
Pipes sorted by U/S MH ID

Pipe ID	U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (mgd)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)	Comments
12-022	12-022	104.00	12-023	100.00	8	350	0.0114	VCP	0.013	7	2.07		0.0013		0.0044	0.98	0.42	0.05	0.8371	0.8327	0.6179	0.6135	
12-023	12-023	100.00	12-024	99.55	8	75	0.0060	VCP	0.013	7	2.07		0.0052		0.0164	1.17	0.91	0.11	0.6066	0.5901	0.4473	0.4308	
12-024	12-024	99.55	12-031	75.60	8	375	0.0639	VCP	0.013	7	2.07		0.0073		0.0225	2.93	0.60	0.07	1.9790	1.9565	1.4600	1.4376	
12-025	12-025	79.54	12-031	75.62	8	40	0.0980	VCP	0.013	7	2.07		0.0022		0.0075	2.43	0.32	0.04	2.4514	2.4439	1.8072	1.7997	
12-026	12-026	96.09	12-028	87.44	8	235	0.0368	VCP	0.013	7	2.07		0.0006		0.0024	1.22	0.24	0.03	1.5024	1.5000	1.1084	1.1060	
12-027	12-027	109.20	12-028	87.56	8	218	0.0993	VCP	0.013	7	2.07		0.0009		0.0032	1.88	0.22	0.03	2.4672	2.4640	1.8200	1.8168	
12-028	12-028	87.16	12-029	76.90	8	325	0.0316	VCP	0.013	7	2.07		0.0019		0.0064	1.56	0.39	0.05	1.3913	1.3850	1.0263	1.0200	
12-029	12-029	76.69	12-030	75.77	8	235	0.0039	VCP	0.013	7	2.07		0.0026		0.0087	0.83	0.74	0.09	0.4900	0.4812	0.3600	0.3513	
12-030	12-030	75.75	12-031	75.61	8	40	0.0035	VCP	0.013	7	2.07		0.0026		0.0087	0.80	0.76	0.10	0.4633	0.4545	0.3419	0.3332	
12-031	12-031	75.60	12-036	68.60	8	280	0.0250	VCP	0.013	7	2.07		0.0122		0.0358	2.43	0.94	0.12	1.2382	1.2023	0.9130	0.8771	
12-032	12-032	90.00	12-036	68.60	8	350	0.0611	VCP	0.013	7	2.07		0.0074		0.0228	2.89	0.61	0.08	1.9363	1.9135	1.4284	1.4056	
12-033	12-033	85.00	12-034	77.00	8	200	0.0400	VCP	0.013	7	2.07	38	0.0009		0.0031	1.35	0.26	0.03	1.5662	1.5631	1.1556	1.1526	
12-833	12-033	85.00	12-060	81.00	8	150	0.0267	VCP	0.013	7	2.07	62	0.0015		0.0050	1.37	0.36	0.05	1.2788	1.2738	0.9436	0.9386	
12-034	12-034	77.00	12-035	69.40	8	150	0.0507	VCP	0.013	7	2.07		0.0030		0.0098	2.10	0.43	0.05	1.7626	1.7529	1.3004	1.2906	
12-035	12-035	69.40	12-036	68.60	8	200	0.0040	VCP	0.013	7	2.07		0.0044		0.0141	0.97	0.93	0.12	0.4953	0.4812	0.3652	0.3511	
12-036	12-036	68.60	12-050	67.48	8	316	0.0035	VCP	0.013	7	2.07		0.0240		0.0670	1.47	2.05	0.26	0.4662	0.3992	0.3413	0.2743	
12-037	12-037	79.00	12-039	78.78	8	55	0.0040	VCP	0.013	7	2.07		0.0146		0.0424	1.34	1.58	0.20	0.4953	0.4529	0.3652	0.3228	
12-038	12-038	86.40	12-039	77.85	6	300	0.0285	VCP	0.013	7	2.07		0.0008		0.0030	1.25	0.30	0.05	0.6138	0.6108	0.4522	0.4491	
12-039	12-039	78.78	12-043	78.18	8	150	0.0040	VCP	0.013	7	2.07		0.0154		0.0446	1.36	1.62	0.20	0.4953	0.4506	0.3652	0.3205	
12-040	12-040	92.80	12-041	92.00	8	142	0.0056	VCP	0.013	7	2.07		0.0041		0.0131	1.07	0.82	0.10	0.5878	0.5747	0.4337	0.4206	
12-041	12-041	92.00	12-042	90.00	8	300	0.0067	VCP	0.013	7	2.07		0.0052		0.0163	1.21	0.88	0.11	0.6394	0.6231	0.4718	0.4556	
12-042	12-042	90.00	12-043	78.18	8	333	0.0355	VCP	0.013	7	2.07		0.0069		0.0213	2.35	0.67	0.08	1.4753	1.4540	1.0884	1.0671	
12-043	12-043	78.17	12-046	76.85	8	331	0.0040	VCP	0.013	7	2.07		0.0232		0.0649	1.52	1.96	0.24	0.4945	0.4296	0.3645	0.2997	
12-044	12-044	98.30	12-045	80.00	8	210	0.0871	VCP	0.013	7	2.07		0.0015		0.0053	2.10	0.28	0.04	2.3116	2.3063	1.7056	1.7003	
12-045	12-045	79.82	12-046	76.90	8	225	0.0130	VCP	0.013	7	2.07		0.0015		0.0053	1.09	0.44	0.06	0.8921	0.8868	0.6579	0.6526	
12-046	12-046	76.76	12-047	76.20	8	140	0.0040	VCP	0.013	7	2.07		0.0260		0.0720	1.56	2.06	0.26	0.4953	0.4233	0.3652	0.2932	
12-047	12-047	76.20	12-049	67.62	8	210	0.0409	VCP	0.013	7	2.07		0.0263		0.0728	3.57	1.17	0.15	1.5828	1.5101	1.1679	1.0951	
12-048	12-048	72.00	12-049	67.62	8	158	0.0277	VCP	0.013	7	2.07		0.0016		0.0055	1.43	0.38	0.05	1.3038	1.2983	0.9617	0.9562	
12-049	12-049	67.62	12-050	67.32	12	127	0.0024	VCP	0.013	7	2.07		0.0292		0.0801	1.28	2.17	0.18	1.1221	1.0420	0.8279	0.7478	
12-050	12-050	67.32	12-052	66.50	12	350	0.0023	VCP	0.013	7	2.07		0.0564		0.1471	1.52	2.94	0.24	1.1175	0.9705	0.8247	0.6776	
12-051	12-051	79.00	12-052	77.00	8	165	0.0121	VCP	0.013	7	2.07		0.0017		0.0059	1.09	0.47	0.06	0.8621	0.8562	0.6360	0.6301	
12-052	12-052	66.55	12-056	65.78	12	350	0.0022		0.013	7	2.07		0.0604		0.1565	1.52	3.08	0.26	1.0829	0.9264	0.7988	0.6424	
12-053	12-053	101.80	12-054	101.13	6	225	0.0030	VCP	0.013	7	2.07		0.0007		0.0026	0.54	0.48	0.08	0.1984	0.1958	0.1469	0.1443	
12-054	12-054	95.43	12-055	73.00	8	268	0.0837	VCP	0.013	7	2.07		0.0026		0.0086	2.40	0.36	0.04	2.2654	2.2569	1.6704	1.6618	
12-854	12-054	96.00	7-169	92.36	8	132	0.0276	VCP	0.013	7	2.07		0.0000		0.0000	0.00	0.00	0.00	1.3004	1.3004	0.9590	0.9590	
12-055	12-055	73.00	12-056	68.00	8	142	0.0352	VCP	0.013	7	2.07		0.0032		0.0106	1.90	0.48	0.06	1.4694	1.4588	1.0839	1.0732	
12-056	12-056	65.78	12-061	65.47	12	142	0.0022	VCP	0.013	7	2.07		0.0643		0.1657	1.54	3.18	0.26	1.0788	0.9131	0.7956	0.6299	
12-057	12-057	122.00	12-058	111.00	8	290	0.0379	VCP	0.013	7	2.07		0.0031		0.0103	1.92	0.47	0.06	1.5251	1.5149	1.1252	1.1150	
12-857	12-057	122.00	7-056	79.00	8	350	0.1229	VCP	0.013	7	2.07		0.0006		0.0023	1.83	0.18	0.02	2.7448	2.7425	2.0246	2.0224	
12-058	12-058	111.00	12-059	99.00	8	200	0.0600	VCP	0.013	7	2.07		0.0046		0.0147	2.52	0.50	0.06	1.9181	1.9035	1.4141	1.3994	
12-059	12-059	99.00	12-060	81.00	8	240	0.0750	VCP	0.013	7	2.07		0.0051		0.0162	2.80	0.50	0.06	2.1445	2.1283	1.5811	1.5649	
12-861	12-060	65.47	12-061	64.70	12	173	0.0044	VCP	0.013	7	2.07		0.0066		0.0205	1.06	0.97	0.08	1.5383	1.5178	1.0771	1.0566	
12-061	12-061	65.47	7-155C	64.70	12	340	0.0023	-	0.013	7	2.07		0.0721		0.1841	1.61	3.32	0.28	1.0987	0.9146	0.8105	0.6263	
12-200	12-200	124.00	12-005	104.00	8	283	0.0707	VCP	0.013	7	2.07		0.0046		0.0147	2.67	0.48	0.06	2.0817	2.0670	1.5356	1.5209	
13-001	13-001	105.02	13-002	103.19	21	315	0.0058	VCP	0.013	13	3.00		0.0416		0.1249	1.86	1.85	0.09	7.8265	7.7016	5.7735	5.6486	
13-002	13-002	103.19	13-003	101.45	21	300	0.0058	VCP	0.013	13	3.00		0.0489		0.1466	1.95	2.00	0.10	7.8201	7.6734	5.7690	5.6224	
13-003	13-003	101.45	13-004	99.73	21	300	0.0057	VCP	0.013	13	3.00		0.0489		0.1466	1.95	2.00	0.10	7.7750	7.6283	5.7354	5.5888	
13-004	13-004	99.21	13-005	97.54	27	293	0.0057	VCP	0.013	13	1.63		0.0064		0.0156	0.95	0.66	0.02	15.1522	15.1366	11.1780	11.1624	
13-804	13-004	99.51	CS-068	99.33	18	31	0.0058	VCP	0.013	CS	3.00		0.0635		0.1904	2.16	2.36	0.13	5.1871	4.9967	3.8268	3.6364	

City of El Segundo
Future Conditions Hydraulic Model Results - with PS 7 bypassed and PS 1 improvements implemented
Pipes sorted by U/S MH ID

Pipe ID	U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (mgd)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)	Comments
13-005	13-005	96.73	13-006	95.75	27	295	0.0033	VCP	0.013	13	1.63		0.0064		0.0156	0.78	0.75	0.03	11.5679	11.5523	8.5339	8.5184	
13-006	13-006	95.75	13-007	94.77	27	295	0.0033	VCP	0.013	13	1.63		0.0256		0.0560	1.16	1.35	0.05	11.5679	11.5119	8.5339	8.4780	
13-007	13-007	94.77	13-008	93.79	27	295	0.0033	VCP	0.013	13	1.63		0.0302		0.0652	1.21	1.45	0.05	11.5679	11.5027	8.5339	8.4688	
13-008	13-008	93.79	13-009	92.76	27	311	0.0033	VCP	0.013	13	1.63		0.1253		0.2411	1.80	2.70	0.10	11.5502	11.3091	8.5204	8.2793	
13-009	13-009	92.76	WW-013	75.00	39	74	0.2385	VCP	0.013	13	1.63		0.1253		0.2411	7.56	0.90	0.02	261.3133	261.0722	192.7714	192.5302	
CS-001	CS-001	96.41	CS-002	95.40	8	300	0.0034	VCP	0.013	CS	3.00		0.0083		0.0248	1.08	1.27	0.16	0.4544	0.4296	0.3370	0.3122	
CS-002	CS-002	95.48	CS-003	94.20	8	430	0.0030	VCP	0.013	CS	3.00		0.0235		0.0705	1.40	2.20	0.27	0.4272	0.3567	0.3154	0.2449	
CS-003	CS-003	94.16	CS-005	93.42	8	252	0.0029	VCP	0.013	CS	3.00		0.0242		0.0725	1.40	2.24	0.28	0.4243	0.3518	0.3128	0.2403	
CS-004	CS-004	93.63	CS-005	93.42	8	75	0.0028	VCP	0.013	CS	3.00		0.0033		0.0099	0.77	0.85	0.11	0.4144	0.4044	0.3057	0.2958	
CS-005	CS-005	93.38	CS-006	92.83	8	178	0.0031	VCP	0.013	CS	3.00		0.0275		0.0825	1.48	2.36	0.29	0.4353	0.3528	0.3212	0.2387	
CS-006	CS-006	92.79	CS-007	92.10	8	228	0.0030	VCP	0.013	CS	3.00		0.0275		0.0825	1.47	2.37	0.30	0.4308	0.3483	0.3180	0.2355	
CS-007	CS-007	92.08	CS-015	90.48	8	400	0.0040	CIP	0.013	CS	3.00		0.0568		0.1704	1.99	3.24	0.40	0.4953	0.3249	0.3652	0.1948	
CS-008	CS-008	114.20	CS-009	104.00	6	144	0.0708	VCP	0.013	CS	3.00		0.0015		0.0044	1.92	0.29	0.05	0.9677	0.9634	0.7142	0.7098	
CS-009	CS-009	104.00	CS-010	97.79	8	127	0.0489	VCP	0.013	CS	3.00		0.0025		0.0075	1.91	0.38	0.05	1.7316	1.7241	1.2778	1.2703	
CS-010	CS-010	97.59	CS-011	97.03	8	30	0.0187	VCP	0.013	CS	3.00		0.0025		0.0075	1.37	0.48	0.06	1.0699	1.0624	0.7892	0.7817	
CS-011	CS-011	91.28	CS-013	90.93	8	48	0.0073	VCP	0.013	CS	3.00		0.0038		0.0114	1.12	0.73	0.09	0.6687	0.6573	0.4931	0.4818	
CS-012	CS-012	101.38	CS-014A	98.52	6	290	0.0099	VCP	0.013	CS	3.00		0.0060		0.0181	1.48	0.91	0.15	0.3611	0.3430	0.2663	0.2482	
CS-013	CS-013	90.93	CS-015	90.47	8	65	0.0071	VCP	0.013	CS	3.00		0.0163		0.0490	1.71	1.48	0.18	0.6588	0.6097	0.4860	0.4370	
CS-014	CS-014	98.48	CS-013	95.62	6	290	0.0099	VCP	0.013	CS	3.00		0.0126		0.0377	1.84	1.31	0.22	0.3611	0.3234	0.2663	0.2286	
CS-014A	CS-014A	101.38	CS-014	98.52	6	290	0.0099	VCP	0.013	CS	3.00		0.0126		0.0377	1.84	1.31	0.22	0.3611	0.3234	0.2664	0.2287	
CS-015	CS-015	90.47	CS-016	88.99	8	205	0.0072	VCP	0.013	CS	3.00		0.0731		0.2194	2.65	3.16	0.40	0.6654	0.4460	0.4906	0.2712	
CS-016	CS-016	88.99	CS-017	86.69	8	320	0.0072	VCP	0.013	CS	3.00		0.0733		0.2199	2.64	3.17	0.40	0.6639	0.4440	0.4899	0.2700	
CS-017	CS-017	86.69	CS-018	86.49	8	30	0.0067	VCP	0.013	CS	3.00		0.0733		0.2199	2.57	3.24	0.40	0.6394	0.4195	0.4718	0.2519	
CS-018	CS-018	86.49	CS-019	85.44	15	290	0.0036	VCP	0.013	CS	3.00		0.1778		0.5334	2.52	4.69	0.31	2.5189	1.9855	1.8533	1.3199	
CS-019	CS-019	85.34	CS-020	84.08	15	320	0.0039	VCP	0.013	CS	3.00		0.1943		0.5830	2.66	4.80	0.32	2.6268	2.0438	1.9282	1.3452	
CS-020	CS-020	83.98	CS-021	82.72	15	310	0.0041	VCP	0.013	CS	3.00		0.1954		0.5861	2.70	4.78	0.32	2.6688	2.0827	1.9771	1.3910	
CS-021	CS-021	82.62	CS-022	81.32	15	330	0.0039	VCP	0.013	CS	3.00		0.1976		0.5928	2.68	4.84	0.32	2.6274	2.0346	1.9282	1.3354	
CS-022	CS-022	80.77	CS-023	79.92	12	298	0.0029	VCP	0.013	CS	3.00		0.1995		0.5984	2.41	5.90	0.49	1.2331	0.6347	0.9094	0.3110	
CS-023A	CS-023	84.35	CS-039A	84.30	15	6	0.0087		0.013	CS	3.00		0.2404		0.7211	3.76	4.37	0.29	3.9036	3.1825	2.8800	2.1589	
CS-024	CS-024	86.96	CS-025	86.08	12	271	0.0032	VCP	0.013	CS	3.00		0.1806		0.5419	2.47	5.37	0.45	1.3157	0.7737	0.9708	0.4288	
CS-025	CS-025	85.78	CS-026	84.33	12	271	0.0054	VCP	0.013	CS	3.00		0.1806		0.5419	2.96	4.67	0.39	1.6888	1.1469	1.2461	0.7041	
CS-026A	CS-026	84.58	CS-039B	84.53	15	26	0.0019		0.013	CS	3.00		0.1814		0.5441	2.02	5.58	0.37	1.8457	1.3017	1.3464	0.8023	
CS-027	CS-027	82.62	CS-903	82.34	15	105	0.0027	VCP	0.013	CS	3.00		0.0034		0.0103	0.70	0.75	0.05	2.1577	2.1474	1.6042	1.5939	
CS-028	CS-028	83.37	CS-027	82.26	8	363	0.0031	VCP	0.013	CS	3.00		0.0034		0.0103	0.80	0.85	0.11	0.4330	0.4227	0.3251	0.3148	
CS-029	CS-029	91.30	CS-030	90.12	8	300	0.0039	VCP	0.013	CS	3.00		0.0037		0.0110	0.89	0.83	0.10	0.4911	0.4801	0.3626	0.3516	
CS-030	CS-030	90.02	CS-032	88.84	8	300	0.0039	VCP	0.013	CS	3.00		0.0228		0.0683	1.53	2.02	0.25	0.4911	0.4228	0.3626	0.2942	
CS-031A	CS-031A	88.62	CS-033	87.88	8	376	0.0020	VCP	0.013	CS	3.00		0.0015		0.0046	0.54	0.65	0.08	0.3474	0.3428	0.2578	0.2531	
CS-032	CS-032	87.56	CS-033	87.39	10	88	0.0019	VCP	0.013	CS	3.00		0.0228		0.0683	1.16	2.23	0.22	0.6240	0.5557	0.4602	0.3918	
CS-033	CS-033	87.39	CS-034	86.75	10	322	0.0020	VCP	0.013	CS	3.00		0.0243		0.0730	1.20	2.29	0.23	0.6330	0.5600	0.4673	0.3943	
CS-034	CS-034	86.75	CS-035	86.10	10	325	0.0020	VCP	0.013	CS	3.00		0.0243		0.0730	1.20	2.29	0.23	0.6350	0.5620	0.4686	0.3956	
CS-035	CS-035	86.10	CS-036	85.61	10	245	0.0020	VCP	0.013	CS	3.00		0.0248		0.0744	1.21	2.31	0.23	0.6350	0.5606	0.4686	0.3942	
CS-036	CS-036	85.61	CS-037	85.12	10	240	0.0020	VCP	0.013	CS	3.00		0.0248		0.0744	1.21	2.30	0.23	0.6415	0.5672	0.4731	0.3987	
CS-037	CS-037	85.12	CS-038	85.08	10	21	0.0019	VCP	0.013	CS	3.00		0.0248		0.0744	1.19	2.34	0.23	0.6197	0.5453	0.4569	0.3826	
CS-038	CS-038	85.08	CS-039	84.85	10	115	0.0020	VCP	0.013	CS	3.00		0.0248		0.0744	1.21	2.31	0.23	0.6350	0.5606	0.4686	0.3942	
CS-039	CS-039	84.15	CS-900	83.58	18	425	0.0013	VCP	0.013	CS	3.00		0.4465		1.3395	2.22	9.39	0.52	2.4937	1.1542	1.8101	0.4706	
CS-039A	CS-039A	84.27	CS-039	84.15	15	14	0.0088	VCP	0.013	CS	3.00		0.4217		1.2652	4.42	5.85	0.39	3.9308	2.6656	2.8973	1.6321	
CS-039B	CS-039B	84.52	CS-039A	84.30	15	6	0.0383	VCP	0.013	CS	3.00		0.1814		0.5441	5.85	2.62	0.17	8.1883	7.6442	6.0437	5.4996	
CS-040	CS-040	118.67	CS-041	113.27	6	270	0.0200	VCP	0.013	CS	3.00		0.0155		0.0464	2.51	1.22	0.20	0.5142	0.4678	0.3794	0.3330	
CS-041	CS-041	113.27	CS-042	111.67	6	70	0.0229	VCP	0.013	CS	3.00		0.0155		0.0464	2.64	1.18	0.20	0.5497	0.5033	0.4052	0.3589	

City of El Segundo
Future Conditions Hydraulic Model Results - with PS 7 bypassed and PS 1 improvements implemented
Pipes sorted by U/S MH ID

Pipe ID	U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (mgd)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)	Comments
CS-042	CS-042	111.44	CS-043	99.91	8	326	0.0354	VCP	0.013	CS	3.00		0.0198		0.0593	3.19	1.10	0.14	1.4727	1.4134	1.0865	1.0272	
CS-043	CS-043	99.71	CS-044	99.66	8	13	0.0038	VCP	0.013	CS	3.00		0.0205		0.0614	1.47	1.92	0.24	0.4856	0.4242	0.3581	0.2966	
CS-044	CS-044	99.46	CS-045	98.26	8	300	0.0040	VCP	0.013	CS	3.00		0.0205		0.0614	1.49	1.90	0.24	0.4953	0.4338	0.3652	0.3038	
CS-045	CS-045	92.83	CS-046	92.39	8	114	0.0039	VCP	0.013	CS	3.00		0.0205		0.0614	1.48	1.92	0.24	0.4865	0.4251	0.3587	0.2973	
CS-046	CS-046	92.37	CS-047	90.97	8	350	0.0040	VCP	0.013	CS	3.00		0.0226		0.0677	1.54	2.00	0.25	0.4953	0.4276	0.3652	0.2975	
CS-047	CS-047	90.97	CS-048	88.71	8	350	0.0065	VCP	0.013	CS	3.00		0.0935		0.2806	2.71	3.74	0.47	0.6293	0.3487	0.4641	0.1835	
CS-048	CS-048	88.71	CS-018	86.49	8	350	0.0063	VCP	0.013	CS	3.00		0.1030		0.3089	2.76	3.98	0.50	0.6237	0.3147	0.4602	0.1513	
CS-049	CS-049	98.24	CS-050	97.49	8	160	0.0047	VCP	0.013	CS	3.00		0.0288		0.0865	1.75	2.17	0.27	0.5361	0.4496	0.3955	0.3090	
CS-050	CS-050	97.49	CS-051	96.87	8	155	0.0040	VCP	0.013	CS	3.00		0.0288		0.0865	1.65	2.26	0.28	0.4953	0.4088	0.3652	0.2787	
CS-051	CS-051	96.87	CS-052A	96.61	8	68	0.0038	VCP	0.013	CS	3.00		0.0288		0.0865	1.63	2.29	0.29	0.4853	0.3988	0.3574	0.2709	
CS-052	CS-052	95.57	CS-053	94.81	8	190	0.0040		0.013	CS	3.00		0.0288		0.0865	1.65	2.26	0.28	0.4953	0.4088	0.3665	0.2799	
CS-052A	CS-052A	96.50	CS-052	95.57	8	235	0.0040		0.013	CS	3.00		0.0288		0.0865	1.64	2.27	0.28	0.4926	0.4061	0.3658	0.2792	
CS-053	CS-053	94.81	CS-054	94.77	8	11	0.0035		0.013	CS	3.00		0.0288		0.0865	1.58	2.34	0.29	0.4657	0.3792	0.3413	0.2548	
CS-054	CS-054	88.77	CS-055	87.38	8	350	0.0040	VCP	0.013	CS	3.00		0.0346		0.1037	1.73	2.49	0.31	0.4935	0.3898	0.3639	0.2602	
CS-055	CS-055	87.38	CS-058	86.74	8	160	0.0040	VCP	0.013	CS	3.00		0.0346		0.1037	1.74	2.48	0.31	0.4953	0.3915	0.3652	0.2614	
CS-056	CS-056	99.16	CS-057	98.88	8	93	0.0030	VCP	0.013	CS	3.00		0.0007		0.0022	0.50	0.42	0.05	0.4297	0.4274	0.3167	0.3145	
CS-057	CS-057	98.73	CS-058	92.88	8	300	0.0195	VCP	0.013	CS	3.00		0.0007		0.0022	0.96	0.27	0.03	1.0935	1.0913	0.8066	0.8044	
CS-058	CS-058	86.74	CS-059	85.98	8	190	0.0040	VCP	0.013	CS	3.00		0.0353		0.1060	1.75	2.51	0.31	0.4953	0.3893	0.3652	0.2592	
CS-059	CS-059	85.90	CS-059A	85.01	8	241	0.0037	VCP	0.013	CS	3.00		0.0368		0.1105	1.72	2.62	0.33	0.4759	0.3654	0.3509	0.2405	
CS-059A	CS-059A	84.50	CS-059B	84.22	8	80	0.0035	VCP	0.013	CS	3.00		0.0368		0.1105	1.68	2.66	0.33	0.4633	0.3528	0.3413	0.2308	
CS-059B	CS-059B	84.89	CS-059C	84.77	8	33	0.0036	VCP	0.013	CS	3.00		0.0368		0.1105	1.71	2.63	0.33	0.4722	0.3617	0.3470	0.2366	
CS-059C	CS-059C	84.77	CS-060	84.50	8	68	0.0040	VCP	0.013	CS	3.00		0.0368		0.1105	1.76	2.57	0.32	0.4934	0.3830	0.3658	0.2553	
CS-060	CS-060	84.50	CS-061	84.22	8	80	0.0035	VCP	0.013	CS	3.00		0.0368		0.1105	1.68	2.66	0.33	0.4633	0.3528	0.3419	0.2314	
CS-061	CS-061	84.02	CS-062	83.06	10	275	0.0035	VCP	0.013	CS	3.00		0.0368		0.1105	1.65	2.45	0.25	0.8389	0.7284	0.6192	0.5087	
CS-062	CS-062	83.06	CS-063	81.98	10	300	0.0036	VCP	0.013	CS	3.00		0.0368		0.1105	1.67	2.43	0.24	0.8519	0.7414	0.6282	0.5177	
CS-063	CS-063	81.98	CS-064	80.90	10	300	0.0036	VCP	0.013	CS	3.00		0.0409		0.1227	1.72	2.56	0.26	0.8519	0.7292	0.6282	0.5055	
CS-064	CS-064	80.90	CS-023	79.82	10	300	0.0036	VCP	0.013	CS	3.00		0.0409		0.1227	1.72	2.56	0.26	0.8519	0.7292	0.6282	0.5055	
CS-065	CS-065	99.50	CS-068	99.33	18	60	0.0028	VCP	0.013	CS	3.00		0.1372		0.4115	2.11	4.10	0.23	3.6234	3.2120	2.6732	2.2617	
CS-066	CS-066	103.24	CS-067	102.04	8	300	0.0040	VCP	0.013	CS	3.00		0.0089		0.0266	1.17	1.26	0.16	0.4953	0.4686	0.3652	0.3385	
CS-067	CS-067	102.04	CS-068	100.85	8	300	0.0040	VCP	0.013	CS	3.00		0.0466		0.1397	1.88	2.91	0.36	0.4932	0.3535	0.3639	0.2242	
CS-068	CS-068	99.13	CS-069	98.36	18	246	0.0031	VCP	0.013	CS	3.00		0.2472		0.7416	2.58	5.38	0.30	3.8084	3.0669	2.8095	2.0680	
CS-069	CS-069	98.16	CS-070	97.34	18	259	0.0032	VCP	0.013	CS	3.00		0.2472		0.7416	2.59	5.37	0.30	3.8302	3.0887	2.8257	2.0841	
CS-070	CS-070	97.14	CS-071	96.35	18	250	0.0032	VCP	0.013	CS	3.00		0.2472		0.7416	2.59	5.37	0.30	3.8266	3.0850	2.8231	2.0815	
CS-071	CS-071	96.15	CS-074	95.21	18	294	0.0032	VCP	0.013	CS	3.00		0.2625		0.7875	2.65	5.52	0.31	3.8491	3.0616	2.8393	2.0518	
CS-072	CS-072	96.98	CS-073	95.86	8	350	0.0032	VCP	0.013	CS	3.00		0.0243		0.0730	1.45	2.20	0.27	0.4430	0.3699	0.3270	0.2540	
CS-073	CS-073	95.78	CS-074	95.62	8	50	0.0032	VCP	0.013	CS	3.00		0.0243		0.0730	1.45	2.20	0.27	0.4430	0.3699	0.3270	0.2540	
CS-074	CS-074	95.01	CS-076	91.44	15	318	0.0112	VCP	0.013	CS	3.00		0.2868		0.8605	4.33	4.48	0.30	4.4354	3.5749	3.2723	2.4118	
CS-075	CS-075	92.96	CS-077	90.83	8	213	0.0100	VCP	0.013	CS	3.00		0.0010		0.0031	0.84	0.36	0.05	0.7831	0.7800	0.5778	0.5747	
CS-076	CS-076	91.24	CS-085	87.88	15	300	0.0112	VCP	0.013	CS	3.00		0.2868		0.8605	4.33	4.48	0.30	4.4302	3.5697	3.2684	2.4079	
CS-077	CS-077	90.83	CS-086	88.72	8	210	0.0100	VCP	0.013	CS	3.00		0.0022		0.0065	1.05	0.52	0.06	0.7849	0.7785	0.5791	0.5726	
CS-078	CS-078	95.41	CS-079	93.59	8	184	0.0099	VCP	0.013	CS	3.00		0.0003		0.0010	0.60	0.22	0.03	0.7788	0.7778	0.5746	0.5735	
CS-079	CS-079	93.22	CS-080	90.96	8	321	0.0070	VCP	0.013	CS	3.00		0.0053		0.0158	1.22	0.86	0.11	0.6571	0.6413	0.4847	0.4689	
CS-080	CS-080	90.37	CS-081	90.30	8	27	0.0026	VCP	0.013	CS	3.00		0.0099		0.0297	1.04	1.48	0.18	0.3987	0.3690	0.2941	0.2644	
CS-081	CS-081	90.42	CS-082	90.11	15	102	0.0030	VCP	0.013	CS	3.00		0.0099		0.0297	1.01	1.19	0.08	2.3078	2.2781	1.7024	1.6727	
CS-082	CS-082	90.11	CS-083	89.21	15	200	0.0045	VCP	0.013	CS	3.00		0.0279		0.0838	1.58	1.78	0.12	2.8082	2.7243	2.0714	1.9876	
CS-083	CS-083	89.21	CS-084	88.31	15	300	0.0030	VCP	0.013	CS	3.00		0.0279		0.0838	1.37	1.96	0.13	2.2929	2.2090	1.6914	1.6076	
CS-084	CS-084	88.31	CS-085	87.56	15	250	0.0030	VCP	0.013	CS	3.00		0.0290		0.0871	1.39	2.00	0.13	2.2929	2.2058	1.6914	1.6043	
CS-085	CS-085	87.56	CS-086	87.54	15	8	0.0025	VCP	0.013	CS	3.00		0.3159		0.9476	2.57	7.08	0.47	2.0931	1.1454	1.5440	0.5964	
CS-086	CS-086	87.54	CS-087	86.51	15	342	0.0030	VCP	0.013	CS	3.00		0.3180		0.9541	2.76	6.74	0.45	2.2973	1.3432	1.6946	0.7405	

City of El Segundo
Future Conditions Hydraulic Model Results - with PS 7 bypassed and PS 1 improvements implemented
Pipes sorted by U/S MH ID

Pipe ID	U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (mgd)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)	Comments
CS-087	CS-087	86.51	CS-088	85.61	15	300	0.0030	VCP	0.013	CS	3.00		0.3357		1.0071	2.80	6.96	0.46	2.2929	1.2858	1.6914	0.6843	
CS-088	CS-088	85.61	CS-089	84.71	15	300	0.0030	VCP	0.013	CS	3.00		0.3373		1.0118	2.80	6.98	0.47	2.2929	1.2811	1.6914	0.6796	
CS-089	CS-089	84.71	CS-093	84.07	15	244	0.0026	VCP	0.013	CS	3.00		0.3378		1.0135	2.66	7.26	0.48	2.1439	1.1304	1.5815	0.5680	
CS-090	CS-090	87.84	CS-091	87.17	10	133	0.0050	VCP	0.013	CS	3.00		0.0206		0.0618	1.58	1.68	0.17	1.0077	0.9459	0.7433	0.6815	
CS-091	CS-091	87.15	CS-092	85.58	10	315	0.0050	VCP	0.013	CS	3.00		0.0216		0.0648	1.60	1.72	0.17	1.0024	0.9375	0.7394	0.6746	
CS-092	CS-092	85.56	CS-093	84.07	10	320	0.0047	VCP	0.013	CS	3.00		0.0216		0.0648	1.56	1.75	0.18	0.9688	0.9040	0.7148	0.6500	
CS-093	CS-093	84.07	CS-094	83.93	15	56	0.0025	VCP	0.013	CS	3.00		0.3594		1.0783	2.66	7.63	0.51	2.0931	1.0147	1.5440	0.4657	
CS-094	CS-094	83.19	CS-095	81.62	15	301	0.0052	VCP	0.013	CS	3.00		0.3594		1.0783	3.49	6.19	0.41	3.0233	1.9450	2.2304	1.1521	
CS-095	CS-095	81.62	CS-098	80.10	15	295	0.0052	VCP	0.013	CS	3.00		0.3607		1.0821	3.48	6.22	0.41	3.0049	1.9228	2.2169	1.1347	
CS-096	CS-096	82.09	CS-097	81.28	12	203	0.0040	VCP	0.013	CS	3.00		0.0054		0.0162	0.95	0.89	0.07	1.4584	1.4422	1.0761	1.0599	
CS-097	CS-097	81.28	CS-098	80.46	12	204	0.0040	VCP	0.013	CS	3.00		0.0081		0.0242	1.08	1.07	0.09	1.4638	1.4396	1.0800	1.0558	
CS-098	CS-098	80.13	CS-099	79.95	15	32	0.0056	VCP	0.013	CS	3.00		0.3688		1.1063	3.61	6.15	0.41	3.1396	2.0333	2.3164	1.2101	
CS-099	CS-099	79.88	CS-100	79.42	15	235	0.0020	VCP	0.013	CS	3.00		0.3688		1.1063	2.44	8.35	0.56	1.8521	0.7458	1.3663	0.2600	
CS-100	CS-100	79.42	CS-101	78.53	15	254	0.0035	VCP	0.013	CS	3.00		0.3688		1.1063	3.04	7.02	0.47	2.4780	1.3716	1.8278	0.7215	
CS-101	CS-101	78.53	CS-102	77.62	15	261	0.0035	VCP	0.013	CS	3.00		0.3688		1.1063	3.03	7.03	0.47	2.4718	1.3655	1.8233	0.7169	
CS-102	CS-102	77.62	CS-103	76.30	15	375	0.0035	VCP	0.013	CS	3.00		0.3688		1.1063	3.04	7.01	0.47	2.4836	1.3773	1.8323	0.7260	
CS-103	CS-103	76.30	CS-104	75.52	15	226	0.0035	VCP	0.013	CS	3.00		0.3688		1.1063	3.02	7.05	0.47	2.4593	1.3530	1.8142	0.7079	
CS-104	CS-104	75.52	CS-105	75.00	15	94	0.0055	VCP	0.013	CS	3.00		0.3688		1.1063	3.59	6.18	0.41	3.1135	2.0072	2.2970	1.1907	
CS-105	CS-105	74.70	CSD-041	74.29	18	376	0.0011	VCP	0.013	CS	3.00		0.3688		1.1063	1.96	8.92	0.50	2.2478	1.1415	1.6661	0.5598	
CS-106	CS-106	88.80	CS-107	87.96	8	350	0.0024	VCP	0.013	CS	3.00		0.0180		0.0540	1.20	2.03	0.25	0.3836	0.3296	0.2831	0.2291	
CS-107	CS-107	87.96	CS-108	87.12	8	380	0.0022	VCP	0.013	CS	3.00		0.0350		0.1050	1.41	2.92	0.37	0.3682	0.2632	0.2715	0.1665	
CS-108	CS-108	87.12	CS-109	86.29	8	348	0.0024	VCP	0.013	CS	3.00		0.0400		0.1200	1.50	3.08	0.38	0.3824	0.2624	0.2824	0.1624	
CS-109	CS-109	86.29	CS-509	86.10	8	81	0.0023	VCP	0.013	CS	3.00		0.0400		0.1200	1.49	3.09	0.39	0.3793	0.2593	0.2799	0.1599	
CS-110	CS-110	86.06	CS-111	84.39	8	346	0.0048	VCP	0.013	CS	3.00		0.0930		0.2791	2.43	4.06	0.51	0.5440	0.2650	0.4014	0.1223	
CS-111	CS-111	84.39	CS-112	82.16	8	346	0.0064	VCP	0.013	CS	3.00		0.0930		0.2791	2.70	3.73	0.47	0.6287	0.3496	0.4641	0.1850	
CS-112	CS-112	81.97	CS-113	80.31	10	346	0.0048	VCP	0.013	CS	3.00		0.0941		0.2824	2.41	3.67	0.37	0.9834	0.7011	0.7258	0.4435	
CS-113	CS-113	80.12	CS-114	78.72	12	351	0.0040	VCP	0.013	CS	3.00		0.0963		0.2888	2.24	3.62	0.30	1.4581	1.1693	1.0755	0.7866	
CS-114	CS-114	78.44	CS-115	77.15	15	322	0.0040	VCP	0.013	CS	3.00		0.0973		0.2918	2.20	3.36	0.22	2.6476	2.3557	1.9532	1.6613	
CS-115	CS-115	77.15	CS-121	76.90	15	58	0.0043	VCP	0.013	CS	3.00		0.0973		0.2918	2.26	3.29	0.22	2.7593	2.4675	2.0246	1.7328	
CS-116	CS-116	85.00	CS-117	83.84	10	294	0.0039	VCP	0.013	CS	3.00		0.0055		0.0165	0.98	0.95	0.09	0.8918	0.8753	0.6579	0.6414	
CS-117	CS-117	83.74	CS-118	82.58	10	294	0.0039	VCP	0.013	CS	3.00		0.0060		0.0181	1.01	0.99	0.10	0.8918	0.8737	0.6579	0.6398	
CS-118	CS-118	82.48	CS-119	81.32	10	295	0.0039	VCP	0.013	CS	3.00		0.0079		0.0236	1.09	1.12	0.11	0.8903	0.8667	0.6567	0.6330	
CS-119	CS-119	81.12	CS-120	80.25	10	221	0.0039	VCP	0.013	CS	3.00		0.0103		0.0309	1.18	1.27	0.13	0.8908	0.8600	0.6573	0.6264	
CS-120	CS-120	80.15	CS-121	77.36	10	221	0.0126	VCP	0.013	CS	3.00		0.0103		0.0309	1.77	0.96	0.10	1.5953	1.5644	1.1769	1.1461	
CS-121	CS-121	76.90	CS-122	75.31	15	396	0.0040	VCP	0.013	CS	3.00		0.1076		0.3227	2.26	3.53	0.24	2.6526	2.3299	1.9570	1.6343	
CS-122	CS-122	75.19	CS-123	73.51	15	351	0.0048	VCP	0.013	CS	3.00		0.1102		0.3306	2.43	3.42	0.23	2.8961	2.5656	2.1367	1.8062	
CS-123	CS-123	73.24	CS-124	72.54	18	346	0.0020	VCP	0.013	CS	3.00		0.1130		0.3391	1.77	4.04	0.22	3.0618	2.7228	2.2589	1.9198	
CS-124	CS-124	72.54	CS-125	71.84	18	346	0.0020	VCP	0.013	CS	3.00		0.1155		0.3465	1.78	4.09	0.23	3.0618	2.7153	2.2589	1.9124	
CS-125	CS-125	71.84	CS-126	71.14	18	346	0.0020	VCP	0.013	CS	3.00		0.1155		0.3465	1.78	4.09	0.23	3.0618	2.7153	2.2589	1.9124	
CS-126	CS-126	70.90	CSD-048	70.43	21	234	0.0020	VCP	0.013	CS	3.00		0.4868		1.4603	2.63	8.13	0.39	4.6019	3.1416	3.3869	1.9266	
CS-127	CS-127	93.05	CS-128	91.20	8	285	0.0065	VCP	0.013	CS	3.00		0.0211		0.0634	1.79	1.71	0.21	0.6309	0.5676	0.4653	0.4020	
CS-128	CS-128	91.10	CS-129	89.72	8	211	0.0065	VCP	0.013	CS	3.00		0.0211		0.0634	1.80	1.71	0.21	0.6333	0.5699	0.4673	0.4039	
CS-129	CS-129	89.42	CS-130	88.68	8	115	0.0064	VCP	0.013	CS	3.00		0.0211		0.0634	1.78	1.72	0.21	0.6282	0.5648	0.4634	0.4000	
CS-130	CS-130	88.38	CS-131	87.00	8	305	0.0045	VCP	0.013	CS	3.00		0.0255		0.0765	1.66	2.06	0.26	0.5267	0.4503	0.3884	0.3120	
CS-131	CS-131	86.00	CS-133	81.86	12	313	0.0132	VCP	0.013	CS	3.00		0.0255		0.0765	2.31	1.40	0.12	2.6553	2.5788	1.9570	1.8805	
CS-132	CS-132	81.26	CS-133	81.21	12	23	0.0022	VCP	0.013	CS	3.00		0.0052		0.0156	0.76	1.01	0.08	1.0765	1.0609	0.7943	0.7787	
CS-133	CS-133	81.20	CS-134	81.10	15	98	0.0010	VCP	0.013	CS	3.00		0.0307		0.0921	0.97	2.67	0.18	1.3372	1.2451	0.9863	0.8942	
CS-134	CS-134	81.01	CS-135	80.53	15	261	0.0018	VCP	0.013	CS	3.00		0.0307		0.0921	1.19	2.31	0.15	1.7952	1.7031	1.3243	1.2322	
CS-135	CS-135	80.43	CS-136	80.04	15	212	0.0018	VCP	0.013	CS	3.00		0.0703		0.2108	1.52	3.47	0.23	1.7955	1.5847	1.3243	1.1135	

City of El Segundo
Future Conditions Hydraulic Model Results - with PS 7 bypassed and PS 1 improvements implemented
Pipes sorted by U/S MH ID

Pipe ID	U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (mgd)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)	Comments
CS-136	CS-136	80.04	CS-137	79.86	15	92	0.0020	VCP	0.013	CS	3.00		0.0729		0.2188	1.57	3.48	0.23	1.8516	1.6328	1.3663	1.1475	
CS-137	CS-137	79.86	CS-138	79.64	15	96	0.0023	STEEL	0.013	CS	3.00		0.0729		0.2188	1.66	3.35	0.22	2.0040	1.7851	1.4781	1.2593	
CS-138	CS-138	79.64	CS-139	79.58	15	33	0.0018	VCP	0.013	CS	3.00		0.0787		0.2362	1.56	3.69	0.25	1.7850	1.5488	1.3165	1.0803	
CS-139	CS-139	79.58	CS-140	79.42	18	80	0.0020	VCP	0.013	CS	3.00		0.0787		0.2362	1.58	3.39	0.19	3.0443	2.8081	2.2459	2.0097	
CS-140	CS-140	79.17	CS-141	78.50	18	337	0.0020	VCP	0.013	CS	3.00		0.0787		0.2362	1.58	3.40	0.19	3.0352	2.7990	2.2388	2.0026	
CS-141	CS-141	78.50	CS-142	77.84	18	330	0.0020	VCP	0.013	CS	3.00		0.0787		0.2362	1.58	3.39	0.19	3.0443	2.8081	2.2459	2.0097	
CS-142	CS-142	77.84	CS-143	77.37	18	237	0.0020	VCP	0.013	CS	3.00		0.0787		0.2362	1.58	3.40	0.19	3.0314	2.7952	2.2363	2.0000	
CS-143	CS-143	77.37	CS-144	76.69	18	343	0.0020	VCP	0.013	CS	3.00		0.0787		0.2362	1.58	3.40	0.19	3.0309	2.7947	2.2363	2.0000	
CS-144	CS-144	76.68	CS-145	71.20	18	330	0.0166	VCP	0.013	CS	3.00		0.0787		0.2362	3.33	2.03	0.11	8.7721	8.5359	6.4716	6.2353	
CS-145	CS-145	71.10	CS-146	70.61	21	330	0.0015	VCP	0.013	CS	3.00		0.6028		1.8085	2.49	9.96	0.47	3.9567	2.1482	2.9188	1.1102	
CS-146	CS-146	70.61	CS-147	70.28	21	277	0.0012	VCP	0.013	CS	3.00		0.6028		1.8085	2.29	10.63	0.51	3.5442	1.7356	2.6143	0.8058	
CS-147	CS-147	70.28	CS-148	70.10	21	156	0.0012	VCP	0.013	CS	3.00		0.6028		1.8085	2.26	10.73	0.51	3.4879	1.6794	2.5730	0.7644	
CS-148	CS-148	70.10	CS-149	69.77	21	271	0.0012	VCP	0.013	CS	3.00		0.6032		1.8097	2.31	10.56	0.50	3.5832	1.7735	2.6434	0.8337	
CS-149	CS-149	69.77	CS-151	69.44	21	274	0.0012	VCP	0.013	CS	3.00		0.6043		1.8129	2.30	10.61	0.51	3.5635	1.7506	2.6286	0.8157	
CS-151	CS-151	69.44	CS-152	69.27	21	144	0.0012	VCP	0.013	CS	3.00		0.6043		1.8129	2.29	10.67	0.51	3.5281	1.7152	2.6027	0.7898	
CS-152	CS-152	69.27	CS-153	68.92	21	293	0.0012	VCP	0.013	CS	3.00		0.6087		1.8261	2.30	10.68	0.51	3.5489	1.7228	2.6182	0.7921	
CS-153	CS-153	68.92	CS-154	68.61	21	254	0.0012	VCP	0.013	CS	3.00		0.6087		1.8261	2.32	10.61	0.51	3.5872	1.7611	2.6467	0.8206	
CS-154	CS-154	68.61	CS-155	68.54	21	57	0.0012	VCP	0.013	CS	3.00		0.6111		1.8333	2.33	10.62	0.51	3.5984	1.7651	2.6544	0.8211	
CS-155	CS-155	68.54	CS-156	68.29	21	209	0.0012	VCP	0.013	CS	3.00		0.6111		1.8333	2.30	10.70	0.51	3.5513	1.7180	2.6202	0.7869	
CS-156	CS-156	68.29	CS-157	67.92	21	309	0.0012	VCP	0.013	CS	3.00		0.6111		1.8333	2.30	10.70	0.51	3.5532	1.7199	2.6215	0.7882	
CS-157	CS-157	67.92	CS-158	67.56	21	300	0.0012	VCP	0.013	CS	3.00		0.6118		1.8354	2.31	10.70	0.51	3.5570	1.7216	2.6240	0.7886	
CS-158	CS-158	67.56	CS-159	67.19	21	306	0.0012	VCP	0.013	CS	3.00		0.6156		1.8469	2.32	10.71	0.51	3.5706	1.7237	2.6337	0.7869	
CS-159	CS-159	67.19	CS-160	66.84	21	294	0.0012	VCP	0.013	CS	3.00		0.6156		1.8469	2.30	10.76	0.51	3.5429	1.6960	2.6137	0.7668	
CS-160	CS-160	66.84	CSD-058	66.74	21	81	0.0012	VCP	0.013	CS	3.00		0.6156		1.8469	2.33	10.65	0.51	3.6079	1.7610	2.6615	0.8146	
CS-161	CS-161	77.45	CS-162	76.06	8	346	0.0040	VCP	0.013	CS	3.00		0.0087		0.0261	1.16	1.25	0.16	0.4963	0.4702	0.3665	0.3403	
CS-162	CS-162	76.06	CS-163	73.42	8	346	0.0076	VCP	0.013	CS	3.00		0.0093		0.0280	1.49	1.10	0.14	0.6840	0.6560	0.5048	0.4768	
CS-163	CS-163	73.21	CS-169	71.75	10	365	0.0040	VCP	0.013	CS	3.00		0.0157		0.0471	1.35	1.56	0.16	0.8980	0.8509	0.6625	0.6153	
CS-164	CS-164	78.74	CS-166	77.32	8	296	0.0048	VCP	0.013	CS	3.00		0.0017		0.0050	0.75	0.54	0.07	0.5424	0.5374	0.4001	0.3951	
CS-165	CS-165	78.50	CS-166	77.32	8	246	0.0048	VCP	0.013	CS	3.00		0.0018		0.0053	0.77	0.56	0.07	0.5423	0.5371	0.4001	0.3948	
CS-166	CS-166	77.22	CS-167	76.01	8	199	0.0061	VCP	0.013	CS	3.00		0.0041		0.0124	1.08	0.79	0.10	0.6106	0.5982	0.4505	0.4380	
CS-167	CS-167	76.01	CS-168	74.83	8	193	0.0061	VCP	0.013	CS	3.00		0.0054		0.0163	1.17	0.90	0.11	0.6123	0.5960	0.4518	0.4355	
CS-168	CS-168	74.83	CS-163	73.48	8	223	0.0061	VCP	0.013	CS	3.00		0.0054		0.0163	1.17	0.90	0.11	0.6093	0.5930	0.4492	0.4329	
CS-169	CS-169	71.57	CS-170	70.97	12	214	0.0028	VCP	0.013	CS	3.00		0.0157		0.0471	1.16	1.61	0.13	1.2225	1.1754	0.9016	0.8545	
CS-170	CS-170	70.97	CS-171	70.22	12	263	0.0029	VCP	0.013	CS	3.00		0.0157		0.0471	1.17	1.60	0.13	1.2329	1.1858	0.9094	0.8622	
CS-171	CS-171	70.22	CS-172	69.47	12	264	0.0028	VCP	0.013	CS	3.00		0.0280		0.0840	1.39	2.12	0.18	1.2306	1.1466	0.9081	0.8241	
CS-172	CS-172	69.47	CS-173	68.84	12	193	0.0033	VCP	0.013	CS	3.00		0.0280		0.0840	1.46	2.05	0.17	1.3191	1.2351	0.9734	0.8893	
CS-173	CS-173	68.84	CS-174	68.41	12	131	0.0033	VCP	0.013	CS	3.00		0.0280		0.0840	1.46	2.05	0.17	1.3228	1.2388	0.9759	0.8919	
CS-174	CS-174	68.41	CS-175	68.07	12	104	0.0033	VCP	0.013	CS	3.00		0.0280		0.0840	1.46	2.05	0.17	1.3201	1.2361	0.9740	0.8900	
CS-175	CS-175	67.45	CSD-052	66.81	21	347	0.0018	VCP	0.013	CS	3.00		0.5148		1.5443	2.59	8.58	0.41	4.4098	2.8655	3.2141	1.6698	
CS-176	CS-176	120.92	CS-177	109.09	12	348	0.0340	VCP	0.013	CS	3.00		0.0294		0.0882	3.36	1.20	0.10	4.2569	4.1686	3.1404	3.0522	
CS-177	CS-177	106.10	CS-178	105.20	12	139	0.0065	VCP	0.013	CS	3.00		0.0294		0.0882	1.88	1.78	0.15	1.8578	1.7696	1.3708	1.2826	
CS-178	CS-178	105.20	CS-179	101.48	12	127	0.0293	VCP	0.013	CS	3.00		0.0988		0.2964	4.57	2.22	0.19	3.9514	3.6550	2.9149	2.6184	
CS-179	CS-179	101.48	CS-180	94.05	12	256	0.0290	VCP	0.013	CS	3.00		0.0988		0.2964	4.56	2.23	0.19	3.9333	3.6369	2.9020	2.6055	
CS-180	CS-180	93.94	CS-181	86.76	12	250	0.0287	VCP	0.013	CS	3.00		0.0988		0.2964	4.54	2.23	0.19	3.9127	3.6163	2.8864	2.5900	
CS-181	CS-181	86.74	CS-182	85.25	12	296	0.0050	VCP	0.013	CS	3.00		0.0988		0.2964	2.45	3.46	0.29	1.6381	1.3416	1.2086	0.9122	
CS-182	CS-182	85.25	CS-186	83.74	12	298	0.0051	VCP	0.013	CS	3.00		0.0988		0.2964	2.45	3.45	0.29	1.6435	1.3470	1.2125	0.9160	
CS-183	CS-183	86.60	CS-184	85.76	10	280	0.0030	VCP	0.013	CS	3.00		0.0000		0.0000	0.00	0.00	0.00	0.7777	0.7777	0.5739	0.5739	
CS-184	CS-184	85.76	CS-185	84.72	10	343	0.0030	VCP	0.013	CS	3.00		0.0099		0.0297	1.06	1.33	0.13	0.7818	0.7521	0.5765	0.5468	
CS-185	CS-185	84.72	CS-186	83.77	10	296	0.0032	VCP	0.013	CS	3.00		0.0269		0.0808	1.46	2.14	0.21	0.8044	0.7236	0.5933	0.5126	

City of El Segundo
Future Conditions Hydraulic Model Results - with PS 7 bypassed and PS 1 improvements implemented
Pipes sorted by U/S MH ID

Pipe ID	U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (mgd)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)	Comments
CS-186	CS-186	83.74	CS-187	82.19	12	309	0.0050	VCP	0.013	CS	3.00		0.1454		0.4362	2.73	4.23	0.35	1.6352	1.1990	1.2060	0.7698	
CS-187	CS-187	82.19	CS-191	80.64	12	306	0.0051	VCP	0.013	CS	3.00		0.1454		0.4362	2.74	4.22	0.35	1.6432	1.2070	1.2125	0.7763	
CS-188	CS-188	83.70	CS-189	82.78	10	303	0.0030	VCP	0.013	CS	3.00		0.0090		0.0271	1.04	1.27	0.13	0.7824	0.7553	0.5772	0.5501	
CS-189	CS-189	82.78	CS-190	81.73	10	346	0.0030	VCP	0.013	CS	3.00		0.0250		0.0750	1.40	2.09	0.21	0.7822	0.7071	0.5772	0.5021	
CS-190	CS-190	81.73	CS-191	80.60	10	346	0.0033	VCP	0.013	CS	3.00		0.0250		0.0750	1.44	2.05	0.21	0.8114	0.7364	0.5985	0.5235	
CS-191	CS-191	80.64	CS-192	79.00	12	321	0.0051	VCP	0.013	CS	3.00		0.1769		0.5308	2.90	4.68	0.39	1.6503	1.1195	1.2177	0.6869	
CS-192	CS-192	79.00	CS-193	77.25	12	346	0.0051	VCP	0.013	CS	3.00		0.1789		0.5368	2.89	4.72	0.39	1.6420	1.1052	1.2112	0.6744	
CS-193	CS-193	77.25	CS-204	75.62	12	326	0.0050	VCP	0.013	CS	3.00		0.1830		0.5490	2.90	4.79	0.40	1.6326	1.0836	1.2041	0.6551	
CS-194	CS-194	87.45	CS-195	86.35	8	276	0.0040	VCP	0.013	CS	3.00		0.0037		0.0112	0.90	0.83	0.10	0.4944	0.4832	0.3645	0.3534	
CS-195	CS-195	86.25	CS-196	84.92	8	332	0.0040	VCP	0.013	CS	3.00		0.0076		0.0229	1.12	1.17	0.15	0.4956	0.4727	0.3658	0.3429	
CS-196	CS-196	84.82	CS-197	83.66	8	290	0.0040	VCP	0.013	CS	3.00		0.0076		0.0229	1.12	1.17	0.15	0.4953	0.4724	0.3652	0.3423	
CS-197	CS-197	83.56	CS-198	82.80	8	200	0.0038	VCP	0.013	CS	3.00		0.0174		0.0521	1.40	1.77	0.22	0.4827	0.4307	0.3561	0.3041	
CS-198	CS-198	82.82	CS-199	82.21	8	166	0.0037	VCP	0.013	CS	3.00		0.0584		0.1751	1.94	3.36	0.42	0.4747	0.2996	0.3503	0.1752	
CS-199	CS-199	82.15	CS-200	81.52	8	166	0.0038	VCP	0.013	CS	3.00		0.0584		0.1751	1.97	3.33	0.42	0.4824	0.3073	0.3561	0.1811	
CS-200	CS-200	81.49	CS-201	80.72	10	244	0.0032	VCP	0.013	CS	3.00		0.0584		0.1751	1.81	3.18	0.32	0.7976	0.6225	0.5881	0.4131	
CS-201	CS-201	80.71	CS-202	80.19	10	148	0.0035	VCP	0.013	CS	3.00		0.0611		0.1834	1.91	3.17	0.32	0.8416	0.6582	0.6211	0.4377	
CS-202	CS-202	80.19	CS-203	79.70	10	153	0.0032	VCP	0.013	CS	3.00		0.0611		0.1834	1.85	3.25	0.32	0.8035	0.6201	0.5927	0.4092	
CS-203	CS-203	79.69	CS-204	78.74	10	300	0.0032	VCP	0.013	CS	3.00		0.0631		0.1894	1.86	3.31	0.33	0.7990	0.6096	0.5894	0.4001	
CS-204	CS-204	72.03	CS-205A	71.74	12	68	0.0043	VCP	0.013	CS	3.00		0.2461		0.7384	2.95	5.93	0.49	1.5078	0.7694	1.1123	0.3739	
CS-205	CS-205	71.31	CS-206	69.87	15	296	0.0049	VCP	0.013	CS	3.00		0.2834		0.8501	3.19	5.54	0.37	2.9198	2.0696	2.1542	1.3040	
CS-205A	CS-205A	71.74	CS-205	71.31	15	100	0.0043	VCP	0.013	CS	3.00		0.2834		0.8501	3.05	5.73	0.38	2.7451	1.8949	2.0246	1.1745	
CS-206	CS-206	69.87	CS-207	68.62	15	257	0.0049	VCP	0.013	CS	3.00		0.2834		0.8501	3.19	5.54	0.37	2.9195	2.0693	2.1535	1.3034	
CS-207	CS-207	68.62	CS-208	68.43	15	40	0.0048	VCP	0.013	CS	3.00		0.2834		0.8501	3.16	5.58	0.37	2.8851	2.0350	2.1283	1.2782	
CS-208	CS-208	68.43	CS-209	66.89	15	330	0.0047	VCP	0.013	CS	3.00		0.2834		0.8501	3.14	5.61	0.37	2.8597	2.0096	2.1096	1.2594	
CS-209	CS-209	66.89	CS-210	65.33	15	297	0.0053	VCP	0.013	CS	3.00		0.2834		0.8501	3.28	5.43	0.36	3.0339	2.1838	2.2382	1.3880	
CS-210	CS-210	65.29	CS-520	64.27	15	17	0.0600	VCP	0.013	CS	3.00		0.2834		0.8501	7.82	2.92	0.19	10.2540	9.4038	7.5645	6.7143	
CS-211	CS-211	79.21	CS-212	77.39	8	350	0.0052	VCP	0.013	CS	3.00		0.0000		0.0000	0.00	0.00	0.00	0.5647	0.5647	0.4169	0.4169	
CS-212	CS-212	77.28	CS-213	75.47	8	350	0.0052	VCP	0.013	CS	3.00		0.0000		0.0000	0.00	0.00	0.00	0.5631	0.5631	0.4156	0.4156	
CS-213	CS-213	75.37	CS-214	73.55	8	350	0.0052	VCP	0.013	CS	3.00		0.0000		0.0000	0.00	0.00	0.00	0.5647	0.5647	0.4169	0.4169	
CS-214	CS-214	73.45	CS-215	70.47	8	397	0.0075	VCP	0.013	CS	3.00		0.0195		0.0584	1.84	1.59	0.20	0.6782	0.6199	0.4997	0.4413	
CS-215	CS-215	66.82	CSD-061	66.00	8	43	0.0190	VCP	0.013	CS	3.00		0.0195		0.0584	2.55	1.26	0.16	1.0782	1.0199	0.7963	0.7380	
CS-519	CS-519	80.22	CS-211	79.31	8	175	0.0052	VCP	0.013	CS	3.00		0.0000		0.0000	0.00	0.00	0.00	0.5647	0.5647	0.4169	0.4169	
CS-528	CS-528	91.01	CS-080	90.46	15	174	0.0032	VCP	0.013	CS	3.00		0.0046		0.0139	0.81	0.83	0.06	2.3535	2.3396	1.7360	1.7221	
CS-529	CS-529	91.46	CS-528	91.01	8	150	0.0030	VCP	0.013	CS	3.00		0.0046		0.0139	0.87	0.99	0.12	0.4289	0.4150	0.3167	0.3028	
CS-532	CS-532	87.41	CS-024	87.10	12	116	0.0027	VCP	0.013	CS	3.00		0.1593		0.4779	2.22	5.28	0.44	1.1935	0.7156	0.8803	0.4024	
CS-535	CS-535	78.96	CS-536	77.78	8	296	0.0040	VCP	0.013	CS	3.00		0.0175		0.0525	1.43	1.76	0.22	0.4944	0.4420	0.3645	0.3121	
CS-536	CS-536	77.68	CS-537A	76.54	8	140	0.0081	VCP	0.013	CS	3.00		0.0373		0.1118	2.29	2.15	0.27	0.7066	0.5949	0.5198	0.4081	
CS-537A	CS-537A	77.68	CS-205A	76.54	8	150	0.0076	VCP	0.013	CS	3.00		0.0373		0.1118	2.23	2.19	0.27	0.6827	0.5709	0.5040	0.3922	
CS-900	CS-900	83.57	CS-901	83.27	18	220	0.0014		0.013	CS	3.00		0.4465		1.3395	2.23	9.35	0.52	2.5115	1.1720	1.8792	0.5397	
CS-901	CS-901	83.27	CS-902	82.87	18	294	0.0014		0.013	CS	3.00		0.4477		1.3430	2.24	9.37	0.52	2.5113	1.1683	1.8792	0.5362	
CS-902	CS-902	82.87	CS-904	82.48	18	287	0.0014		0.013	CS	3.00		0.4965		1.4896	2.29	9.98	0.55	2.5097	1.0201	1.8792	0.3896	
CS-904	CS-904	82.47	CS-903	82.35	15	90	0.0013		0.013	CS	3.00		0.4965		1.4896	2.20	11.94	0.80	1.5310	0.0413	1.1131	-0.3765	Flow Monitor after Elevon Development is Completed
CS-905	CS-905	89.12	CS-901	83.47	8	216	0.0262		0.013	CS	3.00		0.0012		0.0035	1.22	0.31	0.04	1.2665	1.2630	0.5040	0.5005	
CS-906	CS-906	95.27	CS-905	89.22	8	263	0.0230		0.013	CS	3.00		0.0004		0.0011	0.83	0.19	0.02	1.1877	1.1866	0.9346	0.9334	
CS-907	CS-907	94.92	CS-908	91.39	8	411	0.0086		0.013	CS	3.00		0.0034		0.0103	1.15	0.67	0.08	0.7262	0.7158	0.5357	0.5254	
CS-908	CS-908	91.29	CS-909	89.61	8	165	0.0102		0.013	CS	3.00		0.0069		0.0206	1.50	0.89	0.11	0.7903	0.7697	0.5832	0.5626	

City of El Segundo
Future Conditions Hydraulic Model Results - with PS 7 bypassed and PS 1 improvements implemented
Pipes sorted by U/S MH ID

Pipe ID	U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (mgd)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)	Comments
CS-909	CS-909	89.51	CS-911	88.12	10	200	0.0069		0.013	CS	3.00		0.0137		0.0412	1.57	1.28	0.13	1.1828	1.1416	0.8698	0.8285	
CS-910	CS-910	93.46	CS-909	89.61	8	296	0.0130		0.013	CS	3.00		0.0034		0.0103	1.33	0.60	0.08	0.8925	0.8822	0.6581	0.6478	
CS-911	CS-911	88.02	CS-912	86.95	10	215	0.0050		0.013	CS	3.00		0.0211		0.0634	1.59	1.71	0.17	1.0006	0.9372	0.7402	0.6767	
CS-912	CS-912	86.85	CS-913	86.31	10	110	0.0049		0.013	CS	3.00		0.0246		0.0737	1.65	1.84	0.18	0.9953	0.9216	0.7330	0.6592	
CS-913	CS-913	86.21	CS-918	84.52	12	351	0.0048		0.013	CS	3.00		0.0387		0.1162	1.84	2.19	0.18	1.6021	1.4858	1.1794	1.0631	
CS-914	CS-914	88.72	CS-913	86.31	8	241	0.0100		0.013	CS	3.00		0.0107		0.0322	1.71	1.11	0.14	0.7835	0.7513	0.5774	0.5453	
CS-915	CS-915	89.33	CS-914	88.82	8	51	0.0099		0.013	CS	3.00		0.0073		0.0219	1.51	0.92	0.12	0.7793	0.7575	0.5746	0.5527	
CS-916	CS-916	92.04	CS-911	88.12	8	327	0.0120		0.013	CS	3.00		0.0040		0.0119	1.35	0.66	0.08	0.8574	0.8455	0.6322	0.6203	
CS-917	CS-917	92.50	CS-915	89.53	8	307	0.0097		0.013	CS	3.00		0.0039		0.0116	1.24	0.68	0.09	0.7705	0.7590	0.5688	0.5572	
CS-918	CS-918	84.42	CS-902	82.91	12	351	0.0043		0.013	CS	3.00		0.0422		0.1265	1.81	2.34	0.20	1.5148	1.3883	1.1174	0.9909	
PL-01	PL-01	91.44	PL-02	91.03	10	101	0.0041	VCP	0.013	CS	1.63		0.0360		0.0766	1.56	1.97	0.20	0.9041	0.8275	0.6710	0.5944	
PL-02	PL-02	90.93	PL-03	90.38	10	139	0.0040	VCP	0.013	CS	1.63		0.0360		0.0766	1.55	1.98	0.20	0.8940	0.8174	0.6624	0.5858	
PL-03	PL-03	90.28	PL-04	88.90	10	345	0.0040	VCP	0.013	CS	1.63		0.0396		0.0835	1.59	2.06	0.21	0.8982	0.8147	0.6624	0.5789	
PL-04	PL-04	88.80	PL-05	88.61	10	48	0.0039	VCP	0.013	CS	1.63		0.0396		0.0835	1.59	2.07	0.21	0.8907	0.8072	0.6538	0.5702	
PL-05	PL-05	88.51	CS-135	81.53	10	37	0.1888	VCP	0.013	CS	1.63		0.0396		0.0835	6.16	0.81	0.08	6.1685	6.0850	4.5518	4.4683	
SH-001	SH-001	120.00	SH-002	116.00	8	308	0.0130	VCP	0.013	SH	2.07		0.0035		0.0113	1.36	0.63	0.08	0.8924	0.8811	0.6586	0.6473	
SH-002	SH-002	111.00	SH-004	99.60	8	350	0.0326	VCP	0.013	SH	2.07		0.0035		0.0113	1.88	0.51	0.06	1.4133	1.4020	1.0425	1.0312	
SH-003	SH-003	106.50	SH-004	99.60	8	308	0.0224	VCP	0.013	SH	2.07		0.0025		0.0084	1.51	0.48	0.06	1.1721	1.1637	0.8648	0.8564	
SH-004	SH-004	99.60	SH-008	87.81	8	350	0.0337	VCP	0.013	SH	2.07		0.0063		0.0194	2.24	0.65	0.08	1.4372	1.4178	1.0606	1.0412	
SH-005	SH-005	112.30	SH-006	102.00	8	142	0.0725	VCP	0.013	SH	2.07		0.0000		0.0000	0.00	0.00	0.00	2.1090	2.1090	1.5557	1.5557	
SH-006	SH-006	102.00	SH-007	97.20	8	160	0.0300	VCP	0.013	SH	2.07		0.0000		0.0000	0.00	0.00	0.00	1.3563	1.3563	1.0005	1.0005	
SH-007	SH-007	97.10	SH-008	94.10	8	180	0.0167	VCP	0.013	SH	2.07		0.0000	0.0485	0.0485	2.31	1.19	0.15	1.0109	0.9625	0.7458	0.6974	
SH-008	SH-008	87.81	SH-012	86.72	10	263	0.0041	VCP	0.013	SH	2.07		0.0075	0.0485	0.0715	1.54	1.89	0.19	0.9140	0.8425	0.6741	0.6026	
SH-009	SH-009	92.35	SH-010	90.91	8	363	0.0040	VCP	0.013	SH	2.07		0.0029		0.0096	0.86	0.78	0.10	0.4932	0.4836	0.3639	0.3542	
SH-010	SH-010	90.91	SH-012	90.20	8	178	0.0040	VCP	0.013	SH	2.07		0.0044		0.0140	0.96	0.93	0.12	0.4946	0.4805	0.3652	0.3511	
SH-011	SH-011	104.00	SH-010	94.00	8	238	0.0420	VCP	0.013	SH	2.07	55	0.0015		0.0049	1.59	0.32	0.04	1.6051	1.6002	1.1840	1.1791	
SH-911	SH-011	104.00	SH-027	100.00	8	141	0.0284	VCP	0.013	SH	2.07	45	0.0012		0.0040	1.31	0.32	0.04	1.3189	1.3149	0.9727	0.9687	
SH-012	SH-012	86.72	SH-026	85.59	10	378	0.0030	VCP	0.013	SH	2.07		0.0137	0.0485	0.0883	1.46	2.28	0.23	0.7763	0.6880	0.5726	0.4843	
SH-013	SH-013	123.00	SH-023	110.00	8	235	0.0553	VCP	0.013	SH	2.07		0.0016		0.0055	1.81	0.32	0.04	1.8418	1.8363	1.3579	1.3525	
SH-014	SH-014	106.00	SH-023	105.52	8	120	0.0040	VCP	0.013	SH	2.07		0.0012		0.0044	0.68	0.53	0.07	0.4953	0.4909	0.3658	0.3614	
SH-015	SH-015	101.86	SH-024	100.60	8	324	0.0039	VCP	0.013	SH	2.07		0.0014		0.0050	0.70	0.57	0.07	0.4883	0.4834	0.3600	0.3550	
SH-016	SH-016	125.00	SH-017	118.00	8	285	0.0246	VCP	0.013	SH	2.07		0.0010		0.0034	1.19	0.31	0.04	1.2272	1.2238	0.9055	0.9020	
SH-017	SH-017	118.00	SH-018	116.80	8	300	0.0040	VCP	0.013	SH	2.07		0.0052		0.0164	1.01	1.00	0.12	0.4953	0.4789	0.3652	0.3488	
SH-018	SH-018	116.80	SH-024	100.60	8	200	0.0810	VCP	0.013	SH	2.07		0.0063		0.0194	3.04	0.53	0.07	2.2287	2.2092	1.6442	1.6248	
SH-019	SH-019	128.00	SH-020	115.00	8	300	0.0433	VCP	0.013	SH	2.07		0.0012		0.0044	1.56	0.31	0.04	1.6301	1.6257	1.2028	1.1984	
SH-020	SH-020	115.00	SH-021	113.04	8	400	0.0049	VCP	0.013	SH	2.07		0.0029		0.0096	0.92	0.74	0.09	0.5482	0.5386	0.4046	0.3950	
SH-021	SH-021	113.04	SH-022	95.00	8	500	0.0361	VCP	0.013	SH	2.07		0.0055		0.0173	2.22	0.61	0.08	1.4874	1.4701	1.0974	1.0801	
SH-022	SH-022	95.00	SH-026	93.00	8	200	0.0100	VCP	0.013	SH	2.07		0.0069		0.0214	1.51	0.91	0.11	0.7831	0.7617	0.5778	0.5564	
SH-023	SH-023	105.52	SH-024	100.60	8	175	0.0281	VCP	0.013	SH	2.07		0.0028		0.0093	1.68	0.48	0.06	1.3130	1.3037	0.9688	0.9595	
SH-024	SH-024	100.60	SH-025	98.90	8	175	0.0097	VCP	0.013	SH	2.07		0.0105		0.0313	1.67	1.10	0.14	0.7718	0.7405	0.5694	0.5381	
SH-025	SH-025	98.90	SH-026	97.10	8	175	0.0103	VCP	0.013	SH	2.07		0.0105		0.0313	1.71	1.08	0.14	0.7942	0.7629	0.5862	0.5549	
SH-026	SH-026	85.59	SH-027	85.07	10	178	0.0029	VCP	0.013	SH	2.07		0.0311	0.0485	0.1334	1.63	2.82	0.28	0.7674	0.6340	0.5662	0.4328	
SH-027	SH-027	85.07	SH-028	83.89	10	395	0.0030	VCP	0.013	SH	2.07		0.0323	0.0485	0.1364	1.66	2.84	0.28	0.7760	0.6396	0.5726	0.4362	
SH-028	SH-028	83.89	SH-032	83.40	10	157	0.0031	VCP	0.013	SH	2.07		0.0323	0.0485	0.1364	1.68	2.81	0.28	0.7932	0.6568	0.5849	0.4485	
SH-029	SH-029	114.05	SH-030	113.00	8	315	0.0033	VCP	0.013	SH	2.07		0.0006		0.0022	0.52	0.40	0.05	0.4521	0.4499	0.3335	0.3313	
SH-030	SH-030	113.00	SH-031	110.00	8	377	0.0080	VCP	0.013	SH	2.07		0.0023		0.0077	1.02	0.59	0.07	0.6985	0.6908	0.5151	0.5074	
SH-031	SH-031	108.00	SH-032	83.40	8	395	0.0623	VCP	0.013	SH	2.07		0.0044		0.0141	2.52	0.48	0.06	1.9542	1.9401	1.4419	1.4279	
SH-032	SH-032	83.40	SH-037	82.72	12	305	0.0022	VCP	0.013	SH	2.07		0.0380	0.0485	0.1505	1.51	3.01	0.25	1.0902	0.9396	0.8040	0.6535	
SH-033	SH-033	112.00	SH-034	106.00	8	135	0.0444	VCP	0.013	SH	2.07		0.0005		0.0019	1.22	0.21	0.03	1.6509	1.6489	1.2177	1.2157	

City of El Segundo
Future Conditions Hydraulic Model Results - with PS 7 bypassed and PS 1 improvements implemented
Pipes sorted by U/S MH ID

Pipe ID	U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (mgd)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)	Comments
SH-034	SH-034	106.00	SH-037	93.00	8	157	0.0828	VCP	0.013	SH	2.07		0.0005		0.0019	1.52	0.18	0.02	2.2533	2.2514	1.6623	1.6604	
SH-035	SH-035	119.00	SH-036	117.00	8	225	0.0089	VCP	0.013	SH	2.07	50	0.0010		0.0034	0.83	0.39	0.05	0.7383	0.7349	0.5448	0.5414	
SH-935	SH-035	119.00	SH-045	107.00	8	275	0.0436	VCP	0.013	SH	2.07	50	0.0010		0.0034	1.45	0.27	0.03	1.6358	1.6324	1.2067	1.2032	
SH-036	SH-036	117.00	SH-037	93.00	8	500	0.0480	VCP	0.013	SH	2.07		0.0030		0.0099	2.06	0.44	0.05	1.7156	1.7057	1.2655	1.2556	
SH-037	SH-037	82.72	SH-039	82.03	12	313	0.0022	VCP	0.013	SH	2.07		0.0417	0.0485	0.1597	1.53	3.11	0.26	1.0840	0.9244	0.7995	0.6398	
SH-038	SH-038	101.71	SH-039	95.62	8	192	0.0317	VCP	0.013	SH	2.07		0.0011		0.0041	1.36	0.32	0.04	1.3946	1.3906	1.0289	1.0249	
SH-039	SH-039	82.03	SH-042	80.93	12	500	0.0022	VCP	0.013	SH	2.07		0.0438	0.0485	0.1648	1.54	3.16	0.26	1.0829	0.9181	0.7988	0.6340	
SH-040	SH-040	109.50	SH-042	99.00	8	175	0.0600	VCP	0.013	SH	2.07		0.0007		0.0027	1.51	0.23	0.03	1.9181	1.9154	1.4148	1.4120	
SH-041	SH-041	103.31	SH-043	99.22	8	241	0.0170	VCP	0.013	SH	2.07		0.0012		0.0042	1.10	0.37	0.05	1.0201	1.0160	0.7523	0.7482	
SH-042	SH-042	80.93	SH-043	80.88	12	20	0.0025	VCP	0.013	SH	2.07		0.0445	0.0485	0.1666	1.62	3.08	0.26	1.1544	0.9878	0.8518	0.6852	
SH-043	SH-043	80.88	SH-048	79.78	12	500	0.0022	VCP	0.013	SH	2.07		0.0457	0.0485	0.1695	1.55	3.21	0.27	1.0829	0.9134	0.7988	0.6294	
SH-044	SH-044	115.41	SH-045	107.00	8	235	0.0358	VCP	0.013	SH	2.07		0.0006		0.0021	1.17	0.23	0.03	1.4814	1.4792	1.0929	1.0908	
SH-045	SH-045	107.00	SH-047	97.00	8	148	0.0676	VCP	0.013	SH	2.07		0.0016		0.0055	1.94	0.31	0.04	2.0355	2.0300	1.5014	1.4959	
1-846	SH-046	120.00	1-041	114.00	8	199	0.0302	VCP	0.013	7	2.07	30	0.0006		0.0021	1.09	0.23	0.03	1.3597	1.3577	1.0031	1.0010	
SH-046	SH-046	120.00	SH-047	97.00	8	333	0.0691	VCP	0.013	SH	2.07	70	0.0014		0.0048	1.88	0.29	0.04	2.0580	2.0532	0.3658	0.3609	
SH-047	SH-047	97.00	SH-048	86.00	8	185	0.0595	VCP	0.013	SH	2.07		0.0040		0.0128	2.41	0.47	0.06	1.9095	1.8967	1.4090	1.3962	
SH-048	SH-048	79.78	SH-058	79.10	12	310	0.0022	VCP	0.013	SH	2.07		0.0508	0.0485	0.1819	1.58	3.33	0.28	1.0813	0.8994	0.7976	0.6156	
SH-049	SH-049	139.94	SH-050	138.50	8	305	0.0047	VCP	0.013	SH	2.07		0.0020		0.0069	0.83	0.64	0.08	0.5381	0.5311	0.3968	0.3899	
SH-050	SH-050	132.00	SH-051	131.40	8	150	0.0040	VCP	0.013	SH	2.07		0.0028		0.0091	0.85	0.75	0.09	0.4953	0.4861	0.3652	0.3560	
SH-051	SH-051	131.40	SH-054	111.00	8	250	0.0816	VCP	0.013	SH	2.07		0.0032		0.0106	2.53	0.40	0.05	2.2369	2.2263	1.6500	1.6395	
SH-052	SH-052	115.96	SH-053	115.00	8	240	0.0040	VCP	0.013	SH	2.07		0.0012		0.0041	0.67	0.52	0.06	0.4953	0.4912	0.3652	0.3611	
SH-053	SH-053	115.00	SH-054	111.00	8	250	0.0160	VCP	0.013	SH	2.07		0.0024		0.0080	1.32	0.51	0.06	0.9905	0.9825	0.7310	0.7230	
SH-054	SH-054	111.00	SH-055	104.00	8	200	0.0350	VCP	0.013	SH	2.07		0.0061		0.0190	2.26	0.64	0.08	1.4650	1.4460	1.0806	1.0616	
SH-055	SH-055	104.00	SH-058	95.00	8	300	0.0300	VCP	0.013	SH	2.07		0.0061		0.0190	2.14	0.66	0.08	1.3563	1.3373	1.0005	0.9815	
SH-056	SH-056	128.22	SH-057	127.01	8	265	0.0046	VCP	0.013	SH	2.07		0.0022		0.0074	0.83	0.66	0.08	0.5291	0.5218	0.3904	0.3830	
SH-057	SH-057	127.01	SH-058	95.00	8	257	0.1246	VCP	0.013	SH	2.07		0.0031		0.0103	2.91	0.35	0.04	2.7636	2.7534	2.0391	2.0289	
SH-058	SH-058	79.10	SH-063	78.51	12	266	0.0022	VCP	0.013	SH	2.07		0.0629	0.0485	0.2110	1.66	3.58	0.30	1.0874	0.8764	0.8021	0.5911	
SH-059	SH-059	106.28	SH-061	104.65	8	326	0.0050	VCP	0.013	SH	2.07		0.0010		0.0035	0.68	0.45	0.06	0.5537	0.5503	0.4085	0.4050	
SH-060	SH-060	118.95	SH-061	104.95	8	140	0.1000	VCP	0.013	SH	2.07		0.0007		0.0027	1.79	0.20	0.02	2.4763	2.4736	1.8271	1.8245	
SH-061	SH-061	104.95	SH-062	94.95	8	100	0.1000	VCP	0.013	SH	2.07		0.0017		0.0058	2.27	0.29	0.04	2.4763	2.4705	1.8271	1.8213	
SH-062	SH-062	94.95	SH-058	94.00	8	236	0.0040	VCP	0.013	SH	2.07		0.0025		0.0084	0.83	0.72	0.09	0.4968	0.4884	0.3665	0.3581	
SH-063	SH-063	78.51	SH-064	77.29	12	555	0.0022	VCP	0.013	SH	2.07		0.0629	0.0485	0.2110	1.65	3.59	0.30	1.0825	0.8715	0.7988	0.5879	
SH-064	SH-064	77.29	SH-065	76.57	12	182	0.0040	VCP	0.013	SH	2.07		0.0635	0.0485	0.2124	2.04	3.10	0.26	1.4522	1.2398	1.0716	0.8592	
SH-065	SH-065	76.49	SH-080	76.23	12	60	0.0043	VCP	0.013	SH	2.07		0.0635	0.0485	0.2124	2.11	3.03	0.25	1.5198	1.3074	1.1214	0.9090	
1-866	SH-066	114.00	1-028	104.10	8	330	0.0300	VCP	0.013	1	2.07	33	0.0010		0.0034	1.26	0.29	0.04	1.3563	1.3530	1.0005	0.9971	
1-800	SH-066	114.00	1-036	106.00	8	157	0.0510	VCP	0.013	1	2.07	33	0.0010		0.0034	1.52	0.26	0.03	1.7677	1.7643	1.3043	1.3009	
SH-066	SH-066	114.00	SH-068	101.80	8	350	0.0349	VCP	0.013	SH	2.07	34	0.0011		0.0035	1.34	0.29	0.04	1.4620	1.4585	1.0786	1.0751	
1-867	SH-067	105.00	1-038	97.00	8	250	0.0320	VCP	0.013	1	2.07	75	0.0017		0.0056	1.51	0.37	0.05	1.4008	1.3952	1.0335	1.0279	
SH-067	SH-067	105.00	SH-068	101.80	8	357	0.0090	VCP	0.013	SH	2.07	25	0.0006		0.0019	0.69	0.30	0.04	0.7414	0.7395	0.5486	0.5468	
SH-068	SH-068	101.80	SH-071	100.40	8	350	0.0040	VCP	0.013	SH	2.07		0.0028		0.0092	0.85	0.76	0.09	0.4953	0.4860	0.3652	0.3560	
1-869	SH-069	130.00	1-039	119.00	8	200	0.0550	VCP	0.013	1	2.07	68	0.0022		0.0072	1.97	0.36	0.05	1.8365	1.8293	1.3547	1.3475	
SH-069	SH-069	130.00	SH-070	126.00	8	150	0.0267	VCP	0.013	SH	2.07	32	0.0010		0.0034	1.21	0.30	0.04	1.2788	1.2754	0.9446	0.9413	
SH-070	SH-070	126.00	SH-071	106.00	8	207	0.0966	VCP	0.013	SH	2.07		0.0010		0.0037	1.95	0.23	0.03	2.4341	2.4304	1.7955	1.7918	
SH-071	SH-071	100.40	SH-074	98.74	8	370	0.0045	VCP	0.013	SH	2.07		0.0046		0.0146	1.02	0.92	0.11	0.5245	0.5099	0.3871	0.3725	
SH-072	SH-072	131.80	SH-073	127.70	8	150	0.0273	VCP	0.013	SH	2.07		0.0005		0.0021	1.05	0.24	0.03	1.2946	1.2926	0.9553	0.9532	
SH-073	SH-073	127.70	SH-074	98.72	8	334	0.0868	VCP	0.013	SH	2.07		0.0013		0.0046	2.01	0.27	0.03	2.3066	2.3020	1.7017	1.6971	
SH-074	SH-074	98.74	SH-077	94.00	8	330	0.0144	VCP	0.013	SH	2.07		0.0067		0.0207	1.70	0.82	0.10	0.9385	0.9179	0.6922	0.6716	
1-875	SH-075	131.00	1-041	114.00	8	202	0.0842	VCP	0.011	7	2.07	79	0.0017		0.0057	2.13	0.30	0.04	2.2717	2.2660	1.6759	1.6702	
SH-075	SH-075	131.00	SH-076	130.05	8	240	0.0040	VCP	0.013	SH	2.07	21	0.0005		0.0015	0.49	0.33	0.04	0.4927	0.4912	0.3658	0.3642	

City of El Segundo
Future Conditions Hydraulic Model Results - with PS 7 bypassed and PS 1 improvements implemented
Pipes sorted by U/S MH ID

Pipe ID	U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (mgd)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)	Comments
SH-076	SH-076	130.05	SH-077	94.00	8	407	0.0886	VCP	0.013	SH	2.07		0.0022		0.0073	2.33	0.33	0.04	2.3306	2.3233	1.7192	1.7119	
SH-077	SH-077	94.00	SH-078	88.00	8	118	0.0508	VCP	0.013	SH	2.07		0.0091		0.0273	2.87	0.69	0.09	1.7658	1.7384	1.3030	1.2756	
SH-078	SH-078	88.00	SH-079	82.00	8	208	0.0288	VCP	0.013	SH	2.07		0.0094		0.0284	2.38	0.81	0.10	1.3300	1.3016	0.9811	0.9527	
SH-079	SH-079	76.84	SH-080	75.60	12	62	0.0200	VCP	0.013	SH	2.07		0.0094		0.0284	1.98	0.79	0.07	3.2651	3.2368	2.4088	2.3805	
SH-080	SH-080	75.60	SH-082	69.79	12	273	0.0213	VCP	0.013	SH	2.07		0.0731	0.0485	0.2351	3.82	2.15	0.18	3.3682	3.1331	2.4851	2.2500	
SH-081	SH-081	87.20	SH-082	82.00	6	209	0.0249	VCP	0.013	SH	2.07		0.0002		0.0010	0.85	0.19	0.03	0.5735	0.5726	0.4234	0.4224	
SH-082	SH-082	69.79	SH-086	69.02	12	355	0.0022	VCP	0.013	SH	2.07		0.0742	0.0485	0.2376	1.70	3.83	0.32	1.0753	0.8376	0.7992	0.5616	
SH-083	SH-083	93.00	SH-085	82.34	8	84	0.1269	VCP	0.013	SH	2.07		0.0002		0.0008	1.32	0.11	0.01	2.7896	2.7888	2.0579	2.0571	
SH-084	SH-084	83.06	SH-085	82.44	8	159	0.0039	VCP	0.013	SH	2.07		0.0005		0.0018	0.51	0.35	0.04	0.4890	0.4872	0.3606	0.3589	
SH-085	SH-085	82.24	SH-086	77.15	8	98	0.0519	VCP	0.013	SH	2.07		0.0006		0.0024	1.38	0.22	0.03	1.7846	1.7822	1.3165	1.3141	
SH-086	SH-086	69.02	SH-087	68.80	12	101	0.0022	VCP	0.013	SH	2.07		0.0749	0.0485	0.2392	1.71	3.84	0.32	1.0775	0.8384	0.7992	0.5600	
SH-087	SH-087	68.80	SH-095	68.01	15	358	0.0022	VCP	0.013	SH	2.07		0.0755	0.0485	0.2407	1.68	3.54	0.24	1.9665	1.7258	1.4510	1.2103	
SH-088	SH-088	105.77	SH-095	84.36	8	275	0.0779	VCP	0.013	SH	2.07		0.0011		0.0039	1.84	0.25	0.03	2.1850	2.1811	1.6119	1.6080	
SH-089	SH-089	117.47	SH-090	115.01	8	250	0.0098	VCP	0.013	SH	2.07		0.0010		0.0035	0.87	0.39	0.05	0.7768	0.7733	0.5733	0.5698	
SH-090	SH-090	114.81	SH-094	101.47	8	234	0.0570	VCP	0.013	SH	2.07		0.0020		0.0068	1.96	0.35	0.04	1.8697	1.8629	1.3792	1.3724	
SH-091	SH-091	116.49	SH-092	108.70	8	193	0.0403	VCP	0.013	SH	2.07		0.0003		0.0011	1.00	0.17	0.02	1.5727	1.5716	1.1592	1.1581	
SH-092	SH-092	108.60	SH-093	107.98	8	158	0.0039	VCP	0.013	SH	2.07		0.0003		0.0011	0.45	0.28	0.04	0.4905	0.4894	0.3619	0.3608	
SH-093	SH-093	107.89	SH-094	101.41	8	270	0.0240	VCP	0.013	SH	2.07		0.0014		0.0048	1.30	0.36	0.05	1.2131	1.2083	0.8951	0.8904	
SH-094	SH-094	101.17	SH-095	80.17	8	243	0.0864	VCP	0.013	SH	2.07		0.0038		0.0123	2.71	0.42	0.05	2.3020	2.2897	1.6985	1.6862	
SH-095	SH-095	68.01	SH-096	63.77	15	395	0.0107	VCP	0.013	SH	2.07		0.0807	0.0485	0.2529	2.98	2.46	0.16	4.3371	4.0842	3.1993	2.9464	
SH-096	SH-096	63.77	SH-097	63.01	15	343	0.0022	VCP	0.013	SH	2.07		0.0807	0.0485	0.2529	1.71	3.63	0.24	1.9705	1.7176	1.4536	1.2007	
SH-097	SH-097	63.01	SH-099	62.22	15	358	0.0022	VCP	0.013	SH	2.07		0.0807	0.0485	0.2529	1.71	3.63	0.24	1.9665	1.7136	1.4510	1.1981	
SH-517	SH-098	84.48	SH-099	79.64	8	105	0.0461	VCP	0.013	SH	2.07		0.0037		0.0121	2.17	0.48	0.06	1.6812	1.6691	1.2403	1.2281	
SH-099	SH-099	62.22	SH-100	61.90	15	142	0.0023	VCP	0.013	SH	2.07		0.0845	0.0485	0.2616	1.74	3.68	0.25	1.9872	1.7256	1.4658	1.2043	
SH-100	SH-100	61.90	SH-101	61.13	15	348	0.0022	VCP	0.013	SH	2.07		0.0845	0.0485	0.2616	1.72	3.69	0.25	1.9691	1.7075	1.4529	1.1913	
SH-101	SH-101	61.13	SH-300	61.00	24	78	0.0017		0.013	SH	2.07		0.0845	0.0485	0.2616	1.48	3.42	0.14	5.9971	5.7356	4.4597	4.1981	
T-001	T-001	122.18	T-002	119.93	15	102	0.0221	VCP	0.013	Imp 24"	2.52		0.3206		0.8848	5.55	3.82	0.25	6.2174	5.3326	4.5869	3.7021	
T-002	T-002	119.93	T-003	107.07	15	230	0.0559	VCP	0.013	Imp 24"	2.52		0.3206		0.8848	7.72	3.03	0.20	9.8986	9.0138	7.3021	6.4173	
T-003	T-003	106.67	T-004	106.25	24	417	0.0010	VCP	0.013	Imp 24"	2.52		0.3206		0.8848	1.76	7.09	0.30	4.6526	3.7678	3.4326	2.5478	
T-004	T-004	106.25	T-005	105.83	24	369	0.0011	VCP	0.013	Imp 24"	2.52		0.3206		0.8848	1.84	6.87	0.29	4.9460	4.0612	3.6484	2.7637	
T-005	T-005	105.81	T-006A	105.50	24	269	0.0012	VCP	0.013	Imp 24"	2.52		0.3206		0.8848	1.85	6.85	0.29	4.9768	4.0920	3.6717	2.7869	
T-006	T-006	102.48	T-007	99.72	24	418	0.0066	VCP	0.013	Imp 24"	2.52		0.3740		1.0197	3.58	4.75	0.20	11.9127	10.8930	8.7879	7.7682	
T-531	T-006A	105.46	T-006	105.02	24	328	0.0013	VCP	0.013	Imp 24"	2.52		0.3206		0.8848	1.95	6.59	0.27	5.3695	4.4847	3.9613	3.0765	
T-007	T-007	99.72	T-008	98.68	24	345	0.0030	VCP	0.013	Imp 24"	2.52		0.3740		1.0197	2.72	5.77	0.24	8.0492	7.0294	5.9377	4.9180	
T-008	T-008	98.68	T-009	97.72	24	353	0.0027	VCP	0.013	Imp 24"	2.52		0.3740		1.0197	2.62	5.92	0.25	7.6452	6.6255	5.6397	4.6200	
T-009	T-009	97.72	T-010	96.58	24	348	0.0033	VCP	0.013	Imp 24"	2.52		0.3740		1.0197	2.80	5.65	0.24	8.3908	7.3711	6.1898	5.1700	
T-010	T-010	96.58	T-011	95.55	24	301	0.0034	VCP	0.013	Imp 24"	2.52		0.3740		1.0197	2.84	5.59	0.23	8.5759	7.5562	6.3268	5.3071	
T-011	T-011	95.55	T-012	95.00	24	349	0.0016	VCP	0.013	Imp 24"	2.52		0.3740		1.0197	2.16	6.80	0.28	5.8198	4.8001	4.2935	3.2738	
T-012	T-012	95.00	T-013	94.32	24	356	0.0019	VCP	0.013	Imp 24"	2.52		0.3740		1.0197	2.31	6.47	0.27	6.4073	5.3875	4.7265	3.7068	
T-013	T-013	94.32	T-014	93.72	24	294	0.0020	VCP	0.013	Imp 24"	2.52		0.3740		1.0197	2.36	6.37	0.27	6.6229	5.6031	4.8855	3.8658	
T-014	T-014	93.72	T-015	92.83	24	352	0.0025	VCP	0.013	Imp 24"	2.52		0.3740		1.0197	2.55	6.03	0.25	7.3717	6.3520	5.4381	4.4184	
T-015	T-015	92.83	T-016	92.38	24	347	0.0013	VCP	0.013	Imp 24"	2.52		0.3740		1.0197	2.01	7.15	0.30	5.2794	4.2597	3.8947	2.8750	
T-016	T-016	92.30	T-017	91.72	24	307	0.0019	VCP	0.013	Imp 24"	2.52		0.3740		1.0197	2.30	6.49	0.27	6.3722	5.3525	4.7007	3.6809	
T-017	T-017	91.72	T-018	91.06	24	322	0.0021	VCP	0.013	Imp 24"	2.52		0.3740		1.0197	2.37	6.36	0.26	6.6372	5.6175	4.8965	3.8768	
T-018	T-018	91.06	T-019	90.39	24	301	0.0022	VCP	0.013	Imp 24"	2.52		0.3740		1.0197	2.44	6.23	0.26	6.9167	5.8970	5.1027	4.0829	
T-019	T-019	90.39	T-020	89.82	24	301	0.0019	VCP	0.013	Imp 24"	2.52		0.3740		1.0197	2.30	6.49	0.27	6.3797	5.3599	4.7065	3.6868	
T-020	T-020	89.82	T-021	89.13	24	349	0.0020	VCP	0.013	Imp 24"	2.52		0.3740		1.0197	2.34	6.42	0.27	6.5186	5.4989	4.8086	3.7889	
T-021	T-021	89.13	T-022	88.24	24	375	0.0024	VCP	0.013	Imp 24"	2.52		0.3740		1.0197	2.49	6.13	0.26	7.1420	6.1223	5.2688	4.2490	
T-022	T-022	87.95	T-023	86.46	24	343	0.0043	VCP	0.013	Imp 24"	2.52		0.3740		1.0197	3.09	5.27	0.22	9.6625	8.6428	7.1282	6.1085	

City of El Segundo
Future Conditions Hydraulic Model Results - with PS 7 bypassed and PS 1 improvements implemented
Pipes sorted by U/S MH ID

Pipe ID	U/S MH ID	U/S Invert El (ft)	D/S MH ID	D/S Invert El (ft)	Pipe Size (in)	Length (ft)	Slope	Mat	n	Drainage Area	Peaking Factor "a"[1]	% of Split[2]	ADWF (mgd)[3]	Chevron Load (mgd) - not peaked[4]	PDWF (mgd)[5]	PDWF Velocity (ft/s)	PDWF Depth (in)	PDWF d/D	Full Flow (mgd)	Excess Full Capacity (mgd)	Design Capacity d/D=0.64 (mgd)	Excess Design Capacity (mgd)	Comments
T-023	T-023	86.46	T-024	84.81	24	345	0.0048	VCP	0.013	Imp 24"	2.52		0.3740		1.0197	3.20	5.14	0.21	10.1385	9.1188	7.4792	6.4594	
T-024	T-024	84.37	T-025	83.85	24	80	0.0065	VCP	0.013	Imp 24"	2.52		0.3740		1.0197	3.57	4.76	0.20	11.8306	10.8109	8.7192	7.6995	
T-025	T-025	83.25	T-026	83.11	24	185	0.0008	VCP	0.013	Imp 24"	2.52		0.5803		1.5273	1.85	10.25	0.43	4.0280	2.5007	3.0586	1.5312	
T-532	T-026	82.70	T-027	81.72	24	67	0.0145	VCP	0.013	Imp 24"	2.52		0.5803		1.5273	5.33	4.77	0.20	17.6777	16.1504	13.0234	11.4960	
T-027	T-027	81.72	T-028	67.00	24	82	0.1802		0.013	Imp 24"	2.52		0.5803		1.5273	12.91	2.59	0.11	62.2318	60.7045	45.9086	44.3813	
T-028	T-028	67.00	T-1000	66.15	24	28	0.0306		0.013	Imp 24"	2.52		0.5803		1.5273	6.93	3.97	0.17	25.6373	24.1100	18.9187	17.3914	
T-029	T-029	74.00	1-1000	66.15	24	9	0.8722		0.013	1	2.07		0.5275		1.1492	20.53	1.56	0.06	136.9168	135.7676	101.0016	99.8524	
T-026	T-532	86.83	T-025	84.57	15	79	0.0285	VCP	0.013	Imp 15"	2.05		0.2062		0.4797	5.08	2.65	0.18	7.0671	6.5874	5.2128	4.7331	

Notes: of peaking equation: $PDWF = a \times ADWF^{0.92}$
and CS, the peaking equation is $PDWF = 3.0 \times ADWF$
is allocated to the pipe when another pipe is exiting the upstream manhole
ADWF = average dry weather flow
reatment plant located on the Chevron facility. This load is not peaked.
PDWF = peak dry weather flow

APPENDIX 3

SANITARY SEWER SYSTEM MAPS
(NORTHWEST AND EAST)

Hyperion Outfall

Los Angeles International Airport

Hyperion Treatment Plant

City of Los Angeles

Chevron Refinery

PS 1
PS 2
PS 4
PS 5
PS 6
PS 7
PS 8
PS 9
PS 13

DETAIL A
DETAIL B
DETAIL C
DETAIL D
DETAIL E
DETAIL F
DETAIL G

1
2
4
5
6
7
8
9
13
SH

IMPERIAL HWY
IMPERIAL AVE
WALNUT AVE
MAPLE AVE
OAK AVE
PALM AVE
ELM AVE
PINE AVE
ACACIA AVE
MARIPOSA AVE
HOLLY AVE
GRAND AVE
ELIN POINTE
IRENE CT
FRANKLIN AVE
HILLCREST ST
DUNE ST
REDWOOD AVE
LOMA VISTA ST
GAYLORD ST
VIRGINIA ST
WHITING ST
VALLEY ST
CONCORD PL
CEDAR ST
PEPPER ST
CYPRESS ST
EUCALYPTUS DR
MCCARTHY CT
LOMITA ST
SHERIDAN ST
PENN ST
SIERRA ST
ARENA ST
SIERRA PL
GUAYMAS WAY
STANDARD ST
MAIN ST
RICHMOND ST
CONCORD ST
MARYLAND ST
BUNGALOW DR
CALIFORNIA ST
NEVADA ST
OREGON ST
CENTER ST
KANSAS ST
WASHINGTON ST
INDIANA CT
ILLINOIS ST
ILLINOIS CT
SELBY ST
LAIRPORT ST
SEPULVEDA BLVD
I-105

DETAIL A - EXISTING 1" = 50'
DETAIL B - EXISTING 1" = 50'
DETAIL C - EXISTING 1" = 50'
DETAIL A - FUTURE 1" = 50'
DETAIL B - FUTURE 1" = 50'
DETAIL C - FUTURE 1" = 50'
DETAIL D 1" = 50'
DETAIL E 1" = 50'
DETAIL F 1" = 50'
DETAIL G 1" = 50'

SIPHON

N

0 250 500 1,000 Feet

1" = 250'

Legend

- Existing Sewer Maintenance Access Structure
- Existing Pump Station
- City Boundary
- Existing Force Main
- Existing Gravity Sewer
- Future Gravity Sewer
- City of Los Angeles Hyperion Outfall
- Drainage Area 1
- Drainage Area 2 (Tributary to Drainage Area 7)
- Drainage Area 4
- Drainage Area 5
- Drainage Area 6
- Drainage Area 7
- Drainage Area 8
- Drainage Area 9 (Tributary to Drainage Area 4)
- Drainage Area 13
- Sand Hill Area

CITY OF EL SEGUNDO

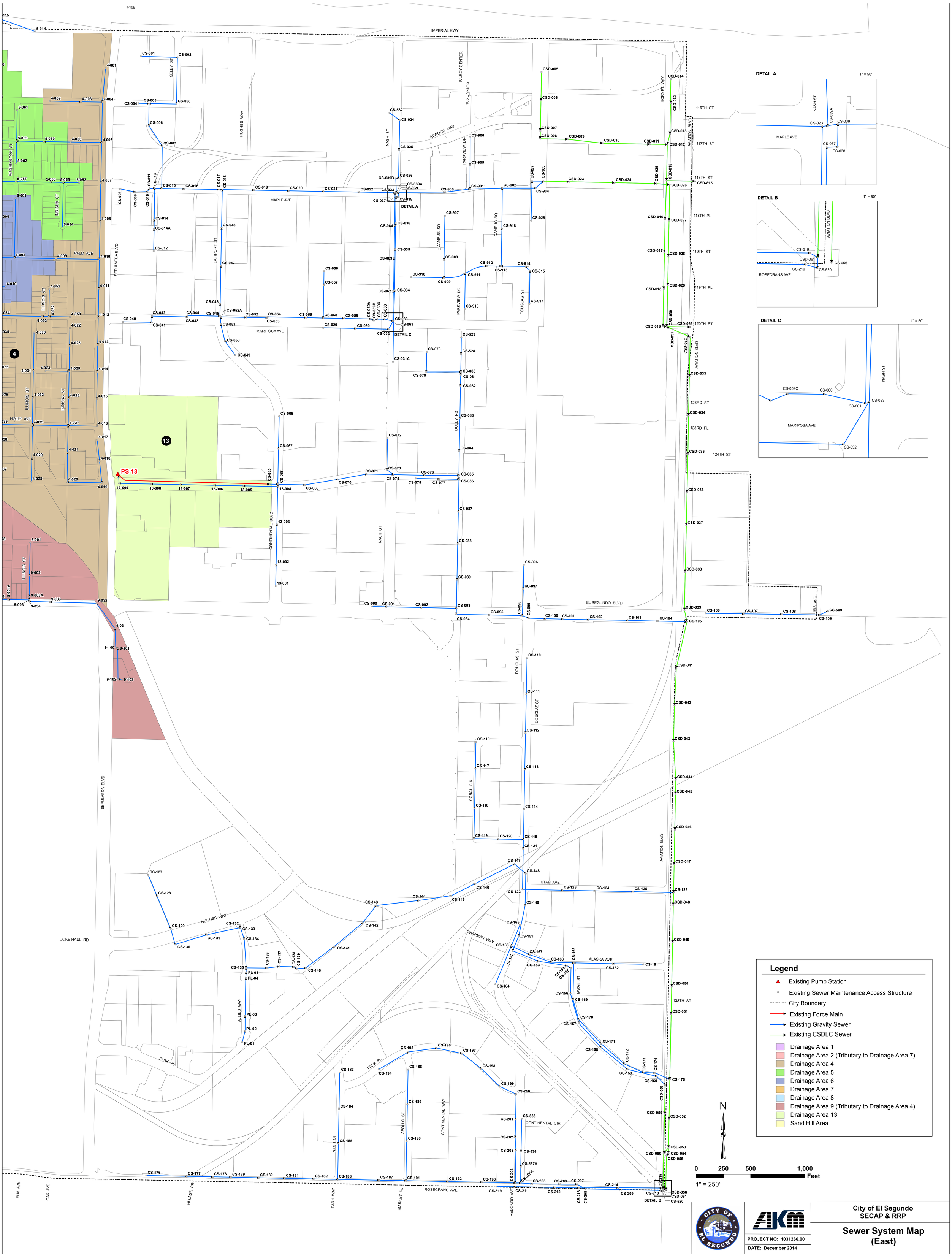
AKM

City of El Segundo
SECAP & RRP

Sewer System Map (Northwest)

PROJECT NO: 1031266.00

DATE: December 2014



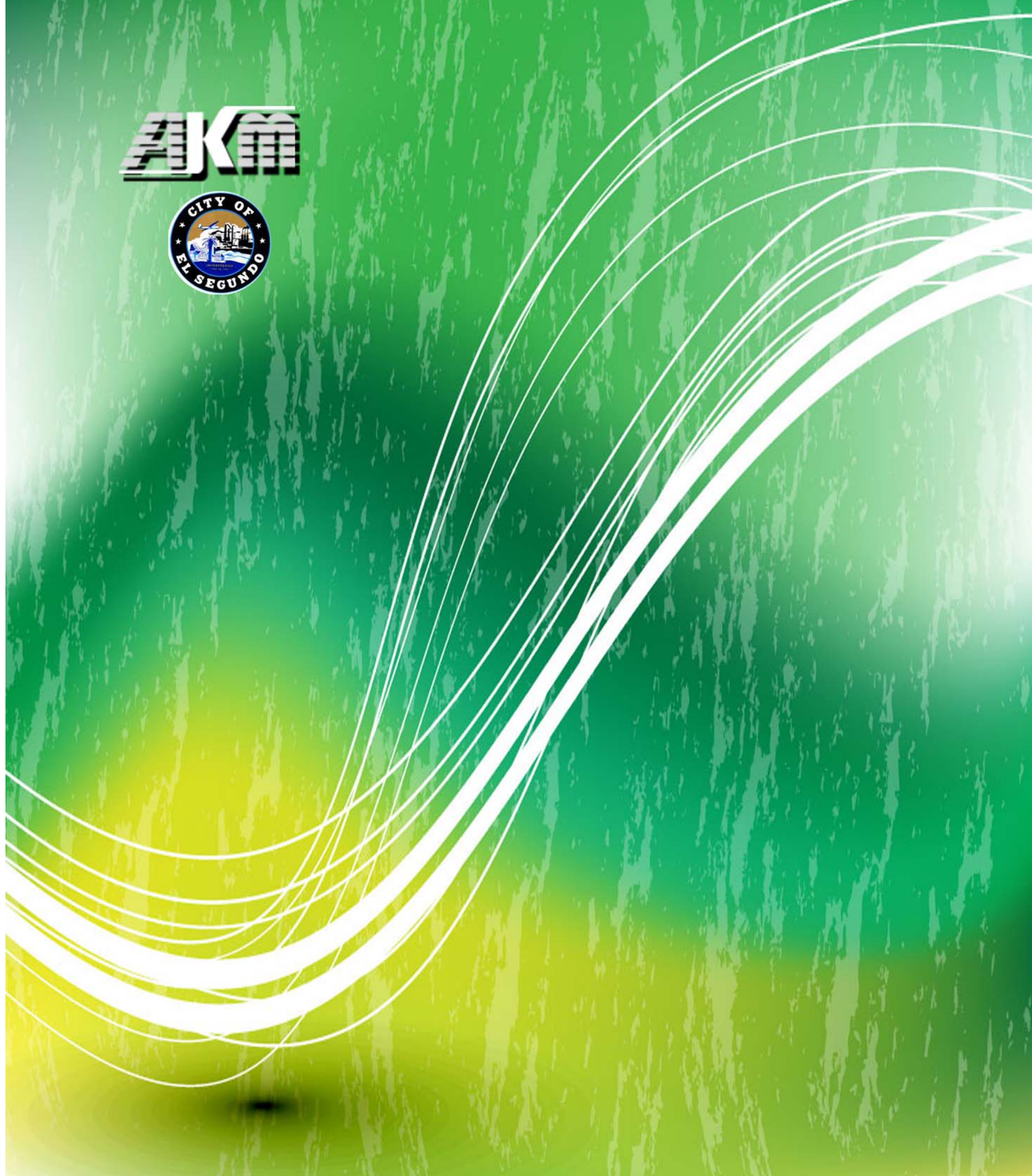
City of El Segundo
SECAP & RRP

Sewer System Map (East)

PROJECT NO: 1031266.00
DATE: December 2014

APPENDIX 4

CITY OF EL SEGUNDO
CAPITAL IMPROVEMENT PROJECTS
FOR SEWER SYSTEM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CITY OF
EL SEGUNDO