Appendices

Appendix A

REFERENCES

REFERENCES

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Appendix B
RHNA REQUIREMENTS

PROJECT MEMORANDUM - FINAL

RHNA HOUSING REQUIREMENT IMPACT TO SOUTH PASADENA WATER & WASTEWATER SERVICES

City of South Pasadena

Date:	10/21/2020
Project No.:	11822A.00

Prepared By:	Rachel Gross, P.E.
Reviewed By:	Inge Wiersema, P.E. and Matt Huang, P.E.
Subject:	RHNA Housing Requirement Impact to South Pasadena Water & Wastewater Services

Introduction

The Regional Housing Needs Assessment (RHNA) is a state-required housing process that determines existing and projected housing needs for all jurisdictions in California every 8 years. For the current 8-year cycle, 2021 through 2029, the RHNA determination for the Southern California Association of Governments (SCAG) is that 1,341,827 new housing units are needed in the SCAG area, which covers the Metropolitan Planning Organization (MPO) of six of the ten counties in Southern California, namely Imperial County, Los Angeles County, Orange County, Riverside County, San Bernardino County, and Ventura County. SCAG then issues a regional determination to distribute these housing units among its member governments. The SCAG determination for the City of South Pasadena (City) is 2,062 new residential units by year 2029.

This project memorandum presents the expected impacts of adding these new housing units on the City's ability to deliver the associated potable water and wastewater conveyance services. This impact is compared to the projected City water and wastewater flows based on the City's most current General Plan, which has a planning horizon of year 2040.

Data and Assumptions

The following assumptions were used to develop the potable water demand and wastewater flow projections that include the RHNA requirement of an additional 2,062 housing units by year 2029[1]:

- Historical water demands, using the average from years 2015 to 2019, has ranged from around 3,300 acre-feet per year (afy) to 3,800 afy with an average of 3,590 afy.
- The historical average dry weather wastewater flows (ADWF) in the same period from 2015-2019 is estimated at 1.86 million gallons per day (mgd) based on an indoor residential water use of 60 gpcd, as well as, a commercial wastewater flow factor of 60 percent and a government wastewater flow factor of 33 percent of the total potable water consumption.
- The majority of the City's water demand is residential (86 percent), followed by commercial (11 percent), government (2 percent), irrigation (less than 1 percent) and fire (less than 1 percent).

[1] All historical water demand data were provided by the City. Expected growth scenarios from the General Plan are based on the 2020 General Plan Update.

- The allocated 2,062 residential units would be added to the City at a constant rate over from the years 2021 through 2029. This equates to an average rate of approximately 258 new units per year.
- The City's General Plan currently plans for an additional 589 housing units by year 2040. These housing units are assumed to be included within the 2,062 units for this analysis.
- The potable water demand projections include both the increased residential demand resulting from adding 2,062 units by the year 2029 and the planned commercial growth through the year 2040 that is anticipated in the City's General Plan. Other water use types, such as government and irrigation uses, are assumed to stay constant over time.
- Current residential potable water use is 114 gallons per capita per day (gpcd). This is expected to decrease to 104 gpcd by year 2030 as indoor residential water use decreases from 60 gpcd to 50 gpcd consistent with state conservation mandates.
- The average occupancy rate in the new units is same as current average household size (2.4 people per household).
- The commercial wastewater flow factor of 60 percent and the government wastewater flow factor of 33 percent of the potable water consumption is assumed to stay constant in the future.

Water Demand Projections

Based on the assumptions listed above and the historical demand data, adding an additional 2,062 residential units to the City by the year 2029 would result in a demand increase of approximately 335 afy, which would result in a total demand of approximately 3,925 afy by year 2029. This represents a 14% increase in water demand in year 2029 compared to the projected demand under the growth conditions described in the City's current General Plan.

The demand projection using the General Plan growth scenario anticipates relatively constant demand with a slight decline in demand through year 2030, as demand analysis shows that water conservation is expected to offset the projected growth in the residential and commercial sectors. The demand projection that includes the RHNA growth scenario of 2,062 residential units predicts a greater and earlier increase in potable water demand as the growth rate is expected to outpace conservation.

The results of the demand analysis are shown in Table 1 and are graphically depicted on Figure 1. As shown, the RHNA projection of 3,925 afy for year 2029 is even greater than the General Plan based demand projection for year 2040, which would still result in a slight demand decrease of 1 percent due to water conservation while the RHNA projection would result in 9 percent demand increase compared to current demands.

Table 1 South Pasadena Current and Projected Water Demand

Scenario	Demand (afy)	Increase compared to Present Day (afy)	Increase compared to Present Day (%)
Present Day (2015-2019 average)	3,590	n/a	n/a
2029 RHNA Growth	3,925	335	9%
2029 General Plan Growth	3,441	-149	-4%
2040 General Plan Growth	3,549	-41	-1%

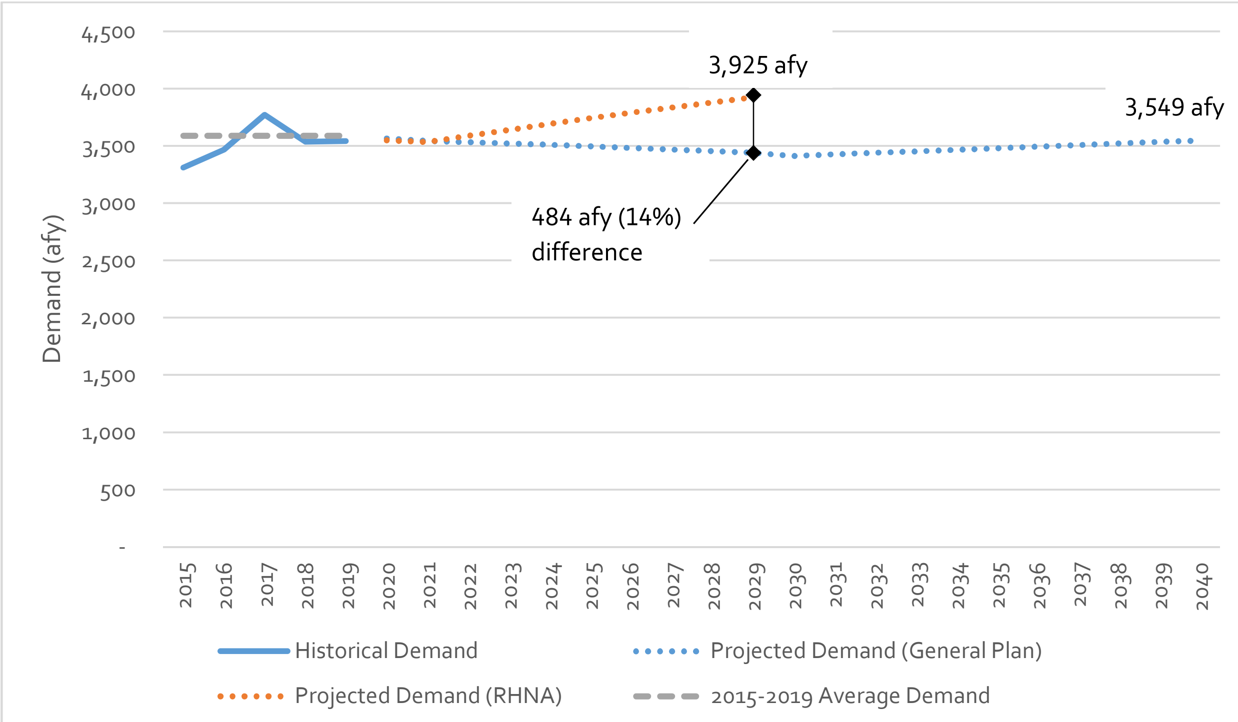


Figure 1 South Pasadena Historical and Projected Water Demand

Wastewater Flow Projections

Based on the assumptions listed above and the estimated recent wastewater flows, adding an additional 2,062 residential units to the City by the year 2029 would result in an ADWF increase of approximately 0.06 mgd, which would result in a total ADWF approximately 1.92 mgd by year 2029. This represents a 14% increase in ADWF in year 2029 compared to the projected demand under the growth conditions described in the City's current General Plan. The ADWF projection using the General Plan growth scenario anticipates a slight decline in flow through year 2030, as demand analysis shows that indoor water use is expected to decrease due to state-mandated water conservation.

The ADWF projection that includes the RHNA growth scenario of 2,062 residential units predicts an overall increase in ADWF as the residential growth rate is expected to outpace conservation. The results of the ADWF analysis are shown in Table 2 and are graphically depicted on Figure 2. As shown, the RHNA ADWF projection of 2.06 mgd for year 2029 is even greater than the General Plan based ADWF projection for year 2040, which would still result in an ADWF decrease of 7 percent due to water conservation while the RHNA projection would result in a 3 percent ADWF increase compared to current estimated ADWF[2].

[2] Current wastewater flows are not measured by the City, so current ADWF is an estimate based on water use data provided by the City and assumed wastewater flow factors.

Table 2 South Pasadena Estimated Current and Projected Wastewater Flow

Scenario	ADWF (mgd)	Increase compared to Present Day (mgd)	Increase compared to Present Day (%)
Present Day (2015-2019 average)	1.86	n/a	n/a
2029 RHNA Growth	1.92	0.06	3%
2029 General Plan Growth	1.68	-0.19	-10%
2040 General Plan Growth	1.73	-0.13	-7%

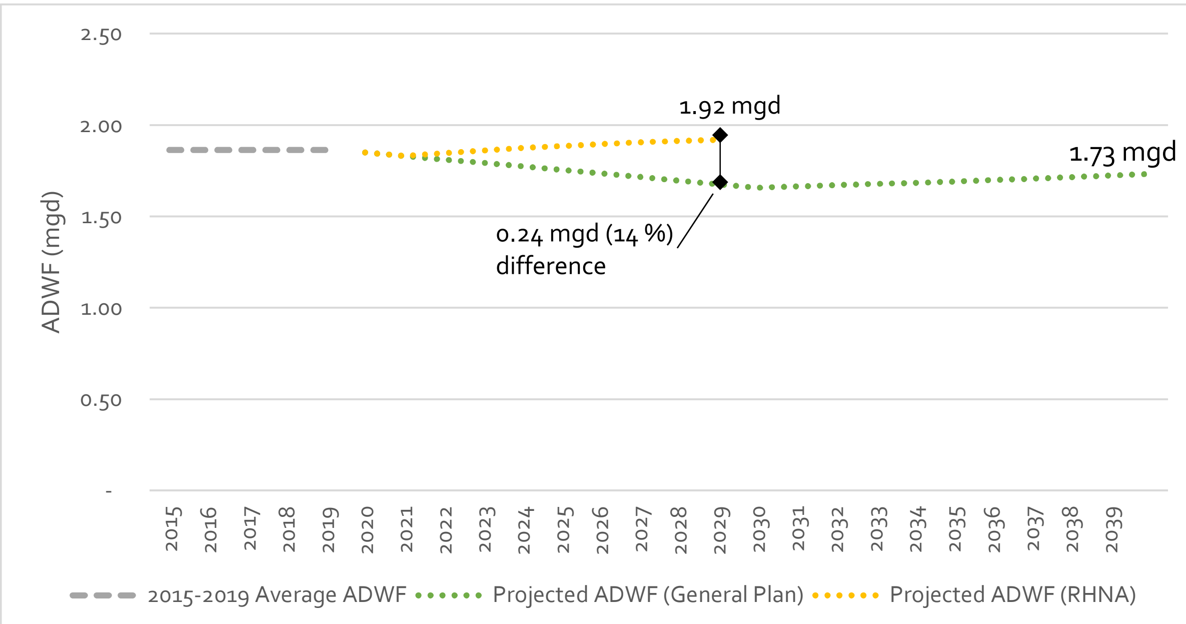


Figure 2 South Pasadena Estimated Current and Projected Average Dry Weather Wastewater Flow (ADWF)

Water Supply Projections

The City has three sources of potable water supply, namely 1) groundwater pumped from the Main San Gabriel Basin (Main Basin), 2) treated imported water purchased from the Metropolitan Water District of Southern California (MWD), and 3) purchased water from the Pasadena Water and Power (PWP). Groundwater pumped from four wells in the Main Basin is the primary source of water supply for the City, contributing on average to 91 percent of the City's water supply since 1990. On average, less than 1 percent of the City's water comes from PWP, while the remaining 9 percent of the City's water supply is purchased from MWD[3]. The City typically avoids purchasing imported water unless a groundwater well becomes non-operational because imported water is the most costly water supply source for the City.

The amount of water pumped from the Main Basin by the City and other water suppliers is managed by the Main San Gabriel Basin Watermaster (Watermaster). The Watermaster determines the total operational safe yield for all groundwater pumpers each year. The City has pumping rights to 1.8 percent of the total safe yield of the Main Basin, as determined by the Watermaster. Since year 1990, the City's groundwater pumping rights from the Main Basin have ranged from 2,527 afy to 4,332 afy and averaged 3,411 afy.

[3] Historical water supply information from the year 1990 through the year 2019 was provided by the City.

However, the City's groundwater pumping right from the Main Basin has been below average at 2,707 afy during the past five years and is projected to decrease even further to 2,347 afy through year 2025 as a result of drought conditions[4]. The City and other pumpers are currently permitted to pump above and beyond their water rights by paying an additional fee for replenishment water, which is managed by the Watermaster.

The City's groundwater rights have historically not been enough to meet demand, so the City has either paid replenishment fees to pump additional groundwater or purchased additional water from MWD, or a combination of both measures. Due to continued growth resulting in a reduction of pervious areas and anticipated future prolonged droughts triggered by climate change, groundwater pumping rights are expected to decrease even further in the future. Hence, the gap between groundwater supply and water demands is expected to grow.

The water supply gap would be further exacerbated due to the increase in demand from the additional housing units required under the RHNA. Figure 3 shows the recent water supply for the City in broken out by groundwater pumped within the City's groundwater rights, groundwater pumped above the City's groundwater rights, and water purchased from MWD. Additionally, Figure 3 shows the projected groundwater pumping rights through the year 2025, as predicted by the Watermaster.

If the City's groundwater rights would remain constant at 2,347 afy between the years 2025 and 2029, the City is projected to have a water supply shortfall of approximately 1,578 acre-feet (af) by year 2029 under RHNA growth conditions. This is 484 afy (44 percent) higher than the supply shortfall of 1,095 afy expected under General Plan growth conditions. This supply shortfall would need to be addressed through additional pumping above the City's rights and/or additional purchases from MWD. These supply sources are both considered less reliable than groundwater pumping within the City's rights. The ability to pump additional water from the Main Basin or purchase additional water from MWD is anticipated to become less reliable in the future as they are contingent on the availability of replenishment water (dependent on wet hydrologic cycled) and imported water (dependent on snowpack of Sierra Nevada Mountains and storage along both California and Colorado aqueducts). These supply sources may become even more uncertain as other water suppliers that rely on the Main Basin and MWD also experience significant demand growth and/or are subject to RHNA allocations.

[4] Historical and projected water rights information for the City is from the Main San Gabriel Basin Watermaster.

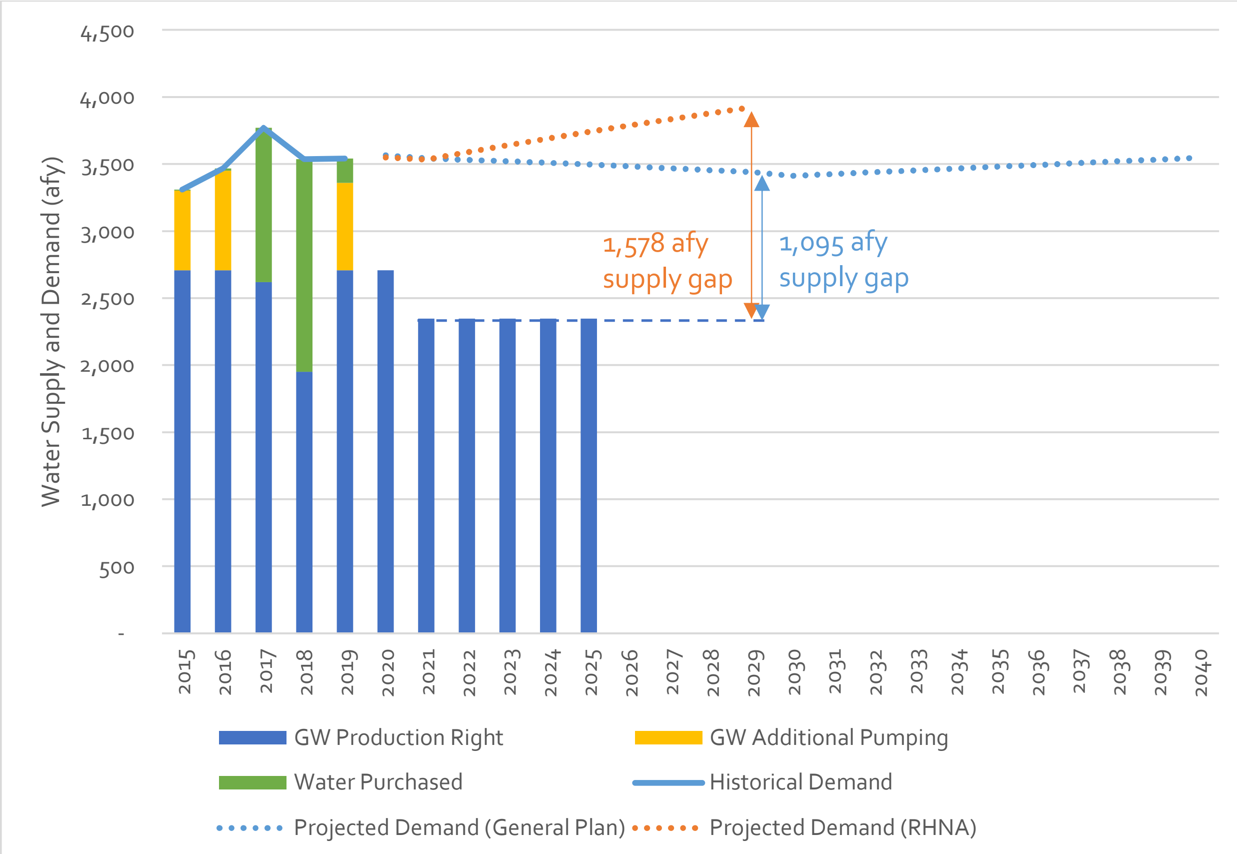


Figure 3 South Pasadena Historical and Projected Supply and Demand

Conclusions

Overall, the additional RHNA requirement of 2,062 housing units is expected to lead to a an accelerated increase in water demand of 335 afy compared to present day demand of 3,590 afy to a total demand of 3,925 afy in year 2029. This demand increase is estimated to be 484 afy (14 percent) higher in year 2029 than the projected demand based on the City's current General Plan. Additionally, the RHNA allocation would result in an estimated wastewater flow increase of 0.24 mgd, which is also 14 percent higher than currently planned for by year 2029.

The RHNA allocation will increase the existing water supply gap between the City's water demand and the City's groundwater pumping from the Main Basin by 484 afy to 1,578 afy, which is 44 percent higher than the existing supply gap of 1,094 afy projected for year 2029 based on the current General Plan. As the City's groundwater pumping rights are the most reliable supply source, the RHNA allocation would reduce the City's supply reliability as it would become more dependent on imported water supply from MWD and availability of replenishment water.

Due to the considerable housing allocations throughout the entire SCAG area, water supply needs for both imported water from MWD and replenishment water are expected to increase significantly regionally. As the availability of both sources are also expected to be negatively impacted by climate change, they may become more unreliable in the future.

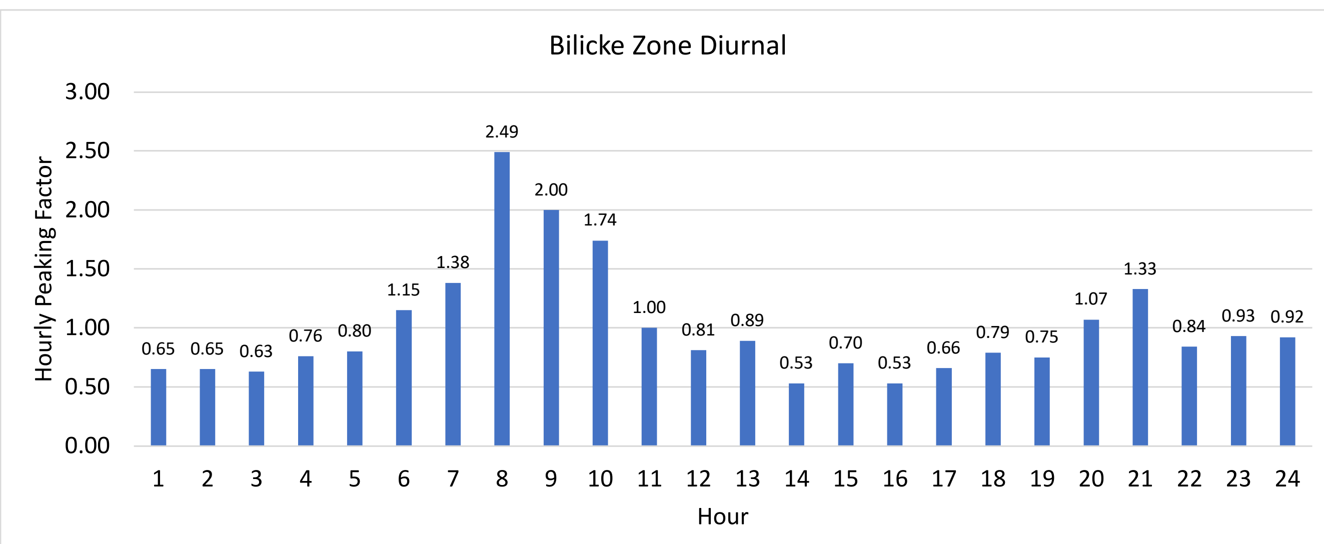
Moreover, due the unknown location of the 2,062 housing units, this growth may result in additional water distribution, storage, pumping and/or wastewater conveyance and discharge constraints that are unknown at this time. Further analysis is needed to identify potential water distribution and wastewater conveyance constraints that may trigger costly investments and associated affordability challenges for the community.

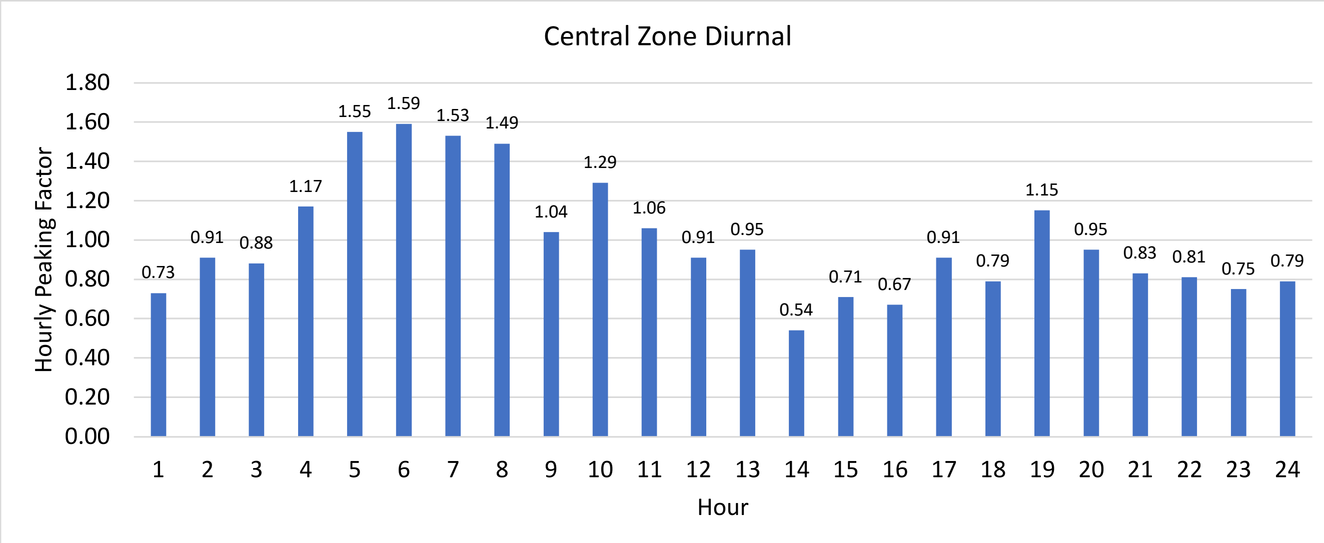
Appendix C

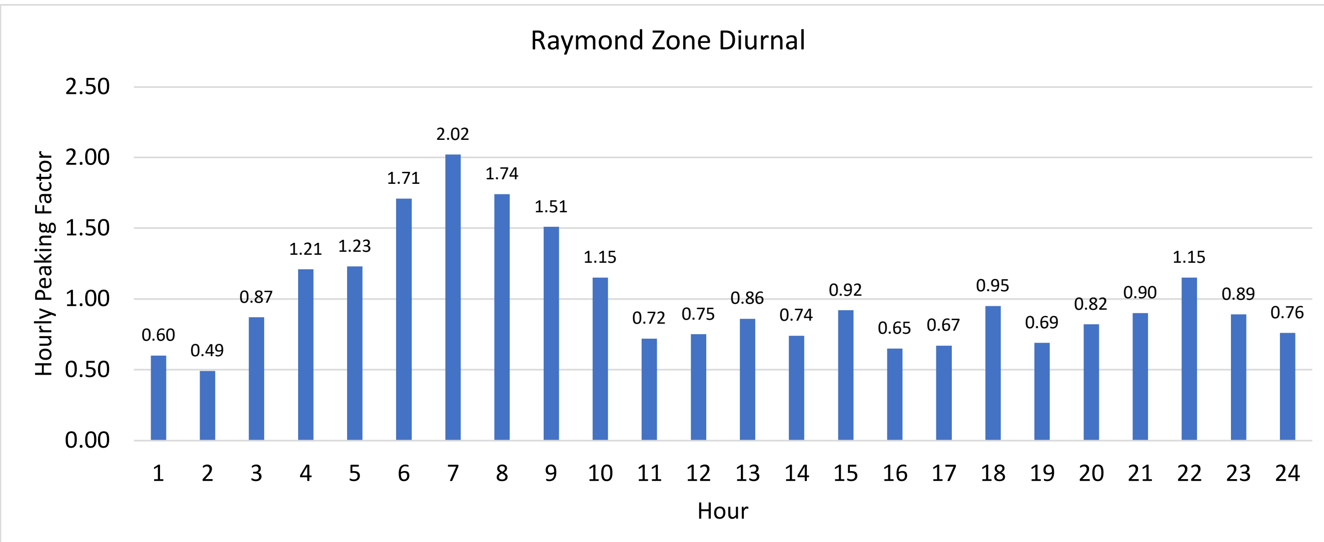
HYDRAULIC MODEL DIURNAL PATTERNS

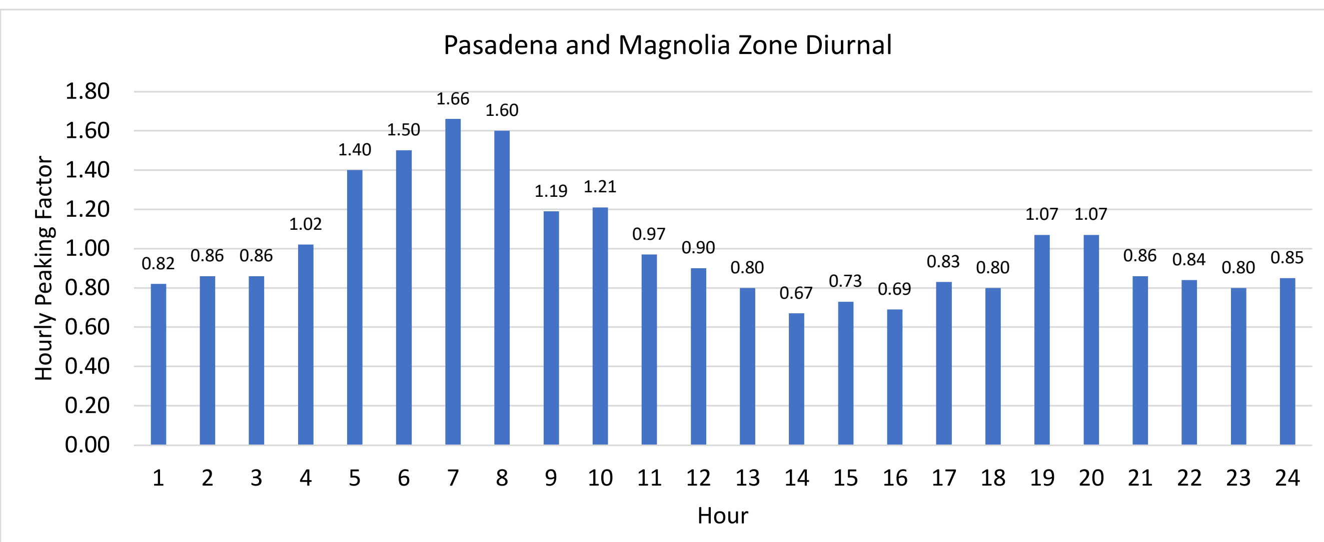
Appendix C - Hydraulic Model Diurnal Patterns

Model Diurnal Name	*DIURN_BILICKIE*	*DIURN_CENTRAL*	*DIURN_RAYMOND*	*DIURN_SOUTHPAS*
Hour	**Bilicke Zone Diurnal**	**Central Zone Diurnal**	**Raymond Zone Diurnal**	**Pasadena and Magnolia Zone Diurnal**
1	0.65	0.73	0.60	0.82
2	0.65	0.91	0.49	0.86
3	0.63	0.88	0.87	0.86
4	0.76	1.17	1.21	1.02
5	0.80	1.55	1.23	1.40
6	1.15	1.59	1.71	1.50
7	1.38	1.53	2.02	1.66
8	2.49	1.49	1.74	1.60
9	2.00	1.04	1.51	1.19
10	1.74	1.29	1.15	1.21
11	1.00	1.06	0.72	0.97
12	0.81	0.91	0.75	0.90
13	0.89	0.95	0.86	0.80
14	0.53	0.54	0.74	0.67
15	0.70	0.71	0.92	0.73
16	0.53	0.67	0.65	0.69
17	0.66	0.91	0.67	0.83
18	0.79	0.79	0.95	0.80
19	0.75	1.15	0.69	1.07
20	1.07	0.95	0.82	1.07
21	1.33	0.83	0.90	0.86
22	0.84	0.81	1.15	0.84
23	0.93	0.75	0.89	0.80
24	0.92	0.79	0.76	0.85
Total	**24.00**	**24.00**	**24.00**	**24.00**
Average	**1.00**	**1.00**	**1.00**	**1.00**
Peak Hour	**2.49**	**1.59**	**2.02**	**1.66**




Central Zone Diurnal
Hourly Peaking Factor
Hour
0.73 0.91 0.88 1.17 1.55 1.59 1.53 1.49 1.04 1.29 1.06 0.91 0.95 0.54 0.71 0.67 0.91 0.79 1.15 0.95 0.83 0.81 0.75 0.79

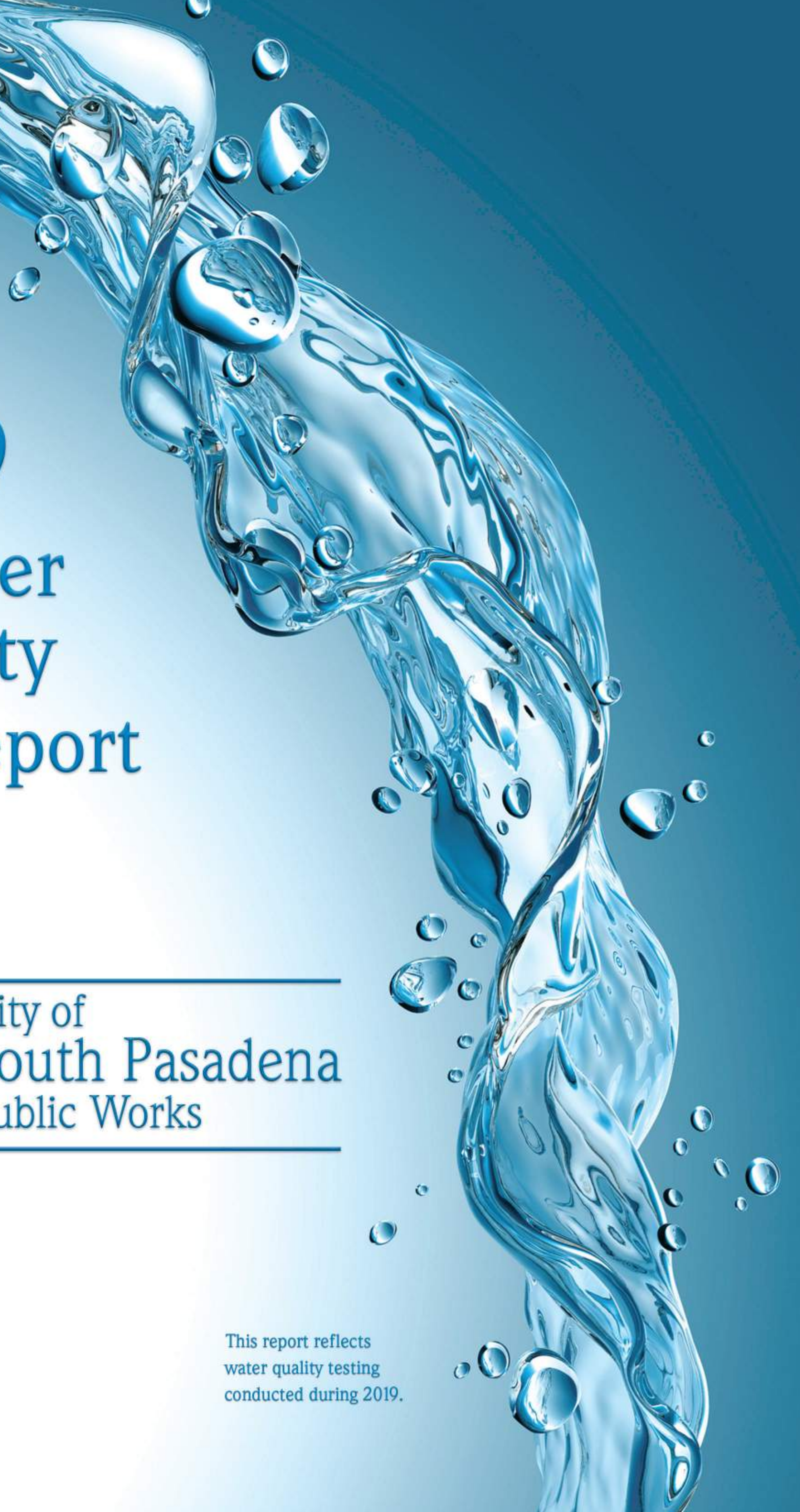

Raymond Zone Diurnal
Hourly Peaking Factor
Hour
0.60 0.49 0.87 1.21 1.23 1.71 2.02 1.74 1.51 1.15 0.72 0.75 0.86 0.74 0.92 0.65 0.67 0.95 0.69 0.82 0.90 1.15 0.89 0.76


Pasadena and Magnolia Zone Diurnal
Hourly Peaking Factor
Hour
0.82 0.86 0.86 1.02 1.40 1.50 1.66 1.60 1.19 1.21 0.97 0.90 0.80 0.67 0.73 0.69 0.83 0.80 1.07 1.07 0.86 0.84 0.80 0.85

Appendix D
CITY'S 2019 WATER QUALITY REPORT

2019 Water Quality Report

City of
South Pasadena
Public Works



This report reflects water quality testing conducted during 2019.

Your 2019 South Pasadena Water Quality Report

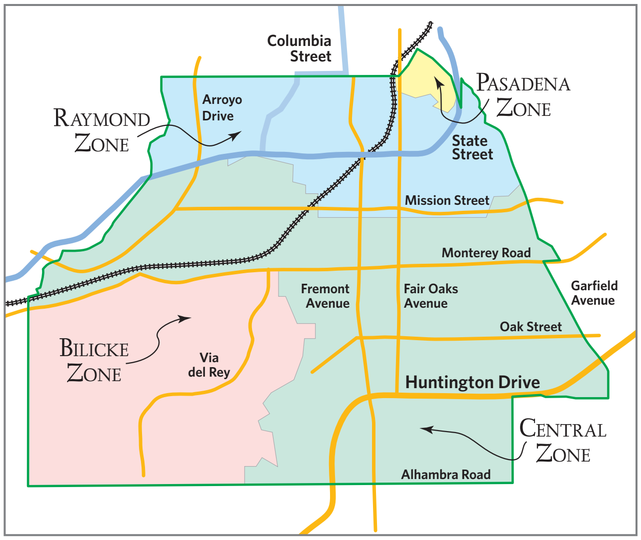
State Water Project

Introduction

The City of South Pasadena (City) is committed to keeping you informed about the quality of your drinking water. This report is provided to you annually. It includes information describing where your drinking water comes from, the constituents found in your drinking water and how the water quality compares with the regulatory standards.

Where Does My Drinking Water Come From?

The water supply for the City comes from three sources: (1) groundwater pumped from wells in the Main San Gabriel Groundwater Basin, (2) surface water imported by Metropolitan Water District of Southern California (Metropolitan) from the Colorado River and from Northern California, and (3) groundwater from the City of Pasadena, which includes Metropolitan water, that is supplied to only the City's Pasadena Zone. Metropolitan filters imported surface water and adds chloramines, a combination of chlorine and ammonia, as a residual disinfectant. The City adds chlorine without ammonia, called free chlorine, to groundwater pumped from wells. A residual amount of free chlorine and chloramines in the distribution system helps prevent microorganisms from growing in the pipes.



City of South Pasadena — Water System Pressure Zone Map

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This report contains important information about your drinking water. Translate it, or speak with someone who understands it.

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Este informe contiene información muy importante sobre su agua potable. Para más información o traducción, por favor contacte al departamento de obras públicas al 626-403-7240.

~

此份有關你的食水報告,
內有重要資料和訊息,請找
他人為你翻譯及解釋清楚。

Questions about your water? Contact us for answers.

For more information or questions regarding this report, please contact the Public Works Department at 626-403-7240.

Regularly scheduled meetings of the City of South Pasadena City Council are held on the first and third Wednesday of each month at 7:30 p.m. at 1424 Mission Street, South Pasadena, California 91030. The meetings provide an opportunity for public participation in decisions that may affect the quality of your drinking water.

The Quality of Your Water Is Our Primary Concern

What Is in My Drinking Water?

Your drinking water is tested by certified professional water system operators and certified laboratories to ensure its safety. The City routinely tests drinking water from its wells and distribution system pipes for bacterial and chemical contaminants while Metropolitan is responsible for testing its treated surface water purchased by the City.

The City of Pasadena is responsible for testing its groundwater purchased by the City for only the Pasadena Zone. The chart in this report shows the average and range of concentrations of the constituents tested in your drinking water during year 2019 or from the most recent tests.

The State Water Resources Control Board, Division of Drinking Water (DDW) allows the City to monitor for some contaminants less than once per year because the concentrations of these contaminants in groundwater do not change frequently. Some of our data, although representative, are more than one year old.

The chart lists all the contaminants **detected** in your drinking water that have federal and state drinking water standards. Detected unregulated contaminants of interest are also included. We are proud to report that during 2019, the drinking water provided by the City to your home met or surpassed all federal and state drinking water standards. We remain dedicated to providing you with a reliable supply of high quality drinking water.

ABOUT SOUTH PASADENA PUBLIC WORKS

We Provide Far More Than Just Water!

The Public Works Department is responsible for streets, public buildings, water, sewer systems, street lighting, and park maintenance. For a name change, or to start water service, call the Finance Department at (626) 403-7250.

Because California's main water sources have been severely impacted by record dry conditions in recent years, we encourage everyone to become more conservation conscious.

Visit **www.bewaterwise.com** to learn more about water savings, and the **South Pasadena Environmental Programs** website for additional information about water conservation rebates: **www.southpasadenaca.gov/rebates**.

What Contaminants May be Present in the Sources of My Drinking Water?

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

- **Microbial contaminants**, such as viruses and bacteria, that may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife.
- **Inorganic contaminants**, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.
- **Pesticides and herbicides**, that may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.
- **Radioactive contaminants**, that can be naturally-occurring or be the result of oil and gas production and mining activities.
- **Organic chemical contaminants**, including synthetic and volatile organic chemicals, that are byproducts of industrial processes and petroleum production, and can also come from gasoline stations, urban stormwater runoff, agricultural application and septic systems.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk.

More information about contaminants and potential health effects can be obtained by calling the United States Environmental Protection Agency's (USEPA) Safe Drinking Water Hotline (1-800-426-4791).

Federal and State Water Quality Regulations

WATER QUALITY ISSUES THAT COULD AFFECT YOUR HEALTH

Are There Any Precautions the Public Should Consider?

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers.

USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

Drinking Water Fluoridation

Metropolitan joined a majority of the nation's public water suppliers by adding fluoride to drinking water in order to prevent tooth decay. The average fluoride level in Metropolitan's treated water is 0.7 milligrams per liter (mg/L). The City does not add additional fluoride to the local water because fluoride occurs naturally in groundwater.

As shown on the water quality chart, the average fluoride concentration in the City's groundwater is 0.91 mg/L, while the average fluoride concentration in the City of Pasadena's groundwater that is supplied to only the Pasadena Zone is 0.8 mg/L.

About Lead in Tap Water

If present, elevated levels of lead can cause serious problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking.

DDW enforces the Lead and Copper Rule, which follows the USEPA's Lead and Copper Rule, and is used to protect the public's drinking water from metals that can adversely affect public health. The Lead and Copper Rule requires water systems to monitor lead and copper levels at the consumers' taps. In accordance with the Lead and Copper Rule, the City collected the latest lead and copper samples from 32 residences during 2018; lead was detected in the samples collected from one residence but it did not exceeded the regulatory Action Level, while copper was detected in the samples collected from 23 residences but none exceeded the regulatory Action Level. Therefore, the City is in compliance with the Lead and Copper Rule.

If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the USEPA Safe Drinking Water Hotline or at www.epa.gov/lead.

Nitrate in Tap Water

Although nitrate in your drinking water never exceeds the MCL of 10 mg/L, nitrate levels may rise quickly for short periods of time because of rainfall or agricultural activity.

Nitrate in drinking water at levels above 10 mg/L is a health risk for infants of less than six months of age. Such nitrate levels in drinking water can interfere with the capacity of the infant's blood to carry oxygen, resulting in a serious illness; symptoms include shortness of breath and blueness of the skin. Nitrate levels above 10 mg/L may also affect the ability of the blood to carry oxygen in other individuals, such as pregnant women and those with certain specific enzyme deficiencies.

If you are caring for an infant, or you are pregnant, you should ask for advice from your health care provider.

Understanding the Water Quality Tables

Source Water Assessments

Imported (Metropolitan) Water Assessment

Every five years, Metropolitan is required by DDW to examine possible sources of drinking water contamination in its State Water Project and Colorado River source waters.

The most recent watershed sanitary surveys of Metropolitan's source water supplies from the Colorado River was updated in 2015 and the State Water Project was updated in 2016.

Water from the Colorado River is considered to be most vulnerable to contamination from recreation, urban/stormwater runoff, increasing urbanization in the watershed, and wastewater. Water supplies from Northern California's State Water Project are most vulnerable to contamination from urban/stormwater runoff, wildlife, agriculture, recreation, and wastewater.

USEPA also requires Metropolitan to complete one Source Water Assessment (SWA) that utilizes information collected in the watershed sanitary surveys. Metropolitan completed its SWA in December 2002. The SWA is used to evaluate the vulnerability of water sources to contamination and helps determine whether more protective measures are needed.

A copy of the most recent summary of either Watershed Sanitary Survey or the SWA can be obtained by calling Metropolitan at (800) CALL-MWD (225-5693).

Groundwater Assessment

In accordance with the federal Safe Drinking Water Act, an assessment of the drinking water sources for the City was completed in December 2002.

The assessment concluded that the City's groundwater wells are considered most vulnerable to the following activities or facilities associated with contaminants detected in the water supply: dry cleaners, gasoline stations, automobile repair shops, high density housing and medical/dental office/clinics. In addition, the groundwater wells are considered most vulnerable to the following facility not associated with contaminants detected in the water supply: leaking underground storage tanks.

A copy of the complete assessment is available at the City of South Pasadena Public Works Department at 1414 Mission Street, South Pasadena, California 91030.

You may request a summary of the assessment to be sent to you by contacting the Public Works Department at 626-403-7240.

An assessment of the drinking water sources for the City of Pasadena's water system was completed in August 2002. The wells in the City of Pasadena were found to be most vulnerable to contamination from automobile gasoline stations, repair shops and body shops; underground storage tanks; and military installations. A copy of the complete assessment is available at Pasadena Water and Power, 150 South Los Robles Avenue, Suite 200, Pasadena, California.

Want Additional Information?

There's a wealth of information on the internet about Drinking Water Quality and water issues in general, especially the drought and conservation. Some good sites — both local and national — to begin your own research are:

City of South Pasadena Water
www.southpasadenaca.gov

U.S. Environmental Protection Agency
www.epa.gov/safewater

State Water Resources Control Board, Division of Drinking Water
www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/publicwatersystems.shtml

Metropolitan Water District of Southern California
www.mwdh2o.com

Drought and Water Conservation Tips
www.BeWaterWise.com
www.SaveOurWater.com

Rebate Information, Water Saving Resources
www.SoCalWaterSmart.com

What are Water Quality Standards?

In order to ensure that tap water is safe to drink, the USEPA and DDW prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. The U.S. Food and Drug Administration regulations and California law also establish limits for contaminants in bottled water that provide the same protection for public health.

Drinking water standards established by USEPA and DDW set limits for substances that may affect consumer health or aesthetic qualities of drinking water. The chart in this report shows the following types of water quality standards:

- **Maximum Contaminant Level (MCL):** The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible.
- **Secondary MCLs** are set to protect the odor, taste, and appearance of drinking water.
- **Maximum Residual Disinfectant Level (MRDL):** The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
- **Primary Drinking Water Standard:** MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements and water treatment requirements.
- **Regulatory Action Level (AL):** The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.
- **Treatment Technique (TT):** A required process intended to reduce the level of a contaminant in drinking water.
- **Notification Level (NL):** An advisory level which, if exceeded, requires the drinking water system to notify the governing body of the local agency in which users of the drinking water reside (i.e. city council, board of directors, and county board of supervisors).

What is a Water Quality Goal?

In addition to mandatory water quality standards, USEPA and DDW have set voluntary water quality goals for some contaminants. Water quality goals are often set at such low levels that they are not achievable in practice and are not directly measurable. Nevertheless, these goals provide useful guideposts and direction for water management practices. The chart in this report includes three types of water quality goals:

- **Maximum Contaminant Level Goal (MCLG):** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by USEPA.
- **Maximum Residual Disinfectant Level Goal (MRDLG):** The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.
- **Public Health Goal (PHG):** The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

How are Contaminants Measured?

Water is sampled and tested throughout the year. Contaminants are measured in:

- parts per million (ppm) or milligrams per liter (mg/L) *(3 drops in 42 gallons – a large bathtub)*
- parts per billion (ppb) or micrograms per liter (μg/L) *(1 drop in 14,000 gallons – an average swimming pool)*
- parts per trillion (ppt) or nanograms per liter (ng/L) *(1 drop in 14,000,000 gallons – an average lake)*

City of South Pasadena 2019 Water Quality (Table 1 of 2)

Constituents and Measurement Units	MCL or [MRDL]	PHG (MCLG) or [MRDLG]	DLR	SOUTH PASADENA GROUNDWATER Result[a]	Range	Most Recent Test	PASADENA GROUNDWATER (Pasadena Zone Only) Result[a]	Range	Most Recent Test	METROPOLITAN IMPORTED WATER Result[a]	Range	Most Recent Test	Typical Origins
Primary Drinking Water Standards – Health-Related Standards													
Filter Effluent Turbidity (NTU) [b]	TT = 1 NTU	NA	NA	NR			NR			0.04	–	Continuous Testing	Soil runoff
	TT = 95% of samples ≤0.3 NTU									100%	–		
Microbiological													
Total Coliforms	5.0%	(0)	NA	0%	0%	Weekly	MCL Compliance Determined from Testing in the South Pasadena Distribution System			MCL Compliance Determined from Testing in the South Pasadena Distribution System			Naturally present in the environment
Disinfectant and Disinfection Byproducts [c]													
Total Trihalomethanes (TTHM) (µg/L)	80	NA	1	35	ND – 6.2	Quarterly	MCL Compliance Determined from Testing in the South Pasadena Distribution System			MCL Compliance Determined from Testing in the South Pasadena Distribution System			By-product of drinking water disinfection
Haloacetic acids (five) (HAA5) (µg/L)	60	NA	1 – 2	9.7	ND – 1	Quarterly							By-product of drinking water disinfection
Chloramines Residual as Cl2 (mg/L)	[4]	[4]	NA	1.2	0.64 – 1.6	Weekly							Drinking water disinfectant
Chlorine Residual as Cl2 (mg/L)	[4]	[4]	NA	0.98	0.20 – 1.3	Weekly							Drinking water disinfectant
Organic Chemicals													
1,2,3 Trichloropropane (µg/L)	0.005	0.0007	0.005	ND	ND	Weekly	ND	ND	2019	ND	ND	2019	Discharge from industrial or agricultural activities
Carbon Tetrachloride (ng/L)	500	100	500	ND	ND	2019	ND	ND	2019	ND	ND	2019	Discharge from industrial activities
cis-1,2-Dichloroethylene (µg/L)	6	100	0.5	ND	ND	2019	ND	ND	2019	ND	ND	2019	Discharge from industrial activities
Tetrachloroethylene (PCE) (µg/L)	5	0.06	0.5	1.6	0.77 – 1.9	2019	ND	ND – 1.2	2019	ND	ND	2019	Discharge from industrial activities
Toluene (µg/L)	150	150	0.5	ND	ND	2019	ND	ND	2019	0.6	0.6	2019	Discharge from petroleum & chemical refineries
Trichloroethylene (TCE) (µg/L)	5	1.7	0.5	1.1	0.65 – 1.7	2019	ND	ND – 1.3	2019	ND	ND	2019	Discharge from industrial activities
Inorganic Chemicals													
Aluminum (mg/L)	1	0.6	0.05	ND	ND	2019	ND	ND	2019	0.12	ND – 0.11	2019	Used for filtration treatment of surface water
Barium (mg/L)	1	2	0.1	ND	ND	2019	ND	ND – 0.16	2019	ND	ND	2019	Erosion of natural deposits
Bromate (µg/L)	10	0.1	1	NR			NR			1.9	ND – 8.1	2019	Byproduct of drinking water disinfection
Copper (mg/L) [d]	AL = 1.3	0.3	0.05	0.33	0 / 32 Samples Exceeded the AL	2018	MCL Compliance Determined from Testing in the South Pasadena Distribution System			NR			Corrosion of household plumbing system
Fluoride (mg/L) Naturally-occurring	2	1	0.1	0.91	0.86 – 0.92	2019	0.8	0.5 – 1.5	2019	NR			Erosion of natural deposits
Fluoride (mg/L) Treatment-related	2	1	0.1	NR			NR			0.7	0.6 – 0.9	2019	Water additive for dental health
Lead (µg/L) [d]	AL = 15	0.2	5	ND	0 / 32 Samples Exceeded the AL	2018	MCL Compliance Determined from Testing in the South Pasadena Distribution System			NR			Corrosion of household plumbing system
Nitrate as N (mg/L)	10	10	0.4	5.1	3.1 – 5.8	Monthly	4.9	ND – 7.8	2019	0.5	0.5	2019	Leaching from fertilizer use
Radioactivity													
Combined Radium (pCi/L)	5	(0)	1	ND	ND	2016	ND	ND – 1.4	2018	ND	ND	2017	Erosion of natural deposits
Gross Alpha Particle Activity (pCi/L)	15	(0)	3	3.3	ND – 6.5	2016	8	5 – 11	2018	ND	ND	2017	Erosion of natural deposits
Uranium (pCi/L)	20	0.43	1	1.6	1.4 – 1.8	2016	10	3 – 15	2018	ND	ND	2017	Erosion of natural deposits
Secondary Drinking Water Standards – Aesthetic Standards, Not Health-Related													
Aluminum (µg/L) [e]	200	600	50	ND	ND	2019	ND	ND	2019	122	ND – 110	2019	Used for treatment of MWD surface water
Color (Units)	15	NA	NA	ND	ND	2018	ND	ND	2019	ND	ND – 1	2019	Naturally occurring organic materials
Chloride (mg/L)	500	NA	NA	18	16 – 19	2018	60	18 – 108	2019	50	46 – 55	2019	Runoff/leaching from natural deposits
Iron (µg/L)	300	NA	100	ND	ND	2018	ND	ND – 220	2019	243	243	2019	Leaching from natural deposits; industrial wastes
Odor-Threshold (Units)	3	NA	1	ND	ND	2018	1	1	2019	1	1	2019	Naturally occurring organic materials
Specific Conductance (µmho/cm)	1,600	NA	NA	350	330 – 360	2018	681	490 – 970	2019	469	435 – 503	2019	Substances that form ions in water
Sulfate (mg/L)	500	NA	0.5	47	40 – 54	2018	100	32 – 259	2019	73	65 – 81	2019	Runoff/leaching from natural deposits
Total Dissolved Solids (mg/L)	1,000	NA	NA	260	240 – 280	2019	399	260 – 630	2019	266	244 – 289	2019	Runoff/leaching from natural deposits
Turbidity (NTU)	5	NA	0.1	0.22	0.13 – 0.3	2018	0.3	ND – 1.7	2019	ND	ND	2019	Soil runoff

City of South Pasadena 2019 Water Quality (Table 2 of 2)

Constituents and Measurement Units	MCL or [MRDL]	PHG (MCLG) or [MRDLG]	DLR	SOUTH PASADENA GROUNDWATER			PASADENA GROUNDWATER (Pasadena Zone Only)			METROPOLITAN IMPORTED WATER			Typical Origins
				Result[(a)]	Range	Most Recent Test	Result[(a)]	Range	Most Recent Test	Result[(a)]	Range	Most Recent Test	
Unregulated Chemicals													
Alkalinity (mg/L)	NA	NA	NA	90	86 – 93	2018	172	87– 210	2019	68	67 – 70	2019	Runoff/leaching from natural deposits
Calcium (mg/L)	NA	NA	NA	21	18 – 23	2018	68	28 – 98	2019	25	23 – 27	2019	Runoff/leaching from natural deposits
Chromium, Hexavalent (µg/L)	NA	0.02	1	2.3	1.2 – 3.3	2019	3.1	1.9 – 5.8	2018	ND	ND	2019	Erosion of natural deposits; industrial waste discharge
Magnesium (mg/L)	NA	NA	NA	5.5	4.4 – 6.5	2018	20	12 – 37	2019	12	11 – 12	2019	Runoff/leaching from natural deposits
Perfluorohexanoic acid (ng/L)	NA	NA	NA		NR			NR		2.6	2.5 – 2.6	2019	Discharge from industrial activities
pH (pH units)	NA	NA	NA	7.9	7.9	2018	7.6	7.2 –7.9	2019	8.5	8.5	2019	Runoff/leaching from natural deposits
Potassium (mg/L)	NA	NA	NA	1.6	1.5 – 1.7	2018	2.6	2 – 3.1	2019	2.4	2.2 – 2.7	2019	Runoff/leaching from natural deposits
Other Constituents of Interest													
Hardness as $CaCO_3$ (mg/L)	NA	NA	NA	74	63 – 84	2018	255	124 – 394	2019	108	101 – 116	2019	Runoff/leaching from natural deposits
Sodium (mg/L)	NA	NA	NA	42	34 – 49	2018	38	22 – 54	2019	50	46 – 54	2019	Runoff/leaching from natural deposits
Unregulated Chemicals Requiring Monitoring													
Manganese (µg/L) [(f)]	SMCL = 50	NA	NA	4.3	0.58 – 8	2019		NR		3	1.2 – 3.7	2019	Erosion of natural deposits
Unregulated Chemicals Requiring Monitoring in the Distribution System													
Haloacetic acids (HAA5) (µg/L)	NA	NA	NA	0.42	ND – 1.5	2019		Testing in the South Pasadena Distribution System			Testing in the South Pasadena Distribution System		Byproducts of drinking water disinfection
Haloacetic acids (HAA6Br) (µg/L)	NA	NA	NA	0.43	ND – 1.5	2019							Byproducts of drinking water disinfection
Haloacetic acids (HAA9) (µg/L)	NA	NA	NA	0.54	ND – 2.2	2019							Byproducts of drinking water disinfection

NOTES:

mg/L = parts per million or milligrams per liter; **AL** = Action Level; **ND** = Not Detected at DLR;
µg/L = parts per billion or micrograms per liter; **DLR** = Detection Limit for Purposes of Reporting;
NA = No Applicable Limit or Data; **ng/L** = parts per trillion or nanograms per liter; **pCi/L** = picoCuries per liter;
MCL = Maximum Contaminant Level; **NL** = Notification Level; **µmho/cm** = micromhos per centimeter;
MCLG = Maximum Contaminant Level Goal; **MRDL** = Maximum Residual Disinfectant Level;
PHG = Public Health Goal; **NTU** = Nephelometric Turbidity Units; **NR** = Not Required to be Sampled;
MRDLG = Maximum Residual Disinfectant Level Goal; **SMCL** = Secondary MCL

(a) The results reported in the table are average concentrations of the constituents detected in your drinking water during year 2019 or from the most recent tests, except for filter effluent turbidity, TTHM, HAA5, chlorine residual, chloramine residual, lead, and copper which are described below.

(b) Turbidity is a measure of the cloudiness of the water, an indication of particulate matter, some of which might include harmful microorganisms that are difficult to detect, such as the parasites *Giardia* and *Cryptosporidium*. Consistently low turbidity in Metropolitan's filtered water indicates complete removal of any harmful microorganisms that may be present. The table gives the highest single turbidity measurement that was recorded and the lowest monthly percentage of samples meeting the requirements of the surface water treatment technique.

(c) Samples were collected in the City of South Pasadena distribution system. The running annual averages and the range of the individual results for chlorine residuals, TTHM and HAA5 are reported.

(d) Thirty-two lead and copper samples were collected in September 2018 and October 2018 at residential taps. The 90th percentile concentration is reported in the table. Out of 32 residences sampled, copper was detected at or above the DLR in 23 samples but none exceeded the Action Level. Out of 32 residences sampled, lead was detected above the DLR in one sample, but it did not exceed the Action Level. During 2019, no school submitted a request to be sampled for lead.

(e) Aluminum also has a secondary MCL of 200 µg/l.

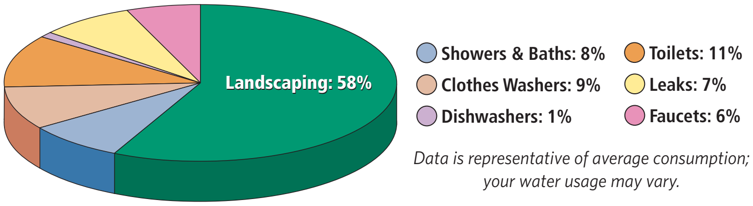
(f) Manganese is regulated with a secondary standard of 50 µg/L but was not detected, based on the DLR of 20 µg/L. Manganese was included as part of the unregulated chemicals requiring monitoring.

For more information or questions, please contact the Public Works Department, City of South Pasadena, 825 Mission Street, South Pasadena, California 91030. Telephone: (626) 403-7240.

Where Do We Use Water the Most?

Outdoor watering of lawns and gardens makes up approximately 60% of home water use. By reducing your outdoor water use — by either cutting back on irrigation or planting more drought tolerant landscaping — you can dramatically reduce your overall water use.

Save the most where you use the most: Make your outdoor use efficient.



Data is representative of average consumption; your water usage may vary.

How to Read Your Residential Water Meter

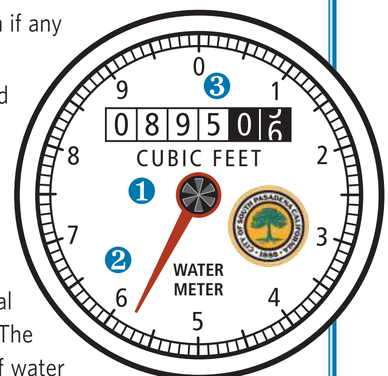
Your water meter is usually located between the sidewalk and curb under a cement cover. Remove the cover by inserting a screwdriver in the hole in the lid and then carefully lift the cover. The meter reads straight across, like the odometer on your car. Read only the white numbers (0895).

If you are trying to determine if you have a leak, turn off all the water in your home, both indoor and outdoor faucets, and then check the red or black triangular dial for any movement of the low-flow indicator. If there is movement, that indicates a leak between the meter and your plumbing system.

❶ **Low-Flow Indicator** — The low flow indicator will spin if any water is flowing through the meter.

❷ **Sweep Hand** — Each full revolution of the sweep hand indicates that one cubic foot of water (7.48 gallons) has passed through the meter. The markings at the outer edge of the dial indicate tenths and hundredths of one cubic foot.

❸ **Meter Register** — The meter register is a lot like the odometer on your car. The numbers keep a running total of all the water that has passed through the meter. The register shown here indicates that 89,505 cubic feet of water has passed through this meter.



For Your Information . . .

Disinfection: Water provided by the City contains chlorine used for disinfection and chloramines used by Metropolitan, also for disinfection purposes. Customers on kidney dialysis should consult their physicians.

Fish or Amphibians: If you have fish or amphibians, make sure to remove any chloramines and chlorine before changing or adding water to the tanks. Remember, allowing drinking water to stand will not remove chloramines. Consult your local aquarium store for products that will remove the disinfectants.

Hot Water Heaters: Many odor complaints may be traced to the home's hot water heater. Remember to follow manufacturer's instructions and flush hot water heaters regularly. This will flush out any sediments that may have accumulated, provide good water turnover to maximize water quality, and help keep your unit in good working order.

Point of Use or Home Water Filtration Units: Be vigilant in changing or cleaning any filters or media on your home units. Always follow the manufacturers instructions. Remember, the water is only as clean as the filter allows. Improperly maintained filters can deliver very poor quality water.

The Need to Conserve Water Remains A High Priority Throughout California

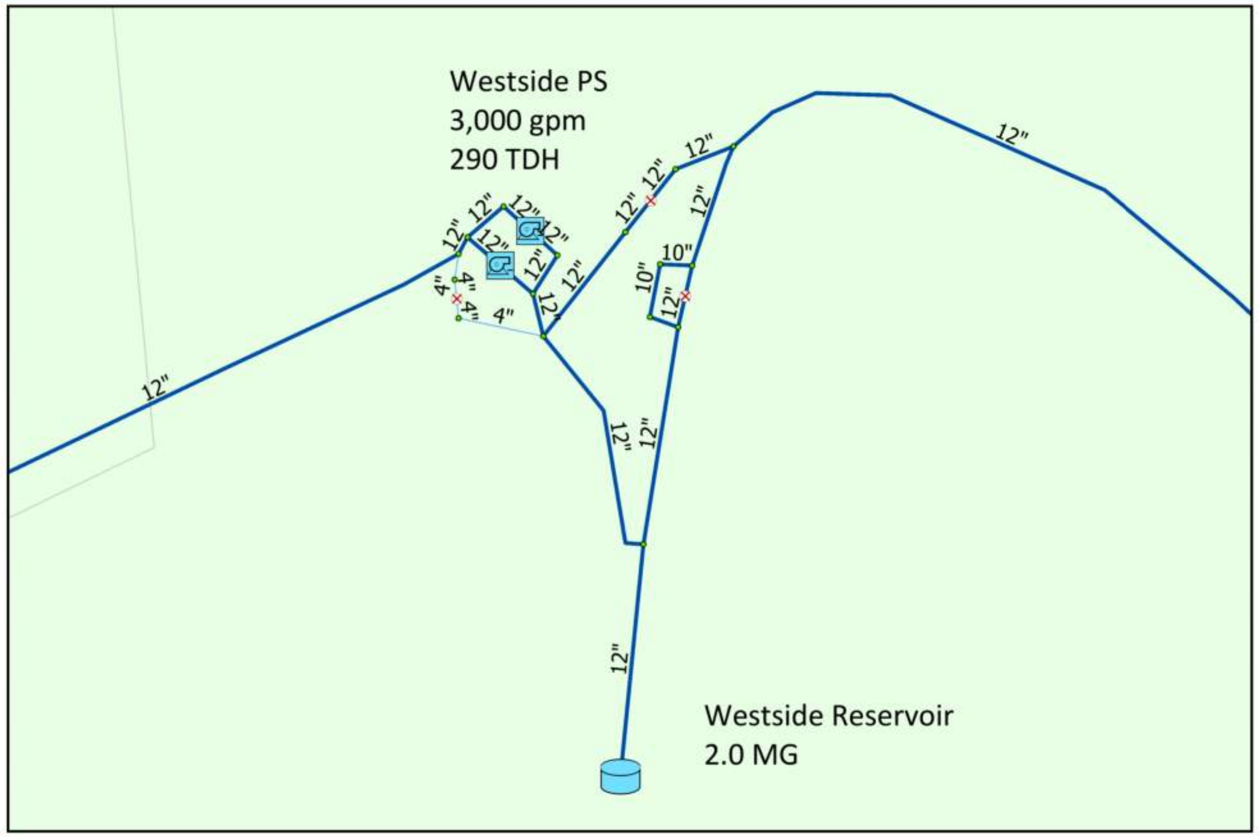
Southern California has an arid climate and the need for wise water use must remain a part of everyone's daily lives. Simple water saving acts like the ones listed here can save countless gallons of water every day.

- Soak pots and pans instead of letting water run while you scrub them clean. ***This both saves water and makes the job easier.***
- Keep a pitcher of drinking water in the refrigerator. ***This can save gallons of water every day and it's always cold!***
- Plug the sink instead of running water to rinse your razor or wet your toothbrush. ***This can save upwards of 300 gallons of water a month.***
- Use a broom instead of a hose to clean off sidewalks and driveways. ***It takes very little time to sweep and the water savings quickly adds up.***
- Check your sprinkler system for leaks, overspray, and broken sprinkler heads and repair promptly. ***This can save countless gallons each time you water.***
- Water plants in the early morning. ***It reduces evaporation and ensures deeper watering.***

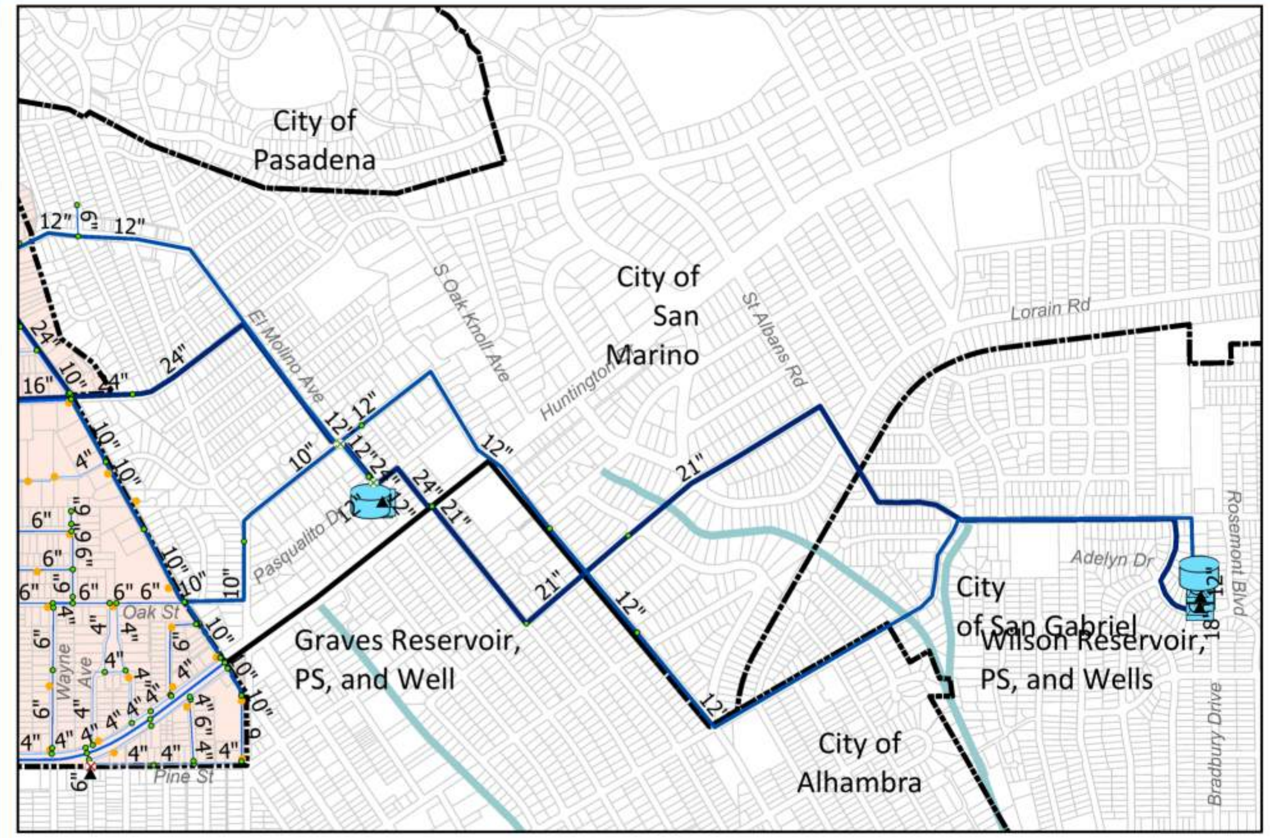
City of South Pasadena Public Works Department
1414 Mission Street • South Pasadena, California 91030
www.southpasadenaca.gov

Appendix E

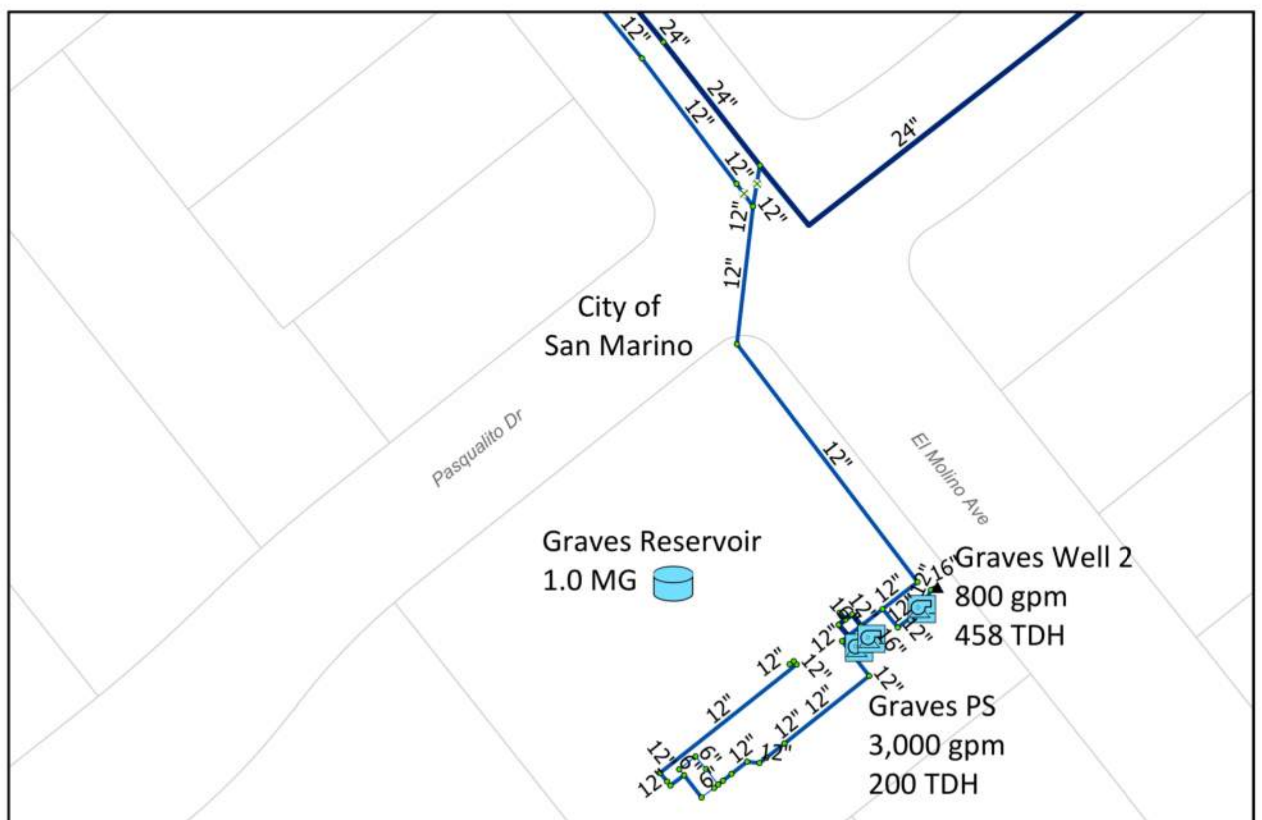
DETAILED FACILITY MAPS



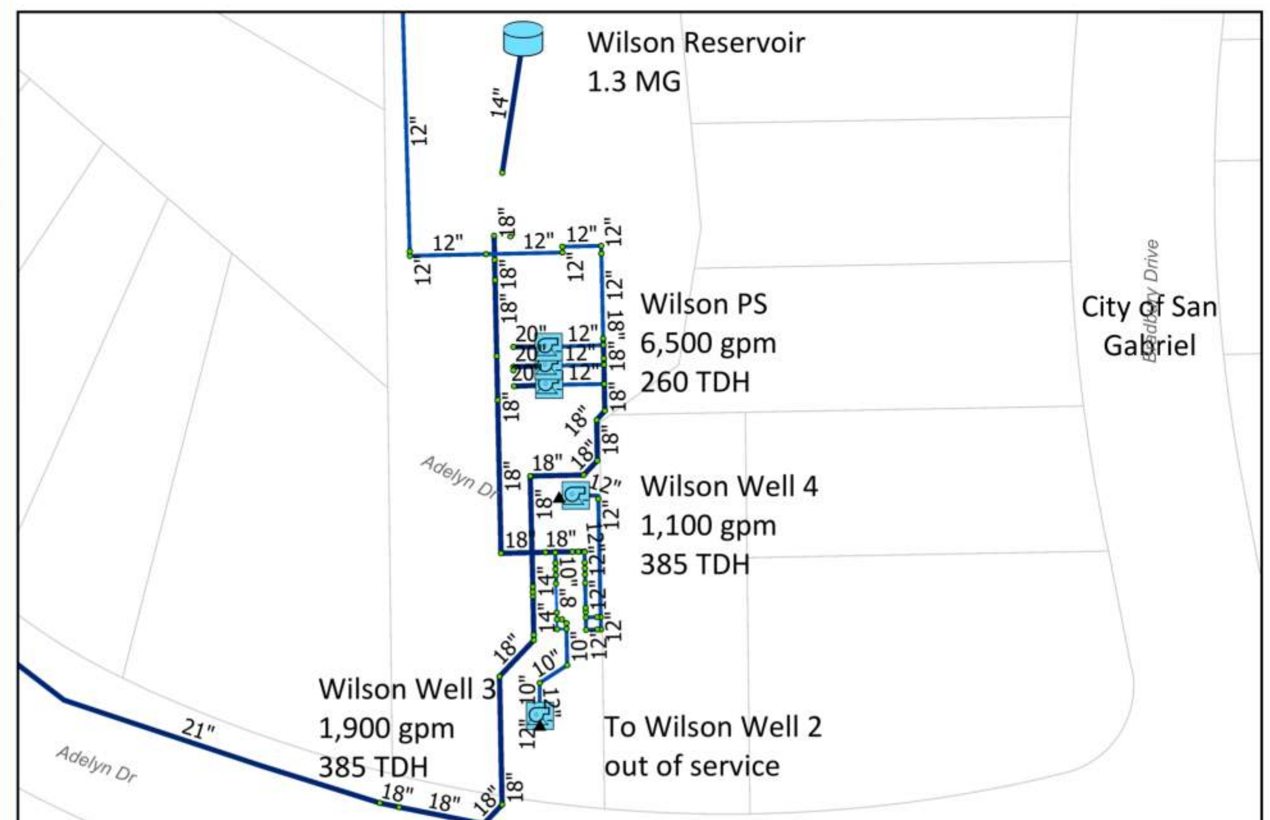
Westside Reservoir & PS



Graves and Wilson Conveyance Piping



Graves Reservoir, PS, and Well



Wilson Reservoir, PS, and Wells

Legend

- Well
- Tanks
- Pumps
- PRV
- Open Valves
- Normally Closed Valves
- Hydrants

Potable Water Pipes

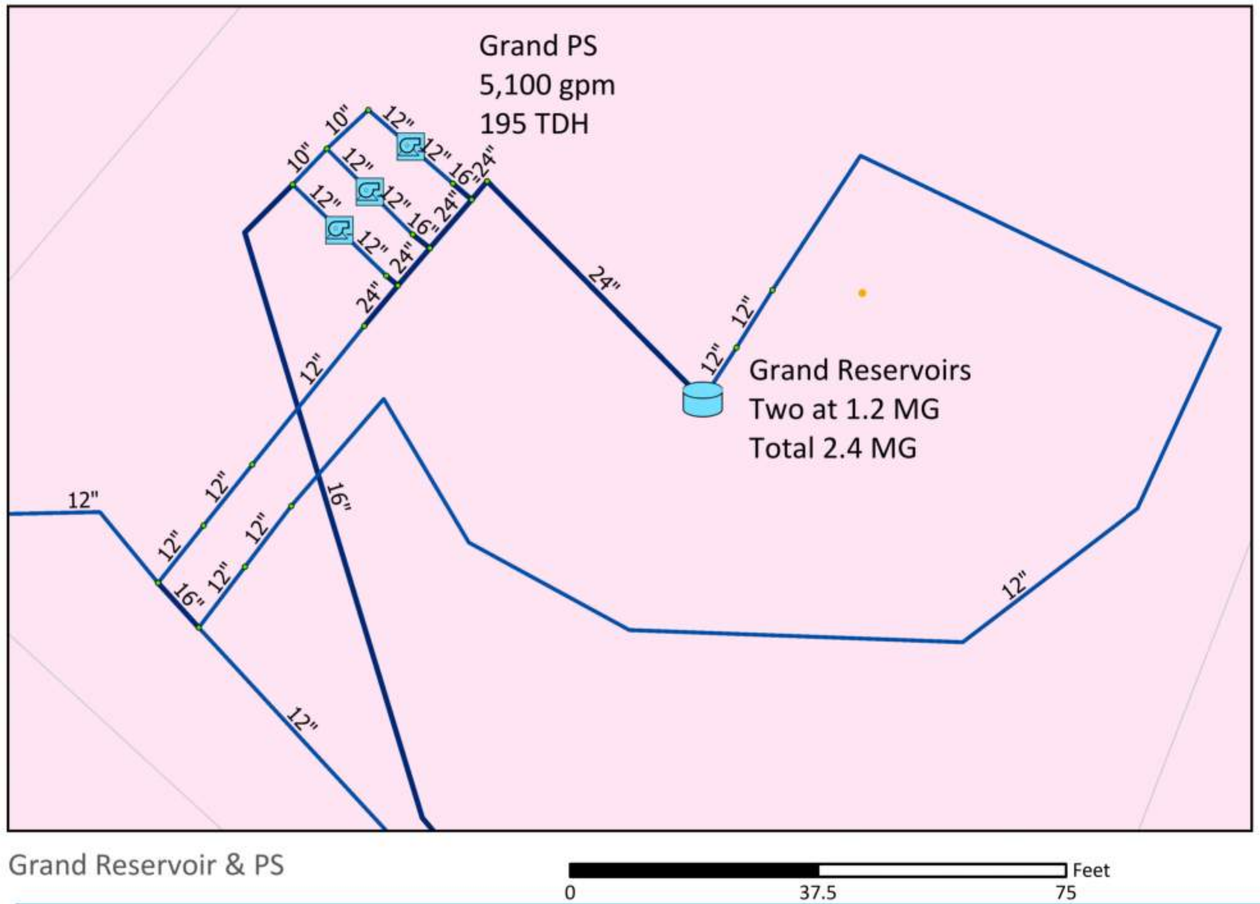
- ≤4"
- 6"
- 8"
- 12"
- ≤24"
- Metro Gold Line
- City Boundaries

Pressure Zones

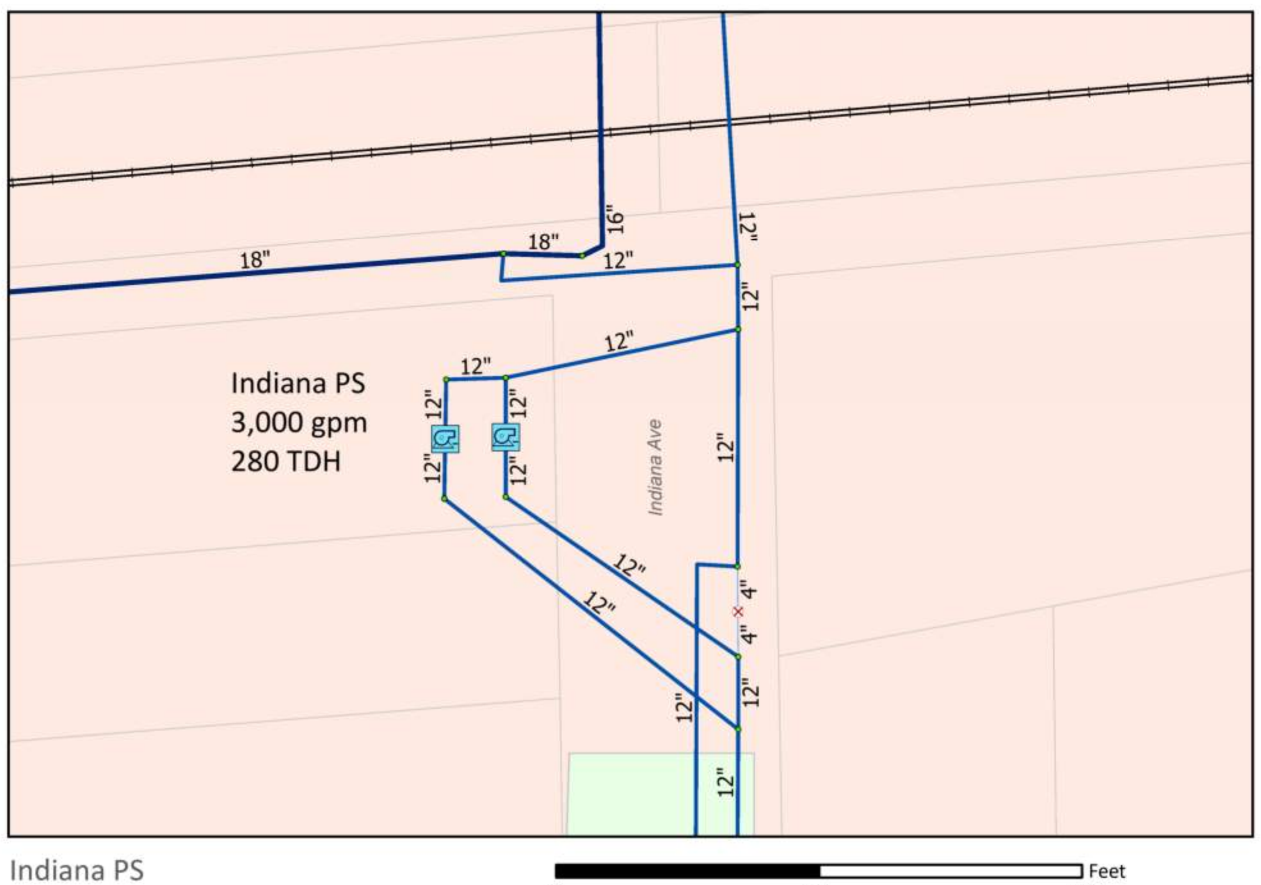
- Magnolia
- Bilikie
- Main
- Pasadena
- Raymond
- Parcel

Data Sources: City of South Pasadena, Los Angeles County

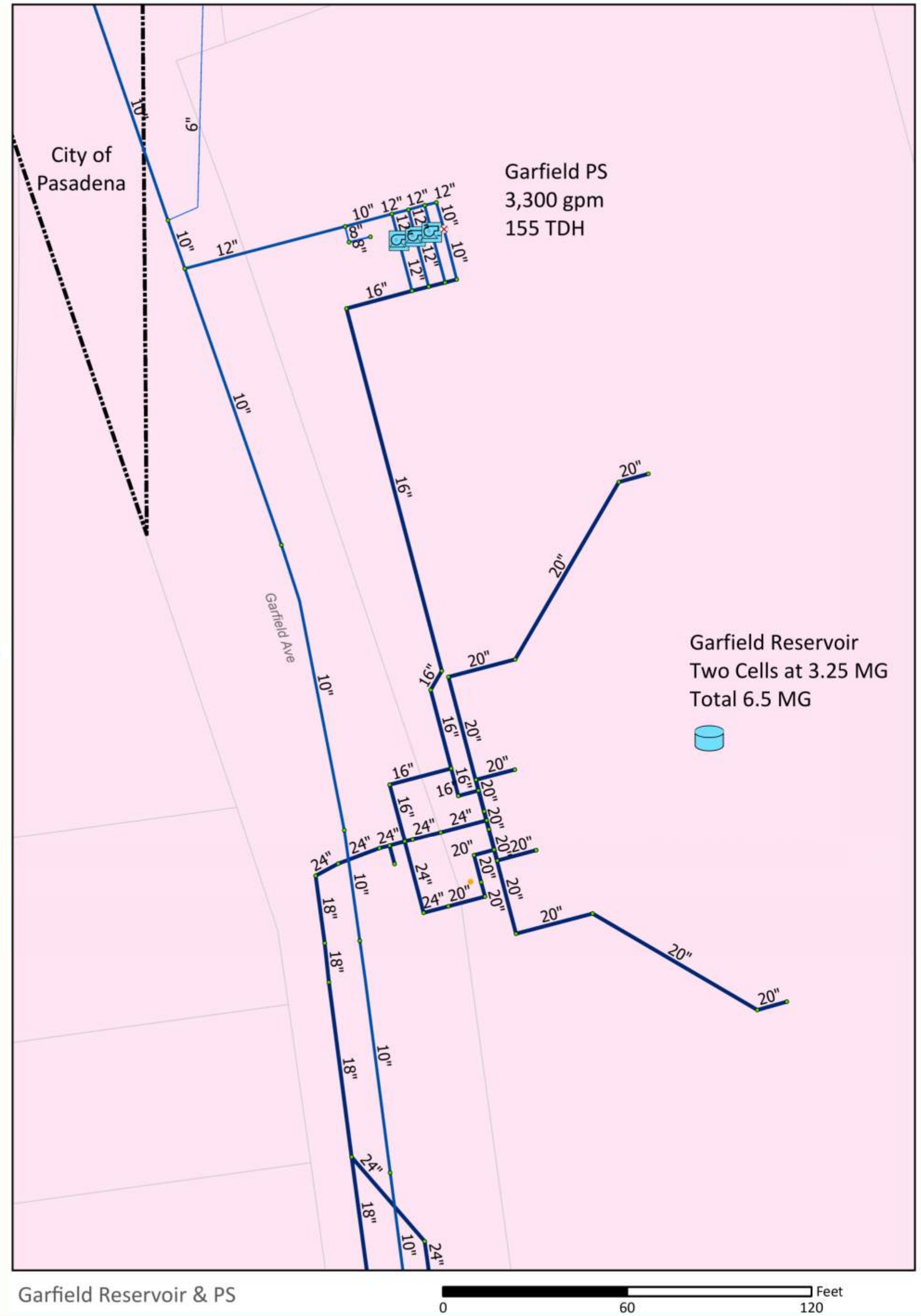
Disclaimer: Features shown in this figure are for planning purposes and represent approximate locations. Engineering and/or survey accuracy is not implied.



Grand Reservoir & PS



Indiana PS



Garfield Reservoir & PS

Legend

- Interconnections
- Tanks
- Pumps
- PRV
- Open Valves
- Normally Closed Valves
- Hydrants

Potable Water Pipes

- ≤4"
- 6"
- 8"
- 12"
- ≤24"
- Metro Gold Line
- City Boundaries

Pressure Zones

- Magnolia
- Bilikie
- Main
- Pasadena
- Raymond
- Parcel

Data Sources: City of South Pasadena, Los Angeles County

Disclaimer: Features shown in this figure are for planning purposes and represent approximate locations. Engineering and/or survey accuracy is not implied.

Appendix F

STORAGE PUMPING AND SUPPLY ANALYSIS

Appendix F.1 - Existing System Supply Analysis with Largest Well Out of Service

Discharge Pressure Zone	Existing Supply	HGL	Supply Capacity	Supply Capacity with Largest Well O.O.S.	Existing ADD	Existing MDD[1]	Total Required Capacity	Existing Capacity Balance
		ft	gpm	gpm	gpm	gpm	gpm	gpm
Pasadena	Sunset	945	600	30				
Central	Graves Well 2	570	800	800				
Central	Wilson Well 3	490	1,900	0				
Central	Wilson Well 4	490	1,100	1,100				
Central	MWD USG-02	943	5,500	5,500				
Total			**9,900**	**7,430**	**2,226**	**3,338**	**3,338**	**4,092**

Notes:
(1) Supply capacities retrieved from City staff
(2) Capacities based on a max velocity of 7 fps in pipelines at their respective locations.
(3) Sunset connection only supplies the Pasadena Zone demand.
(4) MDD Peaking factor is 1.5

Appendix F.2 - Existing System Supply Analysis with MWD Out of Service

Discharge Pressure Zone	Existing Supply	HGL	Supply Capacity	Supply Capacity with MWD O.O.S.	Existing ADD	Existing MDD[1]	Total Required Capacity	Existing Capacity Balance
		ft	gpm	gpm	gpm	gpm	gpm	gpm
Pasadena	Sunset	945	600	30				
Central	Graves Well 2	570	800	800				
Central	Wilson Well 3	490	1,900	1,900				
Central	Wilson Well 4	490	1,100	1,100				
Central	MWD USG-02	943	5,500	0				
Total			**9,900**	**3,830**	**2,226**	**3,338**	**3,338**	**492**

Notes:
(1) Supply capacities retrieved from City staff
(2) Capacities based on a max velocity of 7 fps in pipelines at their respective locations.
(3) Sunset connection only supplies the Pasadena Zone demand.
(4) MDD Peaking factor is 1.5

Appendix F.3 - Existing System Storage Analysis

Pressure Zone	Existing Storage Facilities	Existing Storage Capacity	HGL	Existing ADD	Existing MDD[1]	Operational Storage (30% MDD)	Emergency Storage (100% MDD)	Maximum Fireflow Required In Zone	Fireflow Duration	Fire Storage	Total Storage Required	Zone Deficit/ Surplus[2]	Zone Transfer Description / *Recommended Storage*	Zone Transfer	Proposed Storage Capacity	Surplus with Improvements and Transfers
		MG	ft	mgd	mgd	MG	MG	gpm	hours	MG	MG	MG				
Bilicke	Bilicke Tank	0.15	963										Pump from Central Zone.	1.65		
Zone Subotal	***Bilicke***	***0.15***	***963***	**0.49**	**0.74**	***0.22***	***0.74***	***3,500***	***4***	***0.84***	***1.80***	***-1.65***		**1.65**	**0.00**	**0.00**
Pasadena		0.00	0										Install Check valve from Raymond .	0.34		
Zone Subotal	***Pasadena***	***0.00***	***945***	**0.02**	**0.03**	***0.01***	***0.03***	***2,500***	***2***	***0.30***	***0.34***	***-0.34***		***0.34***	**0.00**	**0.00**
Raymond	Raymond Tank	0.15	881										PRV to Magnolia Zone.	-0.89		
													Install Check Valve to Pasadena Zone.	-0.34		
													Pump from Central Zone.	3.40		
Zone Subtotal	***Raymond***	***0.15***	***881***	**0.76**	**1.14**	***0.34***	***1.14***	***3,500***	***4***	***0.84***	***2.32***	***-2.17***		**2.17**	**0.00**	**0.00**
Central	Westside Reservoir	2.00	710										Pump to Bilicke Zone.	-1.65		
	Grand Reservoir	2.40	746										Pump to Raymond Zone.	-3.40		
	Garfield Reservoir	6.50	746													
	Wilson Reservoir	1.30	490													
	Graves Reservoir	1.00	571													
Zone Subtotal	***Central***	***13.20***	***746***	**1.91**	**2.86**	***0.86***	***2.86***	***3,500***	***4***	***0.84***	***4.56***	***8.64***		***-5.05***	**0.00**	**3.59**
Magnolia		0.00	819										PRV from Raymond	0.89		
Zone Subtotal	***Magnolia***	***0.00***	***819***	**0.02**	**0.04**	***0.01***	***0.04***	***3,500***	***4***	***0.84***	***0.89***	***-0.89***		***0.89***	**0.00**	**0.00**
Grand Total		**13.50**	**N/A**	**3.20**	**4.81**	**1.44**	**4.81**	**N/A**	**N/A**	**3.66**	**9.91**	**3.59**		**0.00**	**0.00**	**3.59**

Notes:

(1) MDD Peaking factor is 1.5

Appendix F.4 - Existing System Pump Station Analysis

Discharge Pressure Zone	Existing Facility	HGL	Pump Station Capacity	Firm Pump Station Capacity[1]	Existing ADD	Existing MDD[2]	Capacity Required Including Upstream Zones	Max Zone Fire Flow (MFF)	Fire Flow Duration	Governing Size Criteria	Total Required Capacity	Existing Capacity Balance	Proposed Improvement[2,3]	Future Total Capacity	Future Total Firm Capacity	Zone Deficit/Surplus with Improvements
		ft	gpm	gpm	gpm	gpm	gpm	gpm	hours		gpm	gpm		gpm	gpm	gpm
Bilicke[3]	Indiana PS A	919	1,500	1,500										1,500	1,500	
	Indiana PS B	924	1,500	0									Replace old pumps. Add Tranfer Switch for backup power.	1,500	0	
	Westside PS A	995	1,500	1,500										1,500	1,500	
	Westside PS B	995	1,500	0									Replace old pumps. Add Tranfer Switch for backup power.	1,500	1,500	
													Add a third pump at Westside PS to increase the firm capacity.	1,500	0	
Zone Subtotal	**Bilicke**	**963**	**6,000**	**3,000**	**343**	**515**	**515**	**3,500**	**4**	**MDD+MFF**	**4,015**	**-1,015**		**7,500**	**4,500**	**485**
Pasadena	Sunset	945	0	0										0	0	
	Sunset (Backup)	945	0	0										0	0	
	Columbia (Backup)	945	0	0										0	0	
													Install Low Pressure 12-inch Check Valve from Raymond Zone.	3,900	3,900	
Zone Subtotal	**Pasadena**	**#N/A**	**0**	**0**	**16**	**24**	**24**	**2,500**	**2**	**MDD+MFF**	**2,524**	**-2,524**		**3,900**	**3,900**	**1,376**
Raymond[3]	Garfield PS A	897	900	900										900	900	
	Garfield PS B	897	900	900										900	900	
	Garfield PS C	922	1,500	0										1,500	0	
	Grand PS A	920	1,700	0										1,700	0	
	Grand PS B	922	1,700	1,700										1,700	1,700	
	Grand PS C	920	1,700	1,700										1,700	1,700	
Zone Subtotal	**Raymond**	**#N/A**	**8,400**	**5,200**	**525**	**788**	**813**	**3,500**	**4**	**MDD+MFF**	**4,313**	**887**		**8,400**	**5,200**	**887**
Central	Graves PS A	763	1,500	1,500										1,500	1,500	
	Graves PS B	779	1,500	0									Add backup power.	1,500	0	
	Wilson PS A	741	2,500	0									Add backup power.	2,500	0	
	Wilson PS B	763	2,500	2,500										2500	2500	
	Wilson PS C	741	1,500	1,500										1,500	1,500	
	MWD USG-02 (8")	943	2,100	0										2,100	0	
	MWD USG-02 (10")	943	3,400	0										3,400	0	
Zone Subtotal	**Central**	**#N/A**	**15,000**	**5,500**	**1,325**	**1,987**	**3,290**	**3,500**	**4**	**MDD**	**3,290**	**2,210**		**15,000**	**5,500**	**2,210**
Magnolia[4]														0	0	
Zone Subtotal	**Magnolia**	**#N/A**	**0**	**0**	**16**	**25**	**25**	**0**	**0**	**N/A**	**0**	**0**		**0**	**0**	**0**
Total			**29,400**	**13,700**	**2,226**	**3,338**	**4,666**	**13,000**			**14,141**	**-441**		**34,800**	**19,100**	**4,959**

Notes:

(1) Firm Pump Station Capacity only required for Zones with Gravity Storage (Table 4.1)

(2) MDD Peaking factor is 1.5

(3) Zone is analyzed using MDD+MFF rather than MDD, because zone storage is minimal

(4) No fire hydrants in zone

(5) Raymond Zone's required capacity includes MDD of Raymond and Magnolia Zones.

(6) Central Zone's required capacity includes MDD of Central, Raymond, Magnolia, and Bilicke Zones.

Appendix F.5 - Re-Zone Existing System Storage Analysis

Pressure Zone	Existing Storage Facilities	Existing Storage Capacity	HGL	Existing ADD	Existing MDD[1]	Operational Storage (30% MDD)	Emergency Storage (100% MDD)	Maximum Fireflow Required In Zone	Fireflow Duration	Fire Storage	Total Storage Required	Zone Deficit/ Surplus[2]	Zone Transfer Description / *Recommended Storage*	Zone Transfer	Proposed Storage Capacity	Surplus with Improvements and Transfers
		MG	ft	mgd	mgd	MG	MG	gpm	hours	MG	MG	MG				
Bilicke	Bilicke Tank	0.15	963										Pump from Central Zone.	1.65		
Zone Subotal	***Bilicke***	***0.15***	***963***	**0.49**	**0.74**	***0.22***	***0.74***	***3,500***	***4***	***0.84***	***1.80***	***-1.65***		**1.65**	**0.00**	**0.00**
Pasadena		0.00	0										Install Check valve from Raymond Zone.	0.34		
Zone Subotal	***Pasadena***	***0.00***	***945***	**0.02**	**0.03**	***0.01***	***0.03***	***2,500***	***2***	***0.30***	***0.34***	***-0.34***		***0.34***	**0.00**	**0.00**
Raymond	Raymond Tank	0.15	881										PRV to Magnolia Zone.	-1.59		
													Install Check Valve to Pasadena Zone.	-0.34		
													Pump from Central Zone.	4.10		
Zone Subtotal	***Raymond***	***0.15***	***881***	**0.76**	**1.14**	***0.34***	***1.14***	***3,500***	***4***	***0.84***	***2.32***	***-2.17***		**2.17**	**0.00**	**0.00**
Central	Westside Reservoir	2.00	710										Pump to Bilicke Zone.	-1.65		
	Grand Reservoir	2.40	746										Pump to Raymond Zone.	-4.10		
	Garfield Reservoir	6.50	746													
	Wilson Reservoir	1.30	490													
	Graves Reservoir	1.00	571													
Zone Subtotal	***Central***	***13.20***	***746***	**1.55**	**2.32**	***0.70***	***2.32***	***3,500***	***4***	***0.84***	***3.85***	***9.35***		***-5.75***	**0.00**	**3.59**
Magnolia		0.00	819										PRV from Raymond Zone.	1.59		
Zone Subtotal	***Magnolia***	***0.00***	***819***	**0.39**	**0.58**	***0.17***	***0.58***	***3,500***	***4***	***0.84***	***1.59***	***-1.59***		***1.59***	**0.00**	**0.00**
Grand Total		**13.50**	**N/A**	**3.20**	**4.81**	**1.44**	**4.81**	**N/A**	**N/A**	**3.66**	**9.91**	**3.59**		**0.00**	**0.00**	**3.59**

Notes:

(1) MDD Peaking factor is 1.5

Appendix F.6 - Existing System Pump Station Analysis

Discharge Pressure Zone	Existing Facility	HGL	Pump Station Capacity	Firm Pump Station Capacity[1]	Existing ADD	Existing MDD[2]	Capacity Required Including Upstream Zones	Max Zone Fire Flow (MFF)	Fire Flow Duration	Governing Size Criteria	Total Required Capacity	Existing Capacity Balance	Proposed Improvement[(2,3)]	Future Total Capacity	Future Total Firm Capacity	Zone Deficit/Surplus with Improvements
		ft	gpm	gpm	gpm	gpm	gpm	gpm	hours		gpm	gpm		gpm	gpm	gpm
Bilicke[3]	Indiana PS A	919	1,500	1,500										1,500	1,500	
	Indiana PS B	924	1,500	0									Replace old pumps. Add Tranfer Switch for backup power.	1,500	0	
	Westside PS A	995	1,500	1,500										1,500	1,500	
	Westside PS B	995	1,500	0									Replace old pumps. Add Tranfer Switch for backup power.	1,500	1,500	
													Add a third pump at Westside PS to increase the firm capacity.	1,500	0	
Zone Subtotal	**Bilicke**	**963**	**6,000**	**3,000**	**343**	**515**	**515**	**3,500**	**4**	**MDD+MFF**	**4,015**	**-1,015**		**7,500**	**4,500**	**485**
Pasadena	Sunset	945	0	0										0	0	
	Sunset (Backup)	945	0	0										0	0	
	Columbia (Backup)	945	0	0										0	0	
													Install Low Pressure 12-inch Check Valve from Raymond Zone.	3,900	3,900	
Zone Subtotal	**Pasadena**	**#N/A**	**0**	**0**	**16**	**24**	**24**	**2,500**	**2**	**MDD+MFF**	**2,524**	**-2,524**		**3,900**	**3,900**	**1,376**
Raymond[3]	Garfield PS A	897	900	900										900	900	
	Garfield PS B	897	900	900										900	900	
	Garfield PS C	922	1,500	0										1,500	0	
	Grand PS A	920	1,700	0										1,700	0	
	Grand PS B	922	1,700	1,700										1,700	1,700	
	Grand PS C	920	1,700	1,700										1,700	1,700	
Zone Subtotal	**Raymond**	**#N/A**	**8,400**	**5,200**	**525**	**788**	**1,190**	**3,500**	**4**	**MDD+MFF**	**4,690**	**510**		**8,400**	**5,200**	**510**
Central	Graves PS A	763	1,500	1,500										1,500	1,500	
	Graves PS B	779	1,500	0									Add backup power.	1,500	0	
	Wilson PS A	741	2,500	0									Add backup power.	2,500	0	
	Wilson PS B	763	2,500	2,500										2,500	2,500	
	Wilson PS C	741	1,500	1,500										1,500	1,500	
	MWD USG-02 (8")	943	2,100	0										2,100	0	
	MWD USG-02 (10")	943	3,400	0										3,400	0	
Zone Subtotal	**Central**	**#N/A**	**15,000**	**5,500**	**1,074**	**1,610**	**2,913**	**3,500**	**4**	**MDD**	**2,913**	**2,587**		**15,000**	**5,500**	**2,587**
Magnolia													PRV from Raymond Zone.	3,901	3,901	
Zone Subtotal	**Magnolia**	**#N/A**	**0**	**0**	**268**	**401**	**401**	**3,500**	**4**	**MDD+MFF**	**3,901**	**-3,901**		**3,901**	**3,901**	**0**
Total			**29,400**	**13,700**	**2,226**	**3,338**	**5,042**	**16,500**			**18,042**	**-4,342**		**38,701**	**23,001**	**4,959**

Notes:
(1) Firm Pump Station Capacity only required for Zones with Gravity Storage (Table 4.1)
(2) MDD Peaking factor is 1.5
(3) Zone is analyzed using MDD+MFF rather than MDD, because zone storage is minimal

Appendix F.7 - 2050 GP Projected Demands - Supply Analysis with Largest Well Out of Service

Discharge Pressure Zone	Existing Supply	HGL	Supply Capacity	Supply Capacity with Largest Well O.O.S.	Existing ADD	Existing MDD[1]	Total Required Capacity	Existing Capacity Balance
		ft	gpm	gpm	gpm	gpm	gpm	gpm
Pasadena	Sunset	945	600	30				
Central	Graves Well 2	570	800	800				
Central	Wilson Well 3	490	1,900	0				
Central	Wilson Well 4	490	1,100	1,100				
Central	MWD USG-02	943	5,500	5,500				
Total			**9,900**	**7,430**	**2,285**	**3,428**	**3,428**	**4,003**

Notes:
(1) Supply capacities retrieved from City staff
(2) Capacities based on a max velocity of 7 fps in pipelines at their respective locations.
(3) Sunset connection only supplies the Pasadena Zone demand.
(4) MDD Peaking factor is 1.5

Appendix F.8 - 2050 GP Projected Demands - Supply Analysis with MWD Out of Service

Discharge Pressure Zone	2050 Supply	HGL	Supply Capacity	Supply Capacity with MWD O.O.S.	2050 ADD	2050 MDD[1]	Total Required Capacity	2050 Capacity Balance
		ft	gpm	gpm	gpm	gpm	gpm	gpm
Pasadena	Sunset	945	600	30				
Central	Graves Well 2	570	800	800				
Central	Wilson Well 3	490	1,900	1,900				
Central	Wilson Well 4	490	1,100	1,100				
Central	MWD USG-02	943	5,500	0				
Total			**9,900**	**3,830**	**2,285**	**3,428**	**3,428**	**403**

Notes:
(1) Supply capacities retrieved from City staff
(2) Capacities based on a max velocity of 7 fps in pipelines at their respective locations.
(3) Sunset connection only supplies the Pasadena Zone demand.
(4) MDD Peaking factor is 1.5

Appendix F.9 - 2050 RHNA Prjected Demands - Supply Analysis with Largest Well Out of Service

Discharge Pressure Zone	Existing Supply	HGL	Supply Capacity	Supply Capacity with Largest Well O.O.S.	Existing ADD	Existing MDD[1]	Total Required Capacity	Existing Capacity Balance
		ft	gpm	gpm	gpm	gpm	gpm	gpm
Pasadena	Sunset	945	600	30				
Central	Graves Well 2	570	800	800				
Central	Wilson Well 3	490	1,900	0				
Central	Wilson Well 4	490	1,100	1,100				
Central	MWD USG-02	943	5,500	5,500				
Total			**9,900**	**7,430**	**2,581**	**3,872**	**3,872**	**3,558**

Notes:
(1) Supply capacities retrieved from City staff
(2) Capacities based on a max velocity of 7 fps in pipelines at their respective locations.
(3) Sunset connection only supplies the Pasadena Zone demand.
(4) MDD Peaking factor is 1.5

Appendix F.10 - 2050 RHNA Projected Demands - Supply Analysis with MWD Out of Service

Discharge Pressure Zone	2050 Supply	HGL	Supply Capacity	Supply Capacity with MWD O.O.S.	2050 ADD	2050 MDD[1]	Total Required Capacity	2050 Capacity Balance
		ft	gpm	gpm	gpm	gpm	gpm	gpm
Pasadena	Sunset	945	600	30				
Central	Graves Well 2	570	800	800				
Central	Wilson Well 3	490	1,900	1,900				
Central	Wilson Well 4	490	1,100	1,100				
Central	MWD USG-02	943	5,500	0				
Total			**9,900**	**3,830**	**2,581**	**3,872**	**3,872**	**-42**

Notes:
(1) Supply capacities retrieved from City staff
(2) Capacities based on a max velocity of 7 fps in pipelines at their respective locations.
(3) Sunset connection only supplies the Pasadena Zone demand.
(4) MDD Peaking factor is 1.5

Appendix F.11 - 2050 GP Projected Demands - Storage Analysis

Pressure Zone	Existing Storage Facilities	2050 Storage Capacity	HGL	2050 ADD	2050 MDD[1]	Operational Storage (30% MDD)	Emergency Storage (100% MDD)	Maximum Fireflow Required In Zone	Fireflow Duration	Fire Storage	Total Storage Required	Zone Deficit/ Surplus[2]	Zone Transfer Description / *Recommended Storage*	Zone Transfer	Proposed Storage Capacity	Surplus with Improvements and Transfers
		MG	ft	mgd	mgd	MG	MG	gpm	hours	MG	MG	MG				
Bilicke	Bilicke Tank	0.00	963										Pump from Central Zone.	1.72		
Zone Subotal	***Bilicke***	***0.00***	***N/A***	**0.45**	**0.68**	***0.20***	***0.68***	***3,500***	***4***	***0.84***	***1.72***	***-1.72***		**1.72**	**0.00**	**0.00**
Pasadena		0.00	0										Check valve from Raymond Zone.	0.34		
Zone Subotal	***Pasadena***	***0.00***	***N/A***	**0.02**	**0.03**	***0.01***	***0.03***	***2,500***	***2***	***0.30***	***0.34***	***-0.34***		***0.34***	**0.00**	**0.00**
Raymond	Raymond Tank	0.00	881										PRV to Magnolia Zone.	-1.73		
													Check Valve to Pasadena Zone.	-0.34		
													Pump from Central Zone.	4.38		
Zone Subtotal	***Raymond***	***0.00***	***N/A***	**0.75**	**1.13**	***0.34***	***1.13***	***3,500***	***4***	***0.84***	***2.30***	***-2.30***		**2.30**	**0.00**	**0.00**
Central	Westside Reservoir	2.00	710										Pump to Bilcke Zone.	-1.72		
	Grand Reservoir	2.40	746										Pump to Raymond Zone.	-4.38		
	Garfield Reservoir	6.50	746													
	Wilson Reservoir	1.30	490													
	Graves Reservoir	1.00	571													
Zone Subtotal	***Central***	***13.20***	***N/A***	**1.61**	**2.41**	***0.72***	***2.41***	***3,500***	***4***	***0.84***	***3.97***	***9.23***		***-6.10***	**0.00**	**3.12**
Magnolia		0.00	0										PRV from Raymond Zone.	1.73		
Zone Subtotal	***Magnolia***	***0.00***	***N/A***	**0.46**	**0.69**	***0.21***	***0.69***	***3,500***	***4***	***0.84***	***1.73***	***-1.73***		***1.73***	**0.00**	**0.00**
Grand Total		**13.20**	**N/A**	**3.29**	**4.94**	**1.48**	**4.94**	**N/A**	**N/A**	**3.66**	**10.08**	**3.12**		**0.00**	**0.00**	**3.12**

Notes:

(1) MDD Peaking factor is 1.5

Appendix F.12 - 2050 RHNA Projected Demands - Storage Analysis

Pressure Zone	Existing Storage Facilities	2050 Storage Capacity (MG)	HGL (ft)	2050 ADD (mgd)	2050 MDD[1] (mgd)	Operational Storage (30% MDD) (MG)	Emergency Storage (100% MDD) (MG)	Maximum Fireflow Required In Zone (gpm)	Fireflow Duration (hours)	Fire Storage (MG)	Total Storage Required (MG)	Zone Deficit/ Surplus[2] (MG)	Zone Transfer Description / *Recommended Storage*	Zone Transfer	Proposed Storage Capacity	Surplus with Improvements and Transfers
Bilicke	Bilicke Tank	0.00	963										Pump from Central Zone.	1.75		
Zone Subotal	***Bilicke***	***0.00***	***N/A***	**0.46**	**0.70**	***0.21***	***0.70***	***3,500***	***4***	***0.84***	***1.75***	***-1.75***		**1.75**	**0.00**	**0.00**
Pasadena		0.00	0										Check valve from Raymond Zone.	0.34		
Zone Subotal	***Pasadena***	***0.00***	***N/A***	**0.02**	**0.03**	***0.01***	***0.03***	***2,500***	***2***	***0.30***	***0.34***	***-0.34***		***0.34***	**0.00**	**0.00**
Raymond	Raymond Tank	0.00	881										PRV to Magnolia Zone.	-2.06		
													Check Valve to Pasadena Zone.	-0.34		
													Pump from Central Zone.	4.85		
Zone Subtotal	***Raymond***	***0.00***	***N/A***	**0.82**	**1.24**	***0.37***	***1.24***	***3,500***	***4***	***0.84***	***2.45***	***-2.45***		**2.45**	**0.00**	**0.00**
Central	Westside Reservoir	2.00	710										Pump to Bilcke Zone.	-1.75		
	Grand Reservoir	2.40	746										Pump to Raymond Zone.	-4.85		
	Garfield Reservoir	6.50	746													
	Wilson Reservoir	1.30	490													
	Graves Reservoir	1.00	571													
Zone Subtotal	***Central***	***13.20***	***N/A***	**1.78**	**2.67**	***0.80***	***2.67***	***3,500***	***4***	***0.84***	***4.31***	***8.89***		***-6.60***	**0.00**	**2.29**
Magnolia		0.00	0										PRV from Raymond Zone.	2.06		
Zone Subtotal	***Magnolia***	***0.00***	***N/A***	**0.63**	**0.94**	***0.28***	***0.94***	***3,500***	***4***	***0.84***	***2.06***	***-2.06***		***2.06***	**0.00**	**0.00**
Grand Total		**13.20**	**N/A**	**3.72**	**5.58**	**1.67**	**5.58**	**N/A**	**N/A**	**3.66**	**10.91**	**2.29**		**0.00**	**0.00**	**2.29**

Notes:

(1) MDD Peaking factor is 1.5

Appendix F.13 - 2050 GP Projected Demands - Pump Station Analysis

Discharge Pressure Zone	Existing Facility /2020 CIP Facility	HGL	Pump Station Capacity	Firm Pump Station Capacity[1]	Existing ADD	Existing MDD[1]	Capacity Required Including Upstream Zones	Max Zone Fire Flow (MFF)	Fire Flow Duration	Governing Size Criteria	Total Required Capacity	Existing Capacity Balance	Proposed Improvement[(2,3)]	Future Total Capacity	Future Total Firm Capacity	Zone Deficit/Surplus with Improvements
		ft	gpm	gpm	gpm	gpm	gpm	gpm	hours		gpm	gpm		gpm	gpm	gpm
Bilicke[3]	Indiana PS A	919	1,500	1,500										1,500	1,500	
	Indiana PS B	924	1,500	0										1,500	0	
	Westside PS A	995	1,500	1,500										1,500	1,500	
	Westside PS B	995	1,500	1,500										1,500	1,500	
	Westside PS C	995	1,500	0										1,500	0	
Zone Subtotal	**Bilicke**	**963**	**7,500**	**4,500**	**315**	**473**	**473**	**3,500**	**4**	**MDD+MFF**	**3,973**	**528**		**7,500**	**4,500**	**528**
Pasadena	Sunset	945	0	0										0	0	
	Sunset (Backup)	945	0	0										0	0	
	Columbia (Backup)	945	0	0										0	0	
	12-inch Check Valve from Raymond Zone		3,900	3,900										3,900	3,900	
Zone Subtotal	**Pasadena**	**#N/A**	**3,900**	**3,900**	**15**	**23**	**23**	**2,500**	**2**	**MDD+MFF**	**2,523**	**1,378**		**3,900**	**3,900**	**1,378**
Raymond[3]	Garfield PS A	897	900	900										900	900	
	Garfield PS B	897	900	900										900	900	
	Garfield PS C	922	1,500	0										1,500	0	
	Grand PS A	920	1,700	0										1,700	0	
	Grand PS B	922	1,700	1,700										1,700	1,700	
	Grand PS C	920	1,700	1,700										1,700	1,700	
Zone Subtotal	**Raymond**	**#N/A**	**8,400**	**5,200**	**521**	**782**	**1,259**	**3,500**	**4**	**MDD+MFF**	**4,759**	**442**		**8,400**	**5,200**	**442**
Central	Graves PS A	763	1,500	1,500										1,500	1,500	
	Graves PS B	779	1,500	0										1,500	0	
	Wilson PS A	741	2,500	0										2,500	0	
	Wilson PS B	763	2,500	2,500										2,500	2,500	
	Wilson PS C	741	1,500	1,500										1,500	1,500	
	MWD USG-02 (8")	943	2,100	0										2,100	0	
	MWD USG-02 (10")	943	3,400	0										3,400	0	
Zone Subtotal	**Central**	**#N/A**	**15,000**	**5,500**	**1,116**	**1,674**	**2,928**	**3,500**	**4**	**MDD**	**2,928**	**2,572**		**15,000**	**5,500**	**2,572**
Magnolia	PRVs from Raymond Zone		3,977	3,977										3,977	3,977	
Zone Subtotal	**Magnolia**	**#N/A**	**3,977**	**3,977**	**318**	**477**	**477**	**3,500**	**4**	**MDD+MFF**	**3,977**	**0**		**3,977**	**3,977**	**0**
Total			**38,777**	**23,077**	**2,285**	**3,428**	**5,159**	**16,500**			**18,159**	**4,919**		**38,777**	**23,077**	**4,919**

Notes:

(1) Firm Pump Station Capacity only required for Zones with Gravity Storage (Table 4.1)

(2) MDD Peaking factor is 1.5

(3) Zone is analyzed using MDD+MFF rather than MDD, because zone storage is planned to be removed.

(4) Raymond Zone's required capacity includes MDD of Raymond and Magnolia Zones.

(5) Central Zone's required capacity includes MDD of Central, Raymond, Magnolia, and Bilicke Zones.

Appendix F.14 - 2050 RHNA Projected Demands - Pump Station Analysis

Discharge Pressure Zone	Existing Facility /2020 CIP Facility	HGL	Pump Station Capacity	Firm Pump Station Capacity[1]	Existing ADD	Existing MDD[1]	Capacity Required Including Upstream Zones	Max Zone Fire Flow (MFF)	Fire Flow Duration	Governing Size Criteria	Total Required Capacity	Existing Capacity Balance	Proposed Improvement[(2,3)]	Future Total Capacity	Future Total Firm Capacity	Zone Deficit/Surplus with Improvements
		ft	gpm	gpm	gpm	gpm	gpm	gpm	hours		gpm	gpm		gpm	gpm	gpm
Bilicke[3]	Indiana PS A	919	1,500	1,500										1,500	1,500	
	Indiana PS B	924	1,500	1,500										1,500	1,500	
	Westside PS A	995	1,500	1,500										1,500	1,500	
	Westside PS B	995	1,500	1,500										1,500	1,500	
	Westside PS C	995	1,500	0										1,500	0	
Zone Subtotal	**Bilicke**	**963**	**7,500**	**6,000**	**323**	**484**	**484**	**3,500**	**4**	**MDD+MFF**	**3,984**	**2,016**		**7,500**	**6,000**	**2,016**
Pasadena	Sunset	945	0	0										0	0	
	Sunset (Backup)	945	0	0										0	0	
	Columbia (Backup)	945	0	0										0	0	
	12-inch Check Valve from Raymond Zone		3,900	3,900										3,900	3,900	
Zone Subtotal	**Pasadena**	**#N/A**	**3,900**	**3,900**	**15**	**23**	**23**	**2,500**	**2**	**MDD+MFF**	**2,523**	**1,377**		**3,900**	**3,900**	**1,377**
Raymond[3]	Garfield PS A	897	900	900										900	900	
	Garfield PS B	897	900	900										900	900	
	Garfield PS C	922	1,500	0										1,500	0	
	Grand PS A	920	1,700	0										1,700	0	
	Grand PS B	922	1,700	1,700										1,700	1,700	
	Grand PS C	920	1,700	1,700										1,700	1,700	
Zone Subtotal	**Raymond**	**#N/A**	**8,400**	**5,200**	**572**	**858**	**1,511**	**3,500**	**4**	**MDD+MFF**	**5,011**	**189**		**8,400**	**5,200**	**189**
Central	Graves PS A	763	1,500	1,500										1,500	1,500	
	Graves PS B	779	1,500	0										1,500	0	
	Wilson PS A	741	2,500	0										2,500	0	
	Wilson PS B	763	2,500	2,500										2,500	2,500	
	Wilson PS C	741	1,500	1,500										1,500	1,500	
	MWD USG-02 (8")	943	2,100	0										2,100	0	
	MWD USG-02 (10")	943	3,400	0										3,400	0	
Zone Subtotal	**Central**	**#N/A**	**15,000**	**5,500**	**1,236**	**1,854**	**3,196**	**3,500**	**4**	**MDD**	**3,196**	**2,304**		**15,000**	**5,500**	**2,304**
Magnolia	PRVs from Raymond Zone		4,153	4,153										4,153	4,153	
Zone Subtotal	**Magnolia**	**#N/A**	**4,153**	**4,153**	**435**	**653**	**653**	**3,500**	**4**	**MDD+MFF**	**4,153**	**0**		**4,153**	**4,153**	**0**
Total			**38,953**	**24,753**	**2,581**	**3,872**	**5,867**	**16,500**			**18,867**	**5,886**		**38,953**	**24,753**	**5,886**

Notes:
(1) Firm Pump Station Capacity only required for Zones with Gravity Storage (Table 4.1)
(2) MDD Peaking factor is 1.5
(3) Zone is analyzed using MDD+MFF rather than MDD, because zone storage is planned to be removed.
(4) Raymond Zone's required capacity includes MDD of Raymond and Magnolia Zones.
(5) Central Zone's required capacity includes MDD of Central, Raymond, Magnolia, and Bilicke Zones.

Appendix G

FACILITY CONDITION ASSESSMENT REPORT

GARFIELD RESERVOIR & PUMP STATION

(Gar-1) Access Hatch on top of Reservoir.

(Gar-2) Roof of Reservoir

GARFIELD RESERVOIR & PUMP STATION

(Gar-3) Roof of Reservoir

(Gar-4) Roof of Reservoir

GARFIELD RESERVOIR & PUMP STATION

(Gar-5) Roof of Reservoir

(Gar-6) Roof of Reservoir

GARFIELD RESERVOIR & PUMP STATION

(Gar-7) Hypochlorite Tank in Chemical Room

(Gar-8) Outside of Chemical/Pump Room

GARFIELD RESERVOIR & PUMP STATION

(Gar-9) Access Hatch on Reservoir Roof

(Gar-10) Break Tank Outside Pump Room

GARFIELD RESERVOIR & PUMP STATION

(Gar-11) Control Panel Outside Pump Room

(Gar-12) Electrical Panel Outside Pump Room

Garfield RESERVOIR & PUmp Station

(Gar-13) Pump Controls Inside Pump Room

(Gar-14) Pump Controls Inside Pump Room

GARFIELD RESERVOIR & PUMP STATION

(Gar-15) Pumps and Motors

(Gar-16) Inside of Pump Room

GARFIELD RESERVOIR & PUMP STATION

(Gar-17) Pumps and Motors

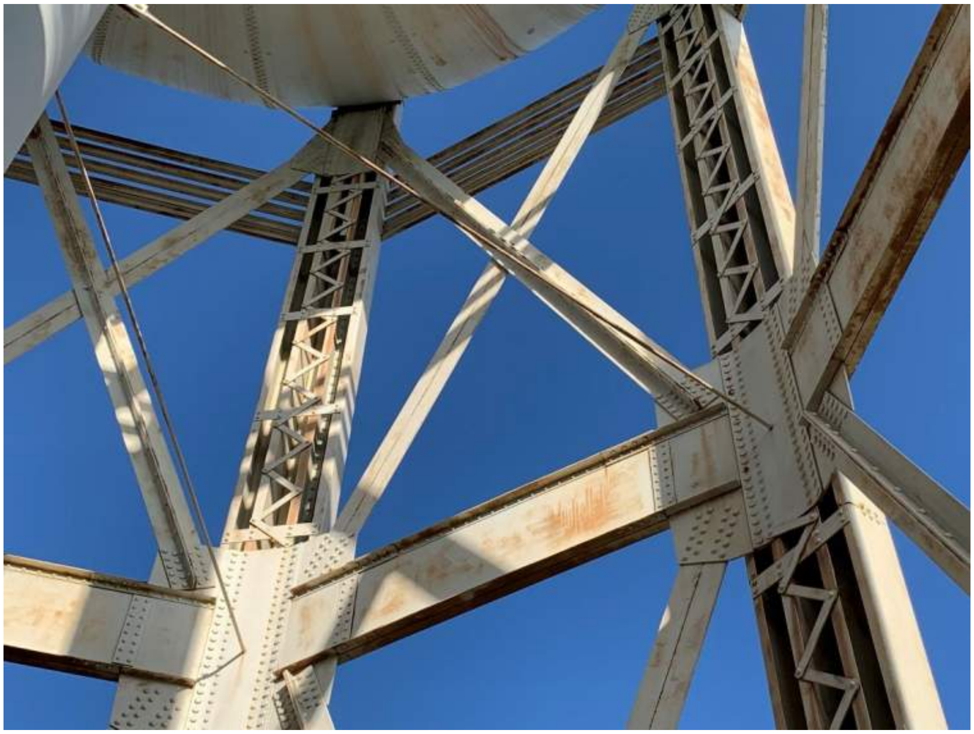
(Gar-18) Hypochlorite Tank Inside Chemical Room

GARFIELD RESERVOIR & PUMP STATION

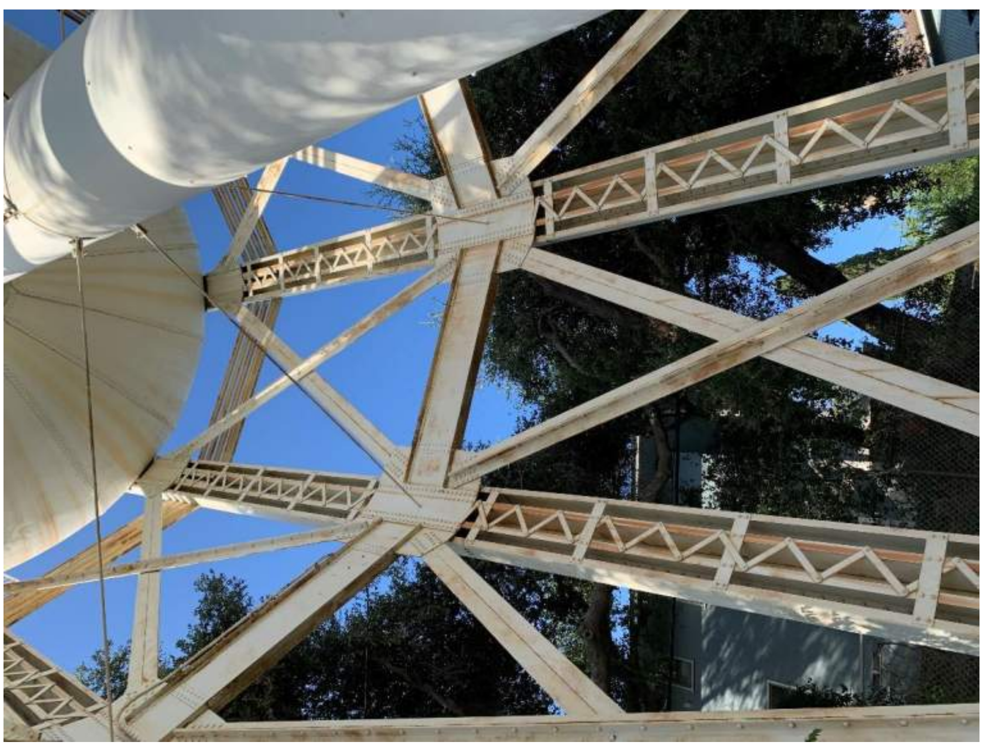
(Gar-19) MicroChlor System in Chemical Room

(Gar-20) Chemical Monitoring Equipment Inside Chemical Room

RAYMOND ELEVATED TANK



(Ray-1) Elevated Tank



(Ray-2) Elevated Tank

RAYMOND ELEVATED TANK

(Ray-3) Elevated Tank

(Ray-4) Base of Column of Elevated Tank

Raymond Elevated Tank

(Ray-5) Retaining Wall at Base of Elevated Tank

(Ray-6) Column of Elevated Tank

RAYMOND ELEVATED TANK

(Ray-7)

(Ray-8) Inlet/Outlet Pipe

RAYMOND ELEVATED TANK

(Ray-9) Base of Column of Elevated Tank

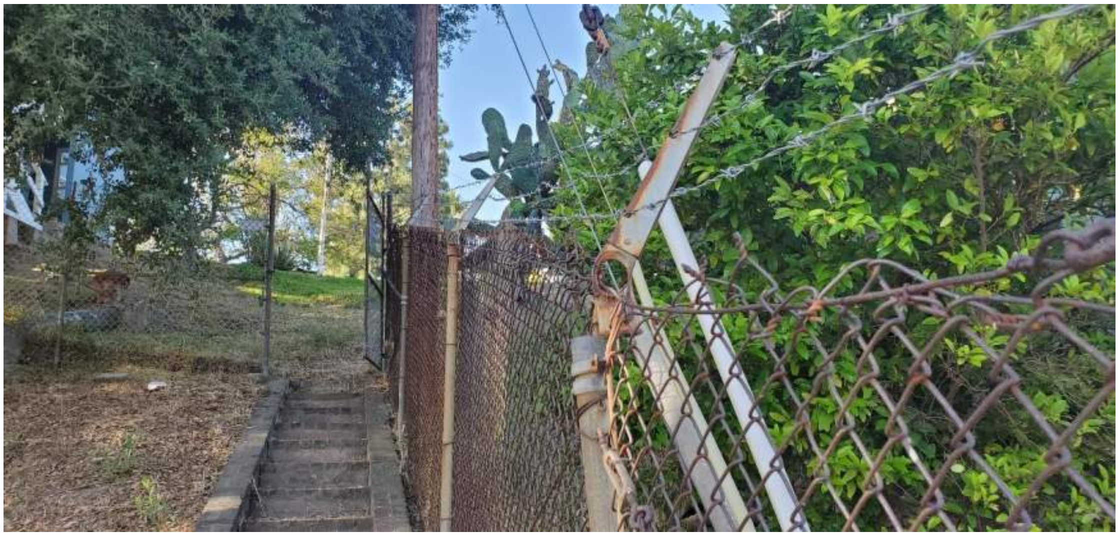
(Ray-10) Base of Column of Elevated Tank

RAYMOND ELEVATED TANK

(Ray-11) Elevated Tank – From Roadway

(Ray-12) INLET/OUTLET PIPE

RAYMOND ELEVATED TANK



(Ray-13) Stairway Access to Tank

(Ray-14) Outside of Electrical Box

RAYMOND ELEVATED TANK

(Ray-15) Inside of Electrical Box

(Ray-16) Inside of Electrical Box

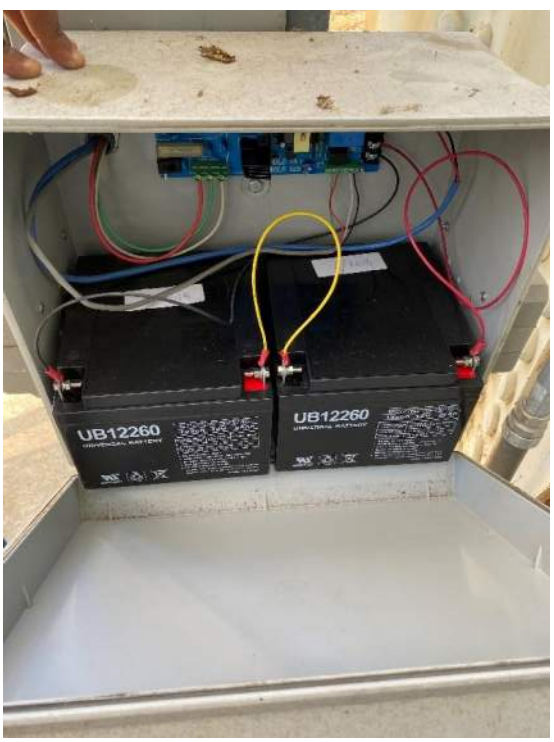
RAYMOND ELEVATED TANK

(Ray-17) Inside of Electrical Box

(Ray-18) Access Ladder to Elevated Tank

RAYMOND ELEVATED TANK

(Ray-19) Inside of Electrical Box



(Ray-20) 12-V Battery System

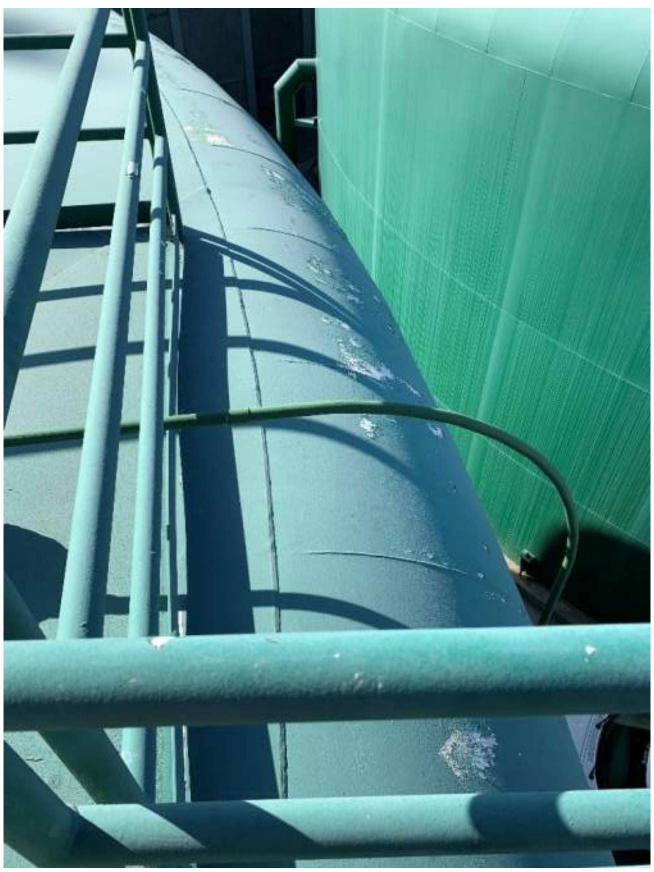
RAYMOND ELEVATED TANK

(Ray-21) Access Ladder to Elevated Tank

(Ray-22) Outside of Tank Site

GRAND RESERVOIR & PUMP STATION

(Grand-1) Reservoir 1



(Grand-2) Top of Reservoir 1

GRAND RESERVOIR & PUMP STATION

(Grand-3) Top of Reservoir 2

(Grand-4) Top of Reservoir 1 and 2 – From Top of Reservoir 1

GRAND RESERVOIR & PUMP STATION

(Grand-5) Top of Reservoir 1 and 2 – From Top of Reservoir 1

(Grand-6)

GRAND RESERVOIR & PUMP STATION

(Grand-7) Drain next to Reservoir 1

(Grand-8) Side of Pump Room

GRAND RESERVOIR & PUMP STATION

(Grand-9) Electrical Box

(Grand-10) Chemical Monitoring Equipment

GRAND RESERVOIR & PUMP STATION

(Grand-11)

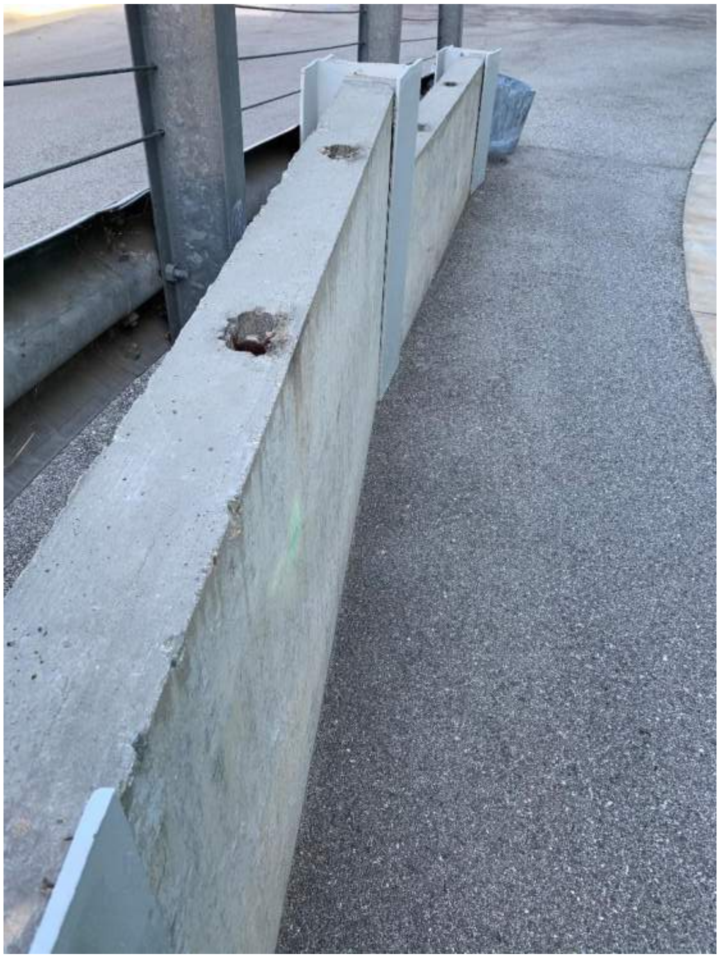
(Grand-12)

GRAND RESERVOIR & PUMP STATION

(Grand-13)

(Grand-14)

GRAND RESERVOIR & PUMP STATION



(Grand-15)

(Grand-16) Outside of Pump Room

GRAND RESERVOIR & PUMP STATION

(Grand-17)

(Grand-18) Electrical Box Outside of Pump Room

GRAND RESERVOIR & PUMP STATION

(Grand-19) Inside of Electrical Panel

(Grand-20) Outside of Generac Hookup Panel

GRAND RESERVOIR & PUMP STATION

(Grand-21) Generac Hookup Panel

(Grand-22)

GRAND RESERVOIR & PUMP STATION

(Grand-23) UPS Panel

(Grand-24) Electrical Panel Inside Pump Room

GRAND RESERVOIR & PUMP STATION

(Grand-25) Pump Motors

(Grand-26) Electrical Panel Inside Pump Room

GRAND RESERVOIR & PUMP STATION

(Grand-27) Electrical Equipment – Inside Pump Room

(Grand-28) Pumps and Motors

GRAND RESERVOIR & PUMP STATION

(Grand-29) Chemical/Storage Room

(Grand-30) Level Sensor on Reservoir 1

GRAND RESERVOIR & PUMP STATION

(Grand-31) Chemical Monitoring Equipment

(Grand-32) Chemical Monitoring Equipment

KOLLE PUMP HOUSE (MWD CONNECTION)

(Kol-1) Wall at Edge of Property

(Kol-2) Wall at Edge of Property

KOLLE PUMP HOUSE (MWD CONNECTION)

(Kol-3) Wall at Edge of Property

(Kol-4) Wall at Edge of Property

KOLLE PUMP HOUSE (MWD CONNECTION)

(Kol-5) Wall at Edge of Property

(Kol-6)

KOLLE PUMP HOUSE (MWD CONNECTION)

(Kol-7) Temporary Chemical Dosing Tank – Outside of Metering Building

(Kol-8) Access Road to Site

KOLLE PUMP HOUSE (MWD CONNECTION)

(Kol-9) Side View of Metering Building

(Kol-10) Light Outside of Metering Building

KOLLE PUMP HOUSE (MWD CONNECTION)

(Kol-11) Electrical Panel Inside Metering Building

(Kol-12) Electrical Panel Inside Metering Building

KOLLE PUMP HOUSE (MWD CONNECTION)

(Kol-13)

(Kol-14) Electrical Panel and Battery System Inside Metering Building

KOLLE PUMP HOUSE (MWD CONNECTION)

(Kol-15) Battery System Inside Metering Building

(Kol-16) Inlet Headers Inside Metering Building

KOLLE PUMP HOUSE (MWD CONNECTION)

(Kol-17) Electrical Panel Inside Metering Building

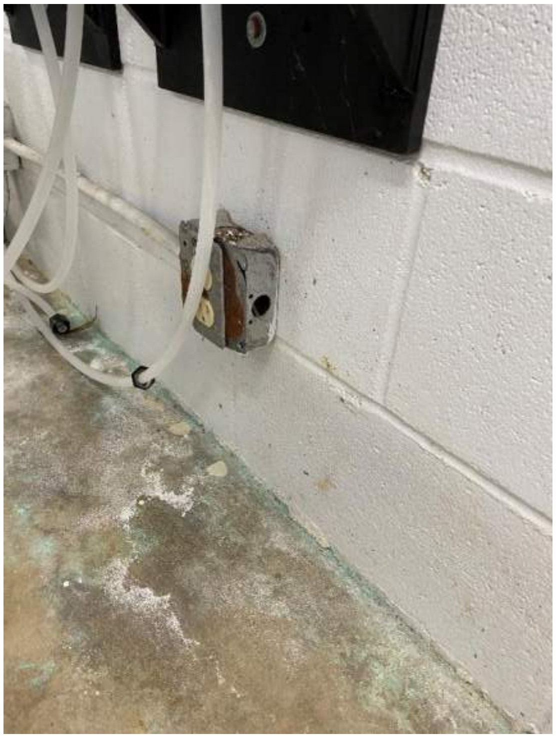
(Kol-18) Electrical Panel Inside Metering Building

KOLLE PUMP HOUSE (MWD CONNECTION)

(Kol-19) Metering Assembly

(Kol-20) Temporary Chemical Dosing Pumps

KOLLE PUMP HOUSE (MWD CONNECTION)



(Kol-21) Temporary Chemical Dosing Tubing

(Kol-22) Antenna on top of Metering Building

WESTSIDE RESERVOIR® & PUMP STATION

(West-1) Top of Reservoir

(West-2) Access Hatch on top of Reservoir

WESTSIDE RESERVOIR® & PUMP STATION

(West-3) Roof of Reservoir

(West-4) Roof of Reservoir

WESTSIDE RESERVOIR® & PUMP STATION

(West-5) Roof of Reservoir

(West-6) Top Wall of Reservoir

WESTSIDE RESERVOIR® & PUMP STATION

(West-7) Top Wall of Reservoir

(West-8) Top Wall of Reservoir

WESTSIDE RESERVOIR® & PUMP STATION

(West-9) Top Wall of Reservoir

(West-10) Top Wall of Reservoir

WESTSIDE RESERVOIR® & PUMP STATION

(West-11) Top Wall of Reservoir

(West-12) Pumps, Motors, and Valve Assemblies Inside Pump Room

WESTSIDE RESERVOIR® & PUMP STATION

(West-13) Pumps, Motors, Valve Assemblies, and Temporary Chemicals Inside Pump Room

(West-14) Electrical Transformers and Mobile Backup Generator Outside Pump Room

WESTSIDE RESERVOIR® & PUMP STATION

(West-15) Pumps, Motors, and Valve Assemblies Inside Pump Room

(West-16) Site Lighting and Surveillance Camera Outside Pump Room

WESTSIDE RESERVOIR® & PUMP STATION

(West-17) Site Lighting and Surveillance Camera Outside Pump Room

(West-18) Antenna on top of Reservoir

WESTSIDE RESERVOIR® & PUMP STATION

(West-19) Inside of Pump Room

(West-20) Electrical Panel Inside Pump Room

WESTSIDE RESERVOIR® & PUMP STATION

(West-21) Discharge Pipeline

(West-22) Electrical Equipment Inside Pump Room

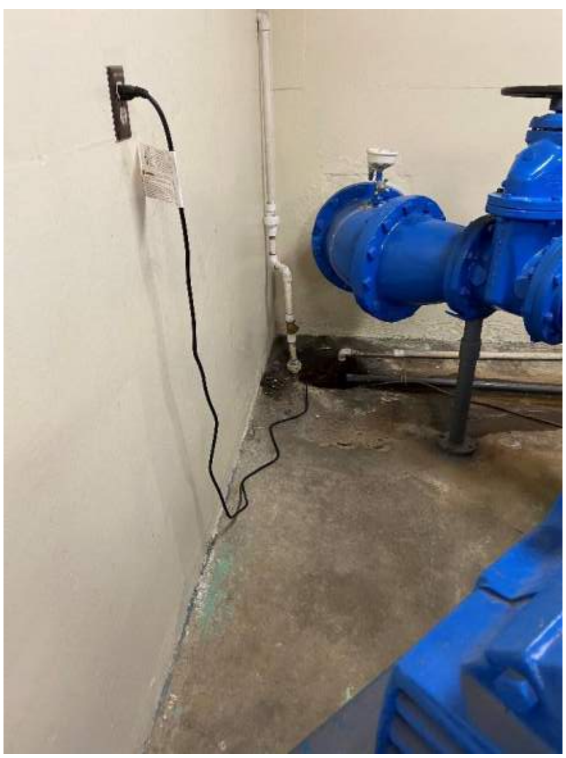
WESTSIDE RESERVOIR® & PUMP STATION

(West-23) Electrical Equipment Inside Pump Room

(West-24) Inside of Pump Room

WESTSIDE RESERVOIR® & PUMP STATION

(West-25) Spare Check Valve Inside Pump Room



(West-26) Intake Pipeline

BILICKE ELEVATED TANK

(Bil-1) Edge of Slope Below Tank Site

(Bil-2) Driveway and Slope Below Tank Site

BILICKE ELEVATED TANK

(Bil-3) Access Rode form Top of Tank Site

(Bil-4) Slope Around Tank Site

BILICKE ELEVATED TANK

(Bil-5) Electrical Meter Box

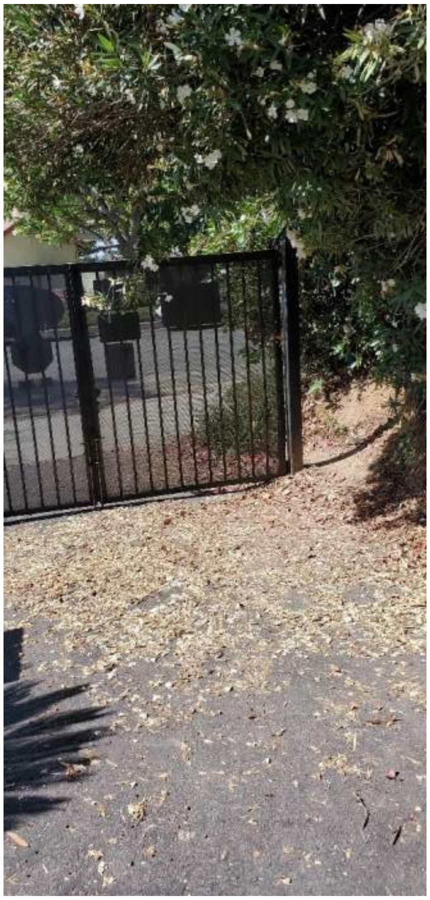
(Bil-6) Electrical Building at Tank Site

BILICKE ELEVATED TANK

(Bil-7) Access Ladder to Tank and Antenna

(Bil-8) Antenna on Tank

BILICKE ELEVATED TANK



(Bil-9) Access Road Gate – From Inside the Site

(Bil-10) Slope Around Tank Site

BILICKE ELEVATED TANK

(Bil-11) Slope and Access Road to Tank Site

(Bil-12) Ground of Tank Site

BILICKE ELEVATED TANK

(Bil-13) Electrical Meter Box

(Bil-14) Electrical Meter Box

BILICKE ELEVATED TANK

(Bil-15) Electrical Equipment at Tank Site

(Bil-16) Tank Access Ladder

INDIANA PUMP STATION

(Ind-1)

(Ind-2) Pumps and Motors

INDIANA PUMP STATION

(Ind-3) Site Access Stairway

(Ind-4) Site Access Stairway

INDIANA PUMP STATION

(Ind-5) Pumps and Motors

(Ind-6) Electrical Panel

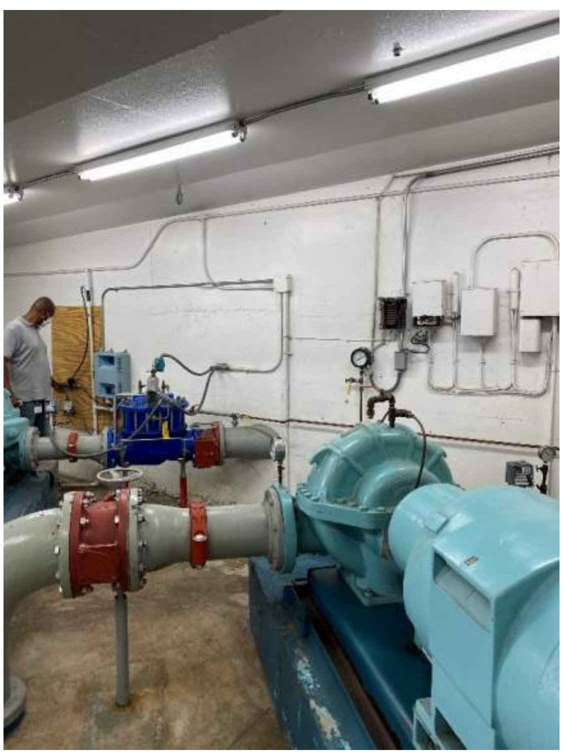
INDIANA PUMP STATION

(Ind-7) Electrical Panel

(Ind-8) Electrical Panel

INDIANA PUMP STATION

(Ind-9) Pump Motor



(Ind-10) Pump and Motor

INDIANA PUMP STATION

(Ind-11) Inside Pump Room

(Ind-12) Electrical Panel

INDIANA PUMP STATION

(Ind-13) Wall Socket

(Ind-14) Pump room Drain

WILSON RESERVOIR, PUMP STATION, & WELLS

(Wil-1) Exterior of Pump Room

(Wil-2) Exterior of Pump Room

WILSON RESERVOIR, PUMP STATION, & WELLS

(Wil-3) Exterior of Pump Room

(Wil-4) Vacuum Valve Outside of Pump Room

WILSON RESERVOIR, PUMP STATION, & WELLS

(Wil-5) Electrical Supply and Storage Room

(Wil-6) Vent for Underground Well 2

WILSON RESERVOIR, PUMP STATION, & WELLS

(Wil-7)

(Wil-8) Well 2 Pump and Motor

WILSON RESERVOIR, PUMP STATION, & WELLS

(Wil-9) Valve in GAC System

(Wil-10) Inside of Pump Room

WILSON RESERVOIR, PUMP STATION, & WELLS

(Wil-11) Vent Above Well 2

(Wil-12) Electrical Panel Inside Pump Room

WILSON RESERVOIR, PUMP STATION, & WELLS

(Wil-13) Electrical Panel Inside Pump Room

(Wil-14) Electrical Panel Inside Pump Room

WILSON RESERVOIR, PUMP STATION, & WELLS

(Wil-15) Electrical Panel Inside Pump Room

(Wil-16) Electrical Panel Inside Pump Room

WILSON RESERVOIR, PUMP STATION, & WELLS

(Wil-17) Electrical Panel Outside of Pump Room

(Wil-18) Electrical Panel Outside of Pump Room

WILSON RESERVOIR, PUMP STATION, & WELLS

(Wil-19) Pump Monitoring Equipment

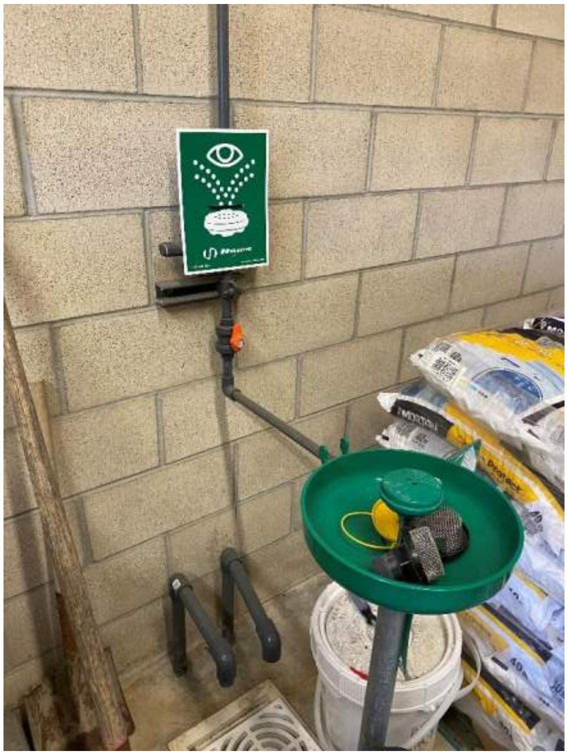
(Wil-20) Pump Monitoring Equipment

WILSON RESERVOIR, PUMP STATION, & WELLS

(Wil-21) Yard Piping

(Wil-22) Flow Meter

WILSON RESERVOIR, PUMP STATION, & WELLS



(Wil-23) Eye Was Station

(Wil-24) Well 3 Motor

Appendix H

WATER SYSTEM FACILITIES FIELD CONDITION ASSESSMENT COST ESTIMATE

Appendix H - Condition Assessment Results and Associated Projects

Integrated Water and Wastewater Master Plan

City of South Pasadena

Visited Sites							
Garfield Reservoir & Pump Station		***CIP-ID***	**Unit**	**Units**	**Unit Cost**	**Baseline Cost**	**CIP Cost**
Assessment Findings and Recommended Projects:							
Containments system around chemical storage tank	NT	*WRSI-NT-1*		1	$ 2,500	$ 3,000	$ 5,000
Install replacement electrical equipment having NEMA 4 (minimum) enclosures, or relocate electrical equipment outside of pump room	LT	*WRSI-LT-1*		5	$ 10,000	$ 50,000	$ 83,000
Repair concrete cracks on walls and roof or reservoir	LT	*WRSI-LT-1*		1	$ 50,000	$ 50,000	$ 83,000
Install solar array on top of reservoir	LT	*WRSI-LT-1*		1	$ 250,000	$ 250,000	$ 414,000
Install LED-type fixtures	O&M	*O&M*				$ -	$ -
Garfield Reservoir & Pump Station Site Total						**$ 353,000**	**$ 585,000**
Raymond Elevated Tank		***CIP-ID***	**Unit**	**Units**	**Unit Cost**	**Baseline Cost**	**CIP Cost**
Assessment Findings and Recommended Projects:							
Remove elevated tank/Retrofit for Antenna	NT	*WRS-1*		1	$ 150,000	$ 150,000	$ 249,000
Install retaining wall and driveway to site entrance (assumed City has easment)	NT	*WRSI-NT-2*		1	$ 20,000	$ 20,000	$ 33,000
Build concrete stairs to access site from above	NT	*WRSI-NT-2*		1	$ 5,000	$ 5,000	$ 8,000
Modernize brick retaining wall	NT	*WRSI-NT-2*		1	$ 10,000	$ 10,000	$ 17,000
Pave areas around footings of elevated tank	NT	*WRSI-NT-2*		1	$ 10,000	$ 10,000	$ 17,000
Consider adding CCTV monitoring systems, as well as automatic security lighting to alert neighbors of unwanted personnel at site	NT	*WRSI-NT-2*		1	$ 5,000	$ 5,000	$ 8,000
Replace alarm system with SCADA	LT	*WRSI-LT-2*		1	$ 2,000	$ 2,000	$ 3,000
Remove corrosion in telemetry cabinet, then seal up unwanted enclosure openings to prevent future water penetrations	O&M	*O&M*				$ -	$ -
Implement a maintenance program to check the operational capabilities of the batteries	O&M	*O&M*				$ -	$ -
Refinish the miscellaneous cabinets to restore their protective coating	O&M	*O&M*				$ -	$ -
Refinish the cabinet to restore its protective coating	O&M	*O&M*				$ -	$ -
Raymond Elevated Tank Site Total						**$ 202,000**	**$ 335,000**
Grand Reservoir & Pump Station		***CIP-ID***	**Unit**	**Units**	**Unit Cost**	**Baseline Cost**	**CIP Cost**
Assessment Findings and Recommended Projects:							
Install a permeant disinfection system to replace the temporary setup	NT	*WRSI-NT-3*		1	$ 30,000	$ 30,000	$ 50,000
Add automation and SCADA control to CLA valves	MT	*WRSI-MT-3*		2	$ 10,000	$ 20,000	$ 33,000
Retrofit to a MicOclor System to be consistent with the rest of the facilities	MT	*WRSI-MT-3*	ask Anteneh or Richard	1	$ 50,000	$ 50,000	$ 83,000
Regrade area near storage room to nearest drainage system	LT	*WRSI-LT-3*		1	$ 10,000	$ 10,000	$ 17,000
Install replacement electrical equipment having a NEMA 4 (minimum) enclosures, or relocate electrical equipment outside of	LT	*WRSI-LT-3*		5	$ 10,000	$ 50,000	$ 83,000
Replace radio alarms with SCADA	LT	*WRSI-LT-3*		1	$ 2,000	$ 2,000	$ 3,000
Check/replace either the fluorescent lamps or ballast in the pump room	O&M	*O&M*				$ -	$ -
Replace lights in pump room and chemical room with LED-type fixture	O&M	*O&M*				$ -	$ -
Spot recoating on both reservoirs	O&M	*O&M*				$ -	$ -
Perform regular electrical maintenance to extend functionality before considering replacement of electrical equipment	O&M	*O&M*				$ -	$ -
Replace sealant along bottom of pump pads	O&M	*O&M*				$ -	$ -
Check weep holes in retaining walls to ensure proper drainage	O&M	*O&M*				$ -	$ -
Grand Reservoir & Pump Station Site Total						**$ 162,000**	**$ 269,000**
Kolle (MWD)		***CIP-ID***	**Unit**	**Units**	**Unit Cost**	**Baseline Cost**	**CIP Cost**
Assessment Findings and Recommended Projects:							
Remove and replace foundation and block wall		*WRSI-NT-4*		1	$ 20,000	$ 20,000	$ 33,000
Add site security system		*WRSI-NT-4*		1	$ 2,000	$ 2,000	$ 3,000
Provide a drainage channel or trench across the driveway to reduce stormflow into the pump station		*WRSI-NT-4*		1	$ 1,000	$ 1,000	$ 2,000
Install a permeant breakpoint chlorine system		*WRSI-NT-4*	ask Anteneh or Richard	1	$ 100,000	$ 100,000	$ 166,000
Install a flow switch on the eye wash water feed line and monitor eyewash operating remotely via SCADA		*WRSI-NT-4*		1	$ 2,500	$ 3,000	$ 5,000
Install replacement electrical equipment having NEMA 4 (minimum) enclosures, or relocate electrical equipment outside with		*WRSI-NT-4*		2	$ 5,000	$ 10,000	$ 17,000
Install new SCADA linked security system		*WRSI-NT-4*		1	$ 2,000	$ 2,000	$ 3,000
Re-grade and add sump pump/storm drain inlet.		*WRSI-NT-4*		1	$ 15,000	$ 15,000	$ 25,000
Re-pave and add wall at south property line		*WRSI-MT-4*		1	$ 15,000	$ 15,000	$ 25,000
Replace antenna and locate on a new area light pole near Kolle Street entrance		*WRSI-MT-4*		1	$ 2,000	$ 2,000	$ 3,000
Replace lighting with new energy efficient LED light fixture	O&M	*O&M*			$ -	$ -	$ -
Replace the valve building duplex wall receptacle with a ground fault type receptacle with new	O&M	*O&M*				$ -	$ -
Kolle Site Total						**$ 170,000**	**$ 282,000**
Westside Reservoir & Pump Station		***CIP-ID***	**Unit**	**Units**	**Unit Cost**	**Baseline Cost**	**CIP Cost**
Assessment Findings and Recommended Projects:							
Conduct a study to analyze options for repair, replacement of roof, or replacement of entire reservoir.	NT	*WRSI-NT-5*		1	$ 100,000	$ 100,000	$ 166,000

Appendix H - Condition Assessment Results and Associated Projects

Integrated Water and Wastewater Master Plan

City of South Pasadena

Visited Sites							
Demolish Existing Reservoir	NT	*WRS-3*		1	$ 300,000.00	$ 300,000	$ 497,000
New Reservoir	NT	*WRS-3*		2,000,000	$ 3.75	$ 7,500,000	$ 12,431,000
Install a fully functional site security and SCADA linked alarm system	NT	*WRSI-NT-5*		1	$ 2,000	$ 2,000	$ 3,000
Replace pump station and outdoor lighting with LED-type fixtures	NT	*WRSI-NT-5*		1	$ 10,000	$ 10,000	$ 17,000
Mount Antenna on taller stand, or mount stand higher up on the hillside	NT	*WRSI-NT-5*		1	$ 5,000	$ 5,000	$ 8,000
Provide new disconnect switch and relocated at an accessible location	NT	*WRSI-NT-5*		1	$ 10,000	$ 10,000	$ 17,000
Install replacement electrical equipment having NEMA 4 (minimum) enclosures, or relocate electrical equipment outside of	NT	*WRSI-NT-5*		3	$ 10,000	$ 30,000	$ 50,000
Replace pump room receptacle with ground fault type receptacle	NT	*WRSI-NT-5*		1	$ 2,000	$ 2,000	$ 3,000
Provide permanent backup generator and move temporary generator to a different location	MT	*WRSI-MT-5*		1	$ 200,000	$ 200,000	$ 332,000
Replace all pumps with reservoir retrofit	MT	*WRPS-1*		400	$ 3,000	$ 1,200,000	$ 1,989,000
Install existing replacement check valve	O&M	*O&M*				$ -	$ -
Perform maintenance on irrigation system.	O&M	*O&M*				$ -	$ -
Westside Reservoir & Pump Station Site Total						**$ 9,359,000**	**$ 15,513,000**
Bilicke Elevated Tank		***CIP-ID***	**Unit**	**Units**	**Unit Cost**	**Baseline Cost**	**CIP Cost**
Assessment Findings and Recommended Projects:							
Remove wooden electrical box with NEMA 3R enclosure, replace/move wiring as needed	NT	*WRSI-NT-6*		2	$ 10,000	$ 20,000	$ 33,000
Install a new gate to eliminate gap at site entrance along La Portada Street	NT	*WRSI-NT-6*		1	$ 3,000	$ 3,000	$ 5,000
Install pressure transmitters and connect to the City's SCADA system	MT	*WRSI-MT-6*		1	$ 2,500	$ 3,000	$ 5,000
Provide slope repair and retaining walls along access road and sidewalk along La Portada street	LT	*WRSI-LT-6*		1	$ 125,000	$ 125,000	$ 207,000
Develop drainage analysis based on new site layout	LT	*WRSI-LT-6*		1	$ 50,000	$ 50,000	$ 83,000
Install new antenna to replace existing system	LT	*WRSI-LT-6*		1	$ 5,000	$ 5,000	$ 8,000
Decommission of Bilicke Elevated Tank	MT	*WRS-2*		1	$ 50,000	$ 50,000	$ 83,000
Replace conduit cover near reservoir ladder	O&M	*O&M*				$ -	$ -
Bilicke Elevated Tank Site Total						**$ 256,000**	**$ 424,000**
Indiana Pump Station		***CIP-ID***	**Unit**	**Units**	**Unit Cost**	**Baseline Cost**	**CIP Cost**
Assessment Findings and Recommended Projects:							
Commission a ventilation system study and upgrade	NT	*WRSI-NT-7*		1	$ 20,000	$ 20,000	$ 33,000
Add oxygen sensor for confined space entry	NT	*WRSI-NT-7*		1	$ 2,500	$ 3,000	$ 5,000
Install new pumps and motors	NT	*WRPS-2*		2	$ 150,000	$ 300,000	$ 497,000
Install replacement electrical equipment having NEMA 4 (minimum) enclosures, or relocate electrical equipment outside with	NT	*WRSI-NT-7*		4	$ 10,000	$ 40,000	$ 66,000
Replace receptacle with ground-fault type	NT	*WRSI-NT-7*		1	$ 2,000	$ 2,000	$ 3,000
Change entrance door to steel	MT	*WRSI-MT-7*		1	$ 2,500	$ 3,000	$ 5,000
Install a flow meter on discharge of pump station	MT	*WRSI-MT-7*		1	$ 20,000	$ 20,000	$ 33,000
Indiana Pump Station Site Total					**Site Total**	**$ 388,000**	**$ 642,000**
Wilson Reservoir & Pump Station		***CIP-ID***	**Unit**	**Units**	**Unit Cost**	**Baseline Cost**	**CIP Cost**
Assessment Findings and Recommended Projects:							
Provide separate generator termination cabinet and eliminate the need to make internal generator connections to the ATS	NT	*WRSI-NT-8*		1	$ 10,000	$ 10,000	$ 17,000
Install a flow switch on the eye wash water feed line, and monitor eyewash operating remotely via SCADA	NT	*WRSI-NT-8*		1	$ 2,500	$ 3,000	$ 5,000
Perform a drainage analysis and regrade to reduce ponding	MT	*WRSI-MT-8*		1	$ 20,000	$ 20,000	$ 33,000
Add camlock hookup for auto transfer switch	MT	*WRSI-MT-8*		1	$ 10,000	$ 10,000	$ 17,000
Maintain/replace leaking valve on GAC system	O&M	*O&M*				$ -	$ -
Spot recoating of walls on buildings	O&M	*O&M*	Re-coat			$ -	$ -
Wilson Reservoir & Pump Station Site Total						**$ 43,000**	**$ 72,000**
Wilson Wells		***CIP-ID***	**Unit**	**Units**	**Unit Cost**	**Baseline Cost**	**CIP Cost**
Assessment Findings and Recommended Projects:							
Install new well pump and motor on Well 2	NT	*WCW-1*		1	$ 250,000	$ 250,000	$ 414,000
Replace motor on Well 3	LT	*WRW-1*		1	$ 100,000	$ 100,000	$ 166,000
Replace lights with LED-type fixture	O&M	*O&M*			$ -	$ -	$ -
Wilson Wells Site Total						**$ 350,000**	**$ 580,000**
TOTAL						**$11,283,000**	**$18,702,000**

Appendix I

ARROYO SECO PROJECT SCW APPLICATIONS

SAFE, CLEAN WATER PROGRAM

TECHNICAL RESOURCES SUMMARY

Regional Program Projects Module

PROJECT CONCEPT NAME	Arroyo Seco Projects Part 1 of 4: Constructed Wetlands by the Arroyo Seco
PROJECT CONCEPT LEAD(S)	Shahid Abbas, Director of Public Works, City of South Pasadena; Kristine Courdy, Deputy Director of Public Works, City of South Pasadena
SCW WATERSHED AREA	Upper Los Angeles River
TOTAL FUNDING REQUESTED	$ 100,000.00

Compiled: Friday, December 13, 2019

Created By: N/A (Kristine Courdy)

OVERVIEW

The Technical Resources Program is a part of the Safe, Clean Water Regional Program providing resources to community groups, municipalities, and individuals who need technical assistance to develop their Project concepts. Each Watershed Area Steering Committee will determine how to appropriate funds for the Technical Resources Program.

The Technical Resources Program funds the development of Project Feasibility Studies. Technical Assistance Teams will work with the necessary parties to add Projects for which there are completed Feasibility Studies to an eligible water quality plan, assist in acquiring a letter of support for non-Municipal Infrastructure Program Project Applicants, and address other prerequisites to apply to the Infrastructure Program. Upon completion, Feasibility Studies shall be submitted to the Watershed Area Steering Committees for consideration.

The Watershed Area Steering Committees will decide which Project concepts will be forwarded to the Technical Assistance Teams for development. The District will provide Technical Assistance Teams comprised of subject matter experts in Stormwater and/or Urban Runoff infrastructure design, hydrology, soils, Nature-Based Solutions, green infrastructure, Stormwater and/or Urban Runoff quality, water supply, recreation, open space, community needs, and other areas. The Technical Assistance Teams will complete Feasibility Studies in partnership with and on behalf of Municipalities, CBOs, NGOs, and others who may not have the technical resources or capabilities to develop Feasibility Studies.

This document summarizes a Project concept that is being proposed for Feasibility Study funding under the Technical Resources Program. This document is based upon inputs to and outputs from the web-based tool called the 'SCW Regional Program Projects Module' (https://portal.safecleanwaterla.org/projects-module/).

ORGANIZATIONAL OVERVIEW:

1 GENERAL INFORMATION

This section provides general information on the Project concept including location and a brief description.

1.1 Overview

The following table provides an overview of the Project concept and the proposed Lead(s):

Project concept Name:	Arroyo Seco Projects Part 1 of 4: Constructed Wetlands by the Arroyo Seco

Brief Project concept description:	The project will direct wet and dry weather drainage from Pasadena and South Pasadena areas north of Arroyo Park and San Pascual Stables to a constructed wetlands, and use the captured water for park irrigation. The project will make use of an existing dike that receives dry weather flows. A walking and biking trail will be incorporated around the wetlands. This includes improving the adjacent trail along the Arroyo Seco which will further enhance the trail network connecting Pasadena and South Pasadena. In addition, native plants and trees are proposed in the wetlands. This project possesses significant advantages over other stormwater capture projects: • The project would expand the capacity of an existing dike and make use of an existing irrigation system connected to the dike. This should reduce the construction costs and project completion time. The constructed wetlands also provides a nature-based solution, and is a more cost effective solution than an underground stormwater capture facility. • The City owns the land and the area is currently unused (being a dike), which will reduce both the project costs and impact on the public's use of the space. • The project would improve public access to waterways by incorporating an improved walking/biking trail along the length of the project that is adjacent to the Arroyo Seco. The feasibility study funding that is being requested through this application will also evaluate an alternate concept design. The concept would replace the Pasadena drainage area with a diversion of the first flush stormwater flows from the Arroyo Seco. This alternative will be pursued should the feasibility study indicate that diversion of the Pasadena drainage area is not optimal due to technical or financial concerns. Both concepts will reduce pollutant loading and concentrations in the Arroyo Seco and its downstream waterbodies--the LA River and harbor. See Attachment to Section 1 for maps of both concepts. Note that the City is submitting four project concepts for Fiscal Year 2020-2021 that are adjacent to each other as well as the Arroyo Seco. If some or all of these project concepts are accepted for Technical Resources Program funding, the feasibility study will be conducted together which will result in a lower overall cost. Should all four project concepts be approved for Technical Resources Program funding, the total funding requested for the projects will be $200,000.
SCW Watershed Area:	Upper Los Angeles River
Call for Projects year:	FY20-21

Total funding requested:	$ 100,000.00
Project concept Lead(s):	Shahid Abbas, Director of Public Works, City of South Pasadena; Kristine Courdy, Deputy Director of Public Works, City of South Pasadena
Additional Project concept Collaborators:	N/A
Additional Project concept Collaborators:	N/A
Additional Project concept Collaborators:	N/A
LACFCD assistance for maintenance of the Project concept?	No
Is this a non-municipal project?	No

1.2 Project Location

The following table details the Project location:

Latitude:	34.120541
Longitude:	-118.167235
Street Address:	649 Stoney Dr
City:	South Pasadena
State:	CA
Zip Code:	91030

Is the project located within or providing a benefit to a Disadvantaged Community (DAC)?

Yes

The following is a summary of how the Project concept will benefit its DAC with a discussion of measures on displacement avoidance:

The project concept will improve park space immediately east of and adjacent to the Arroyo Seco. A walking and biking trail will be incorporated around the wetlands. This includes improving the adjacent trail along the Arroyo Seco. There is a DAC tract of 4,224 people on the west side of the Arroyo Seco within a short walking distance to the park space/project area. Existing bridges connect this community to the project. (GEOID 06037183103.) There are also two DAC block groups of 1,591 people about half a mile east of the project, and within the City of South Pasadena. (GEOIDs 060374806002, 060374806005.)

The project is on existing park/open space and so there will be no displacement.

DAC information source: https://gis.water.ca.gov/app/dacs/

1.3 Background

Please describe the historical background of the Project concept. Please also state which regional water management plan includes the proposed project (SWRP, E/WMP, IRWMP or other, if applicable):

The Upper La River EWMP includes a "signature" project for the City of South Pasadena that has a similar location and purpose as this concept. The EWMP project as proposed (referred to as the Lower Arroyo Park), however, had significant technical feasibility constraints. Through this concept planning effort, these initial constraints were resolved, and the initial EWMP concept has been improved upon. The EWMP in turn has been incorporated into the IRWMP, and the SWRP. This specific project has also been included in the Adaptive Management Section of the ULAR EWMP Group's Annual Report.

1.4 Additional Information

Additional general information regarding Project concept is provided as the following attachments:

Attachments for this Section	
Attachment Name	Description
Constructed Wetlands by the Arroyo Seco (Concept 1) - Project Drainage Area	A map of the Project Drainage Area for the Constructed Wetlands by the Arroyo Seco (Concept 1)
Constructed Wetlands by the Arroyo Seco (Concept 2) - Project Drainage Area	A map of the Project Drainage Area for the Constructed Wetlands by the Arroyo Seco (Concept 2)
Constructed Wetlands by the Arroyo Seco - Project Features	A map of the Project Features for the Constructed Wetlands by the Arroyo Seco (Concept 1)
Arroyo Park Projects - Initial Concept Landscape Plan	Arroyo Parks Projects - Initial Concept Landscape Plan for the project, as well as the adjacent underground detention basin project (separate application) to the southeast.
Maps combining the 4 submitted projects	Maps combining the 4 project submitted for Technical Resources Program funding.

2 DESIGN ELEMENTS

This section provides an overview of the anticipated design elements for the Project concept.

2.1 Configuration

The following is a description of the Project concept layout including its anticipated footprint and key components:

The project will consist of a constructed wetlands with a BMP capacity approximately up to 8 ac-ft at an existing dike structure, 3 acres in size. This nature based solution will include native plants and trees.

The project will make use of an existing dike that currently receives dry weather flows and is closed off with limited access. A walking and biking trail will be incorporated around the wetlands which will enhance the Arroyo Seco trail network between Los Angeles, Pasadena, and South Pasadena. This includes improving the adjacent trail along the Arroyo Seco. The dry weather flows (existing) and wet weather flows captured would be used to irrigate the surrounding park space, and also could be used to supply water to the adjacent proposed detention basin and the proposed constructed wetlands to the golf course and driving range to the south. (See the City's applicable Technical Resource Program applications for these proposed projects.) Diversion of captured water to the sanitary sewer system could also be considered through a feasibility study effort.

This project possesses significant advantages over other stormwater capture projects:

• The project would expand the capacity of an existing dike and make use of an existing irrigation system connected to the dike. This should reduce the construction costs and project completion time. The constructed wetlands also provides a nature-based solution, and is a more cost effective solution than an underground stormwater capture facility.
• The City owns the land and the area is currently unused (being a dike), which will reduce both the project costs and impact on the public's use of the space.
• The project would improve public access to waterways by incorporating an improved walking/biking trail along the length of the project that is adjacent to the Arroyo Seco.
• To provide an economy of scale, the project could be designed and constructed together with the other three adjacent projects that the City is submitting for Technical Resources Program funding.

The feasibility study funding that is being requested through this application will also evaluate an alternate concept design. The concept would replace the Pasadena drainage area with a diversion of the first flush stormwater flows from the Arroyo Seco. This alternative will be pursued should the feasibility study indicate that diversion of the Pasadena drainage area is not optimal due to technical or financial concerns. Note this alternative is also what was considered in the original concept design for the project in the Upper LA River EWMP. Both concepts will reduce pollutant loading and concentrations in the Arroyo Seco and its downstream waterbodies--the LA River and harbor. See the Attachment to Section 1 for area maps of both concepts.

Note that the City is submitting four project concepts for Fiscal Year 2020-2021 that are adjacent to each other as well as the Arroyo Seco. If some or all of these project concepts are accepted for Technical Resources Program funding, the feasibility study will be conducted together which will result in a lower overall cost. Should all four project concepts be approved for Technical Resources Program funding, the total funding requested for the projects will be $200,000.

Specify whether the project is Wet or Dry:

Wet and dry

Estimated Capacity for the Project concept:

8

2.2 Capture Area

The size and land uses of the capture area upstream of a project plays an important role in its water quality and water supply benefits.

The following table details the capture area and its imperviousness:

Capture Area Summary	
Capture Area:	136.7 ac
Impervious Area:	40.4 ac
Pervious Area:	96.3 ac

The following table is a summary of the land use breakdown for the impervious area that drains to the project:

Breakdown of Impervious Acreage in Capture Area		
Land Use Type	Percent Impervious	Acres
Agriculture	6.89 %	2.78
Commercial	0.74 %	0.3
Highways and Interstates	0.14 %	0.06
Institutional	17.49 %	7.07
Multi Family Residential	19.48 %	7.87
Open Space	0.15 %	0.06
Secondary Roads and Alleys	36.42 %	14.71
Single Family Residential	17.08 %	6.9
Urban Open Space	1.61 %	0.65

2.3 Site Conditions & Constraints

The following is a summary of engineering analyses performed to date, and a description of existing and / or potential constraints or limitations due to existing conditions.

Although engineering analyses have not yet been completed for this specific project, the concept for the analogous signature project in the Upper LA River EWMP--Lower Arroyo Park--did provide desktop analyses of geotechnical conditions, environmental constraints, and project sizing optimization. These reports are included as an attachment to Section 2 of this application. Further engineering analysis will be completed as part of the feasibility study that is being requested through this Technical Resources Program application.

The feasibility study funding that is being requested through this application will also evaluate an alternate concept design. The alternate concept would replace the Pasadena drainage area with a diversion of the first flush stormwater flows from the Arroyo Seco. This alternative will be pursued should the feasibility study indicate that diversion of the Pasadena drainage area is not optimal due to technical or financial concerns. Note this alternative is also what was considered in the original concept design for the project in the Upper LA River EWMP. Both concepts will reduce pollutant loading and concentrations in the Arroyo Seco and its downstream waterbodies--the LA River and harbor. See the Attachment to Section 1 for area maps of both concepts.

Known existing and potential constraints include:

• Tree removal, which could disturb active nests or destroy protected trees, which may increase time for site-specific CEQA compliance.
• The presence of archeological or paleontological resources.
• Diverting storm drain pipes to the project location.
• Permitting to allow for the capture of Arroyo Seco flows (for the alternative approach only).

2.4 Cost

The following tables provide details on the anticipated capital and annualized costs for the Project concept:

Capital Cost Breakdown	
Construction Cost:	$ 3,500,000.00
Planning and Design Cost*	$ 350,000.00

*Includes early concept design, pre-project monitoring, feasibility study development, site investigations, formal project design, intermediate and project completion audits, CEQA and other environmental impact studies and permitting.

Annual Cost Breakdown	
Annual Maintenance Cost:	$ 35,000.00
Annual Operation Cost:	$ N/A
Annual Monitoring Cost:	$ 3,000.00
Project Life Span:	50 years

2.5 Operations & Maintenance

The following is a description of the operations and maintenance needs for the Project:

See CASQA BMP Fact Sheet TC-21 attached to Section 2 of this application. Typical maintenance activities and frequencies include:

• Schedule semiannual inspections for burrows, sediment accumulation, structural integrity of the outlet, and litter accumulation.
• Whenever possible use mechanical methods of vegetation removal (e.g mowing with tractor-type or push mowers, hand cutting with gas or electric powered weed trimmers) rather than applying herbicides. Use hand weeding where practical.
• Performing mowing at optimal times. Mowing should not be performed if significant rain events are predicted.

• Collect lawn and garden clippings, pruning waste, tree trimmings, and weeds. Chip if necessary, and compost or dispose of at a landfill.
• Where practical, use automatic timers to minimize runoff.
• Ensure that there is no runoff from the landscaped area(s) if re-claimed water is used for irrigation.
• Apply water at rates that do not exceed the infiltration rate of the soil.
• Utilize a comprehensive management system that incorporates integrated pest management (IPM) techniques.
• Inspect irrigation system periodically to ensure that the right amount of water is being applied and that excessive runoff is not occurring. Minimize excess watering, and repair leaks in the irrigation system as soon as they are observed.
• Remove accumulated trash and debris in the basin at the middle and end of the wet season. The frequency of this activity may be altered to meet specific site conditions and aesthetic considerations.
• Where permitted by the Department of Fish and Wildlife or other agency regulations, stock wet ponds/constructed wetlands regularly with mosquito fish (Gambusia spp.) to enhance natural mosquito and midge control.
• Introduce mosquito fish and maintain vegetation to assist their movements to control mosquitoes, as well as to provide access for vector inspectors. An annual vegetation harvest in summer appears to be optimum, in that it is after the bird breeding season, mosquito fish can provide the needed control until vegetation reaches late summer density, and there is time for re-growth for runoff treatment purposes before the wet season. In certain cases, more frequent plant harvesting may be required by local vector control agencies.
• Require trail inspection periodically and after major storm events to look for signs of erosion or damage to the stabilization.
• Rake out and add decomposed granite or gravel as needed to trail areas subject to rill erosion. Inspect upgradient drainage controls and repair/modify as necessary.
• Trails should remain stable under loose surface material. Any significant problem areas should be repaired to restore uniformity to the installation.
• Maintain emergent and perimeter shoreline vegetation as well as site and road access to facilitate vector surveillance and control activities.
• Remove accumulated sediment in the forebay and regrade about every 5-7 years or when the accumulated sediment volume exceeds 10 percent of the basin volume. Sediment removal may not be required in the main pool area for as long as 20 years.

The following is the agency and contact person that will be responsible for operations and maintenance of the Project:

Kristine Courdy, Deputy Director of Public Works, City of South Pasadena

The following expertise or technical training is necessary to perform basic operation and maintenance of the Project:

N/A

2.6 Additional Information

Additional information regarding design elements for the Project concept is provided as the following attachments:

Attachments for this Section	
Attachment Name	Description

CASQA BMP Fact Sheet TC-21 (Constructed Wetlands)	The CASQA BMP Fact Sheet for Constructed Wetlands, TC-21, which includes information on design and O&M.
Site Conditions and Constraints Attachment	Includes concept planning documents for a similar project (Lower Arroyo Park) located adjacent to the current concept location, and described in the Upper LA River EWMP. Also attached is the County's "Initial Study/Environmental Constraints Evaluation For the Eight Recommended Regional Projects within the Upper Los Angeles River Watershed", which includes the Lower Arroyo Park.

3 Schedule

This section provides an preliminary schedule required to design, construct, operate, and maintain the project.

Schedule Milestone Table	
Milestone Name	Completion Date
Feasibility Study	01/01/2021
Design and Permitting	01/01/2022
Construction	01/01/2024

3.1 Additional Information

Additional information regarding schedule for the Project concept is provided as the following attachments:

Attachments for this Section	
Attachment Name	Description
Note on Schedule.pdf	Explains connection between EWMP compliance schedule and project completion schedule.

4 WATER QUALITY & WATER SUPPLY

This section provides an overview of project elements that will provide water quality and water supply benefits.

4.1 Water Quality

The following describes how the Project concept will address primary pollutants of concern:

The project will capture the primary pollutants of bacteria, metals, toxics, and trash, in both dry and wet weather from a regional drainage area. (See CASQA Fact Sheet TC-21 for Constructed Wetlands for information on pollutant removal effectiveness. The Fact Sheet is an attachment to Section 2 of this application. See the attachment to Section 1 for a map of the upstream drainage area.)

The following describes the water quality concerns in the vicinity and downstream of the proposed Project concept area:

The project is adjacent to the Arroyo Seco. The Arroyo Seco is impaired and is under TMDLs for dry and wet weather bacteria, metals including zinc and copper, and trash. The LA River downstream shares the same impairments and TMDLs, and the harbor at the LA River estuary is impaired for toxic chemicals. The preliminary schedule to prepare a feasibility study (1/1/2021), design and permit (1/1/2022), and construct this project (1/1/2024) will support the Upper LA River EWMP Group's effort to attain its 2024 TMDL/EWMP interim compliance target.

4.2 Water Supply

The following describes and justifies the nexus between water supply and the stormwater and/or urban runoff that will be captured/infiltrated/diverted by the Project:

The stormwater and dry weather urban runoff captured by the constructed wetlands will be used to irrigate Arroyo Park, adjacent landscaping, and the downstream golf course. The existing dike currently takes in dry weather flows from the Arroyo Seco and delivers it to the golf course for irrigation use. Thus the area's existing water supply infrastructure can be used to divert stormwater to landscape irrigation.

If the adjacent proposed underground stormwater detention basin is constructed in tandem with this project, this basin could also hold water to augment the existing irrigation use. In addition, the water could be stored in the proposed constructed wetlands for the golf course and driving range. (See the City's separate Technical Resources Program application for more information on this proposed project.) Excess captured water could also potentially be diverted to the sanitary sewer for later use

Currently the City's Water Division provides 30 acre-feet/year of potable water to the Arroyo Seco Golf Course, 32 acre-feet/year to Arroyo Park, and 2 acre-feet/year to the Arroyo Nature trail. Thus the dry weather flows and stormwater captured by this project and the other proposed projects submitted by the City have the potential to serve as the primary source of irrigation water.

Will this Project capture water for onsite irrigation use?

Yes

The following describes onsite use by the Project:

The stormwater and dry weather urban runoff captured by the constructed wetlands will be used to irrigate Arroyo Park, adjacent landscaping, and the downstream golf course. See the above description for additional detail.

Will this Project capture water used for water recycling by a wastewater treatment facility?

No

The following describes water recycling by the project:

N/A

Will the Project be connected to a managed water supply aquifer?

No

If Yes, managed Aquifer Name:

N/A

4.3 Additional Information

Additional information regarding water quality and water supply benefits of the Project concept is provided as the following attachments:

5 COMMUNITY

This section provides an overview of project elements related to community investment benefits and community engagement performed to date.

5.1 Community Investment

The following table details the Project's anticipated community investment benefits:

Community Investment		
Investment Type	Applicable?	Detailed Description
Does this project improve flood management, flood conveyance, or flood risk mitigation?	Yes	The project will increase flood protection through reduced peak flow rates from peak flow attenuation in the existing storm drain system.
Does this project create, enhance, or restore park space, habitat, or wetland space?	Yes	The project will create wetland space and a bicycle and walking trail adjacent to a waterway: The Arroyo Seco.
Does this project improve public access to waterways?	Yes	The project will create wetland space and a bicycle and walking trail adjacent to a waterway: The Arroyo Seco.
Does this project create or enhance new recreational opportunities?	Yes	The project includes a constructed wetland with pathways for recreation.
Does this project create or enhance green spaces at school?	No	N/A
Does this project reduce heat local island effect and increase shade?	Yes	Several species of native trees (i.e sycamore trees, oak trees) will be planted on site.
Does this project increase shade or the number of trees or other vegetation at the site location?	Yes	Strategically selected native trees and vegetation will be planted to uptake pollutants and will be maintained as part of the wetland system.

5.2 Community Engagement

The following describes the effort of engagement that has occurred to date and identify (if any) agencies / municipalities / stakeholders that were involved in the development of the Project concept:

None to date, however, efforts are proposed during the development of the Project.

The following describes the plan to engage the community during the early development phase of the Project:

The City will hold community-based workshops with the general public and other stakeholders, such as local environmental groups. The City will directly contact local environmental groups involved with the Arroyo Seco--such as the South Pasadena Beautiful, Arroyo Seco Foundation and North East Trees--to ensure that they are aware of the workshops and have the ability to participate in the development of the project.

5.3 Additional Information

Additional information regarding community benefits and engagement for the Project concept is provided as the following attachments:

6 NATURE-BASED SOLUTIONS

This section provides an overview of Project elements that will leverage nature-based solutions.

Will this Project implement natural processes?

Yes

The following is a description of natural processes that will be implemented:

Comparable to natural wetlands, the constructed wetlands will implement natural processes to slow, detain, and capture water, and will incorporate native vegetation. This will protect, enhance, and restore habitat, green space, and usable open space.

Will this project utilize natural materials?

Yes

The following is a description of natural materials that will be utilized:

Comparable to natural wetlands, the constructed wetlands will incorporate native vegetation. This will protect, enhance, and restore habitat, green space, and usable open space.

The following describes how nature-based solutions are utilized to the maximum extent feasible. If nature-based solutions are not used, a description of what options have been considered and why they were not included is provided.

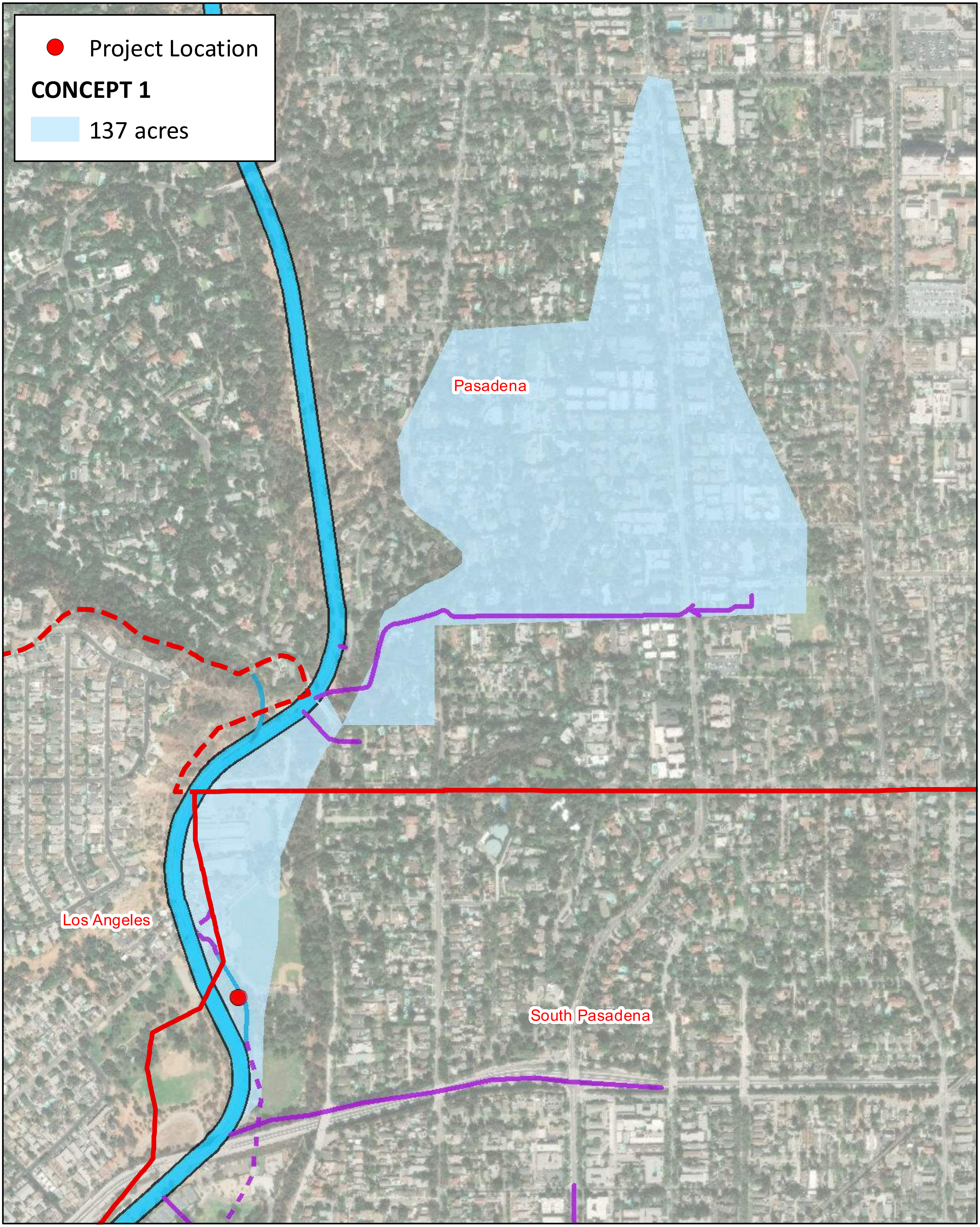
The selection of a constructed wetlands with native vegetation (versus for a example, an underground stormwater capture facility) demonstrates the use of nature-based solutions to the maximum extent feasible.

7 ATTACHMENTS

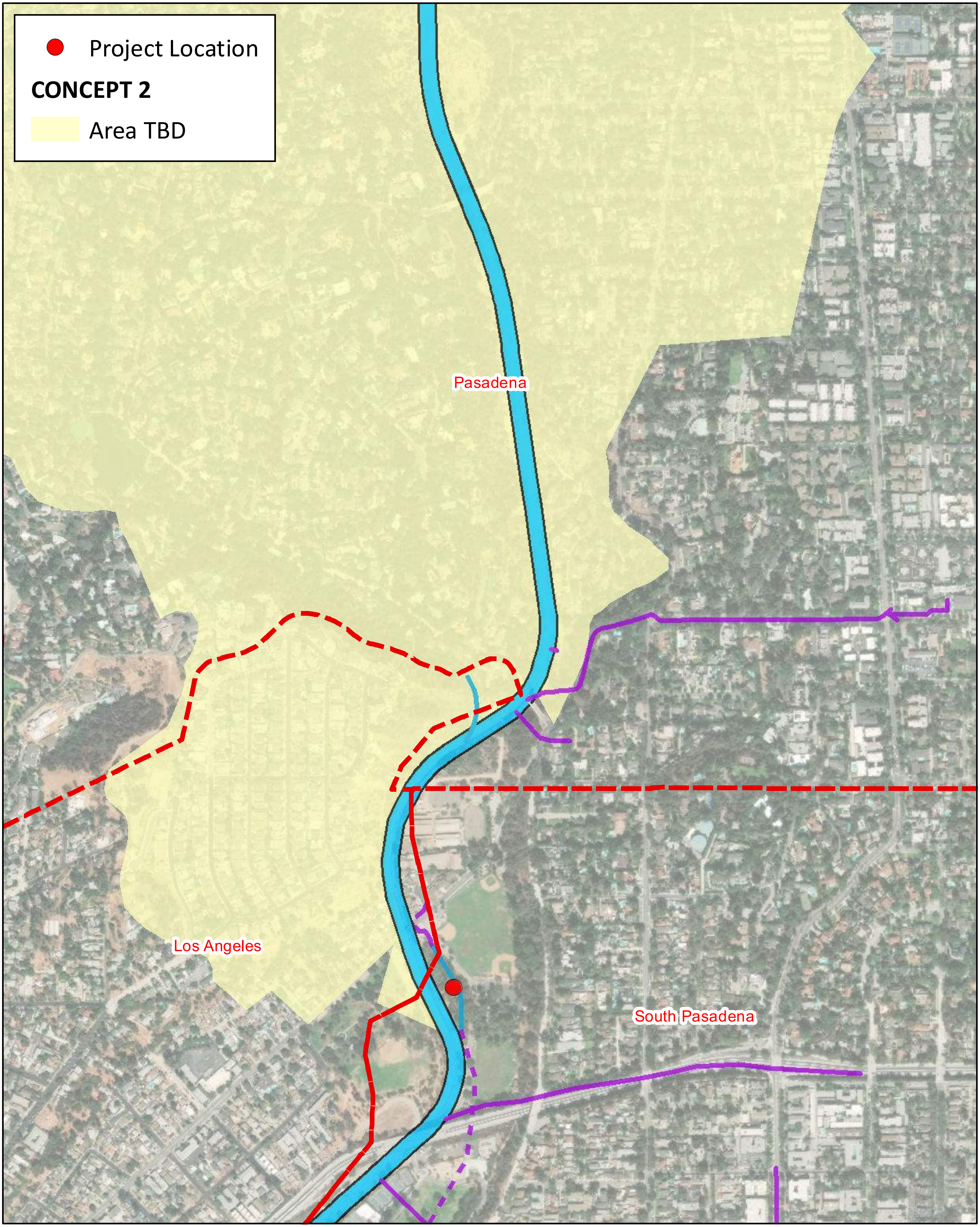
Attachments are bundled and organized in the following pages, with cover pages between each subsection.

ATTACHMENTS FOR SECTION 1

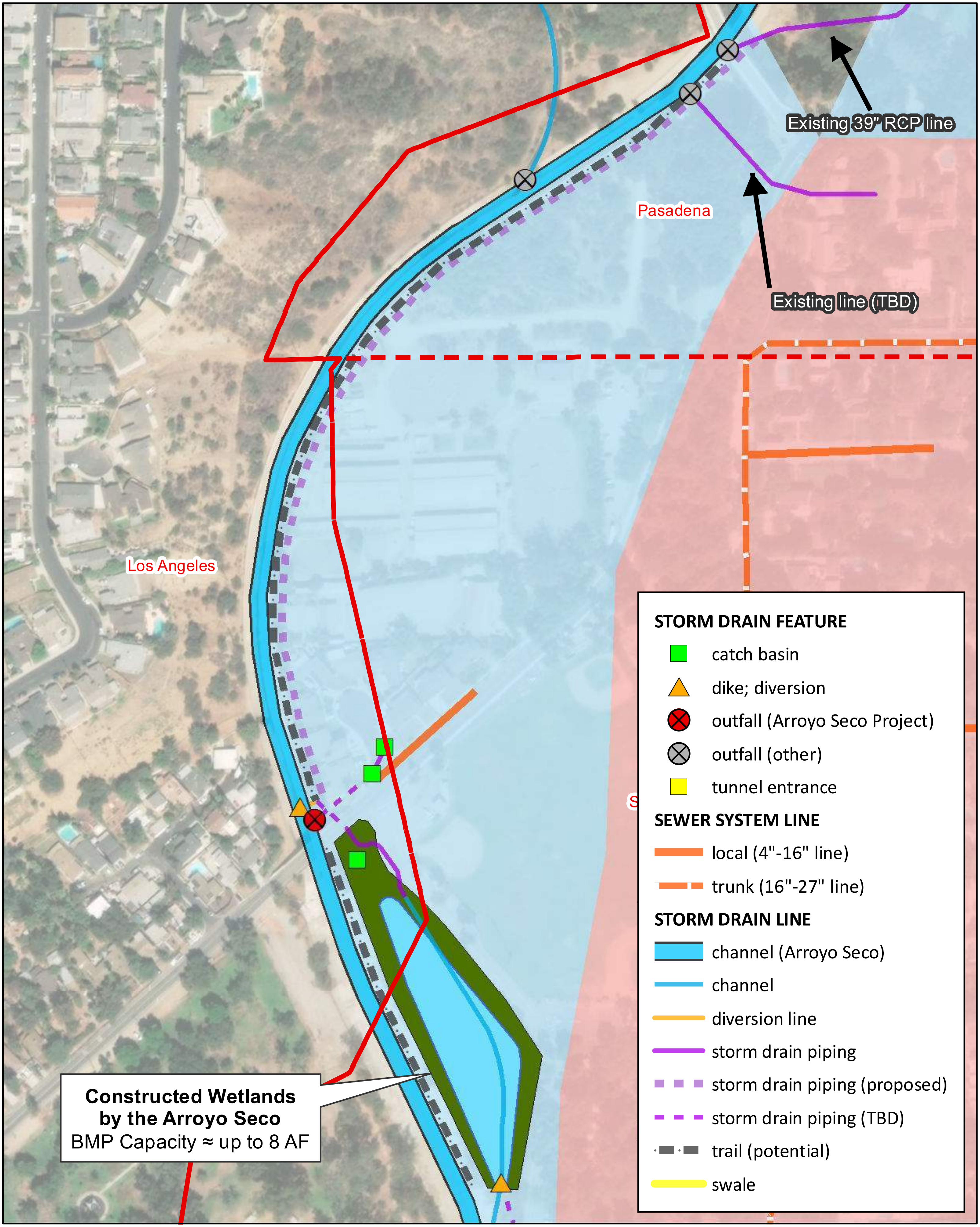
General Information



Constructed Wetlands by the Arroyo Seco: Project Drainage Area



Constructed Wetlands by the Arroyo Seco: Project Drainage Area



Constructed Wetlands by the Arroyo Seco: Project Features

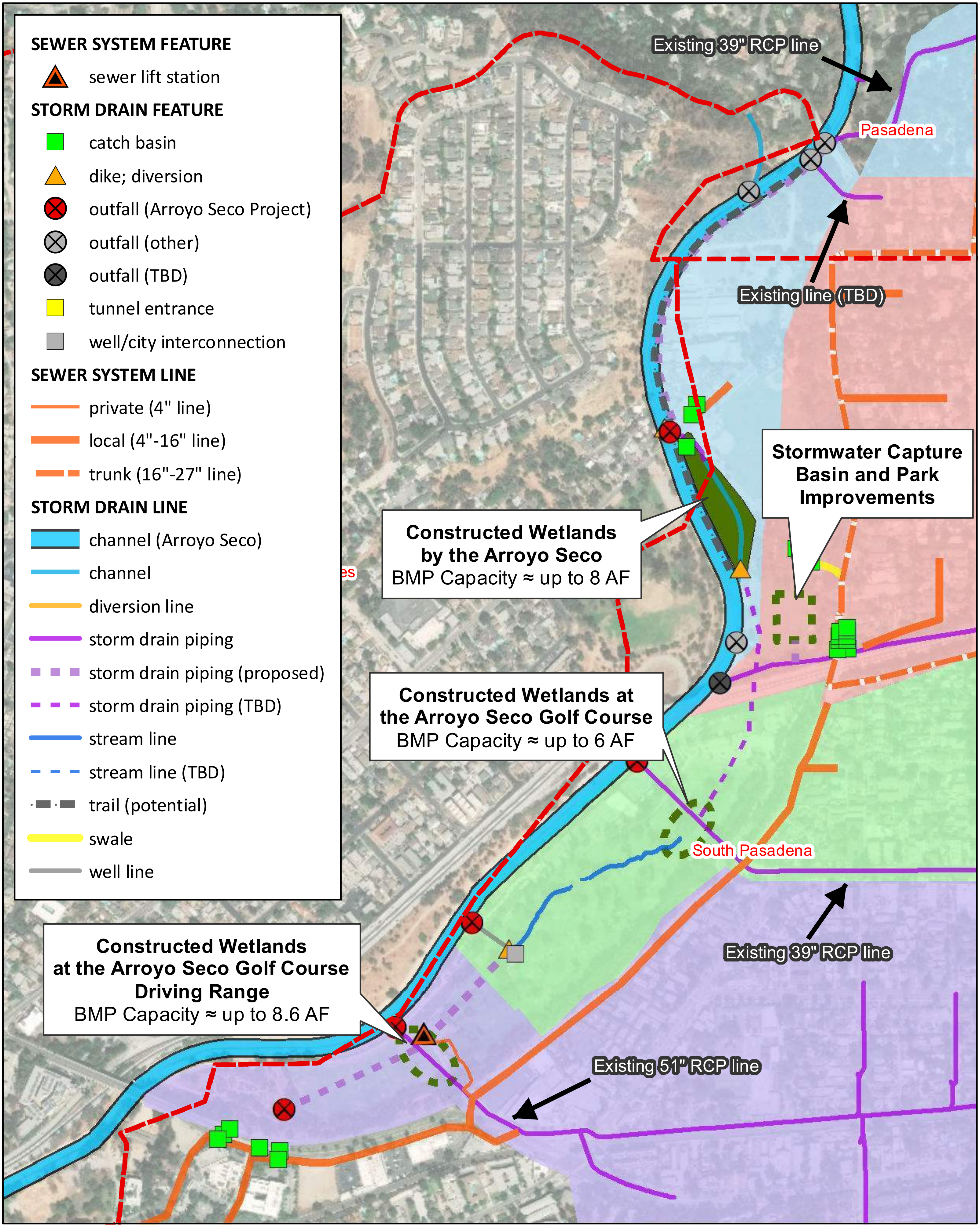
Arroyo Seco Project 1 (Constructed Wetlands by the Arroyo Seco) and Project 2 (Stormwater Capture Basin and Park Improvements): Initial Concept Landscape Plan

Maps Combining the Four Projects
Submitted for Technical Resources Program Funding

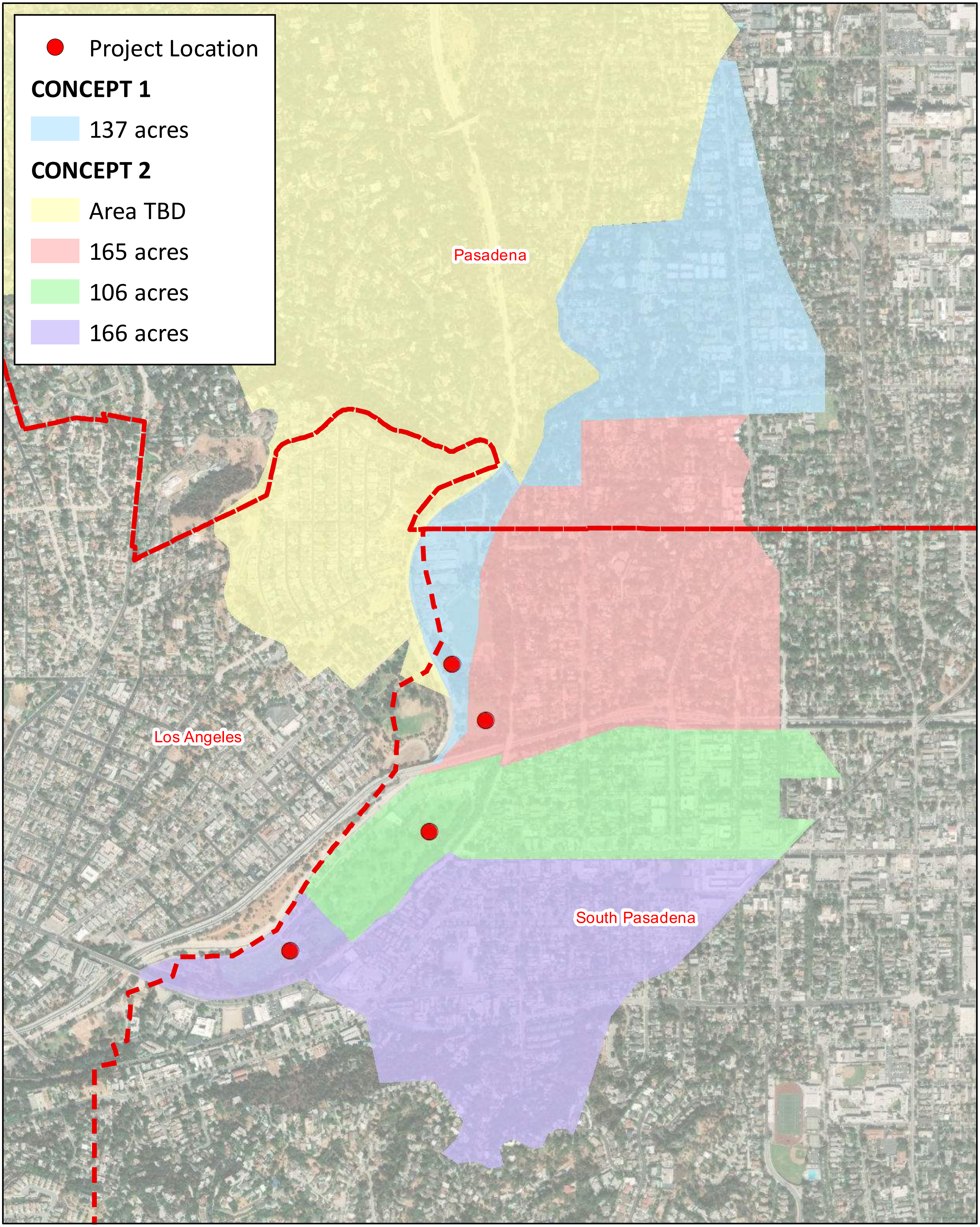
Projects:

1. Constructed Wetlands by the Arroyo Seco **(this application)**
2. Stormwater Capture Basin and Park Improvements
3. Constructed Wetlands at the Arroyo Seco Golf Course
4. Constructed Wetlands at the Arroyo Seco Golf Course Driving Range

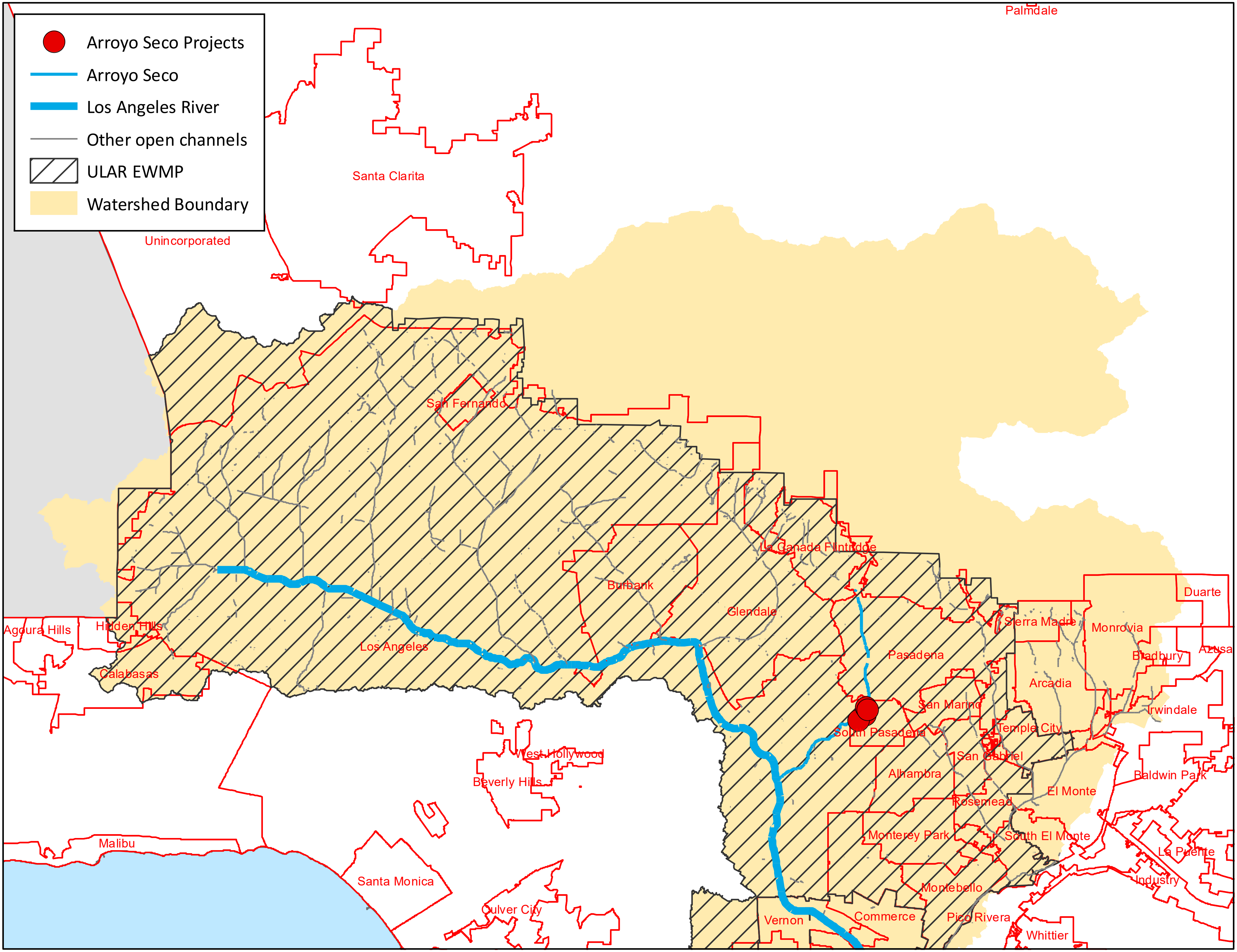
Note that if some or all of the following projects are funded in conjunction, the total requested funds will decrease.



Arroyo Seco Projects: Project Features



Arroyo Seco Projects: Project Drainage Area


Arroyo Seco Projects
Arroyo Seco
Los Angeles River
Other open channels
ULAR EWMP
Watershed Boundary
Palmdale
Santa Clarita
Unincorporated
San Fernando
La Canada Flintridge
Burbank
Glendale
Duarte
Sierra Madre
Monrovia
Azusa
Agoura Hills
Hidden Hills
Los Angeles
Pasadena
Bradbury
Calabasas
Arcadia
San Marino
Irwindale
South Pasadena
Temple City
West Hollywood
San Gabriel
Beverly Hills
Alhambra
Baldwin Park
El Monte
Rosemead
Malibu
Monterey Park
South El Monte
La Puente
Santa Monica
Montebello
Industry
Culver City
Vernon
Commerce
Pico Rivera
Whittier

ATTACHMENTS FOR SECTION 2

Design Elements

Constructed Wetlands TC-21

Design Considerations

- Area Required
- Slope
- Water Availability
- Aesthetics
- Environmental Side-effects

Targeted Constituents

☑	Sediment	■
☑	Nutrients	▲
☑	Trash	■
☑	Metals	■
☑	Bacteria	■
☑	Oil and Grease	■
☑	Organics	■

Legend ***(Removal Effectiveness)***

● Low ■ High

▲ Medium

Description

Constructed wetlands are constructed basins that have a permanent pool of water throughout the year (or at least throughout the wet season) and differ from wet ponds primarily in being shallower and having greater vegetation coverage. The schematic diagram is of an on-line pond that includes detention for larger events, but this is not required in all areas of the state.

A distinction should be made between using a constructed wetland for storm water management and diverting storm water into a natural wetland. The latter practice is not recommended and in all circumstances, natural wetlands should be protected from the adverse effects of development, including impacts from increased storm water runoff. This is especially important because natural wetlands provide storm water and flood control benefits on a regional scale.

Wetlands are among the most effective stormwater practices in terms of pollutant removal and they also offer aesthetic value. As stormwater runoff flows through the wetland, pollutant removal is achieved through settling and biological uptake within the wetland. Flow through the root systems forces the vegetation to remove nutrients and dissolved pollutants from the stormwater.

California Experience

The City of Laguna Niguel in Orange County has constructed several wetlands, primarily to reduce bacteria concentrations in dry weather flows. The wetlands have been very successful in this regard. Even though there is not enough perennial flow to maintain the permanent pool at a constant elevation, the wetland vegetation has thrived.

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

Advantages
- If properly designed, constructed and maintained, wet basins can provide substantial wildlife and wetlands habitat.

- Due to the presence of the permanent wet pool, properly designed and maintained wet basins can provide significant water quality improvement across a relatively broad spectrum of constituents including dissolved nutrients.

- Widespread application with sufficient capture volume can provide significant control of channel erosion and enlargement caused by changes to flow frequency relationships resulting from the increase of impervious cover in a watershed.

Limitations
- There may be some aesthetic concerns about a facility that looks swampy.

- Some concern about safety when constructed where there is public access.

- Mosquito and midge breeding is likely to occur in wetlands.

- Cannot be placed on steep unstable slopes.

- Need for base flow or supplemental water if water level is to be maintained.

- Require a relatively large footprint

- Depending on volume and depth, pond designs may require approval from the State Division of Safety of Dams

Design and Sizing Guidelines
- Capture volume determined by local requirements or sized to treat 85% of the annual runoff volume.

- Outlet designed to discharge the capture volume over a period of 24 hours.

- Permanent pool volume equal to twice the water quality volume.

- Water depth not to exceed about 4 feet.

- Wetland vegetation occupying no more than 50% of surface area.

- Include energy dissipation in the inlet design and a sediment forebay to reduce resuspension of accumulated sediment and facilitate maintenance.

- A maintenance ramp should be included in the design to facilitate access to the forebay for maintenance activities and for vector surveillance and control.

- To facilitate vector surveillance and control activities, road access should be provided along at least one side of BMPs that are seven meters or less in width. Those BMPs that have shoreline-to-shoreline distances in excess of seven meters should have perimeter road access on both sides or be designed such that no parcel of water is greater than seven meters from the road.

Construction/Inspection Considerations

- In areas with porous soils an impermeable liner may be required to maintain an adequate permanent pool level.

- Outlet structures and piping should be installed with collars to prevent water from seeping through the fill and causing structural failure.

- Inspect facility after first large storm to determine whether the desired residence time has been achieved.

Performance

The processes that impact the performance of constructed wetlands are essentially the same as those operating in wet ponds and similar pollutant reduction would be expected. One concern about the long-term performance of wetlands is associated with the vegetation density. If vegetation covers the majority of the facility, open water is confined to a few well defined channels. This can limit mixing of the stormwater runoff with the permanent pool and reduce the effectiveness as compared to a wet pond where a majority of the area is open water.

Siting Criteria

Wet ponds are a widely applicable stormwater management practice and can be used over a broad range of storm frequencies and sizes, drainage areas and land use types. Although they have limited applicability in highly urbanized settings and in arid climates, they have few other restrictions. Constructed wetlands may be constructed on- or off-line and can be sited at feasible locations along established drainage ways with consistent base flow. An off-line design is preferred. Constructed wetlands are often utilized in smaller sub-watersheds and are particularly appropriate in areas with residential land uses or other areas where high nutrient loads are considered to be potential problems (e.g., golf courses).

Wetlands generally consume a fairly large area (typically 4-6 percent of the contributing drainage area), and these facilities are generally larger than wet ponds because the average depth is less.

Wet basin application is appropriate in the following settings: (1) where there is a need to achieve a reasonably high level of dissolved contaminant removal and/or sediment capture; (2) in small to medium-sized regional tributary areas with available open space and drainage areas greater than about 10 ha (25 ac.); (3) where base flow rates or other channel flow sources are relatively consistent year-round; (4) in settings where wildlife habitat benefits can be appreciated.

Additional Design Guidelines

Constructed wetlands generally feature relatively uniformly vegetated areas with depths of one foot or less and open water areas (25-50% of the total area) no more than about 1.2 m (4 feet) deep, although design configuration options are relatively flexible. Wetland vegetation is comprised generally of a diverse, local aquatic plant species. Constructed wetlands can be designed on-line or off-line and generally serve relatively smaller drainage areas than wet ponds, although because of the shallow depths, the footprint of the facility will be larger than a wet pond serving the same tributary area.

The extended detention shallow wetland combines the treatment concepts of the dry extended detention pond and the constructed wetland. In this design, the water quality volume is detained above the permanent pool and released over 24 hours. In addition to increasing the residence time, which improves pollutant removal, this design also attenuates peak runoff rates. Consequently, this design alternative is recommended.

Pretreatment incorporates design features that help to settle out coarse sediment particles. By removing these particles from runoff before they reach the large permanent pool, the maintenance burden of the pond is reduced. In ponds, pretreatment is achieved with a sediment forebay. A sediment forebay is a small pool (typically about 10 percent of the volume of the permanent pool). Coarse particles remain trapped in the forebay, and maintenance is performed on this smaller pool, eliminating the need to dredge the entire pond.

Effective wetland design displays "complex microtopography." In other words, wetlands should have zones of both very shallow (<6 inches) and moderately shallow (<18 inches) wetlands incorporated, using underwater earth berms to create the zones. This design will provide a longer flow path through the wetland to encourage settling, and it provides two depth zones to encourage plant diversity.

There are a variety of sizing criteria for determining the volume of the permanent pool, mostly related to the water quality volume (i.e., the volume of water treated for pollutant removal) or the average storm size in a particular area. In addition, several theoretical approaches to determination of permanent pool volume have been developed. However, there is little empirical evidence to support these designs. Consequently, a simplified method (i.e., permanent pool volume equal to twice the water quality volume) is recommended.

Design features are also incorporated to ease maintenance of both the forebay and the main pool of ponds. Ponds should be designed with a maintenance access to the forebay to ease this relatively routine (every 5–7 year) maintenance activity. In addition, ponds should generally have a drain to draw down the pond for vegetation harvesting or the more infrequent dredging of the main cell of the pond.

Summary of Design Recommendations

(1) Facility Sizing – The basin should be sized to hold the permanent pool as well as the required water quality volume. The volume of the permanent pool should equal twice the water quality volume.

(2) Pond Configuration - The wet basin should be configured as a two stage facility with a sediment forebay and a main pool. The basins should be wedge-shaped, narrowest at the inlet and widest at the outlet. The minimum length to width ratio should be 1.5 where feasible. The depth in the center of the basin should be about 4 feet deep to prevent vegetation from encroaching on the pond open water surface.

(3) Pond Side Slopes - Side slopes of the basin should be 3:1 (H:V) or flatter for grass stabilized slopes. Slopes steeper than 3:1 should be stabilized with an appropriate slope stabilization practice.

(4) Sediment Forebay - A sediment forebay should be used to isolate gross sediments as they enter the facility and to simplify sediment removal. The sediment forebay

should consist of a separate cell formed by an earthen berm, gabion, or loose riprap wall. The forebay should be sized to contain 15 to 25% of the permanent pool volume and should be at least 3 feet deep. Exit velocities from the forebay should not be erosive. Direct maintenance access should be provided to the forebay. The bottom of the forebay may be hardened (concrete) to make sediment removal easier. A fixed vertical sediment depth marker should be installed in the forebay to measure sediment accumulation.

(5) Splitter Box - When the pond is designed as an off-line facility, a splitter structure is used to isolate the water quality volume. The splitter box, or other flow diverting approach, should be designed to convey the 25-year event while providing at least 1.0 foot of freeboard along pond side slopes.

(6) Vegetation - A plan should be prepared that indicates how aquatic and terrestrial areas will be vegetatively stabilized. Wetland vegetation elements should be placed along the aquatic bench or in the shallow portions of the permanent pool. The optimal elevation for planting of wetland vegetation is within 6 inches vertically of the normal pool elevation. A list of some wetland vegetation native to California is presented in the wet pond fact sheet.

Maintenance

The amount of maintenance required for a constructed wetland is highly dependent on local regulatory agencies, particular health and vector control agencies. These agencies are often extremely concerned about the potential for mosquito breeding that may occur in the permanent pool.

Routine harvesting of vegetation may increase nutrient removal and prevent the export of these constituents from dead and dying plants falling in the water. A previous study (Faulkner and Richardson, 1991) documented dramatic reductions in nutrient removal after the first several years of operation and related it to the vegetation achieving a maximum density. Vegetation harvesting in the summer is recommended.

Typical maintenance activities and frequencies include:

- Schedule semiannual inspections for burrows, sediment accumulation, structural integrity of the outlet, and litter accumulation.
- Remove accumulated trash and debris in the basin at the middle and end of the wet season. The frequency of this activity may be altered to meet specific site conditions and aesthetic considerations.
- Where permitted by the Department of Fish and Game or other agency regulations, stock wet ponds/constructed wetlands regularly with mosquito fish (*Gambusia spp.*) to enhance natural mosquito and midge control.
- Introduce mosquito fish and maintain vegetation to assist their movements to control mosquitoes, as well as to provide access for vector inspectors. An annual vegetation harvest in summer appears to be optimum, in that it is after the bird breeding season, mosquito fish can provide the needed control until vegetation reaches late summer density, and there is

time for re-growth for runoff treatment purposes before the wet season. In certain cases, more frequent plant harvesting may be required by local vector control agencies.

- Maintain emergent and perimeter shoreline vegetation as well as site and road access to facilitate vector surveillance and control activities.
- Remove accumulated sediment in the forebay and regrade about every 5-7 years or when the accumulated sediment volume exceeds 10 percent of the basin volume. Sediment removal may not be required in the main pool area for as long as 20 years.

Cost

Construction Cost

Wetlands are relatively inexpensive storm water practices. Construction cost data for wetlands are rare, but one simplifying assumption is that they are typically about 25 percent more expensive than storm water ponds of an equivalent volume. Using this assumption, an equation developed by Brown and Schueler (1997) to estimate the cost of wet ponds can be modified to estimate the cost of storm water wetlands using the equation:

$$C = 30.6^{V0.705}$$

where:

C = Construction, design, and permitting cost;

V = Wetland volume needed to control the 10-year storm (ft3).

Using this equation, typical construction costs are the following:

$ 57,100 for a 1 acre-foot facility

$ 289,000 for a 10 acre-foot facility

$ 1,470,000 for a 100 acre-foot facility

Wetlands consume about 3 to 5 percent of the land that drains to them, which is relatively high compared with other storm water management practices. In areas where land value is high, this may make wetlands an infeasible option.

Maintenance Cost

For ponds, the annual cost of routine maintenance has typically been estimated at about 3 to 5 percent of the construction cost; however, the published literature is almost totally devoid of actual maintenance costs. Since ponds are long-lived facilities (typically longer than 20 years), major maintenance activities are unlikely to occur during a relatively short study.

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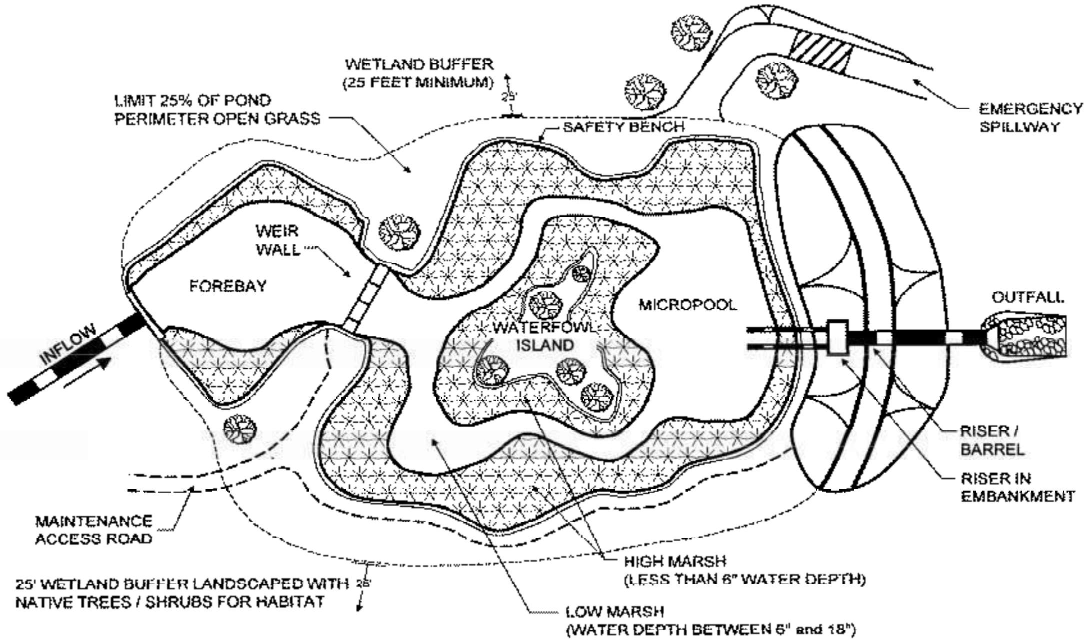
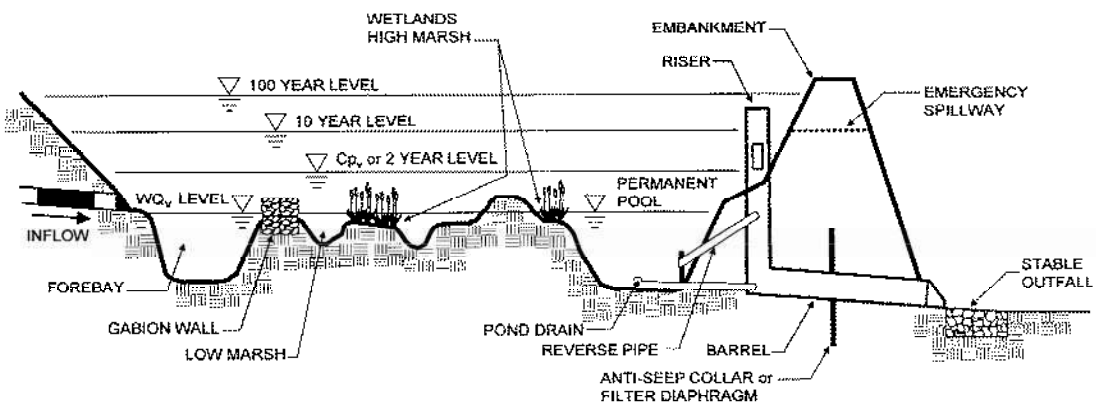


PLAN VIEW



PROFILE

Site Conditions and Constraints

The following are concept planning documents for a similar project (Lower Arroyo Park) located adjacent to the current concept location, and described in the Upper LA River EWMP. Also attached is the County's "Initial Study/Environmental Constraints Evaluation For the Eight Recommended Regional Projects within the Upper Los Angeles River Watershed", which includes the Lower Arroyo Park.

The Lower Arroyo Park project as originally proposed had significant technical feasibility constraints. Through this most recent concept planning effort, these initial constraints were resolved, and the original EWMP concept has been improved upon. The primary modification was moving the project from the west of the Arroyo Seco to the east side, to coincide with the locations of several storm drain pipes that run underneath City park space and directly to the river. Despite the change in location, the attached EWMP concept planning documents for the Lower Arroyo Park provide useful information on the general site location, geotechnical analysis, watershed characteristics, potential retrofit characteristics, as well as environmental constraints.

4.5.8 Lower Arroyo Park

Lower Arroyo Park is located within the City of South Pasadena in an area that drains to Arroyo Seco. A channelized portion of Arroyo Seco runs through the center of the proposed site parcel. Park facilities include two baseball diamonds, open field space, and playground equipment. The potential BMP type is proposed as a below-ground retention/infiltration basin situated beneath the baseball diamonds and other open field space in the southwest corner and northern portions of the park.

No maximum drainage area was identified for this site since it is located adjacent to a receiving waterbody, Arroyo Seco. After review of available site opportunities and surrounding infrastructure, a smaller (alternative) drainage area was delineated, encompassing approximately 145 acres.

After reviewing the hydrologic model results and estimated runoff volume for the various diversion scenarios, it was determined that this project site was suitable for a retention/infiltration BMP sized to accommodate more than the 85th percentile design storm flows contributed from the smaller alternative drainage area. As a result, the recommended active volume of the BMP is 3.7 acre feet.

Table 4-10 below summarizes key conceptual design parameters of the BMP proposed at Lower Arroyo Park. **Figure 4-32** presents summary facts of the Lower Arroyo Park signature project. **Figures 4-33** to **4-35** provided on the following pages show proposed site features and the tributary drainage area(s) considered during the engineering and environmental feasibility analysis.

Table 4-10. Key Design Parameters for Lower Arroyo Park

Summary of Lower Arroyo Park (SP01)		
Project Site Parameters	Total (Maximum) Drainage Area	145 ac
	Alternative (Minimum) Drainage Area	145 ac
	Maximum Recommended BMP Volume	265 ac-ft
	Alternative Recommended BMP Volume	3.7 ac-ft
	Groundwater Depth	25 ft
	Maximum BMP Opportunity Area	10.6 ac
BMP Design Parameters		
	Recommended Maximum BMP Depth (below ground surface)	25 ft
	Available BMP Volume	265 ac-ft
	Recommended Active BMP Volume	**3.7 ac-ft**

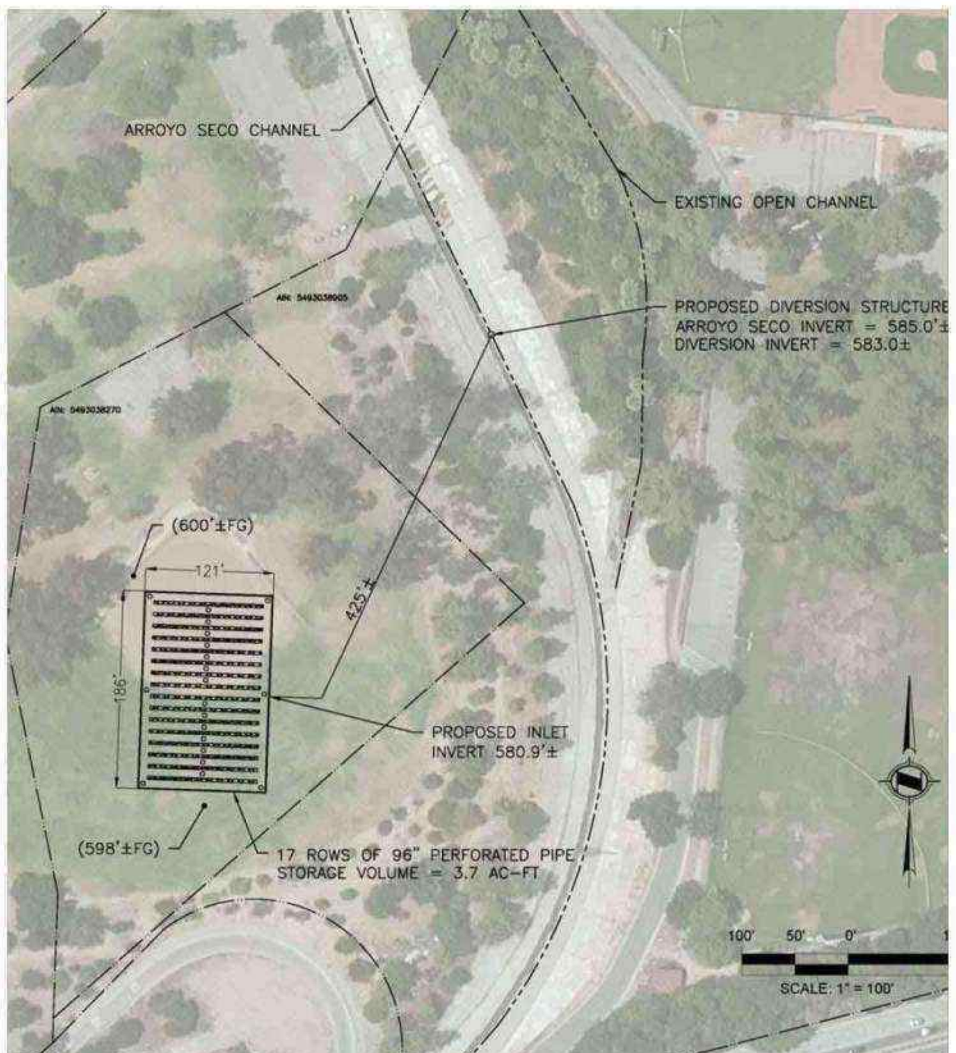
Site Location			
Site Location, City	South Pasadena	Site Name	Lower Arroyo Park
Latitude	34° 7' 18.123" N	Longitude	118° 10' 4.0620" W
Landuse	Open Space	Street Address	San Pasqual Avenue & Stoney Drive
Major Watershed	Upper Los Angeles River	Land Owner	City of South Pasadena
Existing Land Use of Site: Park			

Watershed Characteristics	
Drainage Area Max/Min, ac	145/145
Hydrologic Soil Group	Hanford Gravelly Sandy Loam
Soil Infiltration Rate, in/hr	0.80
Manages 85th Percentile, 24 hr Design Storm Event?	Yes
Recommended Active BMP Volume, ac-ft	3.7

Retrofit Characteristics	
Proposed Retrofit	Subsurface Infiltration
Recommended BMP Footprint, ft²	22506
Available BMP Volume, ac-ft	265
BMP Water Storage Depth, ft	9
Gravel Depth, ft	1

Approximate Rainfall Event Depth Captured Based on Recommended Volume, inch = 0.8

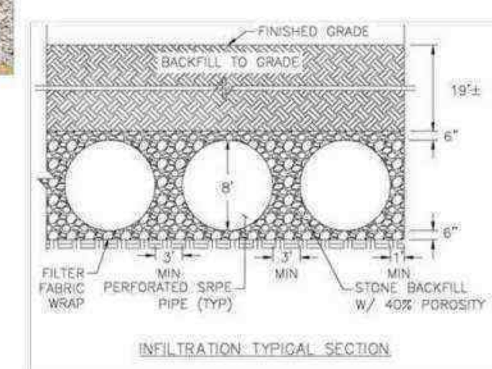
Budget- Level estimates for both soft and hard costs	$5,132,000	Schedule	1 year design, 6 months bid, 9 months construction (2 ¼ years total)



Rendered Improvements

Drainage Map

Watershed and Vicinity



Upper Los Angeles River Enhanced Management Program
Signature Project: Lower Arroyo Park
FACT SHEET PN 182198

Note: Figures are not to scale

Figure 4-32. Summary Facts: Lower Arroyo Park Signature Project

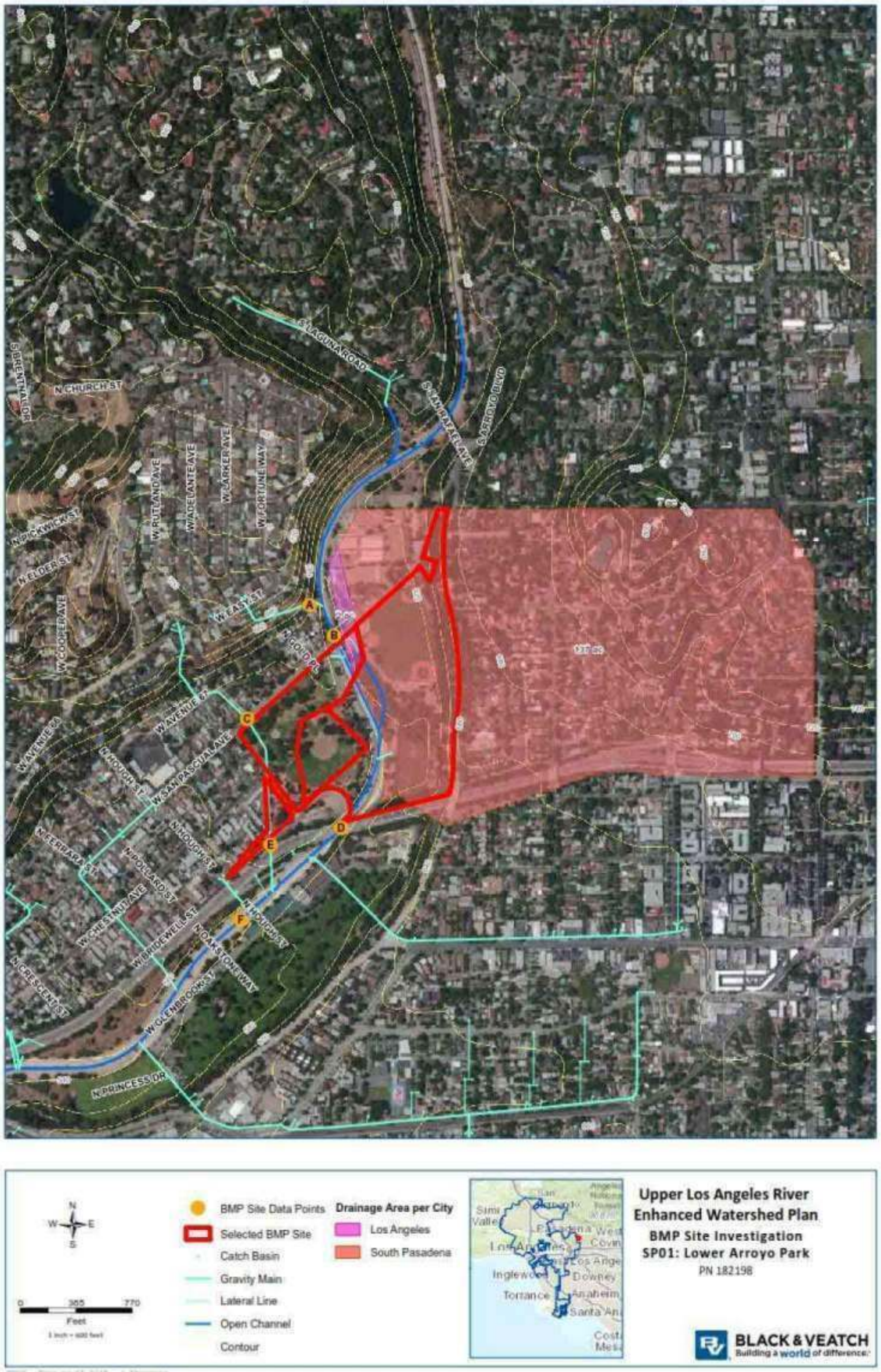


Figure 4-33. Lower Arroyo Park Subsurface Infiltration Drainage Area

Figure 4-34. Lower Arroyo Park Subsurface Infiltration Site Location

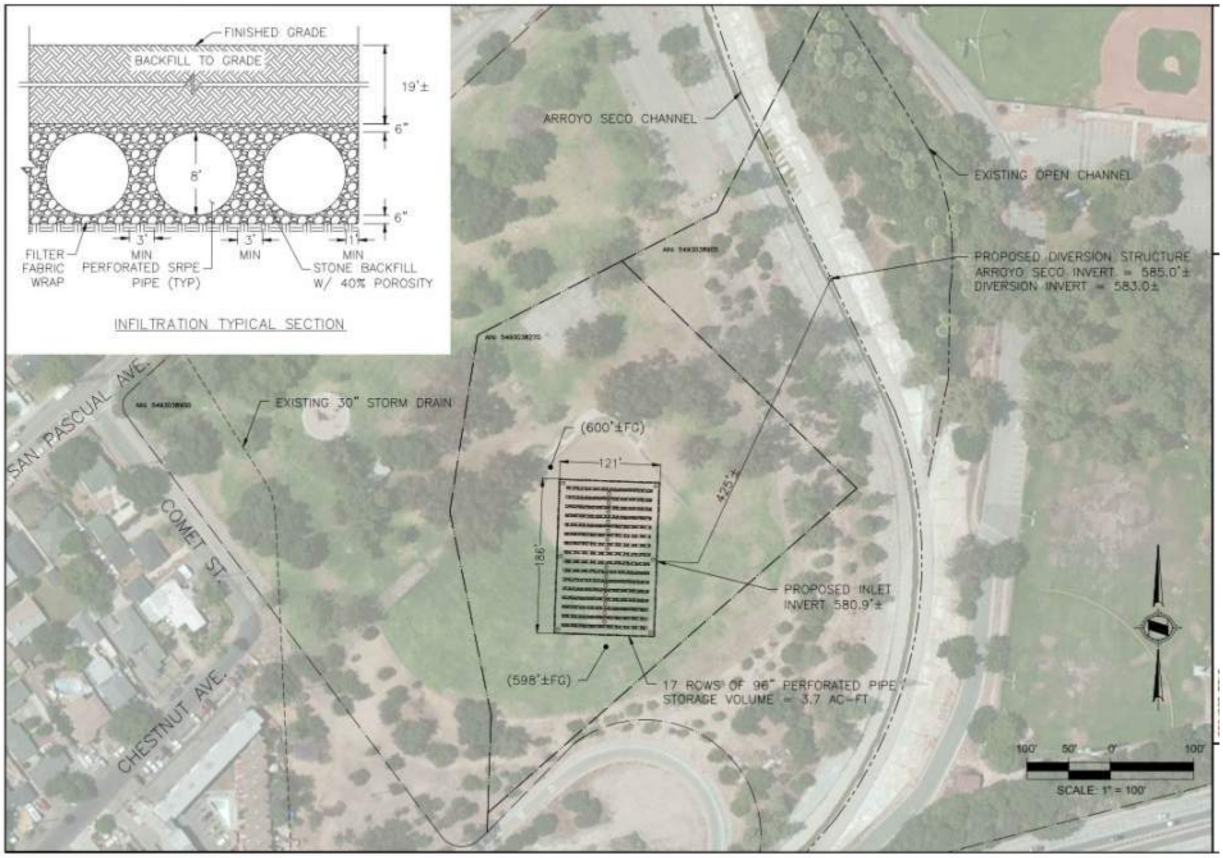


Figure 4-35. Lower Arroyo Park Subsurface Infiltration Concept

4.6 How is the EWMP Integrated with Previous, Ongoing and Future Water Quality Planning Efforts?

The EWMP includes a compilation of numerous previous stormwater compliance planning documents created for the ULAR, and the EWMP represents the "master stormwater compliance plan" moving forward. As such, it is important to recognize and, to the extent practicable, incorporate other planning efforts in the LA River watershed. This section provides a brief overview of the previous planning documents incorporated into the EWMP and considers how the EWMP will be integrated into other efforts to restore and provide access to the Los Angeles River and increase the reliability of local water supplies.

4.6.1 Previous Water Quality Planning Efforts

The process of developing a set of regional project opportunities described above included a review and analysis of many local and regional planning efforts underway by many other agencies and organizations throughout the watershed. The previously developed plans reviewed during EWMP development include the following:

- Implementation Plans for the LA River and Tributaries Metals TMDLs:
  - *City of Los Angeles Draft Implementation Plan, 2010*

3.7 LOWER ARROYO PARK

Lower Arroyo Park is located within the City of South Pasadena in an area that drains to Aroyo Seco. A channelized portion of Arroyo Seco runs through the center of the proposed site parcel. Park facilities include two baseball diamonds, open field space, and playground equipment. The potential BMP type is proposed as a below-ground retention/infiltration basin situated beneath the baseball diamonds and other open field space in the southwest corner and northern portions of the park.

No maximum drainage area was identified for this site since it is located adjacent to a receiving waterbody, Arroyo Seco. After review of available site opportunities and surrounding infrastructure, a smaller (alternative) drainage area was delineated, encompassing approximately 145 acres.

After reviewing the hydrologic model results and estimated runoff volume for the various diversion scenarios, it was determined that this project site was suitable for a retention/infiltration BMP sized to accommodate more than the 85th percentile design storm flows contributed from the smaller alternative drainage area. As a result, the recommended active volume of the BMP is 3.7 acre feet.

Table 3.7-1 summarizes key conceptual design parameters of the BMP proposed at Lower Arroyo Park. A map of the project site including key infrastructure and highlighted BMP opportunity areas is provided in Appendix D. A map of the alternative (minimum) tributary drainage area can be found in Appendix E.

Table 3.7-1 Summary of Lower Arroyo Park (SP01)

Table 3.7-1 Summary of Lower Arroyo Park (SP01)		
Project Site Parameters	Total (Maximum) Drainage Area	N/A
	Alternative (Minimum) Drainage Area	145 ac
	Maximum Required BMP Volume	N/A
	Alternative Required BMP Volume	0.06 ac-ft
	Groundwater Depth	25 ft
BMP Design Parameters	BMP Opportunity Area	10.6 ac
	Recommended Maximum BMP Depth	25 ft
	Available BMP Volume	265 ac-ft
	Recommended Active BMP Volume	**3.7 ac-ft**

In addition to the volumetric features summarized above, it is envisioned that this site would feature the following potential benefits:

- Drains an urbanized area
- Stormwater capture and some infiltration
- Stormwater quality improvement via pre-treatment, retention, and infiltration
- Water harvested can be utilized for a significant amount of on-site irrigation

APPENDIX A

DESKTOP GEOTECHNICAL ANALYSIS

				Chino Silt Loam		Hanford Fine Sandy Loam		Hanford Gravelly Sandy Loam		Ramona Loam		Ramona Sandy Loam		Tujunga Fine Sandy Loam		Yolo Loam	
Cluster ID	Site Name	Total Area (ac)	Aggregate Infiltration Rate (in/hr)	Soil Area (ac)	% of Site Total	Soil Area (ac)	% of Site Total	Soil Area (ac)	% of Site Total	Soil Area (ac)	% of Site Total	Soil Area (ac)	% of Site Total	Soil Area (ac)	% of Site Total	Soil Area (ac)	% of Site Total
AL01	Almansor Park	133.6	0.70	0.0	0%	0.0	0%	0.0	0%	27.6	21%	92.8	69%	13.3	10%	0.0	0%
GL01	Fremont Park	9.4	0.30	0.0	0%	9.4	100%	0.0	0%	0.0	0%	0.0	0%	0.0	0%	0.0	0%
LAC01	Roosevelt Park	24.3	0.30	17.3	71%	7.1	29%	0.0	0%	0.0	0%	0.0	0%	0.0	0%	0.0	0%
MP01	Sierra Vista Park	2.5	0.30	0.0	0%	0.0	0%	0.0	0%	0.1	5%	0.0	0%	0.0	0%	2.3	95%
NHP	North Hollywood Park San	22.5	0.80	0.0	0%	0.0	0%	0.0	0%	0.0	0%	0.0	0%	22.5	100%	0.0	0%
SF01	Fernando Regional Park	10.7	0.80	0.0	0%	0.0	0%	0.0	0%	0.0	0%	0.0	0%	10.7	100%	0.0	0%
SM01	Lacy Park	26.7	0.39	0.0	0%	0.0	0%	0.0	0%	21.9	82%	4.8	18%	0.0	0%	0.0	0%
SP01	Lower Arroyo Park	25.5	0.80	0.0	0%	0.0	0%	25.5	100%	0.0	0%	0.0	0%	0.0	0%	0.0	0%

Hydrologic Soil Group	Infiltration Rate (in/hr)	Soil Textures	Corresponding Unified Soil Classification	
			Symbol	Description
A	1.63	gravel	GW	well-graded gravels, sandy gravels
	1.63	sandy gravel	GP	gap-graded or uniform gravels, sandy gravels
	1.63	silty gravels	GM	silty gravels, silty sandy gravels
	1.63		SW	well-graded gravelly sands
	0.8	sandy gravel	SP	gap-graded or uniform sands, gravelly sands
	0.8	loamy sand		
	0.8	sandy loam		
B	0.45		SM	silty sands, silty gravelly sands
	0.3	loam, silt loam	MH	micaceous silts, diatomaceous silts, volcanic ash
C	0.2	sandy clay loam	ML	silts, very fine sands, silty or clayey fine sands
D	0.06	clay loam	GC	clayey gracels, clayey sandy gravels
	0.06	silty clay loam	SC	clayey sands, clayey gravelly sands
	0.06	sandy clay	CL	low plasticity clays, sandy or silty clays
	0.06	silty clay	OL	organic silts and clays of low plasticity
	0.06	clay	CH	highly plastic clays and sandy clays
	0.06		OH	organic silts and clays of high plasticity

Summary Environmental Constraints: Upper Los Angeles River Watershed Regional Projects

SP01 – Arroyo Park

- **AQ:** Construction emissions in excess of thresholds; may increase time for site-specific CEQA compliance.
- **AQ:** Cumulative AQ impacts may increase time for site-specific CEQA compliance.
- **AQ:** Air pollutant concentrations from construction may increase time for site-specific CEQA compliance.
- **BIO:** Tree removal could disturb active nests (violation of Migratory Bird Treaty Act); may increase time for site-specific CEQA compliance.
- **BIO:** Tree removal could destroy protected trees; may increase time for site-specific CEQA compliance.
- **CUL:** Archeological resources may be present; should be addressed during site specific CEQA compliance.
- **CUL:** Paleontological resources may be present; should be addressed during site specific CEQA compliance.
- **REC:** Temporary closure of the recreational uses within Arroyo Park is likely to require close coordination between the City of South Pasadena, City of Los Angeles (a small section of the park west of the Arroyo Seco appears to be located within the City of Los Angeles), local residents, and community stakeholders to develop suitable mitigation options for addressing the temporary loss of recreational uses. Increased site-specific CEQA compliance time.

Initial Study/
Environmental Constraints Evaluation

For

the Eight Recommended Regional Projects within the Upper Los Angeles River Watershed

February 2015

City of Los Angeles

Bureau of Engineering Watershed Protection Division

1.0 INTRODUCTION

National Pollutant Discharge Elimination System Municipal Separate Storm Sewer System Permit (MS4 Permit) Order No. R4-2012-0175 establishes the waste discharge requirements for stormwater and non-stormwater discharges within the watersheds of Los Angeles County. This MS4 Permit was adopted by the California Regional Water Quality Control Board, Los Angeles Region (Regional Board), on November 8, 2012, and became effective on December 28, 2012.

The MS4 Permit includes provisions that allow permittees the flexibility to customize their stormwater programs to achieve compliance with certain receiving water limitations and water quality based effluent limits over time. Specifically, permittees may voluntarily choose to develop and implement an Enhanced Watershed Management Program (Program). The Program includes prioritization of water-quality issues, identification of implementation strategies, control measures, and Best Management Practices (BMPs) sufficient to meet pertinent standards, integrated water-quality monitoring, and opportunity for stakeholder input. Through the Program, permittees will implement projects to improve water quality, and also have incentives to evaluate and, where feasible, implement regional projects that retain all non-stormwater runoff and all stormwater runoff from the 85th percentile, 24-hour storm event for the drainage area tributary to those projects.

Municipalities, non-governmental organizations and community stakeholders throughout the County of Los Angeles are working collaboratively to develop Enhanced Watershed Management Plans for each of LA's five watersheds - Ballona Creek, Dominguez Channel, Marina Del Rey, Santa Monica Bay and Upper Los Angeles River. The objectives of the Enhanced Watershed Management Plans (or EWMPs) are to comply with water quality mandates, improve the quality of our rivers, creeks and beaches, and address current and future regional water supply issues.

Each of the five watersheds has a Watershed Management Group that meets on a regular basis. The goal of each Watershed Management Group is to develop an EWMP for their specific watershed. Each EWMP will identify current and future multi-benefit projects that will improve water quality, promote water conservation, enhance recreational opportunities, manage flood risk, improve local aesthetics, and support public education opportunities. Each EWMP will include water quality priorities, watershed control measures, reasonable assurance analysis, the scheduling of projects and the monitoring, assessment and adaptive management of projects. The Upper Los Angeles River Watershed Management Group has developed a list of eight very high priority Regional Projects for implementation, which has been submitted to the Regional Water Quality Control Board for approval.

The Los Angeles County Flood Control District is in the process of preparing a Program EIR (Program EIR) to address the environmental impacts associated with implementing EWMPs within 12 watersheds in the MS4 permit coverage area. One of these watersheds is the Upper Los Angeles River Watershed. The Program EIR will focus on potential effects that could result from implementation of the projects and management actions identified in each EWMP, and would assess the physical changes to the environment that would likely result from the construction and operation of EWMP projects, including direct, indirect, and cumulative impacts.

The purpose of this environmental constraints evaluation is to identify potential site-specific environmental constraints associated with each of the recommended eight structural Regional Projects within the Upper Los Angeles River Watershed, including increased time requirements to address issues, obtain project approvals (including CEQA compliance).

2.0 PROJECT DESCRIPTION

2.1 Project Location

2.1.1 Regional Setting

The Upper Los Angeles River Watershed is located on the Los Angeles Coastal Plain south of the San Gabriel Mountains. The watershed encompasses large portions of the San Fernando Valley; east into Pasadena, South Pasadena, San Marino, Alhambra, Monterey Park; south into Los Angeles and south Los Angeles (see Figure 1). The Upper Los Angeles River Watershed is largely urbanized.

2.1.2 Project Setting

Eight structural Regional Projects are recommended for implementation, and the general settings at each location, are as follows:

- SF01 - Recreation Park in the City of San Fernando. The site includes a multi-purpose center, indoor gymnasium, an active recreational field (softball), outdoor basketball courts, playgrounds, fitness area, and picnic areas. The San Fernando Regional Pool facility is located on the northern portion of the site. Mature trees are located along the periphery and some interior areas around the active field. Surrounding land uses include single and multi-family residential units to the west, commercial/industrial uses to the east, the Pacoima Wash to the southeast, and railroad right-of-way to the southwest. The operating hours for the park are sunrise to 9 p.m. daily.
- NHP – North Hollywood Park in the City of Los Angeles. The southern part of North Hollywood Park (located south of Magnolia Boulevard is a landscaped area that includes mature trees, and walking paths. The trees are interspersed throughout the open space. A September 11, 2001 memorial is located bear the west border in approximately the middle of the park. Commercial and multi-family uses are located to the east across Tujunga Avenue, and the Tujunga Wash and Hollywood Freeway to the west.
- GL01 - Fremont Park in the City of Glendale. The site includes tennis courts, a basketball court, playgrounds, horseshoe pits, picnic areas with barbecues, and wading pool. A field is also located along the eastern portion of the park. Mature trees are present at the site and along the periphery. Surrounding land uses include single and multi-family residential units to the west, south and east of the park, and the Verdugo Wash to the north of the park. The operating hours for the park are sunrise to sunset daily.
- SP01 - Arroyo Park in the City of South Pasadena. Arroyo Park is bisected by the Arroyo Seco. the site east of the Arroyo Seco includes multiple lighted athletic fields (baseball, softball and soccer), playground equipment, picnic areas, small amphitheater, .and hiking trails. The park located west of the Arroyo Seco includes a baseball field and open space. Both sites include mature trees. Surrounding land uses are primarily single family residences (in the vicinity of the west site. The San Pascual Stables are located to the north of the park and San Pascual Avenue. The park does not have designated operating hours. (South Pasadena, 2015c).
- SM01 – Lacy Park in the City of San Marino. The site includes a central landscaped green space with an inner and outer walkway around the perimeter. The perimeter of the green space is has been planted with trees of varying species, and most are mature. Site uses include tennis courts, picnic areas, playground, and small field. Surrounding land uses are primarily single-family homes. The operating hours for the park is Monday - Friday: 6:30 a.m. to Sunset, and Saturday -

Sunday: 8:00 a.m. to 8:00 p.m. (March 13–November 5) or 8:00 a.m. to 6:00 p.m. (November 6–March 12).

- AL01 – Almansor Park in the City of Alhambra. The site includes open space areas, picnic tables with covered shelters, playground equipment, barbecues, restrooms, ball fields, tennis courts, horseshoe pits, exercise par course, meeting room, activity room, gymnasium, outdoor basketball court, a small lake, and a jogging course. Mature trees are located along the periphery. Surrounding land uses include single-family residences to the south and west, Alhambra Golf Course to the immediate east, and the Alhambra Fire Training Facility and Alhambra Wash farther to the east. In addition, the Martha Baldwin Elementary School, Emmaus Lutheran School, and Emmaus Lutheran Church are contiguous to the park. The operating hours for the park are 5:00 a.m. to 10:30 p.m. daily. .
- MP01 - Sierra Vista Park in the City of Monterey Park. The site includes a softball field, outdoor basketball and paddle tennis court, children's play area, picnic area, and community center. Mature trees are located along the periphery. Surrounding land uses include single- and multi-family residences. The operating hours for the park are 6:00a.m. - 10:00 p.m. daily.
- LAC01 – Franklin D. Roosevelt Park in the County of Los Angeles. The site includes basketball courts, children's play areas, soccer fields, ball fields, a community center, computer center, fitness zone, gymnasium, skate park, picnic areas with barbecue grills, and senior center. In addition, a Head Start preschool operated by the Mexican American Opportunity Foundation is located at the park. The operating hours for the park are sunrise to sunset, daily. Surrounding land uses include single-family residences to the north and east of the park, commercial and residential to the south, and railroad right-of-way to the west.

2.2 Goals and Objectives

The purpose of the Regional Projects is to improve water quality and help the Cities and County comply with the MS4 permit discharge requirements for stormwater and non-stormwater discharges within the Upper Los Angeles River Watershed.

2.3 Description of Proposed Project

The Regional Projects are defined by the MS4 Permit as multi-benefit regional projects that, wherever feasible, retain all non-stormwater runoff and all stormwater runoff from the 85th percentile, 24-hour storm event for the contributing drainage area, while also achieving other benefits such as flood control and/or water supply. The proposed eight Regional Project sites within the Upper Los Angeles River Watershed would include one or more of the following at each site:

- Infiltration Projects, that could include surface infiltration devices (infiltration basins, infiltration trenches, infiltration galleries, and bio-retention approaches.
- Multi-Directional Infiltration Projects that could include devices such as dry wells, and/or hybrid bio-retention and dry wells.
- Detention Basins that promote settling out of larger particles.
- Capture and Use Projects such as underground cisterns, storage facilities to make captured water available for uses such as irrigation.

The Regional Projects would install and operate infiltrations structures, detention basins, and/or capture and use structures at eight locations (eight parks) within the Upper Los Angeles River Watershed, as described above. The infiltrations structures, detention basins, and/or capture and use structures would likely be located underground at each of the park sites, with possible bio-retention approaches in select areas.

The water quality improvements proposed at each of the Regional Project sites within the Upper Los Angeles River Watershed are as follows:

- SF01-Recreation Park: Buried Infiltration structure, capture and use facility, or detention basin.
- NHP-North Hollywood Park: Buried Infiltration structure, capture and use facility, or detention basin.
- GL01-Fremont Park: Buried Infiltration structure, capture and use facility, or detention basin.
- SP01-Arroyo Park: Buried Infiltration structure, capture and use facility, or detention basin, with possible bio-retention in suitable areas.
- SM01-Lacy Park: Buried Infiltration structure, capture and use facility, or detention basin.
- AL01 – Almansor Park: Buried Infiltration structure, capture and use facility, or detention basin.
- MP01 – Sierra Vista Park: Buried Infiltration structure, capture and use facility, or detention basin.
- LAC01-Franklin D. Roosevelt Park: Buried Infiltration structure, capture and use facility, or detention basin.

In addition, accessory improvements would be required at each Regional Project site to make connections with nearby storm drains, as well as other improvement such as wells, pump stations, and electrical connections and controls.

2.4 Regional Project Construction

Construction of each of the Regional Projects is expected to take between 12-18 months, and would involve mobilization (of materials and equipment), excavation and shoring, haul away of soils, construction of the infiltration, detention, or capture and use structure (likely to be cast-in-place concrete), accessory improvements such as storm drain connections, equipment installation, backfilling, and surface restoration. Because the project sites are all park areas, the construction areas would have to be physically separated from the remaining park areas and screened. Due to the large quantities of runoff that would be infiltrated, detained, or captured, the subsurface structures would likely occupy substantial subsurface portions of the identified sites. Following construction of the facilities, surface features at each location would be restored to existing conditions or better.

2.5 Regional Project Operations

Once the Regional Projects are completed and commissioned, they would operate automatically, although their operation would be monitored and adjustments made on an as-needed basis, including during wet weather. The majority of the Regional Project would have subsurface components and their operation would not be detectible or apparent at the site surface. Small above-ground structures that house control equipment may be required.

Regional Projects that utilize approaches at the site surfaces (such as bio-retention) could periodically fill with retained runoff, and preclude other uses of those areas until percolation has been completed and the areas dry enough to support other uses.

2.6 Anticipated Permits and Approvals

Approvals or permits from the following agencies are expected to be required:

- City of Alhambra
- City of Glendale
- City of Los Angeles
- City of Monterey Park
- City of San Marino

- City of South Pasadena
- City of San Fernando
- County of Los Angeles
- State and Regional Water Quality Control Boards
- Others?

3.0 Initial Study Checklist

Potential environmental constraints associated with the Regional Projects are addressed in the Initial Study Checklist and detailed discussions are provided below.

Environmental Checklist Form

1. Project Title:	Upper Los Angeles River Regional Projects
2. Lead Agency Name and Address:	Varies depending on jurisdiction of each Regional Project (City of Alhambra, City of Glendale, City of Los Angeles, City of Monterey Park, City of San Marino, City of South Pasadena, City of San Fernando, and County of Los Angeles)
3. Contact Person and Phone Number:	Jim Rasmus, Black and Veatch (858) 945-8675
4. Project Location:	City of Alhambra, City of Glendale, City of Los Angeles, City of Monterey Park, City of San Marino, City of South Pasadena, City of San Fernando, and County of Los Angeles
5. Project Sponsor's Name and Address:	Bureau of Sanitation Watershed Protection Division1149 S. Broadway, 10th Floor Los Angeles, CA 90015
6. General Plan Designations:	Varies (Open Space)
7. Zoning:	Varies (includes OS, OS-1XL, SR – special recreation)
8. Description of Project:	The proposed Project consists of installation and operation of runoff infiltration and/or capture and use facilities at eight (8) locations within the Upper Los Angeles River Watershed. Facility options include underground stormwater and runoff detention facilities, underground infiltration facilities, and surface treatment features. Ancillary improvements, including connector pipelines to nearby storm drains, and/or pump stations or wet wells would be included.

Environmental Factors Potentially Affected:

The environmental factors checked below would potentially be affected by the Regional Projects (i.e., the proposed Project would involve environmental constraints, as indicated by the checklist on the following pages).

	Aesthetics		Agriculture and Forest Resources	X	Air Quality
X	Biological Resources	X	Cultural Resources		Geology/Soils
	Greenhouse Gas Emissions	X	Hazards and Hazardous Materials	X	Hydrology/Water Quality
	Land Use/Planning		Mineral Resources	X	Noise
	Population/Housing		Public Services	X	Recreation
	Transportation/Traffic		Utilities/Service Systems	X	Mandatory Findings of Significance

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
I.	**AESTHETICS.** Would the project:				
a.	Have a substantial adverse effect on a scenic vista?			X	
b.	Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings along a scenic highway?			X	
c.	Substantially degrade the existing visual character or quality of the site and its surroundings?			X	
d.	Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area?			X	

Discussion:

a. Would the project have a substantial adverse effect on a scenic vista?

A scenic vista generally provides focal views of objects, settings, or features of visual interest; or panoramic views of large geographic areas of scenic quality, primarily from a given vantage point. Substantial constraints occur if the Regional Projects introduce incompatible visual elements within a field of view containing a scenic vista or substantially alters a view of a scenic vista.

No Environmental Constraints.

- SF01 - Recreation Park. Recreation Park is located in an urbanized portion of the City of San Fernando and is not located within a Scenic Vista. Further, the improvements at this site would likely be buried features with the park surface restored to the same or better condition than currently exists.

- NHP – North Hollywood Park. North Hollywood Park is located in the City of Los Angeles' North Hollywood Community in an urbanized area, and is not located within a Scenic Vista. The improvements at this site would occur underground, and the park surface restored to the same or better condition than currently exists.

- GL01 – Fremont Park. Fremont Park, located in the City of Glendale just north of SR134 and south of the Verdugo Wash, is not located within a Scenic Vista. The improvements would place subsurface structures at this site, with the park surface restored to the same or better condition than currently exists.

- SP01 – Arroyo Park. Arroyo Park is located in South Pasadena along the Arroyo Seco north of the Pasadena Freeway. Although a ridgeline is present along the east side of Arroyo Park, the future improvements at this site would likely be buried and surface features restored to the same or better condition than currently exists. A small area of surface bio-treatment features could be added between the wash and San Ramon Drive. None of the proposed improvements would block views of the surrounding hillside, and no scenic vistas would be adversely affected.
- SM01 – Lacy Park. Lacy Park is located within a residential neighborhood in the City of San Marino. There are no designated scenic vistas in Lacy Park. The improvements would place subsurface structures at this site, with the park surface restored to the same or better condition than currently exists.
- AL01 – Almansor Park. Almansor Park is located adjacent to a single-family residential area and the Alhambra Golf Course in the City of Alhambra. This park is not located within a Scenic Vista. The improvements at this site would likely be buried and surface features would be restored to the same or better condition than currently exists.
- MP01 – Sierra Vista Park. Sierra Vista Park is located in a mixed residential area in the City of Monterey Park. This park is not located within a Scenic Vista. The improvements at this site would likely be buried and surface features would restored to the same or better condition than currently exists.
- LAC01 – Franklin D. Roosevelt Park. Franklin D. Roosevelt Park is located in a mixed residential and urbanized area in the southern portion of the County of Los Angeles. This park is not located within a Scenic Vista. The improvements at this site would likely be buried and surface features would be restored to the same or better condition than currently exists.

b./c. Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

No Environmental Constraints. The Regional Project improvements would not have the potential to damage scenic resources within a state scenic highway because none of the activities would be located near an eligible or designated state scenic highway. The California Department of Transportation (Caltrans) is responsible for the official nomination and designation of eligible scenic highways. The nearest officially designated state scenic highway (State Highway 2, from approximately three miles north of Interstate [I]-210 in La Cañada to the San Bernardino County Line) (California Department of Transportation, 2013) is located approximately 6 miles northeast of the nearest Regional Project (GL01 – Fremont Park).

The nearest eligible state scenic highway (State Highway 1, from State Highway 19 near Long Beach to I-5 south of San Juan Capistrano) (California Department of Transportation, 2013) is approximately 14 miles southeast of the nearest Regional Project (LAC01 – Franklin D. Roosevelt Park). None of the Regional Projects are visible from either of these State Scenic Highways; therefore, the Regional Projects would not adversely affect the quality of the scenic views from these locations.

In addition, the following summarizes specific details regarding scenic resources at each Regional Project site:

- SF01 - Recreation Park. Recreation Park is located between industrial development to the east and residential structures along to the west. The buried water quality improvement structures Recreation Park would not be visible, and the surface would be restored to the same or better condition than currently exists following construction. As such, the improvements at Recreation Park are not expected to result in adverse effects to scenic resources or result in significant adverse impacts to visual character of the area.

- NHP – North Hollywood Park. The area of North Hollywood Park proposed for the water quality improvement facilities is a well-used landscaped open space with various mature and less mature trees. The water quality improvements at this site would likely be subsurface facilities that would not be visible. Further, the park surface would be restored to the same or better condition than currently exists following construction. As such, the improvements at North Hollywood Park are not expected to result in adverse effects to scenic resources or result in significant adverse impacts to visual character of the area.

- GL01 – Fremont Park. Fremont Park is landscaped and includes various active and passive recreational uses. There are no designated scenic highways in the City of Glendale. The Open Space and Conservation Element of the General Plan identify several "urban hikeways" in an effort to provide opportunities for citizens and visitors to discover Glendale's unique urban form. Three self-guided routes cross through downtown Glendale, highlighting the Financial/Fremont Park District, the Brand Shopping District, and the Civic Center District. Although Fremont Park is located along one of the hikeways, the water quality improvements at this site would likely be subsurface facilities that would not be visible, once completed. Further, the park surface would be restored to the same or better condition than currently exists following construction. As such, the improvements at Fremont Park are not expected to result in adverse effects to scenic resources or result in significant adverse impacts to visual character of the area.

- SP01 – Arroyo Park. Arroyo Park is landscaped, and contains active and passive recreational uses. Trees are located throughout the park. This park is not located along a locally designated scenic highway; however, as stated in the City's Open Space and Resource Conservation element of the General Plan, it is considered a valued resource by the City of South Pasadena. The subsurface water quality improvements at this site would not be visible. There is the potential for surface bio retention improvements to be added between the wash and Stoney Drive; however, these improvements are expected to be consistent with the open space setting of the park and would not introduce incompatible structures. Further, the park surfaces would be restored to the same or better condition than currently exists following construction. As such, the improvements at Arroyo Park are not expected to result in adverse effects to scenic resources or result in significant adverse impacts to visual character of the area.

- SM01 – Lacy Park. Lacy Park is located within a residential neighborhood in the City of San Marino. The center of Lacy Park serves as an open expanse which is highlighted as a resource in the City's General Plan. The proposed improvements would be located beneath the ground surface in the central area of lacy park; however, because the improvements would be subsurface and the park surfaces restored to existing conditions or better, the improvements are not expected to adversely affect the central area as a scenic resource.

- AL01 – Almansor Park. Almansor Park is located adjacent to a single-family residential area and the Alhambra Golf Course in the City of Alhambra. The improvements at this site would likely be buried and surface features would restored to the same or better condition than currently exists, and are not anticipated to result in significant impacts to scenic resources or the visual character of the project area.
- MP01 – Sierra Vista Park. Sierra Vista Park is located in a mixed residential area in the City of Monterey Park. Because the improvements at this site would likely be buried and surface features would restored to the same or better condition than currently exists, significant impacts to scenic resources or visual character of the project area are not anticipated.
- LAC01 – Franklin D. Roosevelt Park. Franklin D. Roosevelt Park is located in a mixed residential and urbanized area in the southern portion of the County of Los Angeles. The improvements at this site would likely be buried and surface features would restored to the same or better condition than currently exists, and are not anticipated to result in significant impacts to scenic resources or the visual character of the project area.

d. affect day or nighttime views in the area?

No Environmental Constraints. The Regional Projects would involve the placement of buried infiltration or storage structures, with surface features restored. Exterior lighting of such structures are not anticipated. Water quality improvements such as bio-retention of runoff and stormwater could be place at ground level in one area of Arroyo Park in South Pasadena; however, lighting, if any, is not expected to be substantial. Some low intensity security lighting could be included; however, such lighting would not be intrusive and would not represent a substantial source of new lighting. As a consequence, adverse impacts related to new lighting sources are not anticipated.

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
II.	**AGRICULTURE AND FOREST RESOURCES.** In determining whether impacts on agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest Range Assessment Project and the Forest Legacy Assessment Project; and the forest carbon measurement methodology provided in the Forest Protocols adopted by the California Air Resources Board. Would the project:				
a.	Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?				X
b.	Conflict with existing zoning for agricultural use or conflict with a Williamson Act contract?				X
c.	Conflict with existing zoning for, or cause rezoning of, forest land (as defined in PRC Section 12220(g)) or timberland (as defined in PRC Section 4526)?				X
d.	Result in the loss of forest land or conversion of forest land to non-forest use?				X

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
e.	Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?				X

Discussion:

a. Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

No Environmental Constraints. The California Department of Conservation, as part of its Farmland Mapping and Monitoring Program (FMMP), develops maps and statistical data to be used for analyzing impacts on California's agricultural resources. The FMMP categorizes agricultural land according to soil quality and irrigation status; the best quality agricultural land is identified as Prime Farmland. According to the FMMP, the proposed Regional Project sites are located in areas designated as Urban and Built-Up Land, which is described as land occupied by structures that has a variety of uses including industrial, commercial, institutional facilities, railroad or other transportation yards (California Department of Conservation, 2010 and 2011b). There is no Prime Farmland, Unique Farmland, Farmland of Statewide Importance, or Farmland of Local Importance in the vicinity of the Regional Project sites. Therefore, there would be no impact to designated farmland.

b. Would the project conflict with existing zoning for agricultural use or a Williamson Act contract?

No Environmental Constraints. The Regional Project sites are zoned for open space or developed as existing parks, and there are no agricultural zoning designations or agricultural uses within the Project limits or adjacent areas. The Williamson Act applies to parcels consisting of at least 20 acres of Prime Farmland or at least 40 acres of land not designated as Prime Farmland. None of the Regional Project sites are located within a Prime Farmland designation, or on areas consisting of more than 40 acres of farmland (California Department of Conservation, 2010 and 2011b). No Williamson Act contracts apply to the Regional Project sites. Therefore, the Regional Projects would not have an impact on agricultural zoning or a Williamson Act contract.

c. Would the project conflict with existing zoning for, or cause rezoning of, forest land (as defined in PRC Section 12220(g)) or timberland (as defined in PRC Section 4526)?

No Environmental Constraints. The Regional Project sites are zoned for open space or used for parks, and therefore would not conflict with existing zoning for, or require rezoning of forest land or timberland. Therefore, the Regional Projects would have no impact on land zoned for forest land.

d. Would the project result in the loss of forest land or conversion of forest land to non-forest use?

No Environmental Constraints. The Regional Projects would occur at existing park sites, which are not designated as forest lands. The Regional Projects would not result in the loss of forest land or conversion of forest land to non-forest use.

e. Would the project involve other changes in the existing environment that, due to their location or nature, could individually or cumulatively result in loss of Farmland to non-agricultural use or conversion of forest land to non-forest use?

No Environmental Constraints. As discussed above, no farmland or forest land is located on the Regional Project sites. Therefore, the Regional Projects would not involve the disruption or damage of the existing environment that would result in the loss of farmland to non-agricultural use or conversion of forest land to non-forest use.

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
III.	**AIR QUALITY.** When available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a.	Conflict with or obstruct implementation of the applicable air quality plan?			X	
b.	Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	X			
c.	Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a non-attainment area for an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?	X			
d.	Expose sensitive receptors to substantial pollutant concentrations?	X			
e.	Create objectionable odors affecting a substantial number of people?			X	

Discussion:

a. Would the project conflict with or obstruct implementation of the applicable air quality plans?

No Environmental Constraints. The Regional Project sites are located within the South Coast Air Basin (SCAB), which is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). The SCAQMD is responsible for administering the Air Quality Management Plan (AQMP) for the Basin, which is a comprehensive air pollution control program for attaining state and federal ambient air quality standards. The Cities in which the Regional Project sites would occur have each adopted an Air Quality Element as part of their General Plan. The Air Quality Elements contains policies and goals for attaining state and federal air quality standards, while continuing economic growth, and includes implementation strategies for local programs contained in the AQMP. A significant impact could occur if the proposed project is inconsistent with the AQMP or the applicable General Plan.

The Regional Projects would place water quality improvements below each of the sites or at their surface, and would not require permanent changes in uses of the parks (or median). Rather, the Regional projects are deemed to be consistent with the planned and existing uses at each site and with the applicable general plan. Therefore, the Regional Projects are not expected to conflict with or obstruct implementation of the applicable air quality plan and no impact is anticipated.

b. Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?

Some Environmental Constraints. Construction of the Regional Projects would require excavation of portions of each site for either the placement of subsurface storage and infiltration structures, or surface improvements. In addition, construction would be required to make connections with existing storm drains, and could require construction of accessory facilities such as subsurface pump stations or wet wells. The South Coast Air Quality Management District (SCAQMD) has established thresholds of significance for criteria pollutants generated during construction and operation, and a significant impact would occur if the Regional Projects result in construction or operational emissions that exceed the thresholds. Construction is likely to require heavy equipment such as loaders, and excavators, and substantial amounts of soil would require export from the sites. As a consequence, there is a possibility for construction emissions to exceed the SCAQMD significance thresholds, even with mitigation, depending on the construction phasing and schedule. Although such exceedances would not represent a substantial environmental constraint to the project, they would likely have the effect of increasing the length of time required for individual project approvals by requiring Mitigated Negative Declarations or Environmental Impact Reports for CEQA compliance. There is also the potential for the applicable decision-making body to determine that the benefits of an individual Regional Project do not override any associated significant impacts (including impacts to air quality), and therefore do not approve the project. However, this potential is considered to be minimal given the need for the Regional Projects in order to comply with the MS4 permit requirements.

Operation of the proposed Project would occur either passively, or if pumping is required, would not likely utilize a substantial amount of energy or require more than nominal operational activities, and therefore, are not likely to result in emission in excess of the SCAQMD significance thresholds for operation. Therefore, operation of the Regional Projects would not likely pose environmental constraints.

c. Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

Some Environmental Constraints. Construction of the Regional projects could result in emissions that exceed SCAQMD significance thresholds, and pose constraints related to individual Regional Project approval, as discussed above. Construction of the Regional Projects, in conjunction with construction of other water quality and related improvements, could result in cumulative air quality impacts. Cumulative impacts would be addressed as part of the County's Program EIR or in site specific environmental compliance documentation (under the California Quality Act) and would pose the same environmental constraint as described above under Checklist Item III.b.

d. Would the project expose sensitive receptors to substantial pollutant concentrations?

Some Environmental Constraints. As discussed above, construction of the Regional projects could result in emissions that exceeds SCAQMD significance thresholds. Many of the Regional Projects are located in close proximity to residences, which are considered to be sensitive receptors. The SCAQMD has established localized significance thresholds (LST) to address the impacts that pollutant concentrations could have on nearby receptors. There is a potential for construction to result in emissions in excess of the applicable LSTs, which would have the effect of increasing the length of time required for individual project approvals for CEQA compliance.

e. Would the project create objectionable odors affecting a substantial number of people?

No Environmental Constraints. Construction of the Regional Projects would result in some odors associated with diesel emissions from construction equipment. Diesel odors are common in urbanized environments, and during project construction, would be temporary and localized, and not expected to result in substantial odor impacts.

Air emissions, including odors, during operation are anticipated to be absent or minimal, as surface water would not be stagnant, and storage and infiltration units would be located underground. Therefore, operation of the Regional Projects are not expected to result in substantial odors.

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
IV.	**BIOLOGICAL RESOURCES.** Would the project:				
a.	Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?			X	
b.	Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?				X
c.	Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marshes, vernal pools, coastal wetlands, etc.) through direct removal, filling, hydrological interruption, or other means?				X
d.	Interfere substantially with the movement of any native resident or migratory fish or wildlife species, or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?		X		
e.	Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?		X		
f.	Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan?				X

Discussion:

a. **Would the project have a substantial adverse impact, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or the U.S. Fish and Wildlife Service?**

No Environmental Constraints. No candidate, sensitive, or special-status species are known to occur on the Regional Project sites. Sites SF01 is located within the USGS San Fernando quadrangle; NHP within the Van Nuys quadrangle; GL01 within the Burbank quadrangle; SP01 within the Los Angeles quadrangle; SM01, AL01, and MP01 within the El Monte quadrangle; and LAC01 within the South Gate quadrangle. Federal and state listed threatened and endangered species have been found in each of the quadrangles in the past (CNDDB, 2015); however it is very unlikely that such habitat existing at any of the Regional Project sites, as those sites are all developed and actively used urban recreational areas. In addition, there are no Significant Ecological Areas (SEAs) in the vicinity of the Regional Project sites (LA County, 2014).

b. **Would the project have a substantial adverse impact on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or the U.S. Fish and Wildlife Service?**

No Environmental Constraints. There is no riparian habitat or wetlands located at any of the Regional Project sites or the immediate vicinity, as all of the sites are developed are recreational areas. Open drainage channels that are concrete lined are located adjacent to NHP (Tujunga Wash), GL01 (Verdugo Wash), and SP01 (Arroyo Seco); however, these drainages are devoid of riparian habitat and are not expected to be physically modified. Each Regional Project site is designated in its respective general plan as recreation, open space, or other public use. In addition, no SEAs are located in the vicinity of the Regional Project sites.

c. **Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marshes, vernal pools, coastal wetlands, etc.) through direct removal, filling, hydrological interruption, or other means?**

No Environmental Constraints. There is no riparian habitat or wetlands located at any of the Regional Project sites or the immediate vicinity, as all of the sites are developed are recreational areas (see discussion above for Checklist Item IV.b.), and adjacent washes are lined with concrete.

d. **Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species, or with established native resident or migratory wildlife corridors, or impede the use of wildlife nursery sites?**

Some Environmental Constraints. There are no known terrestrial migration corridors within the vicinities of the Regional Project sites. The sites are located in urban areas, and are not connected with other open space areas via undeveloped or natural corridors. Although wildlife may visit the Regional Project sites, introduction of subsurface facilities at the Regional Project sites would not otherwise impede migration. None of the Regional Project sites have water courses that can be used by migratory fish. Therefore, the Regional Projects would not interfere with wildlife migration.

The Regional Project sites include landscaped open space areas, which include trees that could be used as nesting sites. Impacts to migratory birds and active nests are prohibited under the Federal Migratory Bird Treaty Act (MBTA), 50 C.F.R. Part 10, and Sections 3500 through 3705 of the California Fish and Game Code protect most migratory bird species and active nests from harm or destruction. Nearly all native North American bird species are on the MBTA list. The nesting season varies according to species, but is generally February 15th through August 15th for most birds and January 31st through September 1st for raptors. If tree and vegetation removal would occur during nesting months at any Regional Project site, a confirmation bird survey at each of the sites should be performed to prevent disturbance of active nests. Such surveys are standard mitigation applied during site specific environmental documentation. The requirements for bird surveys are not expected to result in substantial environmental constraints, but could result in additional time requirements for CEQA compliance.

e. Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Some Environmental Constraints. The Regional Projects would be located in the City of San Fernando (SF01), City of Los Angeles (NHP), City of Glendale (GL01), City of South Pasadena (SP01), City of San Marino (SM01), City of Alhambra (AL01), City of Monterey Park (MP01), and the County of Los Angeles LAC01).

The City of San Fernando does not currently have any locally-designated tree species, and existing vegetation is limited to introduced species used for landscaping (i.e. lawn area, bushes, and trees) (City of San Fernando, 2008).

The City of San Marino has established an Oak Tree Preservation Program that assists property owners on the proper care of oak trees. San Marino has established tree removal regulations for private property, which would not apply to Lacy Park. The City however does prohibit tree removal in Lacy Park unless authorized by the City Manager.

The City of Alhambra has established tree removal requirements and allows trees to be removed at city-owned facilities only after a review by the department head having jurisdiction. Any removed trees must be replaced as soon as practicable.

The City of Monterey Park allows the removal of trees from public property provided the owner of adjacent private property receives approval from the recreation and parks director. It is assumed that the director would also have to approve any tree removals from Sierra Vista Park or public areas, if required for the water quality improvements.

The County of Los Angeles protects oak trees and requires a permit prior to any oak tree removals.

Other municipalities have established various requirements for tree protection.

The City of Los Angeles protects the following trees within its jurisdiction:

- Oak tree including valley oak
- California Live Oak
- Southern California Black Walnut
- Western Sycamore

- Any other oak genus indigenous to California but excluding the scrub oak,
- California Bay

The City of Glendale protects the following trees, regardless of their location (public or private property):

- Coast Live Oak
- Mesa Oak
- Valley Oak
- Scrub Oak
- California Sycamore
- California Bay

The City of South Pasadena has established regulations governing tree removals within its jurisdiction. A permit is required for trimming or removing the following tree types:

- Oak trees of all varieties
- Coast Redwood
- Dawn Redwood
- Sycamore
- Blue Elderberry
- Heritage trees
- Giant Redwood
- California Walnut
- Christmas Berry
- Mexican Elderberry

There is a potential for the Regional Projects to result in some tree removal, depending on the specific locations and parameters of the water quality improvements, which would require permits or other approvals from the respective jurisdiction. The jurisdictions could apply conditions of approval, including tree replacements, or other measure that mitigate the removals. There tree removals would likely have the effect of increasing the length of time required for individual project approvals and CEQA compliance.

f. Would the project conflict with the provisions of an adopted habitat conservation plan, natural communities conservation plan, or any other approved local, regional, or state habitat conservation plan?

No Environmental Constraint. The Regional Project sites are located within urbanized areas and are developed as parks and recreational facilities. The sites are not located within an adopted Natural Communities Conservation Plan (NCCP) or Habitat Conservation Plan (HCP). In addition, the sites are not located in or near any SEA.

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
V.	**CULTURAL RESOURCES.** Would the project:				
a.	Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?			X	
b.	Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?		X		
c.	Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?		X		
d.	Disturb any human remains, including those interred outside of formal cemeteries?			X	

Discussion:

a. Would the project cause a substantial adverse change in the significance of a historical resource as defined in State CEQA Guidelines §15064.5?

No Environmental Constraints. The Regional Projects would be located at community parks, or on a center median. None of the locations where water quality improvements would occur at the Regional Project sites are developed with structures over the age of 50-years that would be directly affected, and therefore, none of the Regional Projects would result in demolition or relocation of any historic structure. However, there is one historic resource north of GL01, Fremont Park, and one historic structure located at the east end of Lacy Park (SM01) in San Marino.

<u>SM01 – Lacy Park.</u> Lacy Park was originally Wilson Lake in 1875, and the land was purchased by the city in 1925 and dedicated as a park. Many of the tree species, planted nearly 100 years ago, are the result of the designer, Mr. William Hertrich and its first Park Superintendent, Mr. Armin Thurnher. The City considers the Thurnher house, located at the east end of the Park, to be a historic resource. In addition, the San Marino War Memorial is located at the east end of the Park. The water quality improvements would be subsurface and confined to center area of the Park and are not expected to not result in physical changes to the Thurnher house or the War memorial.

<u>GL01 – Fremont Park.</u> Fremont Park is bounded by Kenilworth Avenue on its east boundary. Approximately 200 feet to the north of the northern boundary of Fremont Park, the Kenilworth Avenue Bridge crosses over the Verdugo Wash. This bridge is listed as a historic resource in the City of Glendale's Register of Historic Resources. The water quality improvements would be confined to Fremont Park and would not result in physical changes to the bridge, or its context.

b. Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to State CEQA Guidelines §15064.5?

Some Environmental Constraints. The Regional Project site would be constructed within the boundaries of community parks and recreation sites. The surfaces of these sites are developed for active recreational uses (fields and courts) and passive recreational uses (picnic areas, etc.), and are not intensively developed. Because the development history of these sites is unknown and the onsite development is low intensity, there could be undisturbed soils below the sites which contain archaeological resources. Based on this, site-specific cultural resource investigations, including a cultural resources records search and field survey by a qualified archaeologist) should be conducted, either prior to or as part of the site-specific environmental documentation for each Regional Project. Mitigation that may be applied in the site-specific environmental document may include monitoring of excavation work by a qualified archaeologist with the authority to halt construction, and the subsequent evaluation and curation of any discovered resources. This potential constraint could have the effect of increasing the length of time required for individual project approvals and CEQA compliance.

c. Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Some Environmental Constraints. Similar to the discussion under archaeological resources, the development history of the Regional Project sites is unknown and the onsite development is low intensity. There could be undisturbed subsurface geological units suitable for containing paleontological resources. A site-specific paleontological records search should be conducted by the County's Natural History Museum to determine whether paleontological resources can be present at the depths that would occur at each site, either prior to or as part of the site-specific environmental documentation for each Regional Project. Mitigation that may be applied in the site-specific environmental document may include monitoring of excavation work by a qualified paleontologist with the authority to halt construction, and the subsequent evaluation and curation of any discovered resources. This potential constraint could have the effect of increasing the length of time required for individual project approvals and CEQA compliance.

d. Disturb any human remains, including those interred outside of formal cemeteries?

No Environmental Constraint. No cemeteries or burial sites are known to have occurred at the Regional Project site; however, it is still possible that human remains exist in the subsurface. California Health and Safety Code Section 7050.5 requires that in the event of the discovery of human remains outside of a dedicated cemetery, all ground disturbances must cease and the county coroner must be notified. Section 7052 establishes a felony penalty for mutilating, disinterring, or otherwise disturbing human remains, except by relatives. Sections 5097.94 and 5097.98 of the Public Resources Code specify a protocol to be followed when the Native American Heritage Commission receives notification of a discovery of Native American human remains from a county coroner. Compliance with existing laws regarding the handling of human remains discovered outside of formal cemeteries are expected to address any issues associated with the unanticipated discovery of human remains during project construction, and no environmental constraints are anticipated.

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
VI.	**GEOLOGY AND SOILS.** Would the project:				
a.	Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
	i.) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the state geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.			X	
	ii.) Strong seismic ground shaking?			X	
	iii.) Seismic-related ground failure, including liquefaction?			X	
	iv.) Landslides?				X
b.	Result in substantial soil erosion or the loss of topsoil?				X
c.	Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project and potentially result in an on-site or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?			X	
d.	Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?			X	
e.	Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems in areas where sewers are not available for the disposal of wastewater?				X

Discussion:

a. **Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:**

(i.) **Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the state geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.**

No Environmental Constraints. Southern California is one of the most seismically active areas in the U.S. Numerous active faults and fault zones are located within the general region, including the Whittier, Hollywood-Raymond, and Newport Inglewood faults. The Regional Projects would include subsurface storage basins and structures, and potentially some surface improvements. As a standard practice during the design process for any structure or facility, a geotechnical study is performed of each site that evaluates and identifies faults and fault zones that could affect the project, and that would make recommendations regarding project design based on the geotechnical considerations. Because geotechnical considerations are addressed during the design phase, the Regional Projects would not result in exposure of people or structures to substantial geotechnical hazards.

(ii.) **Strong seismic ground shaking?**

No Environmental Constraints. As discussed above, the Los Angeles Basin is an area of known seismic activity. The risk of seismic hazards such as ground shaking cannot be avoided. Similar to the earthquake fault hazards described above, geotechnical evaluations would be performed as a standard practice as part of the design phase, and the recommendations would be incorporated into project design to keep the Regional Projects from resulting in exposure of people or structures to substantial geotechnical hazards, including to ground shaking.

(iii.) **Seismic-related ground failure, including liquefaction?**

No Environmental Constraints. Similar to the earthquake hazards described above, a geotechnical study for each Regional Project would be prepared as a standard practice to address geotechnical considerations, including liquefaction, during the Project design phase, which would keep the Regional projects from resulting in exposure of people or structures to geotechnical hazards related to liquefaction.

(iv.) **Landslides?**

No Environmental Constraints. The Regional Projects would be constructed and operated on various community park sites and a center median. The project sites are relatively flat with no substantial natural or graded slopes. The Regional Projects are not located near any landslide hazard areas; therefore, there would be no environmental constraints.

b. **Would the project result in substantial soil erosion or the loss of topsoil?**

No Environmental Constraints. The majority of Regional Projects would involve storage structures beneath community recreation areas, and would not result in erosion. The

Regional Projects at Arroyo Park (SM01) could place bio-retention features at the ground surface; however, these improvements would be engineered and constructed in a manner that infiltrates captured stormwater, rather than conveys it offsite. These design features would limit the potential for erosion, and would not represent an environmental constraint.

c. Is the project located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on-site or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse?

No Environmental Constraints. Although no unstable geologic conditions are known to occur at the Regional Project sites, a geotechnical study for each Regional Project would be prepared as a standard practice to address geotechnical considerations during the Project design phase. Recommendations would be incorporated into the project design, which would keep the Regional Projects from resulting in substantive geotechnical hazards or risk exposure.

d. Is the project located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

No Environmental Constraints Expansive soils generally result from specific clay minerals that expand when saturated and shrink when dry. Expansive clay minerals are common in the geologic deposits throughout the Southern California region, and there is the potential that expansive sols could be present that the Regional Project sites. As discussed above, a geotechnical study for each Regional Project would be prepared to address geotechnical considerations (including expansive soils) as a standard practice during the Project design phase, and recommendations would be incorporated into Project designs to keep the Regional Projects from resulting in substantial risks to life or property.

e. Would the project have soils that are incapable of supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

No Environmental Constraints. The Regional Projects are water quality improvement projects that do not generate wastewater. Therefore, the Regional Projects would not result in environmental constraints related to alternative wastewater disposal methods.

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
VII.	**GREENHOUSE GAS EMISSIONS.** Would the project:				
a.	Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?			X	
b.	Conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?			X	

Discussion;

a. Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

No Environmental Constraints. The Regional Projects would generate criteria pollutant emissions during construction, including CO2 and equivalents. Construction emissions are amortized over 30-years, and are not likely to result in substantive annual greenhouse gas emissions. In addition, operation of the Regional Projects would consist of the pumping of stormwater to the treatment devices, and are not expected to generate substantial levels of greenhouse gasses.

b. Would the project conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?

No Environmental Constraints. The Regional Projects are water quality improvement projects that would not generate substantial greenhouse gas emissions. Because of this, the Regional Projects are not expected to not conflict with any applicable plans, policies, or regulations adopted by the state and local jurisdictions for the purposes of reducing GHG emissions.

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
VIII.	**HAZARDS AND HAZARDOUS MATERIALS.** Would the project:				
a.	Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?			X	
b.	Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?		X		
c.	Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within 0.25-mile of an existing or proposed school?				X
d.	Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				X
e.	Be located within an airport land use plan area or, where such a plan has not been adopted, be within 2 miles of a public airport or public use airport, and result in a safety hazard for people residing or working in the project area?				X
f.	Be located within the vicinity of a private airstrip and result in a safety hazard for people residing or working in the project area?				X
g.	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?			X	
h.	Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?				X

Discussion:

a. **Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?**

No Environmental Constraint. Construction activities associated with the Regional Projects are not likely to involve the use of substantial quantities of hazardous materials and the most likely source of hazardous materials would be from vehicles and construction equipment at the site. However, there could be small amounts of hazardous materials, including solvents and lubricants used to maintain construction equipment. These materials would be confined and located at the applicable staging areas. Federal and state regulations that govern the storage of hazardous materials in containers (i.e., the types of materials and the size of packages containing hazardous materials), secondary confinement requirements, and the separation of containers holding hazardous materials, would limit the potential adverse impacts of contamination to a relatively small area. In compliance with the State General Permit for Storm Water Discharges Associated with Construction Activity and a Project-specific SWPPP, standard BMPs would be used during construction activities to minimize runoff of contaminants and clean-up any spills. Applicable BMPs include, but are not limited to controls for: vehicle and equipment fueling and maintenance; material delivery, storage, and use; spill prevention and control; and waste management. Therefore, implementation of construction standards would minimize the potential for an accidental release of petroleum products, hazardous materials, and/or explosion during construction activities at the Project site. As a consequence, construction would not create an environmental constraint related to potential hazards to the public or the environmental through the routine transport, use, or disposal of hazardous materials.

Operation of the Regional Projects would be automated (with minimal electrical consumption for pumping) and would not require hazardous materials. The infiltration units would filter incoming stormwater to remove oil, grease, metals, and trash; however, the filters would be routinely replaced, and disposed of in accordance with applicable laws and regulations. Based on the above, the Regional project s are not expected to create a substantial hazard to the public or the environmental through the routine transport, use, or disposal of hazardous materials.

b. **Would the project create a significant hazard to the public or the environment through the reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment?**

Some Environmental Constraints. The Regional Projects would be located on or beneath community parks within in residential or mixed commercial residential areas, Various hazardous materials and contamination databases were reviewed (Geotracker and Envirostor), and several sites were identified near two Regional Project sites (SF01 and AL01) that have indications of past contamination.

None of the other Regional Project sites were documented to have been subject to past contamination, leaks, or remediation efforts. Based on this, Regional Projects NHP, GL01, SP01, SM01, MP01, and LAC01 are not expected to create a hazard to the public or environment during construction.

- <u>SF01 – Recreation Park.</u> The water quality improvement are within Recreation Park is located about 350 feet west of a site (located just east of Parkside Drive) potentially contaminated with lead. The Envirostor database identifies this site as "San Fernando Playground" and as in need of evaluation. Because this site is in need of evaluation, the extent of contamination present is unknown, and due to its proximity to SF01, further due diligence may be required during the Project planning and design phase. This potential constraint could also have the effect of increasing the length of time required for individual project approvals and CEQA compliance.

AL01 – Almansor Park. Geotracker identifies a leaking underground fuel tank located at 900 New Avenue that is owned by the City of Alhambra. Although Geotracker displayed the site location at the intersection of New Avenue and East Adams Avenue, the actual location of the tank may be at the City's Fire Training Facility approximately 900 feet east of the area of Almansor Park where the water quality improvements would occur. Due to the distance of the leaking underground fuel tank from this Regional Project site and given that the tank location is at a lower elevation than Almansor Park, it is unlikely that leaked fuel has traveled to the Project site. In addition, Geotracker has identified several reported leaks from auto repair facilities (in 2000). Geotracker shows these sites located at the north end of Almansor Street (extended) and the railroad right-of-way; however, Geotracker appears to be displaying these locations incorrectly, and the actual locations of these facilities are north of the railroad right-of-way and west of the project site. Because of this, these facilities are not likely to have contaminated the project site or potential storm drain tie-in locations near the railroad right-of-way.

Based on the above, there appears to be a low potential for contaminated soils or groundwater to be present beneath the Project site, and no additional constraints related to hazardous materials are anticipated.

c. Would the project emit hazardous emissions or handle hazardous materials or acutely hazardous materials, substances, or waste within 0.25-mile of an existing or proposed school?

No Environmental Constraint. None of the Regional Projects would utilize processes that could emit hazardous emissions or otherwise release hazardous substances or wastes. Infiltration devices would contain filtration systems designed to remove oils, metals, and other pollutants from storm water; however, the filters would be removed and disposed of in accordance with manufacturers' recommendations and would not be released to the environment. Because of this, no environmental constraint associated with the Regional Projects are expected.

d. Is the project located on a site that is included on a list of hazardous material sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

No Environmental Constraint. The provisions in Government Code Section 65962.5 are commonly referred to as the "Cortese List" (after the Legislator who authored the legislation that enacted it). Because this statute was enacted over twenty years ago, some of the provisions refer to agency activities that were conducted many years ago and are no longer being implemented and, in some cases, the information to be included in the Cortese List does not exist. While Government Code Section 65962.5 makes reference to the preparation of a "list," many changes have occurred related to web-based information access since 1992 and this information is now largely available on the Internet sites of the responsible organizations (CalEPA, 2015). The California Environmental Protection Agency (CalEPA) has identified the data resources that provide information regarding the facilities or sites identified as meeting the "Cortese List" requirements (Cal EPA, 2014b), which are as follows:

- List of Hazardous Waste and Substances sites from Department of Toxic Substances Control (DTSC) EnviroStor database,
- List of Leaking Underground Storage Tank Sites by County and Fiscal Year from State Water Board GeoTracker database,
- List of solid waste disposal sites identified by the State Water Board with waste constituents above hazardous waste levels outside the waste management unit,
- List of "active" Cease and Desist Orders (CDO) and Cleanup and Abatement Order (CAO) from the State Water Board[1], and
- List of hazardous waste facilities subject to corrective action pursuant to Section 25187.5 of the Health and Safety Code, identified by DTSC.

The Hazardous Waste and Substance Site List maintained by the DTSC Information was downloaded from the DTSC EnviroStor website (DTSC, 2015), and reviewed. The Regional Project sites are not listed in the Hazardous Waste and Substance Site.

The Leaking Underground Storage Tank (LUST) Cleanup Sites contained in the State Water Resources Control Board (SWRCB) GeoTracker database was queried (February, 2015), and the Regional Project sites are not contained in the LUST Cleanup Site list.

The list of solid waste disposal sites identified by the SWRCB with waste constituents above hazardous waste levels outside the waste management unit (CalEPA, 2015c) was reviewed, and the Project site was not contained in the list.

The list of "active" CDOs and CAOs from the SWRCB (SWRCB, 2015b) was downloaded in February, 2015 and reviewed (sorted and searched). The Regional Project sites are not contained in the list of "active" CDO and CAO.

The DTSC list of hazardous waste facilities subject to corrective action pursuant to Section 25187.5 of the Health and Safety Code (DTSC, 2015b) was reviewed and the Regional Project sites are not included in this list.

Based on the reviews of the specific lists that currently comprise the Cortese List, none of the Regional Project sites are contained on a list of hazardous material sites compiled pursuant to Government Code Section 65962.5.

e. For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

No Environmental Constraints. The Regional Project site that is closest to a public airport is SF01, which is located approximately 1.4 miles northwest of the Whiteman Airport runway. None of the other Regional Project are located within 2 miles of a public use airport. Although SF01 is located within 2 miles of an airport, neither it nor the other Regional Project sites are located within an airport land use plan; therefore, there would be no environmental constraints.

[1] This list contains many CDOs and CAOs that do NOT concern the discharge of wastes that are hazardous materials. Many of the listed orders concern, as examples, discharges of domestic sewage, food processing wastes, or sediment that do not contain hazardous materials, but the State Water Boards' database does not distinguish between these types of orders.

f. For a project located within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?

No Environmental Constraints. There are numerous private airports throughout Los Angeles County, which include heliports. The proximity of the heliports to any of the Regional Projects would not result in a safety hazard for people working in the Project area, as the Regional Project would have no effect on air transport activities or their flight paths. The Regional Projects would therefore not result in any safety hazards for people in the vicinity of the sites.

g. Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

No Environmental Constraint. The Regional Project sites are currently used for recreational activities (active and passive). Although the Regional Projects would place water quality improvement infrastructure within the park and recreational sites, additional construction would be required at each site to connect with the existing storm drain system, which are located within the streets surrounding each site. The storm drain connections would involve excavations into the streets to make the tie-ins with the storm drains, and would require the temporary closure of one or more lanes while street work is occurring. However, street work would occur under permit from the applicable City or County, and appropriate notifications would be made to local emergency providers so that alternative routes can be planned for in the event of an emergency. As a standard practice, street work would be subject to the requirements of a Traffic Control Plan approved by the local transportation agency, or would comply with applicable work area traffic control requirements. In addition, contractors would have steel plating available in the event excavations need to be quickly spanned. Aside from the temporary street work, no other disruptions to the local transportation system would occur, and substantial interruptions to emergency access are not anticipated.

h. Would the project expose people or structures to the risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

No Environmental Constraint. The Regional Project sites are developed as community parks and recreations areas, or landscaped center median, and no wildlands are present at the Regional Project sites. The areas immediately surrounding the Regional Project sites are urbanized, and no increased wildland fire hazard is expected as a result of the water quality improvements at each site.

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
IX.	**HYDROLOGY AND WATER QUALITY.** Would the project:				
a.	Violate any water quality standards or waste discharge requirements?		X		
b.	Substantially deplete groundwater supplies or interfere substantially with groundwater recharge, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)?				X
c.	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on site or off site?				X
d.	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on site or off site?			X	
e.	Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?			X	
f.	Otherwise substantially degrade water quality?				X
g.	Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary, Flood Insurance Rate Map or other flood hazard delineation map?				X
h.	Place within a 100-year flood hazard area structures that would impede or redirect flood flows?				X

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
i.	Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?			X	
j.	Contribute to inundation by seiche, tsunami, or mudflow?			X	

Discussion:

a. Would the project violate any water quality standards or waste discharge requirements?

Some Environmental Constraints. The Regional Projects would install and operate water quality improvement facilities at eight parks Upper Los Angeles River watershed, which would divert, treat, and infiltrate stormwater in order to meet the requirements of the MS4 permits. The Regional Projects would generally result in beneficial impacts to water quality.

However, for SF01, there is a remote potential for subsurface contamination to be present at portions of SF01 if contamination from the sites west of Parkside Drive (see Checklist Item VIII.b. above) has migrated westward. If such subsurface contamination is present and infiltration would occur in areas where the contamination is present, then there is a potential for adverse water quality impacts to groundwater. This potential environmental constraint is considered remote but could result in increased time for the planning and design of these three Regional Projects, and could also have the effect of increasing the length of time required for individual project approvals, design and CEQA compliance.

b. Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (i.e., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)?

No Environmental Constraints. The Regional Projects would not be located in areas used for groundwater recharge and therefore would not interfere with groundwater recharge. The Regional Projects would divert runoff and stormwater from the storm drain system in the Upper Los Angeles River watershed, and treat and infiltrate some of the diverted stormwater. As a consequence, the Regional Projects are considered to provide beneficial effects to groundwater by increasing infiltration above baseline conditions.

c. Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on site or off site?

No Environmental Constraints. The Regional Projects would be located within community parks or a center median, and would not result in physical changes to a stream or river. All Regional Project sites would be restored following construction. Infiltration would occur subsurface and would not result in erosion. Bio-retention features would be designed to properly manage the diverted runoff and storm water, and would not result in erosion.

d. Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on site or off site?

No Environmental Constraints. The Regional Projects would divert and store or divert and treat/infiltrate a portion of the stormwater generated within the Upper Los Angeles River watershed, and would have the effect of decreasing the amount and slowing runoff generated in the watershed, which are considered to be beneficial effects. In addition, the stormwater diversions would decrease the potential for flooding downstream.

e. Would the project create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

No Environmental Constraints. The Regional Projects would divert and store or treat/infiltrate a portion of the stormwater generated within the Upper Los Angeles River watershed, and would have the effect of improving runoff quality and decreasing the potential for flooding downstream.

f. Would the project otherwise substantially degrade water quality?

No Environmental Constraints. No constraints regarding water quality are anticipated beyond those discussed under Checklist Item IX.a. above.

g. Would the project place housing within a 100-year floodplain, as mapped on a federal Flood Hazard Boundary, Flood Insurance Rate Map or other flood hazard delineation map?

No Environmental Constraints. No housing is proposed under any of the Regional Projects.

h. Would the project place within a 100-year floodplain structures that would impede or redirect flood flows?

No Environmental Constraints. The water quality improvements under the Regional Projects would be either buried infiltration or storage units, or surface bio-retention features, neither of which would impede site runoff or flood flows.

i. Would the project expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?

No Environmental Constraints. Based on a review of the safety elements of the general plans of the Cities of Glendale, Los Angeles, Monterey Park, Pasadena, and South Pasadena, Regional Project sites SF01, NHP, SP01, and LAC01 appear to be within potential inundation or flood areas, including areas subject to flooding in the event of a dam failure. However, the Regional Projects would not house people or otherwise increase the risk of exposure to risks related to potential flooding. In addition, the Regional

Projects are stormwater management projects that are expected to result in beneficial effects to downstream conveyance capacity in the event of a flood.

j. Would the project contribute to inundation by seiche, tsunami, or mudflow?

No Environmental Constraints. The Regional Project sites are not located within a tsunami hazard zone, or near inland water bodies that could be subject to a seiche. In addition, the sites are relatively flat and are not subject to mudflows.

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
X.	**LAND USE AND PLANNING.** Would the project:				
a.	Physically divide an established community?				X
b.	Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?				X
c.	Conflict with any applicable habitat conservation plan or natural community conservation plan?				X

Discussion:

a. Would the project physically divide an established community?

No Environmental Constraints. The Regional Projects would be located within existing community parks, and would not physically divide the surrounding communities.

b. Would the project conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

No Environmental Constraints. The Regional Projects would be placed within community parks that are designated as open space or public facilities, and are considered to be consistent with planned and existing uses. It should be noted that for the water quality improvements under SP01, part of the site located west of Arroyo Seco appears to fall within the City of Los Angeles, and another portion within the City of South Pasadena. Regardless, the improvements at SP01 are not expected to conflict with either jurisdiction's applicable land use plan.

c. Would the project conflict with any applicable habitat conservation plan or natural communities conservation plan?

No Environmental Constraints. The Regional Project sites do not fall within or near an area covered by a habitat conservation plan or natural communities conservation plan. In addition, there are no Significant Ecological Areas in the vicinity of the Regional Projects.

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XI.	**MINERAL RESOURCES.** Would the project:				
a.	Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				X
b.	Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?				X

Discussion:

a. Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

No Environmental Constraints. The Regional Projects would be located within existing community parks or a center median, and none of the sites are designated as containing important mineral resources.

b. Would the project result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?

No Environmental Constraints. The Regional Project sites are designated in the applicable general plan as open space or parks. Therefore, the Regional Projects would not result in the loss of availability of mineral resources.

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XII.	**NOISE.** Would the project:				
a.	Expose persons to or generate noise levels in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies?		X		
b.	Expose persons to or generate excessive groundborne vibration or groundborne noise levels?			X	
c.	Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?			X	
d.	Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?		X		
e.	Be located within an airport land use plan area, or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport and expose people residing or working in the project area to excessive noise levels?				X
f.	Be located in the vicinity of a private airstrip and expose people residing or working in the project area to excessive noise levels?				X

Discussion:

a. Would the project result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies?

No Environmental Constraints. The Regional Projects would be located beneath the surface as the eight respective sites and the surface restored such that existing activities could resume following completion of construction. Operation of the water quality improvements would be automated and pump systems required to convey stormwater to the buried facilities would either be subsurface or placed in small housing units. Noise from operations is not expected to be noticeable, and would not result in elevations in ambient noise levels at the Regional Project sites or vicinities. The water quality improvements would require periodic maintenance; however, maintenance activities would not result in substantial elevation in ambient noise.

Construction of the water quality improvement facilities would result in noise associated with construction equipment and haul trip activities. Constriction noise is typically governed by ordinance in each jurisdiction, and the following summarizes the construction noise regulations (the City of San Fernando construction noise regulations are discussed below).

- City of Los Angeles Noise Regulations. The City of Los Angeles (municipal Code, Chapter IV, Article 1, Section 41.40) allows construction Monday through Friday between 7:00 a.m. to 9:00 p.m., Saturdays and National Holidays between 8:00 a.m. to 6:00 p.m., and prohibits construction on Sundays (except for residents). The noise regulations also prohibit night construction if related noise can disturb persons occupying sleeping quarters in any dwelling, hotel, or residence. Major public works projects conducted by the City are exempt from this weekend and holiday restriction.
- City of Glendale Construction Noise Regulations. The City of Glendale (Municipal Code section 8.36.080) prohibits construction for projects within 500 feet of a residential zone between the hours of 7:00 p.m. one day and 7:00 a.m. the next day; 7:00 p.m. Saturday to 7:00 a.m. Monday; and from 7:00 p.m. preceding a holiday to 7:00 a.m. following such holiday.
- City of South Pasadena Noise Regulations. The City of South Pasadena (Municipal Code 19A.13) prohibits construction within or within 500 feet of a residential before 8:00 a.m. and after 7:00 p.m. on Monday through Friday, on Saturday before 9:00 a.m. and after 7:00 p.m., and Sunday before 10 a.m. and after 6:00 p.m.
- City of San Marino Noise Regulations. The City of San Marino (Municipal Code Section 25.01.02) prohibits construction between the hours of 6:00 p.m. and 7:00 a.m. Monday through Friday, on Saturdays, before 9:00 a.m. and after 4:00 p.m., and on Sunday and National holidays. City of Alhambra. The City of Alhambra regulates noise sources in its jurisdiction (Municipal Code Chapter 18.02), but exempts construction on public property or by public entities or their authorized representatives from the noise regulations.
- City of Monterey Park. The City of Monterey Park regulate noise sources in its jurisdiction (Municipal Code 9.53.010 - 9.53.070), but exempts construction conducted between the hours of 7:00 a.m. and 7:00 p.m. on weekdays and the hours of 9:00 a.m. and 6:00 p.m. on Saturdays, Sundays and holidays.
- County of Los Angeles. The County of Los Angeles regulates noise within its jurisdiction (Code section 12.08.440) and prohibits construction activities between the hours of 7:00 p.m. and 7:00 a.m. and on Sundays and national holidays. The Code also establishes specific noise level limits at residential receptors for different categories of construction (mobile equipment operated for short durations, and stationary equipment operated for longer durations); however, the construction noise levels of the proposed project are exempt from the noise limits of the County Noise Control Ordinance as specified in the County Noise Control Ordinance Part 5 Exemptions, H: 5, which includes all transportation, flood control, and utility company maintenance and construction operations at any time on public right of way, and those situations, which may occur on private real property deemed necessary to serve the best interest of the public and to protect the public's health and well-being (County, 2012).

Construction of the Regional Projects would occur within the hours allowed for in the applicable noise regulations, or would be exempt from the noise regulations. It should be noted that several schools (Martha Baldwin Elementary School and Emmaus Lutheran Preschool) are located close to Almansor Park, and a Head Start preschool is located at the central portion of Franklin D. Roosevelt Park, and some noise reducing measures may be prudent during construction despite compliance with noise regulations.

Some Environmental Constraints. The City of San Fernando has established construction noise controls that set limits on when construction could occur, and the noise levels at the property line. Section 34-28 (a)(10) (Specific noises prohibited) and Section 34-31(5) (Exclusions) of the San Fernando Municipal Code provide the following provisions for construction noise:

> *Noise sources associated with construction, repair, remodeling or grading of any real property are allowed up to 70 dB measured at the property line, provided such activities do not take place between the hours of 6:00 p.m. and 7:00 a.m. on weekdays, including Saturday, or at any time on Sunday or a federal holiday.*

Construction at Recreation Park would comply with the construction time restrictions (no construction between the hours of 6:00 p.m. to 7:00 a.m. Monday through Friday, or at any time on Saturdays and Sundays); however construction noise at the property line of the park could exceed the 70dBA restriction level established in the code. As such, construction of the water quality improvements at Recreation Park could conflict with the City's noise regulations. This potential environmental constraint could result in increased time required for CEQA compliance for SF01.

b. Expose persons to or generate excessive groundborne vibration or groundborne noise?

No Environmental Constraints. Construction activities of the Regional Projects would generate some level of vibration. Construction equipment such as excavators, loaders, and haul trucks would generate vibrations that could result in groundborne noise or vibration that could affect nearby structures or residences. Transient vibration levels greater than 0.5 inches per second (in/sec) and continuous/frequent intermittent vibration levels greater than 0.3 in/sec have the potential to damage older residential structure. Additionally, transient vibration levels greater than 2.0 in/sec or continuous sources greater than 0.4 in/sec would be severely noticeable to a human (Caltrans, 2013b). All phases of the construction involve multiple trucks and other vibration producing equipment resulting in vibration levels approximately up to 0.02 in/sec at the closest residences. Excessive groundborne vibration and/or groundborne noise are not anticipated. Therefore, substantial vibrations are not expected to occur during construction of the Regional Projects.

Operation of the Regional Project could include changing of filters in runoff treatment units and general inspections; however, these types of maintenance activities do not produce substantive vibrations. Therefore, operation of the proposed Project would not result in impacts related to groundborne vibration or noise.

c. Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

No Environmental Constraints. Operation of the Regional Projects would include pump stations or wet wells that transfer stormwater from storm drains to the water quality improvement structures, as well as general maintenance activities. Pump stations would be underground or housed in small structures, and are not expected to produce audible noise. Because of this, operation of the Regional Projects are not expected to result in permanent increase in ambient noise levels.

d. Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Some Environmental Constraints. Construction of the Regional Projects would occur within the hours allowed for in the applicable local noise regulations or would be exempt from noise regulations, and although construction would result in temporary increases in noise levels compared to ambient conditions without construction, the noise levels are presumably not considered to be substantial due to consistency with noise regulations.

However, for construction projects in the City of Los Angeles that last more than 10 days within a three-month period, the City recommends using the threshold of significance of 5 dBA or more increase in noise levels over existing ambient community noise equivalent level (CNEL), which is a type of 24-hour average noise level (City of Los Angeles, 2006). Given the extent of construction, the anticipated construction durations, and the surrounding noise receptors, it is likely that construction of the Regional Projects in the City of Los Angeles (NHP) would result in temporary elevations of the CNEL in excess of the 5dBA threshold, which would have the effect of increasing the length of time required for individual project approvals and CEQA compliance.

e. For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

No Environmental Constraints. The Regional Project site that is closest to a public airport is SF01, which is located approximately 1.4 miles northwest of the Whiteman Airport runways. Although SF01 is located within 2 miles of an airport, the water quality improvements would be automated, and would not expose people to excessive noise related to proximity to an airport. None of the other Regional Project sites are located within an airport land use plan or within 2 miles of a public airport.

f. For a project located within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

No Environmental Constraints. There are numerous private airports throughout Los Angeles County, which include heliports. The proximity of the heliports to any of the Regional Projects would not result in exposure of people to excessive noise levels, as the Regional Project would have no effect on air transport activities or their flight paths, and would not cause people to move closer to a private airport.

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XIII.	**POPULATION AND HOUSING.** Would the project:				
a.	Induce substantial population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)?				X
b.	Displace a substantial number of existing housing units, necessitating the construction of replacement housing elsewhere?				X
c.	Displace a substantial number of people, necessitating the construction of replacement housing elsewhere?				X

Discussion:

a. Would the project induce substantial population growth in an area, either directly (e.g., by proposing new homes and business) or indirectly (e.g., through extension of roads or other infrastructure)?

No Environmental Constraints. The Regional Projects are water quality improvement projects that would not result in substantive employment demand and do not have a housing component that could induce population growth.

b. Would the project displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

No Environmental Constraints. No housing is located on any of the Regional Project sites, and no housing displacements would occur.

c. Would the project displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

No Environmental Constraints. There is no housing within the Regional Project site boundaries that would be displaced. The Regional Projects would not result in the displacement of any persons, or the need for replacement housing.

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XIV.	**PUBLIC SERVICES.** Would the project:				
a.	Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or a need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services:				
	i.) Fire protection?				X
	ii.) Police protection?				X
	iii.) Schools?				X
	iv.) Parks?				X
	v.) Other public facilities?				X

Discussion:

a. **Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or a need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:**

i.) Fire Protection

No Environmental Constraints. The Regional Projects are water quality improvement projects that would not increase housing or induce population growth that could in turn increase the need for new fire protection services. Although the Regional Projects would involve some construction within the street system to connect to storm drains, the construction is not expected to substantively increase fire protection response times because prior notifications to emergency service providers occur as a standard permit condition for in-street construction.

ii.) Police Protection

No Environmental Constraints. The Regional Projects are water quality improvement projects that would not increase housing or induce population growth that could in turn increase the need for new police protection services. Although the Regional Projects would involve some construction within the street system to connect to storm drains, the construction is not expected to substantively increase police protection response times because prior notifications to emergency service providers occur as a standard permit condition for in-street construction.

iii) Schools

No Environmental Constraints. The Regional Projects are water quality improvement projects that would not increase housing or induce population growth that could in turn increase the need for new schools.

iv) Parks

No Environmental Constraints. The Regional Projects are water quality improvement projects that would not increase housing or induce population growth that could in turn increase the need for new parks. Environmental constraints related to impacts on existing community parks are discussed under Checklist Item XV.b. below.

v) Other Public Facilities

No Environmental Constraints. The Regional Projects are water quality improvement projects that would not increase housing or induce population growth that could in turn increase the need for new public facilities.

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XV.	**RECREATION.** Would the project:				
a.	Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?				X
b.	Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?		X		

Discussion:

a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

No Environmental Constraints. The Regional Projects would construct and operate water quality improvement facilities at specific community parks in the Cities of San Fernando, Los Angeles, Glendale, San Marino, Alhambra, and Monterey Park, and the County of Los Angeles. The water quality improvement facilities are considered to be infrastructure projects that do not increase the housing stock and do not result in the movement or relocation of people from one area to another. As a consequence, the Regional Projects would not result in increased demand for recreational facilities and would therefore not directly or indirectly result in physical deterioration of parks or other recreational facilities.

b. Does the project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?

Some Environmental Constraints. The Regional Projects would construct and operate water quality improvement facilities at specific community parks. Construction is estimated to take up to 18 months, and would result in the temporary disruption of park activities within the construction zone. The likely disruption to recreational uses at each Regional Project site are discussed below.

- SF01 – Recreation Park. The water quality improvement features at Recreation Park include buried storage basins and infiltration units within southern portion of the park. The improvements, depending on where they would be located, would require substantial excavation of the main park site, which could result in temporary closure of the softball field and other areas within the south end of the park. The closures would occur for the duration of construction (estimated to be 12-18 months) and the amount of time it would take to restore the fields, and other affect recreational features (estimated at 1-2 months). The temporary loss of recreational areas of Recreation Park is likely to require close coordination between the City of San Fernando, local residents, and community stakeholders to develop suitable mitigation options for addressing the temporary loss of recreational uses. This represents an environmental constraint which would have the effect of increasing the length of time required for project approval and CEQA compliance.

- NHP – North Hollywood Park. The water quality improvements at North Hollywood Park would likely be subsurface infiltration and/or storage structures. Construction of these facilities would result in the temporary closure of some existing walking paths areas used for passive recreation. The temporary closure of a large portion of North Hollywood Park during construction is likely to require close coordination between the City of Los Angeles, local residents, and community stakeholders to develop suitable mitigation options for addressing impacts to passive recreational uses of the park. This represents an environmental constraint which would have the effect of increasing the length of time required for project approval and CEQA compliance.

- GL01 - Fremont Park. The water quality improvements proposed for the Fremont Park include a subsurface infiltration or storage facility within the southeastern portion of the park (beneath the active field). The improvements would require the temporary closure (up to approximately 18 months) of this portion of the park, including the active field and potentially relocation of other recreational facilities within the park. The temporary closure of a portion of Fremont Park during construction will likely to require close coordination between the City of Glendale, local residents, and community stakeholders to develop suitable mitigation options for addressing impacts to Fremont Park. This represents an environmental constraint which would have the effect of increasing the length of time required for project approval and CEQA compliance.

- SP01 – Arroyo Park. The water quality improvement facilities at Arroyo Park would include buried infiltration structures storage basins beneath the 3 baseball and softball fields in the northern part of the park, beneath the baseball field at the portion of the park west of the Arroyo Seco, and potential surface bio-retention improvements east of the Arroyo Seco to Stoney Drive. This latter area contains vegetation and does not appear to be used for active recreation. The improvements are likely to require substantial excavation within the park, which would result in temporary closure of multiple active areas (baseball and softball fields) and the periphery. Other park uses such as picnic areas and playgrounds may require relocation to elsewhere in the park. The closures would occur for the duration of construction (estimated to be up to 18 months) and the amount of time it would take to restore the fields and recreational areas. The temporary closure of the recreational uses within Arroyo Park is likely to require close coordination between the City of South Pasadena, City of Los Angeles (a small section of the park west of the Arroyo Seco is located within the City of Los Angeles), local residents, and community stakeholders to develop suitable mitigation options for addressing the temporary loss of recreational uses. This represents an environmental constraint which would have the effect of increasing the length of time required for project approval and CEQA compliance.

- SM01 – Lacy Park. The water quality improvement facilities at Lacy Park would include buried infiltration and/or storage basins in approximately the center of the park. The improvements would require substantial excavation, which could result in temporary closure of the ball field and potentially several picnic areas around the periphery of the central green space. The temporary closure would occur for the duration of construction (estimated to up to 18 months) plus the amount of time it would take to restore the central green space area (estimated at 1-2 months). The temporary closure of the central portion of Lacy Park is likely to require close coordination between the City of San Marino, local residents, and community stakeholders to develop suitable mitigation options for addressing the temporary closure. This represents an environmental constraint which would have the effect of increasing the length of time required for project approval and CEQA compliance.

- AL01 – Almansor Park. The water quality improvement facilities proposed for Almansor Park include buried infiltration units and storage basins beneath the ball fields. The improvements would require substantial excavation, which would result in temporary closure of the ball fields for the duration of construction (estimated to be up to 18 months) plus the amount of time it would take to restore the fields, and other affect recreational features (estimated at 1-2 months). The temporary closure of the recreational uses within Almansor Park is likely to require close coordination between the City of Alhambra, local residents, and community stakeholders to develop suitable mitigation options for addressing the temporary loss of recreational uses. This represents an environmental constraint which would have the effect of increasing the length of time required for project approval and CEQA compliance.

- MP01 – Sierra Vista Park. The water quality improvement facilities proposed for Sierra Vista Park include buried infiltration units and/or storage basins at the southern end of the park, beneath the softball field. The improvements would require substantial excavation, which would result in temporary closure of the softball field and tennis courts. The closures would occur for the duration of construction (estimated to be up to 18 months) plus the amount of time it would take to restore the field, and other affect recreational features (estimated at approximately 1 month). The temporary closure of the recreational uses within Sierra Vista Park is likely to require close coordination between the City of Monterey Park, local residents, and community stakeholders to develop suitable mitigation options for addressing the temporary loss of recreational uses. This represents an environmental constraint which would have the effect of increasing the length of time required for project approval and CEQA compliance.

- LAC01 – Franklin D. Roosevelt Park. The water quality improvement facilities proposed for the Franklin D. Roosevelt Park would include buried infiltration units and/or storage basins beneath the northern, middle, and southern areas of the Park. The improvements are likely to require substantial excavation and result in temporary closure of these areas of the park, which include soccer fields, ball fields, basketball courts, and picnic areas. The closures would occur for the duration of construction (estimated to be up to 18 months) plus the amount of time it would take to restore the affected recreational areas (estimated at 1-2 months). The temporary closure of large portions of Franklin D. Roosevelt park will require close coordination between the County of Los Angeles, local residents, and community stakeholders to develop suitable mitigation options for addressing the temporary loss of recreational areas. This represents an environmental constraint which would have the effect of increasing the length of time required for project approval and CEQA compliance.

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XVI.	**TRANSPORTATION/TRAFFIC.** Would the project:				
a.	Exceed the capacity of the existing circulation system, based on an applicable measure of effectiveness (as designated in a general plan policy, ordinance, etc.), taking into account all relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?			X	
b.	Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?				X
c.	Result in a change in marine vessel traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?				X
d.	Substantially increase hazards because of a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?				X
e.	Result in inadequate emergency access?				
f.	Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?				X

Discussion:

a. Would the project increase the capacity of the existing circulation system, based on an applicable measure of effectiveness (as designated in a general plan policy, ordinance, etc.), taking into account all relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?

No Environmental Constraints. The Regional Projects would involve water quality improvements at eight community parks within the Upper Los Angeles River watershed.

Although the Regional Projects would require some construction within the streets surrounding each site to make connections with storm drains, the construction would be temporary and subject to traffic control plans as required by the applicable city. Once the connections are made, the streets would be repaired and returned to service. Because the Regional projects would not make substantive changes to the circulation system or street capacities, they are not expected to pose environmental constraints in this area.

b. Would the project conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?

No Environmental Constraints. The Regional Projects are not located along a designated or interim CMP highway or arterial (Metro, 2010), and are not considered traffic generators. Therefore, the Regional Project would not conflict with the LA County Congestion Management Plan.

c. Would the project result in a change in marine vessel traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

No Environmental Constraints. The Regional Projects are land based and are not generators of marine vessel traffic. Therefore, the Regional Project would not result in any environmental constraints related to marine vessel traffic.

d. Would the project substantially increase hazards because of a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

No Environmental Constraints. The Regional Projects would involve water quality improvements at seven community parks. Although the Regional Projects would require some construction within the streets surrounding each site to make connections with storm drains, the construction would be temporary and subject to traffic control plans as required by the applicable city. Once the connections are made, the streets would be repaired and returned to service. Because no substantive changes would be made to the street system, the Regional Projects would not increase roadway hazards.

e. Would the project result in inadequate emergency access?

No Environmental Constraints. As discussed under Checklist Item VIII.g. above, the Regional Projects would not result in substantial interruptions to emergency access.

f. Would the project conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?

No Environmental Constraints. The Regional Projects proposed for the community park sites would not result in permanent changes to the street systems that could affect alternative transportation routes, such as bike lanes or bike paths.

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XVII.	**UTILITIES AND SERVICE SYSTEMS.** Would the project:				
a.	Exceed wastewater treatment requirements of the applicable regional water quality control board?				X
b.	Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				X
c.	Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				X
d.	Have sufficient water supplies available to serve the project from existing entitlements and resources, or would new or expanded entitlements be needed?				X
e.	Result in a determination by the wastewater treatment provider that serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?				X
f.	Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?			X	
g.	Comply with federal, state, and local statutes and regulations related to solid waste?				X

Discussion:

a. **Would the project exceed wastewater treatment requirements of the applicable regional water quality control board?**

No Environmental Constraints. The Regional Projects are water quality improvements projects that are not generators of wastewater. Therefore, the Regional Projects would not affect wastewater treatment requirements.

b. **Would the project require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?**

No Environmental Constraints. The Regional Projects are water quality improvements projects would not consume or require potable water, and would not generate wastewater. Therefore, the Regional Projects would not increase require new potable water supplies or additional wastewater treatment capacity.

c. **Would the project require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?**

No Environmental Constraints. The Regional Projects are water quality improvements projects that would divert a portion of the runoff generated in the Upper Los Angeles River watershed, and would store, treat, and infiltrate the diverted runoff. The Regional Projects would have beneficial effects on downstream storm drain capacity.

d. **Would the project have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?**

No Environmental Constraints. The Regional Projects are water quality improvements projects that would not consume water. Therefore, the Regional Projects would not require new water supplies.

e. **Has the wastewater treatment provider that serves or may serve the project determined that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?**

No Environmental Constraints. The Regional Projects are water quality improvements projects that would not generate wastewater and would not have an effect on existing wastewater treatment capacity.

f. **Is the project served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?**

No Environmental Constraints. The Regional Projects are water quality improvements projects would not generate substantial amounts of solid wastes. The Regional Projects would include a pre-treatment or filtration device that removes sediment, oils, particulates, and other contaminants from stormwater. The filters would periodically be removed and disposed of in accordance with applicable laws and regulations. Although some solid wastes would be generated by the Regional Projects, the amounts would be minimal and would not adversely affect landfill capacity. During construction, excavated soil would be hauled away and reused elsewhere in the area, or used as landfill cover, which does not contribute to reductions in landfill capacity.

g. **Would the project comply with federal, state, and local statutes and regulations related to solid waste?**

No Environmental Constraints. As discussed above, the Regional Projects would generate minimal solid wastes, but would comply with applicable solid waste regulations.

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XVIII.	**MANDATORY FINDINGS OF SIGNIFICANCE**				
a.	Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?		X		
b.	Does the project have impacts that are individually limited but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)		X		
c.	Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?		X		

Discussion:

a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?

Construction of the Regional Projects could affect nesting birds if tree removals are required during the nesting season. Construction of water quality improvements at the Regional Project sites has the potential to encounter archaeological and paleontological resources, which could require site-specific mitigation. These potential constraints have been identified above, and would be addressed during site-specific CEQA compliance.

b. Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past

projects, the effects of other current projects, and the effects of probable future projects.)

Construction of the Regional Projects could contribute to cumulative air quality and potentially cumulative noise impacts, as well as other resource area cumulative impacts. However, cumulative impacts would be addressed in the County's Program EIR or in site-specific CEQA documentation.

c. Does the project have environmental effects that would cause substantial adverse effects on human beings, either directly or indirectly?

The Regional Projects would result in impacts on human beings related to air quality, hazardous materials, water quality, noise, and recreation, as described above. These impacts would be addressed in future site-specific CEQA documentation.

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APPENDIX C

OPTIMIZATION RESULTS

by TetraTech

Assumptions

- BMP area was fixed at the maximum footprint; depth was varied
- Maximum BMP depth was assumed based on the assumptions below
- Each curve is cut off at the maximum BMP size, per assumptions below

Cluster ID	Site Name	Max Drainage Area[1] (ac)	Min Drainage Area[2] (ac)	BMP Footprint (ac)	Max. BMP Depth[3] (ft)	Max. Practical Active Depth (ft)	Aggregate Infiltration Rate[4] (in/hr)	Comment on Max Drainage Area
AL01	Almansor Park	1145	51	10.205	165	25	0.70	Max updated to now include San Pascual Wash as max.
GL01	Fremont Park	~~13375.7~~	206.2264	0.3743	50	20	0.30	Max is not applicable as it is accepting the Verdugo Wash
LAC01	Roosevelt Park	2249.62	190	9.5979	80	20	0.30	Okay as is
MP01	Sierra Vista Park	2927.7265	799.4605	0.652	80	20	0.30	Okay as is
SF01	San Fernando	~~4429.9353~~	422.2799	2.7103	50	20	0.80	Max is not applicable as this is accepting the Pacoima Wash
SM01	Lacy Park	927.52563	1067.2045	2.3892	145	20	0.39	Okay as is
SP01	Lower Arroyo Park	~~15380.546~~	145.2086	10.588	25	25	0.80	Max is not applicable as it is accecpting the Arroyo Seco
NHP	North Hollywood Park	~~13909.873~~	5122.0118	7.9579	65	20	0.80	Max is not applicable as it is accepting the Tujunga Wash

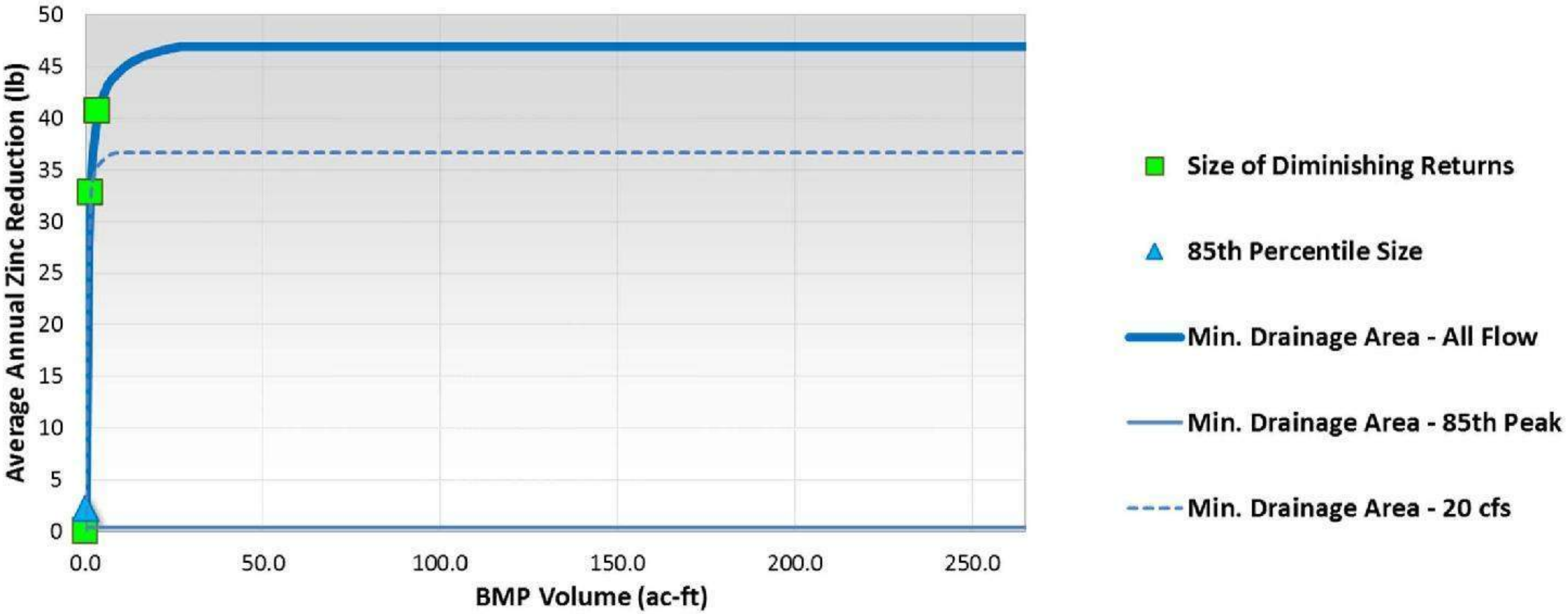
[1] Max Drainage Areas were delineated from subwatersheds from LA County GIS

[2] Min Drainage Areas were provided by Tetra Tech

[3] BMP depth was determined using Groundwater Depth Contours provided by Tetra Tech. 10 feet of seperation is a
conformance with the County's LID ordinance.

[4] Soil data was taken from LA County GIS and associated infiltration rates were provided by Eliza Jane

SP01 – Lower Arroyo Park



Small drainage area and large BMP footprint; small incremental increases in BMP size result in high pollutant load reduction

ATTACHMENTS FOR SECTION 3

Schedule

The preliminary schedule to prepare a feasibility study (1/1/2021), design and permit (1/1/2022), and construct the project (1/1/2024) will support the Upper LA River EWMP Group's effort to attain its 2024 interim compliance target.

ATTACHMENTS FOR SECTION 4

Water Quality & Water Supply

ATTACHMENTS FOR SECTION 5

Community

SAFE, CLEAN WATER PROGRAM

TECHNICAL RESOURCES SUMMARY

Regional Program Projects Module

PROJECT CONCEPT NAME	Arroyo Seco Projects Part 2 of 4: Stormwater Capture Basin and Park Improvements
PROJECT CONCEPT LEAD(S)	Shahid Abbas, Director of Public Works, City of South Pasadena; Kristine Courdy, Deputy Director of Public Works, City of South Pasadena
SCW WATERSHED AREA	Upper Los Angeles River
TOTAL FUNDING REQUESTED	$ 100,000.00

Compiled: Saturday, December 14, 2019

Created By: N/A (Kristine Courdy)

OVERVIEW

The Technical Resources Program is a part of the Safe, Clean Water Regional Program providing resources to community groups, municipalities, and individuals who need technical assistance to develop their Project concepts. Each Watershed Area Steering Committee will determine how to appropriate funds for the Technical Resources Program.

The Technical Resources Program funds the development of Project Feasibility Studies. Technical Assistance Teams will work with the necessary parties to add Projects for which there are completed Feasibility Studies to an eligible water quality plan, assist in acquiring a letter of support for non-Municipal Infrastructure Program Project Applicants, and address other prerequisites to apply to the Infrastructure Program. Upon completion, Feasibility Studies shall be submitted to the Watershed Area Steering Committees for consideration.

The Watershed Area Steering Committees will decide which Project concepts will be forwarded to the Technical Assistance Teams for development. The District will provide Technical Assistance Teams comprised of subject matter experts in Stormwater and/or Urban Runoff infrastructure design, hydrology, soils, Nature-Based Solutions, green infrastructure, Stormwater and/or Urban Runoff quality, water supply, recreation, open space, community needs, and other areas. The Technical Assistance Teams will complete Feasibility Studies in partnership with and on behalf of Municipalities, CBOs, NGOs, and others who may not have the technical resources or capabilities to develop Feasibility Studies.

This document summarizes a Project concept that is being proposed for Feasibility Study funding under the Technical Resources Program. This document is based upon inputs to and outputs from the web-based tool called the 'SCW Regional Program Projects Module' (https://portal.safecleanwaterla.org/projects-module/).

ORGANIZATIONAL OVERVIEW:

1 GENERAL INFORMATION

This section provides general information on the Project concept including location and a brief description.

1.1 Overview

The following table provides an overview of the Project concept and the proposed Lead(s):

Project concept Name:	Arroyo Seco Projects Part 2 of 4: Stormwater Capture Basin and Park Improvements
Brief Project concept description:	The project will direct wet and dry weather drainage from Pasadena and South Pasadena areas north of the 110 Freeway to an underground detention basin, and use the captured water for park irrigation. The existing baseball and soccer field would also be rebuilt, with native trees and vegetation lining the project perimeter. This project possesses significant advantages over other stormwater capture projects: • The City owns the land, with the project adjacent to both the Arroyo Seco and the storm drain pipe that would be diverted. (Each within 100 ft to 200 ft.) Existing storm drain maps indicate that the storm drain pipe is owned by the City. These conditions should reduce the construction costs and project completion time. • The project would incorporate both community investments (park improvements) and nature-based solutions (native trees). • The basin could connect to the adjacent proposed constructed wetlands projects that have been submitted separately for Technical Resources Program funding, to increase total storage capacity. Note that the City is submitting four project concepts for Fiscal Year 2020-2021 that are adjacent to each other as well as the Arroyo Seco. If some or all of these project concepts are accepted for Technical Resources Program funding, the feasibility study will be conducted together which will result in a lower overall cost. Should all four project concepts be approved for Technical Resources Program funding, the total funding requested for the projects will be $100,000.
SCW Watershed Area:	Upper Los Angeles River
Call for Projects year:	FY20-21
Total funding requested:	$ 100,000.00

Project concept Lead(s):	Shahid Abbas, Director of Public Works, City of South Pasadena; Kristine Courdy, Deputy Director of Public Works, City of South Pasadena
Additional Project concept Collaborators:	N/A
Additional Project concept Collaborators:	N/A
Additional Project concept Collaborators:	N/A
LACFCD assistance for maintenance of the Project concept?	No
Is this a non-municipal project?	No

1.2 Project Location

The following table details the Project location:

Latitude:	34.119133
Longitude:	-118.166315
Street Address:	605 Arroyo Dr
City:	South Pasadena
State:	CA
Zip Code:	91030

Is the project located within or providing a benefit to a Disadvantaged Community (DAC)?

Yes

The following is a summary of how the Project concept will benefit its DAC with a discussion of measures on displacement avoidance:

The project concept will improve park space immediately east of and adjacent to the Arroyo Seco. There is a DAC tract of 4,224 people on the west side of the Arroyo Seco within a short walking distance to the park space/project area. Existing bridges connect this community to the project. (GEOID 06037183103.) There are also two DAC block groups of 1,591 people about half a mile east of the project, and within the City of South Pasadena. (GEOIDs 060374806002, 060374806005.)

The project is on existing park space and so there will be no displacement.

DAC information source: https://gis.water.ca.gov/app/dacs/

1.3 Background

Please describe the historical background of the Project concept. Please also state which regional water management plan includes the proposed project (SWRP, E/WMP, IRWMP or other, if applicable):

The Upper La River EWMP includes a "signature" project for the City of South Pasadena that has a similar location and purpose as this concept. The EWMP project as proposed (referred to as the Lower Arroyo Park), however, had significant technical feasibility constraints. Through this concept planning effort, these initial constraints were resolved, and the initial EWMP(s) concept has been improved upon. The EWMP in turn has been incorporated into the IRWMP, and the SWRP. This specific project has also been included in the Adaptive Management Section of the ULAR EWMP Group's Annual Report.

1.4 Additional Information

Additional general information regarding Project concept is provided as the following attachments:

Attachments for this Section	
Attachment Name	Description
Stormwater Capture Basin and Park Improvements - Project Drainage Area	A map of the project drainage area.
Stormwater Capture Basin and Park Improvements - Project Features	A map of the project features.
Arroyo Park Projects - Initial Concept Landscape Plan	Arroyo Park Projects - Initial Concept Landscape Plan for the project, as well as the adjacent project (separate application) at the existing dike to the northwest.
Maps combining the 4 submitted projects.pdf	Maps combining the 4 project submitted for Technical Resources Program funding.

2 DESIGN ELEMENTS

This section provides an overview of the anticipated design elements for the Project concept.

2.1 Configuration

The following is a description of the Project concept layout including its anticipated footprint and key components:

The project will consist of an underground detention basin at existing open space at Arroyo Park, with a BMP capacity up to approximately 8 ac-ft, and footprint of approximately 22,000 sq ft. The dry weather and wet weather flows captured would be used to irrigate the surrounding park space. Diversion of captured water to the sanitary sewer system could also be considered through a feasibility study effort.

This project possesses advantages over other stormwater capture projects:

• The City owns the land, with the project adjacent to both the Arroyo Seco and the storm drain pipe that would be diverted. (Each within 100 ft to 200 ft.) Existing storm drain maps indicate that the storm drain pipe is owned by the City. These conditions should reduce the construction costs and project completion time.
• The project would provide a nature-based solution and invest in the community by incorporating native trees and vegetation into park space. The project will also invest in the community by improving the existing baseball field.
• To provide an economy of scale, the project could be designed and constructed together with the other three adjacent projects--constructed wetlands--that the City is submitting for Technical Resources Program funding. This particular project could serve to store water to recharge the wetlands, and for park irrigation use.

Note that the City is submitting four project concepts for Fiscal Year 2020-2021 that are adjacent to each other as well as the Arroyo Seco. If some or all of these project concepts are accepted for Technical Resources Program funding, the feasibility study will be conducted together which will result in a lower overall cost. Should all four project concepts be approved for Technical Resources Program funding, the total funding requested for the projects will be $100,000.

Specify whether the project is Wet or Dry:

Wet and dry

Estimated Capacity for the Project concept:

8

2.2 Capture Area

The size and land uses of the capture area upstream of a project plays an important role in its water quality and water supply benefits.

The following table details the capture area and its imperviousness:

Capture Area Summary	
Capture Area:	164.8 ac

Impervious Area:	46 ac
Pervious Area:	118.8 ac

The following table is a summary of the land use breakdown for the impervious area that drains to the project:

Breakdown of Impervious Acreage in Capture Area		
Land Use Type	Percent Impervious	Acres
Commercial	9.4 %	4.32
Highways and Interstates	22.07 %	10.15
Institutional	1.83 %	0.84
Multi Family Residential	3.21 %	1.48
Open Space	0.49 %	0.23
Secondary Roads and Alleys	25.25 %	11.62
Single Family Residential	37.48 %	17.24
Urban Open Space	0.27 %	0.12

2.3 Site Conditions & Constraints

The following is a summary of engineering analyses performed to date, and a description of existing and / or potential constraints or limitations due to existing conditions.

Although engineering analyses have not yet been completed for this specific project, the concept for the analogous signature project in the Upper LA River EWMP--Lower Arroyo Park--did provide desktop analyses of geotechnical conditions, environmental constraints, and project sizing optimization. These reports are included as an attachment to Section 2 of this application. Further engineering analysis will be completed as part of the feasibility study that is being requested through this Technical Resources Program application.

Known existing and potential constraints include:

• Tree removal, which could disturb active nests or destroy protected trees, which may increase time for site-specific CEQA compliance.
• The presence of archeological or paleontological resources.
• Closing the existing baseball and soccer field during the construction phase of the project.

2.4 Cost

The following tables provide details on the anticipated capital and annualized costs for the Project concept:

Capital Cost Breakdown	
Construction Cost:	$ 5,500,000.00
Planning and Design Cost*	$ 550,000.00

*Includes early concept design, pre-project monitoring, feasibility study development, site investigations, formal project design, intermediate and project completion audits, CEQA and other environmental impact studies and permitting.

Annual Cost Breakdown	
Annual Maintenance Cost:	$ 8,000.00
Annual Operation Cost:	$ N/A
Annual Monitoring Cost:	$ 3,000.00
Project Life Span:	50 years

2.5 Operations & Maintenance

The following is a description of the operations and maintenance needs for the Project:

See CASQA BMP Fact Sheet TC-12 attached to Section 2 of this application. Typical maintenance activities and frequencies include:

• Relatively frequent inspection and maintenance to verify proper operation of the facility. Some maintenance concerns are specific to the type or irrigation system practice used.
• Preventing mosquito access to standing water sources in BMPs (particularly below-ground). BMPs that hold water for over 72 hours and/or rely on electrical or mechanical devices to dewater may require routine inspections and treatments by local mosquito and vector control agencies to suppress mosquito production.

The following is the agency and contact person that will be responsible for operations and maintenance of the Project:

Kristine Courdy, Deputy Director of Public Works, City of South Pasadena

The following expertise or technical training is necessary to perform basic operation and maintenance of the Project:

N/A

2.6 Additional Information

Additional information regarding design elements for the Project concept is provided as the following attachments:

Attachments for this Section	
Attachment Name	Description
CASQA BMP Fact Sheet TC-12 (Retention-Irrigation)	The CASQA BMP Fact Sheet for stormwater Retention/irrigation, TC-12, which includes information on design and O&M.

Site Conditions and Constraints Attachment.pdf	Includes concept planning documents for a similar project (Lower Arroyo Park) located adjacent to the current concept location, and described in the Upper LA River EWMP. Also attached is the County's "Initial Study/Environmental Constraints Evaluation For the Eight Recommended Regional Projects within the Upper Los Angeles River Watershed", which includes the Lower Arroyo Park.

3 Schedule

This section provides an preliminary schedule required to design, construct, operate, and maintain the project.

Schedule Milestone Table	
Milestone Name	Completion Date
Feasibility Study	01/01/2021
Design and Permitting	01/01/2022
Construction	01/01/2024

3.1 Additional Information

Additional information regarding schedule for the Project concept is provided as the following attachments:

Attachments for this Section	
Attachment Name	Description
Note on Schedule	Explains connection between EWMP compliance schedule and project completion schedule.

4 WATER QUALITY & WATER SUPPLY

This section provides an overview of project elements that will provide water quality and water supply benefits.

4.1 Water Quality

The following describes how the Project concept will address primary pollutants of concern:

The project will capture the primary pollutants of bacteria, metals, toxics, and trash, in both dry and wet weather from a regional drainage area. (See CASQA Fact Sheet TC-12 for stormwater retention/irrigation systems for information on pollutant removal effectiveness. The Fact Sheet is an attachment to Section 2 of this application. See the attachment to Section 1 for a map of the upstream drainage area.)

The following describes the water quality concerns in the vicinity and downstream of the proposed Project concept area:

The project is adjacent to the Arroyo Seco. The Arroyo Seco is impaired and is under TMDLs for dry and wet weather bacteria, metals including zinc and copper, and trash. The LA River downstream shares the same impairments and TMDLs, and the harbor at the LA River estuary is impaired for toxic chemicals. The preliminary schedule to prepare a feasibility study (1/1/2021), design and permit (1/1/2022), and construct this project (1/1/2024) will support the Upper LA River EWMP Group's effort to attain its 2024 TMDL/EWMP interim compliance target.

4.2 Water Supply

The following describes and justifies the nexus between water supply and the stormwater and/or urban runoff that will be captured/infiltrated/diverted by the Project:

The stormwater and dry weather urban runoff captured by the underground detention basin will be used to irrigate Arroyo Park, adjacent landscaping, and the downstream golf course. The existing dike to the north currently takes in dry weather flows from the Arroyo Seco and delivers it to the golf course through this open space for irrigation use. Thus the area's existing water supply infrastructure can be used to divert stormwater to landscape irrigation.

If the adjacent proposed constructed wetlands is constructed in tandem with this project, this basin could also hold water to augment the existing irrigation use. In addition, the water could be stored in the proposed underground detention basin for the golf course and driving range. (See the City's separate Technical Resources Program application for more information on this proposed project.) Excess captured water could also potentially be diverted to the sanitary sewer for later use.

Currently the City's Water Division provides 30 acre-feet/year of potable water to the Arroyo Seco Golf Course, 32 acre-feet/year to Arroyo Park, and 2 acre-feet/year to the Arroyo Nature trail. Thus the dry weather flows and stormwater captured by this project and the other proposed projects submitted by the City have the potential to serve as the primary source of irrigation water.

Will this Project capture water for onsite irrigation use?

Yes

The following describes onsite use by the Project:

The stormwater and dry weather urban runoff captured by the underground detention basin will be used to irrigate Arroyo Park, adjacent landscaping, and the downstream golf course. See the above description for additional detail.

Will this Project capture water used for water recycling by a wastewater treatment facility?

No

The following describes water recycling by the project:

N/A

Will the Project be connected to a managed water supply aquifer?

No

If Yes, managed Aquifer Name:

N/A

4.3 Additional Information

Additional information regarding water quality and water supply benefits of the Project concept is provided as the following attachments:

5 COMMUNITY

This section provides an overview of project elements related to community investment benefits and community engagement performed to date.

5.1 Community Investment

The following table details the Project's anticipated community investment benefits:

Community Investment		
Investment Type	Applicable?	Detailed Description
Does this project improve flood management, flood conveyance, or flood risk mitigation?	Yes	The project will increase flood protection through reduced peak flow rates from peak flow attenuation in the existing storm drain system.
Does this project create, enhance, or restore park space, habitat, or wetland space?	Yes	The project will enhance park space by creating a new dual-use baseball field and soccer field, and incorporating native trees and vegetation.
Does this project improve public access to waterways?	Yes	The project will improve park space immediately adjacent to the Arroyo Seco.
Does this project create or enhance new recreational opportunities?	Yes	The project will enhance recreational opportunities by creating a new dual-use baseball field and soccer field, and incorporating native trees and vegetation.
Does this project create or enhance green spaces at school?	No	N/A
Does this project reduce heat local island effect and increase shade?	Yes	Several species of native trees (i.e sycamore trees, oak trees) and vegetation will be planted on site.
Does this project increase shade or the number of trees or other vegetation at the site location?	Yes	Several species of native trees (i.e sycamore trees, oak trees) and vegetation will be planted on site.

5.2 Community Engagement

The following describes the effort of engagement that has occurred to date and identify (if any) agencies / municipalities / stakeholders that were involved in the development of the Project concept:

None to date, however, efforts are proposed during the development of the Project.

The following describes the plan to engage the community during the early development phase of the Project:

The City will hold community-based workshops with the general public and other stakeholders, such as local environmental groups. The City will directly contact local environmental groups involved with the Arroyo Seco--such as the South Pasadena Beautiful, Arroyo Seco Foundation and North East Trees--to ensure that they are aware of the workshops and have the ability to participate in the development of the project.

5.3 Additional Information

Additional information regarding community benefits and engagement for the Project concept is provided as the following attachments:

6 NATURE-BASED SOLUTIONS

This section provides an overview of Project elements that will leverage nature-based solutions.

Will this Project implement natural processes?

Yes

The following is a description of natural processes that will be implemented:

The underground detention basin will implement processes to slow, detain, and capture water, and the project will incorporate native trees and vegetation. This will protect, enhance, and restore habitat, green space, and usable open space.

Will this project utilize natural materials?

Yes

The following is a description of natural materials that will be utilized:

The project will incorporate native trees and vegetation. This will protect, enhance, and restore habitat, green space, and usable open space.

The following describes how nature-based solutions are utilized to the maximum extent feasible. If nature-based solutions are not used, a description of what options have been considered and why they were not included is provided.

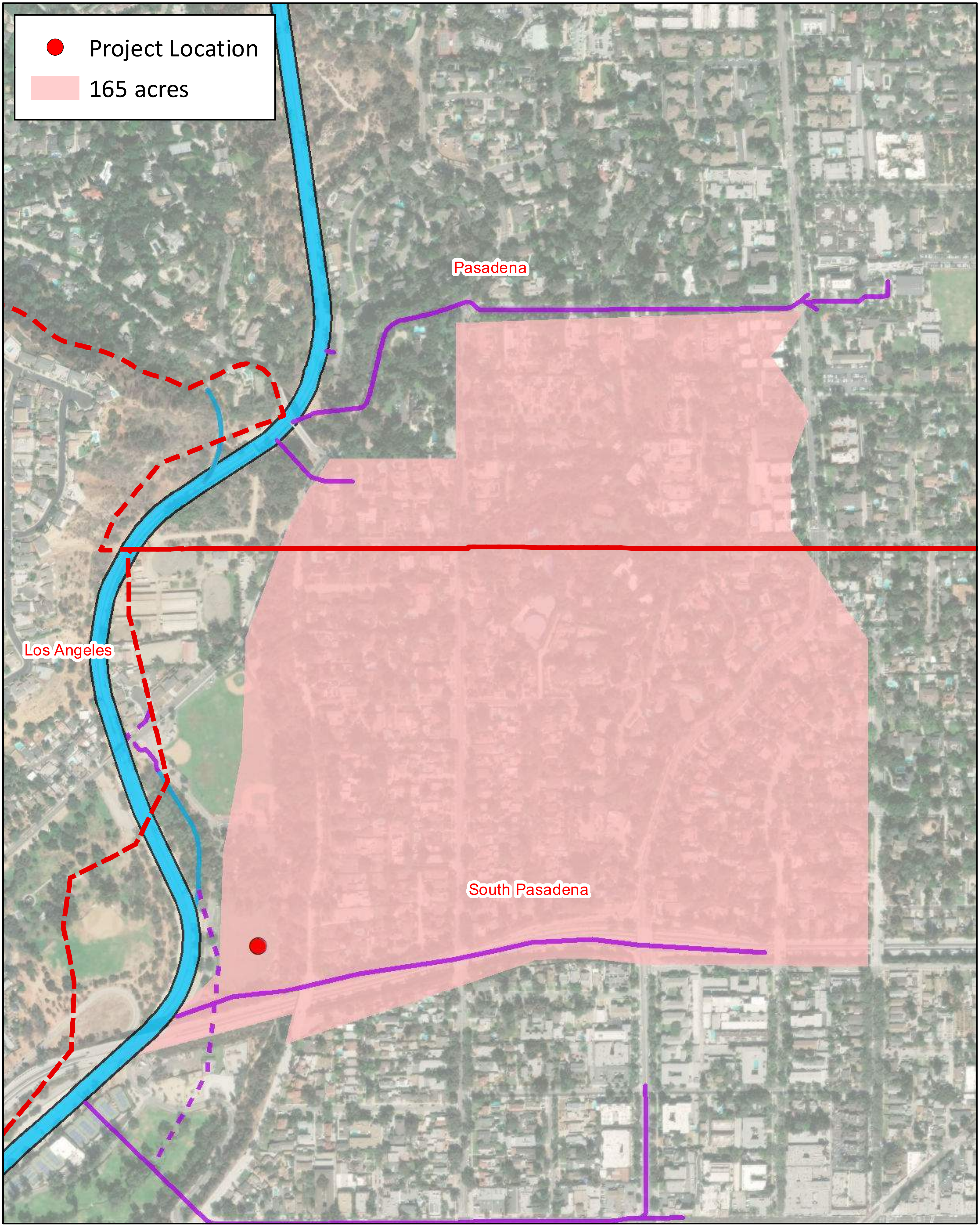
The selection of an underground detention basin (versus for a example, a constructed wetlands) was due to the location's existing use as park space and a dual baseball/soccer field. To maximize nature-based solutions, the improved field will be lined with native trees and vegetation.

7 ATTACHMENTS

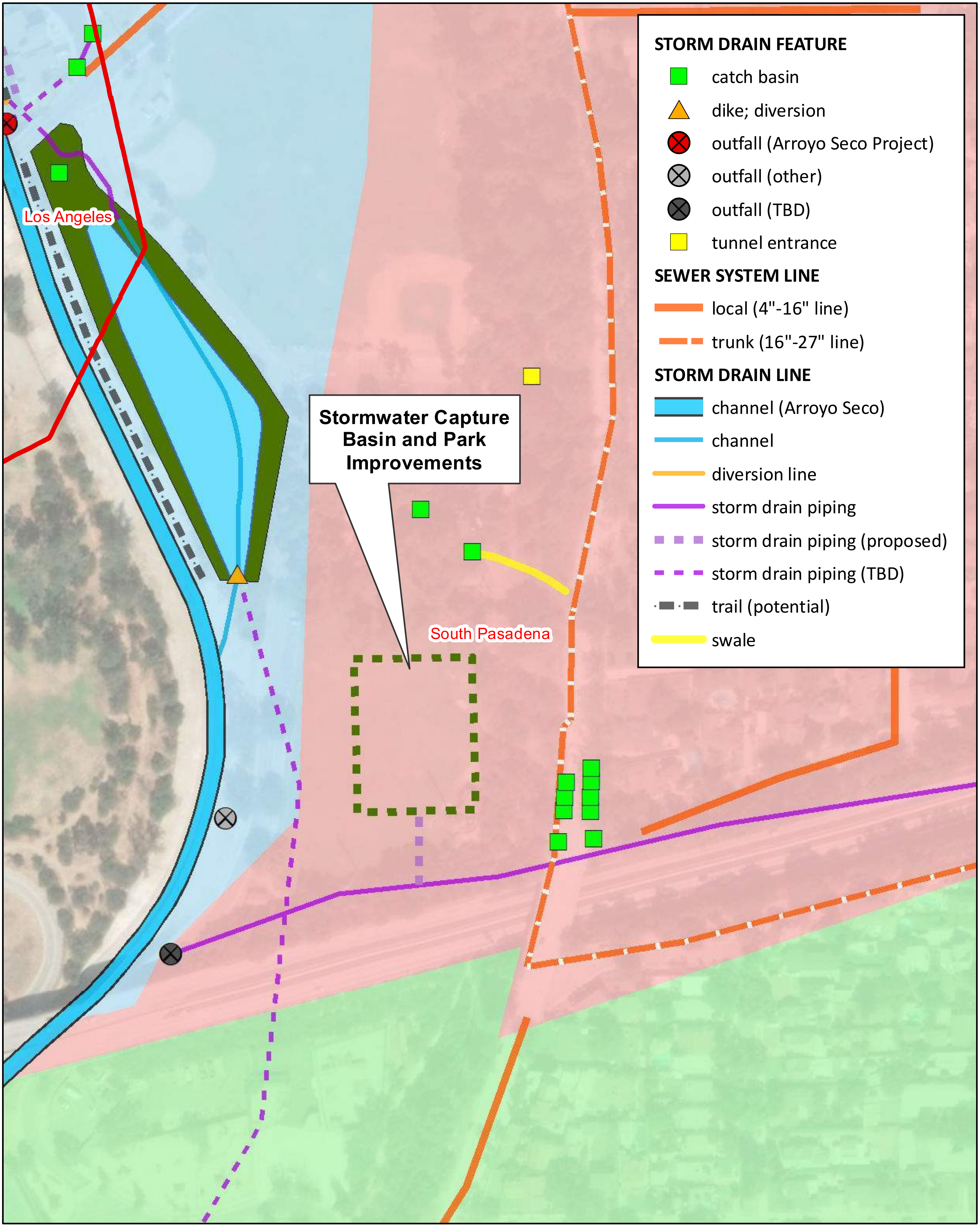
Attachments are bundled and organized in the following pages, with cover pages between each subsection.

ATTACHMENTS FOR SECTION 1

General Information



Stormwater Capture Basin and Park Improvements: Project Drainage Area



Stormwater Capture Basin and Park Improvements: Project Features

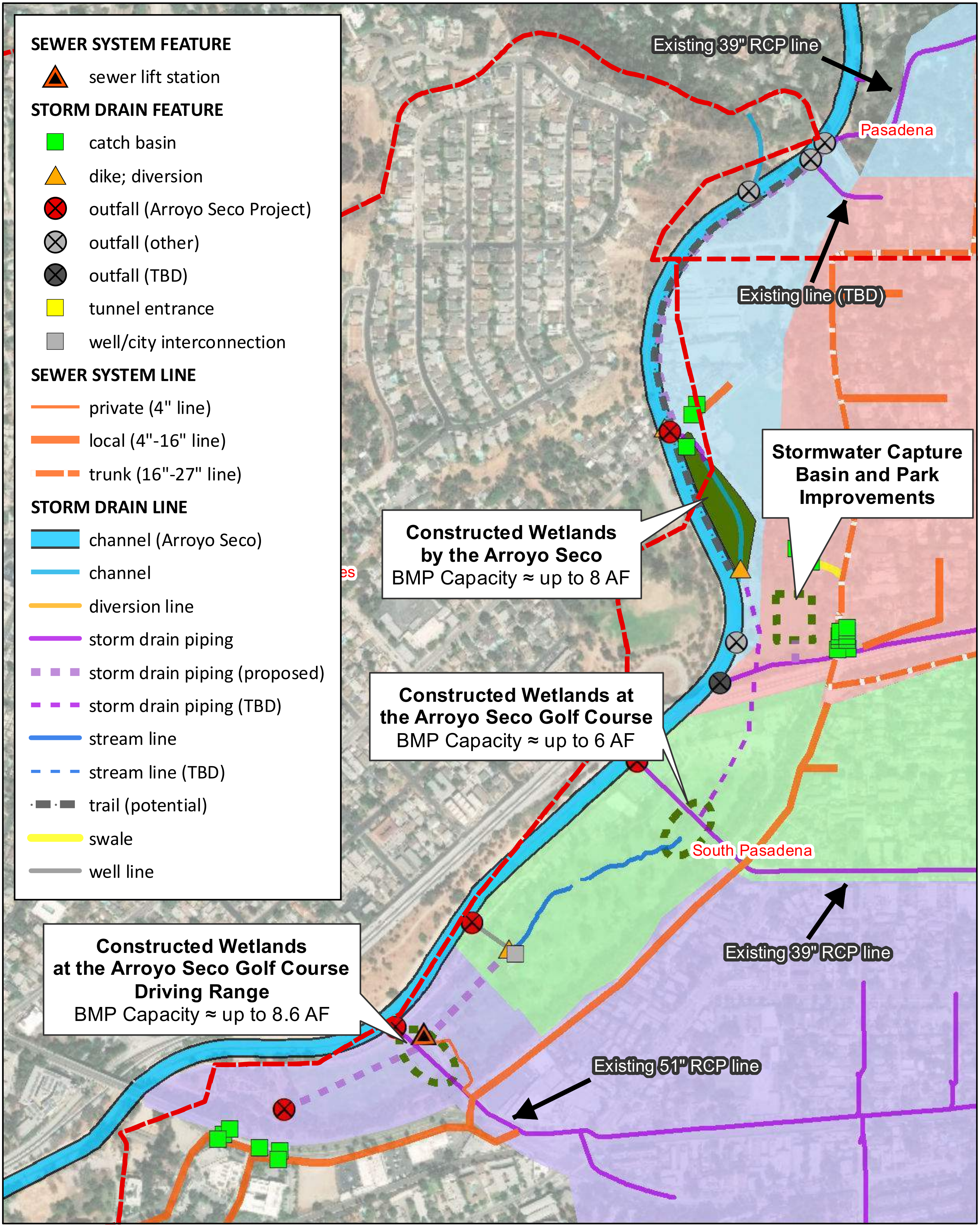
Arroyo Seco Project 1 (Constructed Wetlands by the Arroyo Seco) and Project 2 (Stormwater Capture Basin and Park Improvements): Initial Concept Landscape Plan

Maps Combining the Four Projects
Submitted for Technical Resources Program Funding

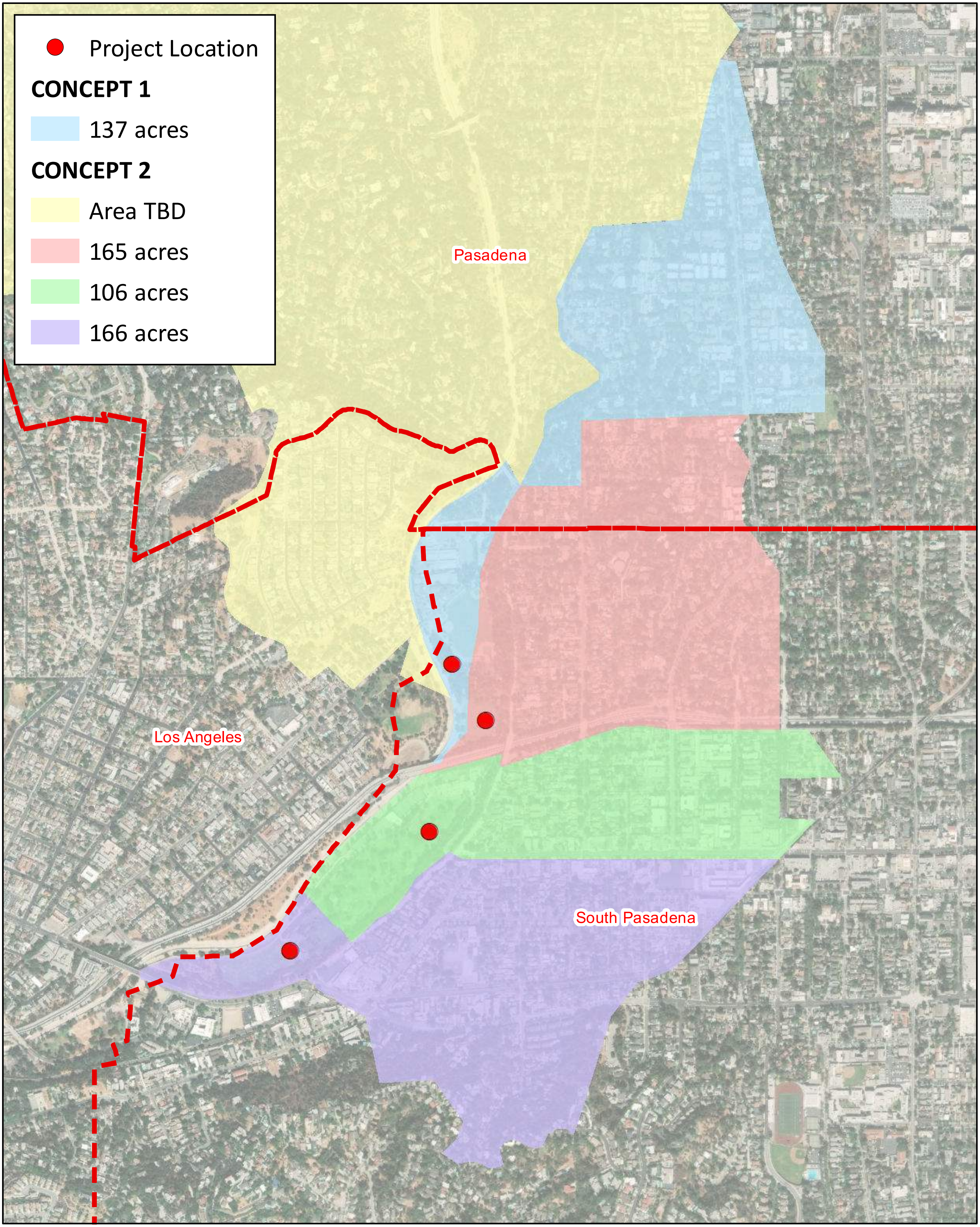
Projects:

1. Constructed Wetlands by the Arroyo Seco
2. Stormwater Capture Basin and Park Improvements **(this application)**
3. Constructed Wetlands at the Arroyo Seco Golf Course
4. Constructed Wetlands at the Arroyo Seco Golf Course Driving Range

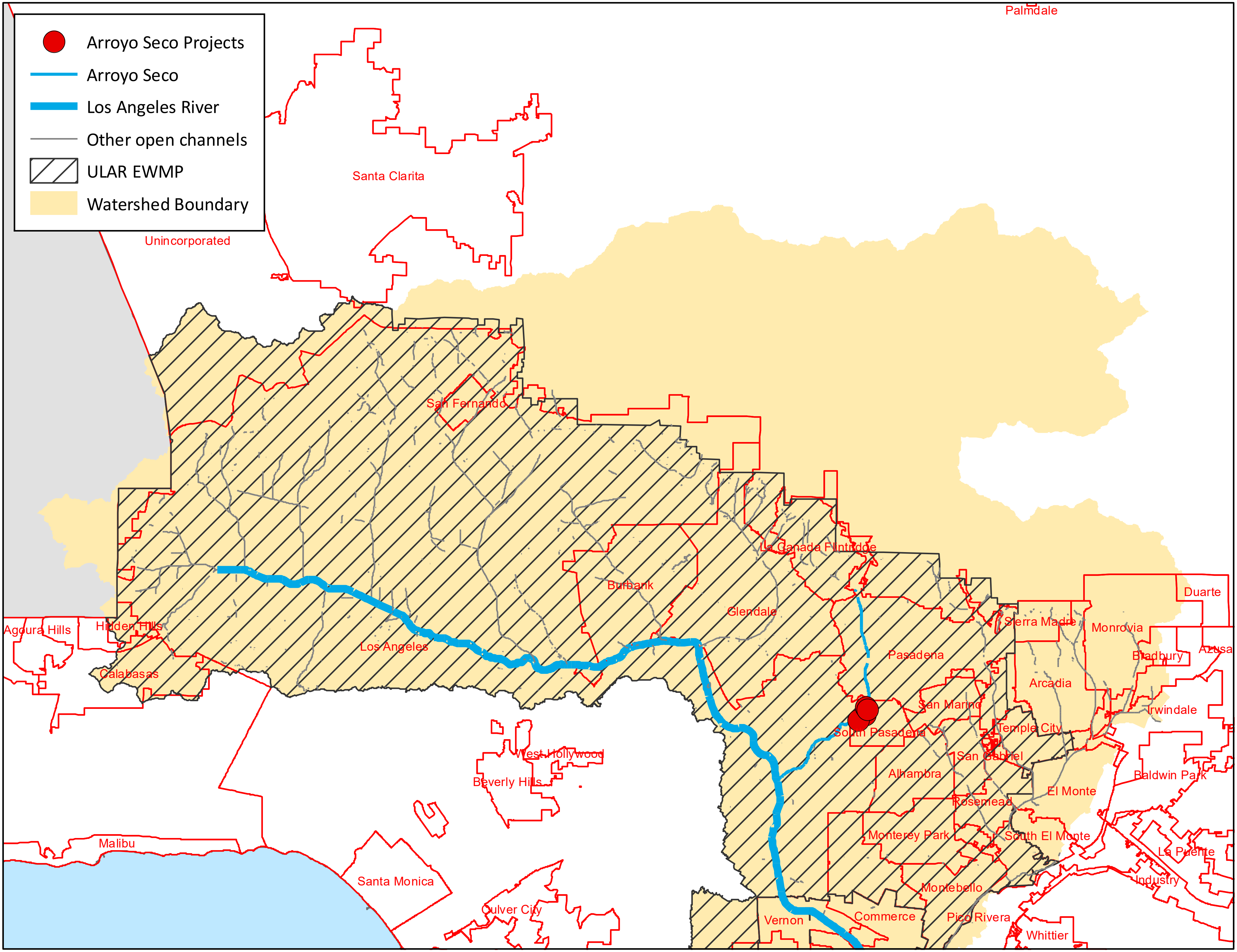
Note that if some or all of the following projects are funded in conjunction, the total requested funds will decrease.



Arroyo Seco Projects: Project Features



Arroyo Seco Projects: Project Drainage Area


Arroyo Seco Projects
Arroyo Seco
Los Angeles River
Other open channels
ULAR EWMP
Watershed Boundary
Palmdale
Santa Clarita
Unincorporated
San Fernando
La Canada Flintridge
Burbank
Glendale
Duarte
Sierra Madre
Monrovia
Azusa
Agoura Hills
Hidden Hills
Los Angeles
Pasadena
Bradbury
Calabasas
Arcadia
San Marino
Irwindale
South Pasadena
Temple City
West Hollywood
San Gabriel
Beverly Hills
Alhambra
Baldwin Park
El Monte
Rosemead
Malibu
Monterey Park
South El Monte
La Puente
Santa Monica
Industry
Montebello
Culver City
Commerce
Pico Rivera
Vernon
Whittier

ATTACHMENTS FOR SECTION 2

Design Elements

Description

Retention/irrigation refers to the capture of stormwater runoff in a holding pond and subsequent use of the captured volume for irrigation of landscape of natural pervious areas. This technology is very effective as a stormwater quality practice in that, for the captured water quality volume, it provides virtually no discharge to receiving waters and high stormwater constituent removal efficiencies. This technology mimics natural undeveloped watershed conditions wherein the vast majority of the rainfall volume during smaller rainfall events is infiltrated through the soil profile. Their main advantage over other infiltration technologies is the use of an irrigation system to spread the runoff over a larger area for infiltration. This allows them to be used in areas with low permeability soils.

Capture of stormwater can be accomplished in almost any kind of runoff storage facility, ranging from dry, concrete-lined ponds to those with vegetated basins and permanent pools. The pump and wet well should be automated with a rainfall sensor to provide irrigation only during periods when required infiltration rates can be realized. Generally, a spray irrigation system is required to provide an adequate flow rate for distributing the water quality volume (LCRA, 1998). Collection of roof runoff for subsequent use (rainwater harvesting) also qualifies as a retention/irrigation practice.

This technology is still in its infancy and there are no published reports on its effectiveness, cost, or operational requirements. The guidelines presented below should be considered tentative until additional data are available.

California Experience

This BMP has never been implemented in California, only in the Austin, Texas area. The use there is limited to watersheds where no increase in pollutant load is allowed because of the sensitive nature of the watersheds.

Advantages

- Pollutant removal effectiveness is high, accomplished primarily by: (1) sedimentation in the primary storage facility; (2) physical filtration of particulates through the soil profile; (3) dissolved constituents uptake in the vegetative root zone by the soil-resident microbial community.

Design Considerations

- Soil for Infiltration
- Area Required
- Slope
- Environmental Side-effects

Targeted Constituents

☑	Sediment	■
☑	Nutrients	■
☑	Trash	■
☑	Metals	■
☑	Bacteria	■
☑	Oil and Grease	■
☑	Organics	■

Legend *(Removal Effectiveness)*

● Low ■ High

▲ Medium

The hydrologic characteristics of this technique are effective for simulating pre-developed watershed conditions through: (1) containment of higher frequency flood volumes (less than about a 2-year event); and (2) reduction of flow rates and velocities for erosive flow events.

- Pollutant removal rates are estimated to be nearly 100% for all pollutants in the captured and irrigated stormwater volume. However, relatively frequent inspection and maintenance is necessary to assure proper operation of these facilities.

- This technology is particularly appropriate for areas with infrequent rainfall because the system is not required to operate often and the ability to provide stormwater for irrigation can reduce demand on surface and groundwater supplies.

Limitations

- Retention-irrigation is a relatively expensive technology due primarily to mechanical systems, power requirements, and high maintenance needs.

- Due to the relative complexity of irrigation systems, they must be inspected and maintained at regular intervals to ensure reliable system function.

- Retention-irrigation systems use pumps requiring electrical energy inputs (which cost money, create pollution, and can be interrupted). Mechanical systems are also more complex, requiring skilled maintenance, and they are more vulnerable to vandalism than simpler, passive systems.

- Retention-irrigation systems require open space for irrigation and thus may be difficult to retrofit in urban areas.

- Effective use of retention irrigation requires some form of pre-treatment of runoff flows (i.e., sediment forebay or vegetated filter) to remove coarse sediment and to protect the long-term operating capacity of the irrigation equipment.

- Retention/irrigation BMPs capture and store water that, depending on design may be accessible to mosquitoes and other vectors for breeding.

Design and Sizing Guidelines

- Runoff Storage Facility Configuration and Sizing - Design of the runoff storage facility is flexible as long as the water quality volume and an appropriate pump and wet well system can be accommodated.

- Pump and Wet Well System - A reliable pump, wet well, and rainfall or soil moisture sensor system should be used to distribute the water quality volume. These systems should be similar to those used for wastewater effluent irrigation, which are commonly used in areas where “no discharge” wastewater treatment plant permits are issued.

- Detention Time - The irrigation schedule should allow for complete drawdown of the water quality volume within 72 hours. Irrigation should not begin within 12 hours of the end of rainfall so that direct storm runoff has ceased and soils are not saturated. Consequently, the length of the active irrigation period is 60 hours. The irrigation should include a cycling factor of ½, so that each portion of the area will be irrigated for only 30 hours during the total of 60 hours allowed for disposal of the water quality volume. Irrigation also should not occur during subsequent rainfall events.

- Irrigation System - Generally a spray irrigation system is required to provide an adequate flow rate for timely distribution of the water quality volume.

- Designs that utilize covered water storage should be accessible to vector control personnel via access doors to facilitate vector surveillance and control if needed.

- Irrigation Site Criteria – The area selected for irrigation must be pervious, on slopes of less than 10%. A geological assessment is required for proposed irrigation areas to assure that there is a minimum of 12 inches of soil cover. Rocky soils are acceptable for irrigation; however, the coarse material (diameter greater than 0.5 inches) should not account for more than 30% of the soil volume. Optimum sites for irrigation include recreational and greenbelt areas as well as landscaping in commercial developments. The stormwater irrigation area should be distinct and different from any areas used for wastewater effluent irrigation. Finally, the area designated for irrigation should have at least a 100-foot buffer from wells, septic systems, and natural wetlands.

- Irrigation Area – The irrigation rate must be low enough so that the irrigation does not produce any surface runoff; consequently, the irrigation rate may not exceed the permeability of the soil. The minimum required irrigation area should be calculated using the following formula:

$$A = \frac{12 \times V}{T \times r}$$

where:

A = area required for irrigation (ft2)

V = water quality volume (ft3)

T = period of active irrigation (30 hr)

r = Permeability (in/hr)

- The permeability of the soils in the area proposed for irrigation should be determined using a double ring infiltrometer (ASTM D 3385-94) or from county soil surveys prepared by the Natural Resource Conservation Service. If a range of permeabilities is reported, the average value should be used in the calculation. If no permeability data is available, a value of 0.1 inches/hour should be assumed.

- It should be noted that the minimum area requires intermittent irrigation over a period of 60 hours at low rates to use the entire water quality volume. This intensive irrigation may be harmful to vegetation that is not adapted to long periods of wet conditions. In practice, a much larger irrigation area will provide better use of the retained water and promote a healthy landscape.

Performance

This technology is still in its infancy and there are no published reports on its effectiveness, cost, or operational requirements.

Siting Criteria

Capture of stormwater can be accomplished in almost any kind of runoff storage facility, ranging from dry, concrete-lined ponds to those with vegetated basins and permanent pools. Siting is contingent upon the type of facility used.

Additional Design Guidelines

This technology is still in its infancy and there are no published reports on its effectiveness, cost, or operational requirements.

Maintenance

Relatively frequent inspection and maintenance is necessary to verify proper operation of these facilities. Some maintenance concerns are specific to the type or irrigation system practice used.

BMPs that store water can become a nuisance due to mosquito and other vector breeding. Preventing mosquito access to standing water sources in BMPs (particularly below-ground) is the best prevention plan, but can prove challenging due to multiple entrances and the need to maintain the hydraulic integrity of the system. Reliance on electrical pumps is prone to failure and in some designs (e.g., sumps, vaults) may not provide complete dewatering, both which increase the chances of water standing for over 72 hours and becoming a breeding place for vectors. BMPs that hold water for over 72 hours and/or rely on electrical or mechanical devices to dewater may require routine inspections and treatments by local mosquito and vector control agencies to suppress mosquito production. Open storage designs such as ponds and basins (see appropriate fact sheets) will require routine preventative maintenance plans and may also require routine inspections and treatments by local mosquito and vector control agencies.

Cost

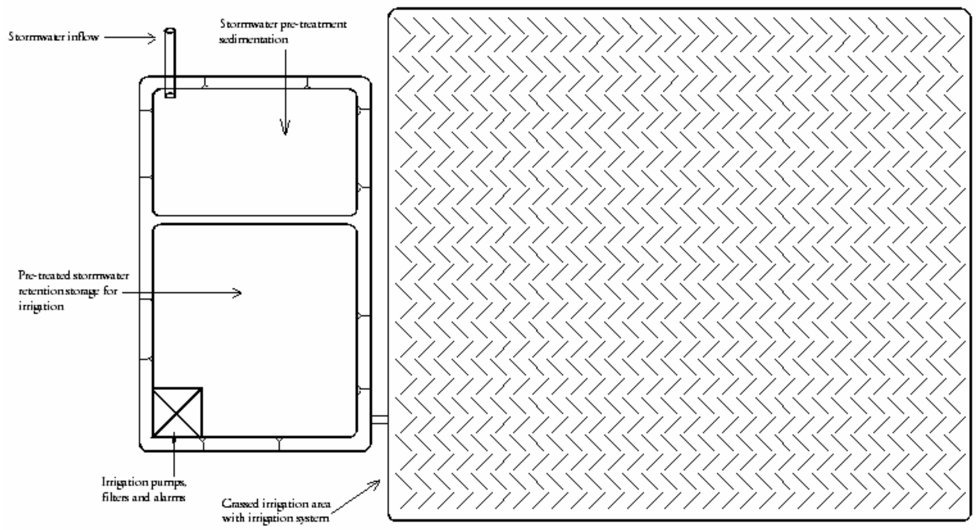
This technology is still in its infancy and there are no published reports on its effectiveness, cost, or operational requirements. However, O&M costs for retention-irrigation systems are high compared to virtually all other stormwater quality control practices because of the need for: (1) frequent inspections; (2) the reliance on mechanical equipment; and (3) power costs.

References and Sources of Additional Information

Barrett, M., 1999, Complying with the Edwards Aquifer Rules: Technical Guidance on Best Management Practices, Texas Natural Resource Conservation Commission Report RG-348. http://www.tnrcc.state.tx.us/admin/topdoc/rg/348/index.html

Lower-Colorado River Authority (LCRA), 1998, Nonpoint Source Pollution Control Technical Manual, Austin, TX.

Metzger, M. E., D. F. Messer, C. L. Beitia, C. M. Myers, and V. L. Kramer. 2002. The dark side of stormwater runoff management: disease vectors associated with structural BMPs. Stormwater 3(2): 24-39.


Stormwater inflow
Stormwater pre-treatment sedimentation
Pre-treated stormwater retention storage for irrigation
Irrigation pumps, filters and alarms
Grassed irrigation area with irrigation system

Site Conditions and Constraints

The following are concept planning documents for a similar project (Lower Arroyo Park) located adjacent to the current concept location, and described in the Upper LA River EWMP. Also attached is the County's "Initial Study/Environmental Constraints Evaluation For the Eight Recommended Regional Projects within the Upper Los Angeles River Watershed", which includes the Lower Arroyo Park.

The Lower Arroyo Park project as originally proposed had significant technical feasibility constraints. Through this most recent concept planning effort, these initial constraints were resolved, and the original EWMP concept has been improved upon. The primary modification was moving the project from the west of the Arroyo Seco to the east side, to coincide with the locations of several storm drain pipes that run underneath City park space and directly to the river. Despite the change in location, the attached EWMP concept planning documents for the Lower Arroyo Park provide useful information on the general site location, geotechnical analysis, watershed characteristics, potential retrofit characteristics, as well as environmental constraints.

4.5.8 Lower Arroyo Park

Lower Arroyo Park is located within the City of South Pasadena in an area that drains to Arroyo Seco. A channelized portion of Arroyo Seco runs through the center of the proposed site parcel. Park facilities include two baseball diamonds, open field space, and playground equipment. The potential BMP type is proposed as a below-ground retention/infiltration basin situated beneath the baseball diamonds and other open field space in the southwest corner and northern portions of the park.

No maximum drainage area was identified for this site since it is located adjacent to a receiving waterbody, Arroyo Seco. After review of available site opportunities and surrounding infrastructure, a smaller (alternative) drainage area was delineated, encompassing approximately 145 acres.

After reviewing the hydrologic model results and estimated runoff volume for the various diversion scenarios, it was determined that this project site was suitable for a retention/infiltration BMP sized to accommodate more than the 85th percentile design storm flows contributed from the smaller alternative drainage area. As a result, the recommended active volume of the BMP is 3.7 acre feet.

Table 4-10 below summarizes key conceptual design parameters of the BMP proposed at Lower Arroyo Park. **Figure 4-32** presents summary facts of the Lower Arroyo Park signature project. **Figures 4-33** to **4-35** provided on the following pages show proposed site features and the tributary drainage area(s) considered during the engineering and environmental feasibility analysis.

Table 4-10. Key Design Parameters for Lower Arroyo Park

Summary of Lower Arroyo Park (SP01)		
Project Site Parameters	Total (Maximum) Drainage Area	145 ac
	Alternative (Minimum) Drainage Area	145 ac
	Maximum Recommended BMP Volume	265 ac-ft
	Alternative Recommended BMP Volume	3.7 ac-ft
	Groundwater Depth	25 ft
	Maximum BMP Opportunity Area	10.6 ac
BMP Design Parameters		
	Recommended Maximum BMP Depth (below ground surface)	25 ft
	Available BMP Volume	265 ac-ft
	Recommended Active BMP Volume	**3.7 ac-ft**

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Note: Figures are not to scale

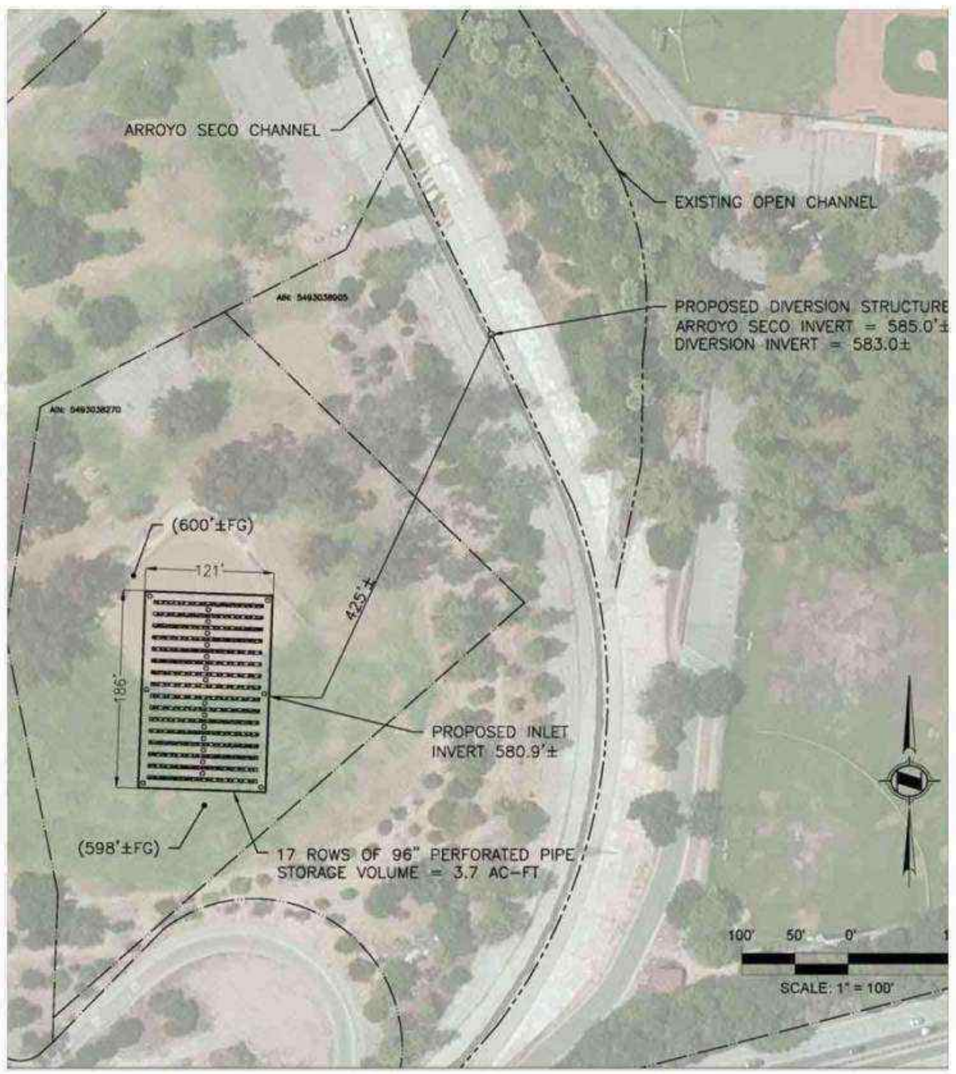
Site Location			
Site Location, City	South Pasadena	Site Name	Lower Arroyo Park
Latitude	34° 7′ 18.123″ N	Longitude	118° 10′ 4.0620″ W
Landuse	Open Space	Street Address	San Pasqual Avenue & Stoney Drive
Major Watershed	Upper Los Angeles River	Land Owner	City of South Pasadena
Existing Land Use of Site: Park			

Watershed Characteristics		Retrofit Characteristics	
Drainage Area Max/Min, ac	145/145	Proposed Retrofit	Subsurface Infiltration
Hydrologic Soil Group	Hanford Gravelly Sandy Loam	Recommended BMP Footprint, ft²	22506
Soil Infiltration Rate, in/hr	0.80	Available BMP Volume, ac-ft	265
Manages 85th Percentile, 24 hr Design Storm Event?	Yes	BMP Water Storage Depth, ft	9
Recommended Active BMP Volume, ac-ft	3.7	Gravel Depth, ft	1
Approximate Rainfall Event Depth Captured Based on Recommended Volume, inch = 0.8			

Budget- Level estimates for both soft and hard costs	$5,132,000	**Schedule**	1 year design, 6 months bid, 9 months construction (2 ¼ years total)

Drainage Map

Watershed and Vicinity



Rendered Improvements

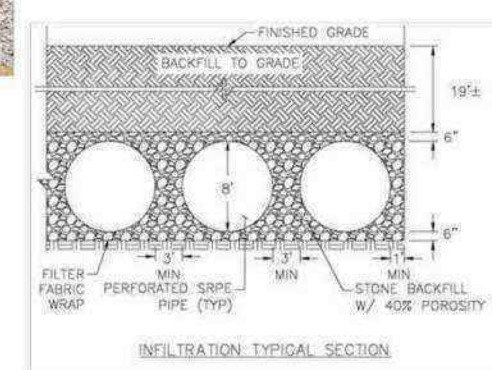


Figure 4-32. Summary Facts: Lower Arroyo Park Signature Project

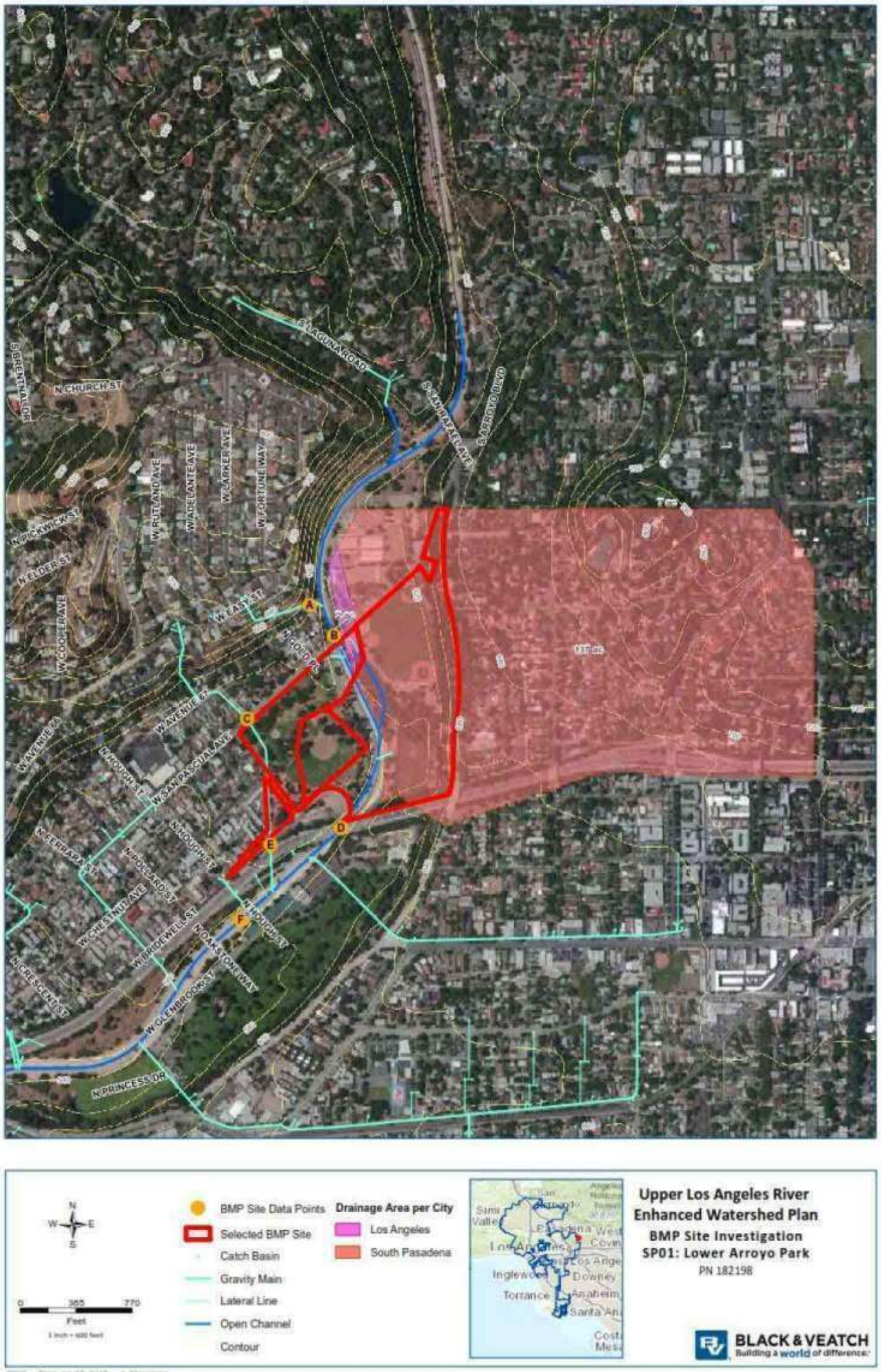


Figure 4-33. Lower Arroyo Park Subsurface Infiltration Drainage Area

Figure 4-34. Lower Arroyo Park Subsurface Infiltration Site Location

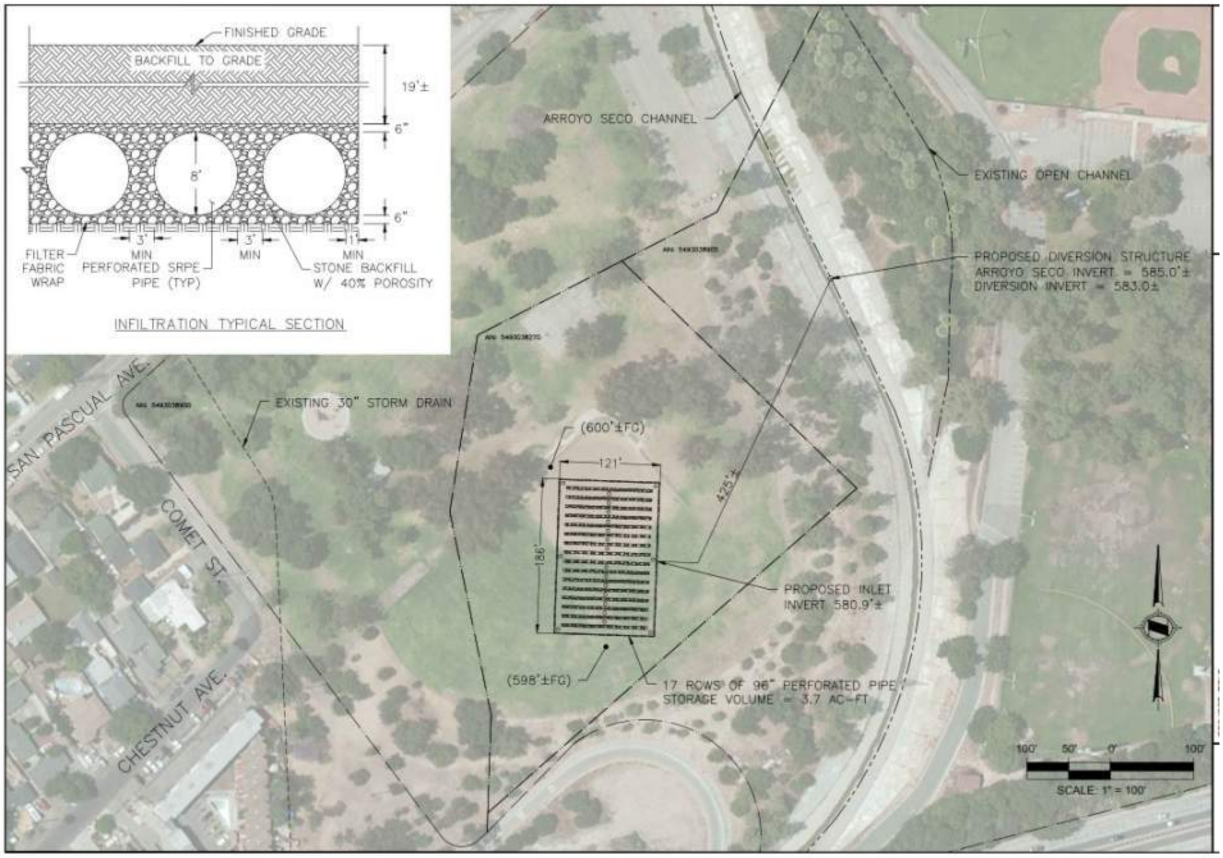


Figure 4-35. Lower Arroyo Park Subsurface Infiltration Concept

4.6 How is the EWMP Integrated with Previous, Ongoing and Future Water Quality Planning Efforts?

The EWMP includes a compilation of numerous previous stormwater compliance planning documents created for the ULAR, and the EWMP represents the "master stormwater compliance plan" moving forward. As such, it is important to recognize and, to the extent practicable, incorporate other planning efforts in the LA River watershed. This section provides a brief overview of the previous planning documents incorporated into the EWMP and considers how the EWMP will be integrated into other efforts to restore and provide access to the Los Angeles River and increase the reliability of local water supplies.

4.6.1 Previous Water Quality Planning Efforts

The process of developing a set of regional project opportunities described above included a review and analysis of many local and regional planning efforts underway by many other agencies and organizations throughout the watershed. The previously developed plans reviewed during EWMP development include the following:

- Implementation Plans for the LA River and Tributaries Metals TMDLs:
  - *City of Los Angeles Draft Implementation Plan, 2010*

3.7 LOWER ARROYO PARK

Lower Arroyo Park is located within the City of South Pasadena in an area that drains to Aroyo Seco. A channelized portion of Arroyo Seco runs through the center of the proposed site parcel. Park facilities include two baseball diamonds, open field space, and playground equipment. The potential BMP type is proposed as a below-ground retention/infiltration basin situated beneath the baseball diamonds and other open field space in the southwest corner and northern portions of the park.

No maximum drainage area was identified for this site since it is located adjacent to a receiving waterbody, Arroyo Seco. After review of available site opportunities and surrounding infrastructure, a smaller (alternative) drainage area was delineated, encompassing approximately 145 acres.

After reviewing the hydrologic model results and estimated runoff volume for the various diversion scenarios, it was determined that this project site was suitable for a retention/infiltration BMP sized to accommodate more than the 85th percentile design storm flows contributed from the smaller alternative drainage area. As a result, the recommended active volume of the BMP is 3.7 acre feet.

Table 3.7-1 summarizes key conceptual design parameters of the BMP proposed at Lower Arroyo Park. A map of the project site including key infrastructure and highlighted BMP opportunity areas is provided in Appendix D. A map of the alternative (minimum) tributary drainage area can be found in Appendix E.

Table 3.7-1 Summary of Lower Arroyo Park (SP01)

Table 3.7-1 Summary of Lower Arroyo Park (SP01)		
Project Site Parameters	Total (Maximum) Drainage Area	N/A
	Alternative (Minimum) Drainage Area	145 ac
	Maximum Required BMP Volume	N/A
	Alternative Required BMP Volume	0.06 ac-ft
	Groundwater Depth	25 ft
BMP Design Parameters	BMP Opportunity Area	10.6 ac
	Recommended Maximum BMP Depth	25 ft
	Available BMP Volume	265 ac-ft
	Recommended Active BMP Volume	**3.7 ac-ft**

In addition to the volumetric features summarized above, it is envisioned that this site would feature the following potential benefits:

- Drains an urbanized area
- Stormwater capture and some infiltration
- Stormwater quality improvement via pre-treatment, retention, and infiltration
- Water harvested can be utilized for a significant amount of on-site irrigation