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RECONNAISSANCE-LEVEL RECHARGE STUDY IN THE SIX BASINS

FINAL – FEBRUARY 2020
DRAFT – JANUARY 2020

Prepared by:
Stantec

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Acronyms, Abbreviations, and Initialisms

af	acre-feet
afy	acre-feet per year
APN	Assessor's Parcel Number
BMP	Best Management Practice
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
EPA	Environmental Protection Agency
ESGV	East San Gabriel Valley
Fairplex	Los Angeles County Fairplex
ft	feet
GIS	Geographic Information System
IEUA	Inland Empire Utilities Agency
LA	Los Angeles
LACSD	Los Angeles County Sanitation District
MS4	Municipal Separate Storm Sewer System
MOU	Memorandum of Understanding
NPDES	National Pollutant Discharge Elimination System
NRCS	National Resources Conservation Service
O&M	Operations and Maintenance
Parties	Six Basins Watermaster Parties
PDR	Preliminary Design Report
PEIR	Programmatic Environmental Impact Report
Pedley	Pedley Spreading Grounds
R4	Rainfall, Runoff, Router, and Root Zone
RWL	Receiving Water Limitation
SASG	San Antonio Spreading Grounds
SWP	State Water Project
TVMWD	Three Valleys Municipal Water District
WMMS	Watershed Management Modeling System
WRP	Water Reclamation Plan
WEI	Wildermuth Environmental, Inc.
WMP	Watershed Management Plan
WQBEL	Water-Quality-Based Effluent Limitations

1.1 Background

The Watermaster Parties (Parties) have collectively agreed to enhance the management of the Six Basins beyond the execution of the Judgment by developing and implementing a Strategic Plan for the Six Basins (Strategic Plan). The Strategic Plan identified enhanced stormwater recharge through compliance with the municipal separate storm sewer system (MS4) permit as a potential project in the Six Basins. The project calls for Watermaster to collaborate with MS4 permittees to develop MS4-compliant projects that maximize recharge and provide yield benefits to the Six Basins. Similarly, the East San Gabriel Valley (ESGV) Watershed Management Group[1] is actively seeking conceptual "project types" and Best Management Practice (BMP) design concepts that maximize stormwater capture potential to meet its MS4 regulatory compliance goals. Figure 1-1 is a location map that shows the Six Basins, the ESGV boundary, and city boundaries.

On April 24, 2019, the Six Basins Watermaster Board approved Task Order 2019-02 – Conduct a Reconnaissance-Level Recharge Study in the Six Basins (study). This study was a collaborative effort between Stantec, representing the ESGV, and WEI, representing Watermaster.

1.2 Objectives and Methods

The objectives of this study were to identify projects that will: (i) comply with MS4 permit requirements and (ii) enhance stormwater recharge in the Six Basins. The technical information derived from the study can also be used to support applications for project implementation funding.

The study methods included: identifying potential recharge sites; describing the reconnaissance-level engineering design and operation of potential recharge facilities, characterizing the expected volumes of stormwater recharge at these facilities, characterizing benefits towards MS4 compliance, identifying the potential for supplemental water recharge, and estimating the capital and ongoing operation and maintenance costs to implement the recharge projects.

1.3 Potential Collaborating Partners

The MS4 permit applies to Los Angeles (LA) County and LA County municipalities for all lands that are planned for new development or redevelopment. All MS4 permittees and landowners that overlie the Six Basins are potential collaborating partners for project implementation.

1.4 Report Organization

Section 1 Introduction. This section summarizes the background, objectives, and methods of the study, and identifies potential collaborating partners for project implementation.

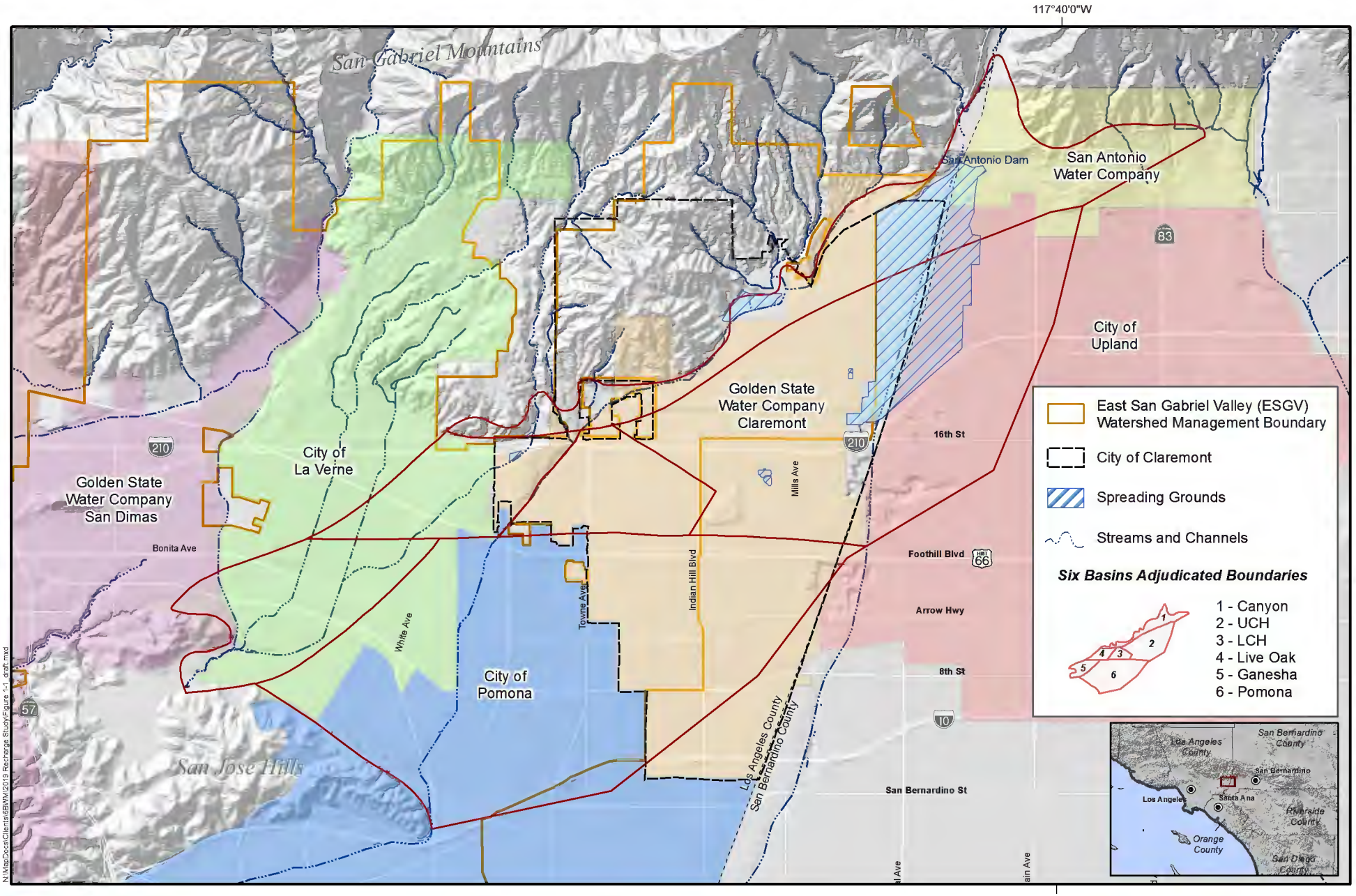
[1] ESGV is comprised of the cities of La Verne, Pomona, Claremont, and San Dimas.

Section 2 Planning Criteria. This section describes the planning criteria used for site selection, project design, and project evaluation for potential stormwater harvesting/recharge projects in the Six Basins.

Section 3 Potential Stormwater Harvesting and Recharge Sites. This section describes the process to select eight sites for potential stormwater harvesting/recharge projects in the Six Basins.

Section 4 Description and Performance of Potential Stormwater Harvesting and Recharge. This section describes expected stormwater diversions, recharge performance, and associated costs to construct and operate stormwater harvesting and recharge projects at the sites identified in Section 3.

Section 5 Conclusions and Recommendations. This section describes the findings of this report, potential funding sources to support the implementation of the projects described in Section 4, and recommendations for future actions based on these findings.



Produced by:

WEI
Wildermuth Environmental, Inc.

Author: RT
Date: 20200120

0 0.5 1 Miles
0 1 2 Kilometers

The Six Basins and ESGV Watershed

Figure 1-1

This section describes the planning criteria used for site selection, project design, and project evaluation for potential stormwater harvesting/recharge projects in the Six Basins. Specifically, it describes the engineering design and operational assumptions for the recharge facilities at the sites, financial assumptions to help estimate costs for the recharge facilities evaluated in this study, and the Safe Clean Water Program funding eligibility criteria developed by LA County to evaluate projects that apply for funding under this program.

2.1 Criteria for Identifying and Ranking Potential MS4 Recharge Sites

Criteria critical to stormwater recharge and MS4 permit compliance were used to identify the universe of available sites within the study area. Table 2-1 lists these pass/fail criteria. These criteria cover physical, hydrologic, and regulatory limitations, and ensure that the sites are located across the entire area of the Six Basins.

Sites that passed the criteria were ranked, based on ranking criteria, to identify the top MS4 recharge sites. Table 2-2 lists the ranking criteria, which were designed to favor sites that maximize stormwater harvesting and recharge. Each site was assigned a ranking value for each criterion. The ranking value was multiplied by the weight for that criterion, and all weighted rankings were summed to calculate a final ranking score.

2.2 Planning Criteria for Design, Operation, and Cost of Recharge Facilities

Table 2-3 lists the engineering design and operating criteria used in this study. These criteria describe assumptions for the engineering design and operation of facilities for diversion, conveyance, and recharge of stormwater at the selected sites.

Table 2-4 lists the various financial assumptions used to develop and evaluate cost opinions for recharge projects. Level-5 cost opinions[1] will be developed for each project concurrently with design.

2.3 Funding Eligibility Criteria for the LA County Safe Clean Water Program

Project designs resulting from this study may be eligible for project implementation funding under the LA County's Safe Clean Water Program.[2] The Safe Clean Water Program is funded by a parcel tax intended to increase LA County's local water supply, improve water quality, and

[1] See AACE International Recommended Practice No. 18R97 Cost Estimate Classification System as Applied in Engineering, Procurement and Construction for the Process Industries. www.aacei.org/toc/toc_18R-97.pdf

[2] Los Angeles County. Program Elements. July 11, 2018. Prepared for the Safe Clean Water Program Funding Measure. https://safecleanwaterla.org/wp-content/uploads/2018/08/7.13.18-FINAL-SCW-REVISED-BL-PACKAGE.pdf

invest in making communities greener and more livable. Table 2-5 lists the criteria developed by LA County by which projects are evaluated to receive Safe Clean Water Program funding. The criteria shown in Table 2-5 informed the design of projects in this study to maximize the potential to receive funding.

Table 2-1
Pass/Fail Criteria for Identification of Potential Recharge Sites

Pass/Fail Criteria
The site must be within the Six Basins, and at least one site must be located within each groundwater subbasin (except the Canyon subbasin).
The site must be at least 100 feet away from a potable water-supply well.[1]
The site must have mild slopes (≤ 10%).
The site must contain Type A, B, and/or C soils.[2]
The site must be at least two acres in size, including setbacks and ancillary facilities.
The site must not be within a mapped area of historical high groundwater.
The current thickness of the unsaturated zone underlying the site must be at least 50 feet.
The site must not have existing industrial development, multiple residential buildings, or plans for development.
The site must not have any unresolvable environmental, institutional, or other challenges for use as a recharge basin.[3]

[1] Pursuant to the Los Angeles County NPDES Permit No. CA S004001 Section VI.D.7.c.ii.

[2] Los Angeles County soil classifications are used to classify hydrologic soil groups for areas not surveyed by NRCS.

[3] A search of active groundwater contamination cleanup sites listed on Geotracker will be completed for this criterion.

Table 2-2
Site-Specific Ranking Criteria for Potential Recharge Sites

Criteria	Weight	Range	Ranking
Site ownership:	2	Six Basins Party Owned	5
		Publicly Owned	3
		Owned by Other Potential Partners	1
Soil type[1]:	2	'A' Soil Type	5
		'B' Soil Type	3
		'C' Soil Type	1
Site size:	2	X > 50 acres	5
		20 acres < X ≤ 50 acres	4
		10 acres < X ≤ 20 acres	3
		5 acres < X ≤ 10 acres	2
		X ≤ 5 acres	1
Distance from existing storm sewer:	2	X ≤ 200 feet	5
		200 feet < X ≤ 500 feet	3
		X > 500 feet	1
Depth to historical shallowest groundwater[2]:	1	X > 100 feet	5
		X = 50 - 100 feet	3
		X = 40 - 50 feet	1
Percent imperviousness:	1	0 - 10 percent	5
		10 - 50 percent	3
		50 - 90 percent	1
		90 - 100 percent	0

[1]Where areas have multiple soil types, the less desirable soil type is assumed for the site.

[2]Depth to shallowest groundwater is determined through analysis of all historical groundwater-level data at wells.

[3] Potable water-supply wells are identified using the Six Basins Watermaster database.

Table 2-3
Engineering-Design and Operating Criteria for Potential Recharge Facilities

Criteria		Reasoning and/or References
Average Infiltration Rate	0.5 ft/day	This will be the assumed infiltration rate for all off-channel recharge sites.
Multipurpose and Conservation Basin Priority of Operation	Pursuant to Los Angeles County criteria	Multipurpose basins accept recycled water and storm water; however, storm water operations and safety take precedence over recharge. Conservation basins accept recycled water and storm water and are not used for flood control.
Basin Side Slopes	3:01	Typical design for recharge basin slide slopes.
Basin Freeboard	≥ 3 feet	Freeboard is the vertical distance from the water surface to the top of the basin design capacity. Freeboard is also considered the safety factor for unknown factors, such as wind/wave action due to earthquakes and/or other hydrological effects in the watershed.
Instrumentation	SCADA	SCADA will be used to remotely operate diversion works, rubber dams and outlets and to record stage and equipment settings.
Site Setbacks	Frontage ≥ 40 feet Sides ≥ 20 feet Back ≥ 20 feet	A setback is the distance from the site's property line to the outer edge of the recharge basin's berm. This distance has been set to allow for circulation of maintenance equipment. The front of the property or portions of the property that front surrounding roadways will require an additional distance to allow for screening type landscaping.
Access Road	Width ≥ 15 feet Turning Radius ≥ 40 feet	Minimum widths are set to allow for maintenance equipment access. A 20-foot access road is preferable. Centerline turning radius must be a minimum of 40 feet and must terminate with a turnaround area of 40x40 feet.
Maintenance	Yearly or as needed	Maintenance will consist of weed abatement and vector control. Removing miscellaneous vegetation from the recharge basin bottom and side walls is essential to minimizing potential vector issues. Subcontracting with a vector control specialist during the summer months is key to preventing vector issues. Other activities include removing debris/sediment accumulation from diversion works and conveyance facilities, fence repair, and access road/ramp repair.
Maintenance: Removal of Recharge-Limiting Materials	After significant debris inflow events that limit infiltration (floods and/or watershed fires); at least once every three years.	Debris removal of built-up fines and organic matter that have accumulated at the bottom of the basin and/or within outlet structures. This activity is vital to maintaining recharge capacity.

Table 2-4
Financial Assumptions

Items	Unit		Assumption
Mobilization	Rate	5%	of direct construction costs
Contingency for project < $1 million	Rate	20%	of direct construction costs
Contingency for project $1 to 2 million	Rate	15%	of direct construction costs
Contingency for project > $2 million	Rate	10%	of direct construction costs
Engineering and Admin for project < $1 million	Rate	20%	of direct construction costs
Engineering and Admin for project $1 to 2 million	Rate	15%	of direct construction costs
Engineering and Admin for project > $2 million	Rate	10%	of direct construction costs
Construction Management for project < $1 million	Rate	20%	of direct construction costs
Construction Management for project $1 to 2 million	Rate	15%	of direct construction costs
Construction Management for project > $2 million	Rate	10%	of direct construction costs
Amortization Rate	Rate	5%	
Amortization Period	Years	30	

Table 2-5

LA County Safe, Clean Water Program -- Ranking Criteria for Potential MS4 Recharge Sites[1]

Criteria	Weight	Range	Ranking
A. Water Quality Benefits[2]			
A.1 Wet Weather Water Quality Benefits (maximum of 50 points)			
A.1.1 Water Quality Cost Effectiveness[3]:	1	>1.0 (acre feet capacity / $-Million)	20
		0.8-1.0 (acre feet capacity / $-Million)	14
		0.6-0.8 (acre feet capacity / $-Million)	11
		0.4-0.6 (acre feet capacity / $-Million)	7
		<0.4 (acre feet capacity / $-Million)	0
A.1.2 Water Quality Pollution Reduction (Primary Class)[4]:	1	> 80%	20
		> 50%	15
A.1.2 Water Quality Pollution Reduction (Secondary or More Classes)[4]:	1	> 80%	10
		> 50%	5
-OR- **A.2 Dry Weather Water Quality Benefits (maximum of 40 points)**			
A.2.1 Water Quality Benefits	1	Project is designed to capture, infiltrate, or divert 100% of all tributary dry weather flows.	20
A.2.2 BMP Tributary Size	1	> 200 acres	20
		< 200 acres	10
B. Significant Water Supply Benefits (maximum of 25 points)			
B1. Water Supply Cost Effectiveness: Total Life Cycle Cost[5]:	1	<$1000/ac-ft	13
		$1000–1500/ac-ft	10
		$1500-2,000/ac-ft	6
		$2,000–2,500/ac-ft	3
		>$2500/ac-ft	0
B2. Annual additional water supply volume resulting from Project:	1	>300 ac-ft/year	12
		200 - 300 ac-ft/year	9
		100 - 200 ac-ft/year	5
		25 - 100 ac-ft/year	2
		<25 ac-ft/year	0
C. Community Investment Benefits (maximum of 10 points)			
C1. Community Investment Benefits (CIBs)[6]:	1	7 distinct defined CIBs	10
		4 distinct defined CIBs	4
		1 of the defined CIBs	1
D. Nature Based Solutions (maximum of 15 points)			
D1. Nature Based Solutions	1	Implements natural processes or mimics natural processes to slow, detain, capture, and absorb/infiltrate water in a manner that protects, enhances and/or restores habitat, green space and/or usable open space	5
	1	Utilizes natural materials such as soils and vegetation with a preference for native vegetation	5
	1	Removes Impermeable Area from Project	5
E. Leveraging Funds and Community Support (maximum of 10 points)			
E1. Cost-Share:	1	>50% Funding Matched	6
		>25% Funding Matched	3
E2. Community Support[7]:	1	Demonstrates strong local, community-based support and/or has been developed as part of a partnership with local NGOs/CBOs	4

1 -- Los Angeles County. Program Elements. July 11, 2018. Prepared for the Safe, Clean Water Program Funding Measure. <https://safecleanwaterla.org/wp-content/uploads/2018/08/7.13.18-FINAL-SCW-REVISED-BL-PACKAGE.pdf>.

2 -- If a BMP is designated a Wet Weather feature, it is evaluated per Section A.1 of the criteria; if a BMP is designated a Dry Weather feature, it is evaluated per Section A.2 of the criteria.

3 -- (24-hour BMP Capacity) / (Capital Cost in $Millions). Management of the 24-hour event is considered the maximum capacity of a Project for a 24- hour period. For water quality focused Projects, this would typically be the 85th percentile design storm capacity. Units are in acre-feet (af).

4 -- Total Life-Cycle Cost per unit of acre foot of Stormwater and/or Urban Runoff volume captured for water supply: The annualized value of all Capital, planning, design, land acquisition, construction, and total life O&M costs for the Project for the entire life span of the Project (e.g. 50-year design life span should account for 50-years of O&M). The annualized cost is used over the present value to provide a preference to Projects with longer life spans.

5 -- The pollutant reduction (i.e. concentration, load, exceedance day, etc.) for a class of pollutants using a similar analysis as the E/WMP which uses the District's Watershed Management Modeling System (WMMS). The analysis should be an average percent reduction comparing influent and effluent for the class of pollutant over a ten-year period showing the impact of the Project. Modeling should include the latest performance data to reflect the efficiency of the BMP type.

6 -- A benefit created in conjunction with a Project or Program, such as, but not limited to: improved flood management, flood conveyance, or flood risk mitigation; creation, enhancement or restoration of parks, habitat or wetlands; improved public access to waterways; enhanced or new recreational

7 -- Community support will be gauged at the time of report writing by interviewing project proponents. Community support is subject to change over time.

Section 3 – Potential Stormwater Harvesting and Recharge Sites

This section describes the rationale and process of selecting eight sites for potential stormwater harvesting/recharge projects in the Six Basins. The selected sites are evaluated for recharge performance and cost in Section 4.

3.1 Selection of Pedley, SASG, and Fairplex as Potential Recharge Sites

As part of the Strategic Plan, the Six Basins parties identified projects to enhance stormwater recharge within the Six Basins. These projects include:

- Enhance stormwater recharge at the San Antonio Spreading Grounds (SASG).
- Enhance stormwater recharge at the Thompson Creek Spreading Grounds.
- Enhance stormwater recharge at the Pedley Spreading Grounds (Pedley).
- Recharge stormwater and supplemental water at the LA County Fairplex (Fairplex).

The SASG, Pedley, and Fairplex sites were evaluated in this study because they were identified as stormwater harvesting/recharge opportunities in the Strategic Plan. The Thompson Creek Spreading Grounds were excluded from this study: projects at this site will not contribute to MS4 permit compliance due to the limited urbanized area tributary to it.

Pedley and SASG have existing stormwater recharge operations, but the source of stormwater is San Antonio Canyon (i.e. mountain-front runoff). The recharge projects to be explored and characterized at Pedley and SASG are concepts to divert and recharge stormwater runoff from urbanized areas that could be tributary to these sites. These projects represent new stormwater recharge that currently exits the Six Basins in flood-control channels.

3.2 Selection of MS4 Recharge Sites

Five additional recharge sites were selected in the LA County portion of the Six Basins (MS4 recharge sites) using the selection criteria described in Section 2.1. MS4 recharge sites are defined herein as sites that have urbanized tributary areas, and hence, harvesting/recharge of stormwater runoff from these tributary areas will contribute to MS4 permit compliance. A multistep process was devised to first identify the universe of MS4 recharge sites and then rank them to select the top five sites. Table 3-1 lists the geographic information system (GIS) layers that were collected and compiled to help perform site selection.

3.2.1 Identifying the Universe of Potential MS4 Recharge Sites

A GIS layer of approximately 19,900 land parcels within the Six Basins was obtained from LA County. The pass/fail criteria in Section 2.1 were applied to the land parcel information and the other GIS layers in Table 3-1 to identify the universe of potential MS4 recharge sites. The following additional considerations were made in executing the pass/fail criteria:

- Parcels smaller than two acres passed the analysis if the parcel could be combined with an adjacent parcel(s) of the same ownership into a single site that totaled more than two acres.
- For areas where the National Resources Conservation Service (NRCS) soil group was not rated or unavailable, hydrologic soil groups were interpolated using the LA County Hydrology Manual's soil classification data.
- Parcels with multiple soil types present were assumed to have the least favorable soil type for infiltration.
- Areas within LA County's Frank G. Bonelli Regional Park and Brackett Field failed the analysis due to current shallow groundwater east of Puddingstone Reservoir. However, these parcels passed based on their large site areas as well as their close proximity to the City of Pomona's recycled water distribution system. Proximity to the recycled water distribution system enables recycled water recharge at a facility if and when permitted. LA County has been approached by the ESGV Watershed Management Group and is considering projects at these sites.

The pass/fail analysis resulted in the identification of approximately 55 potential MS4 recharge sites, comprising 96 parcels. Figure 3-1 shows the locations of the potential MS4 recharge sites. Table 3-2 lists the sites by name, assessor parcel numbers (APN), parcel sizes, and site owner.

3.2.2 Ranking the Universe of Potential MS4 Sites

The 55 potential MS4 recharge sites were assigned weights and ranking values according to the criteria defined in Section 2.1. The 55 sites were then grouped by the underlying Six Basins subbasin and ranked according to a weighted average of the criteria scores. The following considerations were made in executing the ranking:

- The distances to storm sewers were evaluated by site and not by parcel. For distance to storm sewer, the site was assigned a ranking score based on the nearest storm sewer to the site boundary.
- The Frank G. Bonelli Regional Park and Brackett Field parcels that overlie current shallow groundwater (<40 feet [ft]) were assigned a score of zero for the depth to historical shallowest groundwater ranking criteria as they did not pass the current thickness pass/fail criteria.[3]
- Because both the Frank G. Bonelli Regional Park and Brackett Field sites did not pass the pass/fail criteria, they were considered the lowest ranked sites for their corresponding subbasin.

Table 3-2 shows the results of each ranking criterion and the total rank score for each site. In cases where sites resulted in the same total rank score, the site with the larger area received a higher rank. Figure 3-1 shows the top five ranked sites within each subbasin. Figures 3-2a

[3] If selected for further evaluation, testing is recommended to verify depth to groundwater at these sites. Pursuant to the LA County NPDES Permit No. CA S004001 Section VI.D.7.c.ii, a project is considered technically infeasible in areas where seasonal high groundwater is within 10 feet below ground surface.

through Figure 3-2c show the sites and rankings at smaller scale with an air photo background to display current land use.

3.2.3 MS4 recharge Site Selection

A draft version of Section 3 (this section) was presented at the June 26, 2019 Board meeting to obtain stakeholder feedback and suggested revisions. At the July 24, 2019 Board meeting, WEI and Stantec presented twelve sites and asked the Board to rank them to select up to five sites to evaluate in this study. Staff received comments and suggested ranking from the Board and, based on this feedback, recommended the following seven sites (by Site ID and name):

- UCH-01, Rancho Santa Ana Botanical Gardens
- UCH-01, La Puerta Sports Park
- P-25, Brackett Field
- G-02, Las Flores Park
- P-05, Harvey Mudd/ Pitzer/ Scripps Colleges
- LO-01, Lutheran High School
- LCH-02, Alexander Hughes Community Center and Lewis Park

These seven sites were reduced to five sites after the water sources and availability were characterized, as discussed in Section 4.

In addition to these seven MS4 recharge sites, the SASG, Pedley, and Fairplex sites were evaluated in this study because they were identified as stormwater recharge opportunities in the Strategic Plan.

Table 3-1
GIS Data Collected

Data Layer	Source	Additional Site Information Collected
Parcels	LA County, 2016	Ownership, size
Elevation Contours	Cities of Claremont, La Verne, Pomona	Slope
Soil Survey	NRCS, LA County[1]	Hydraulic soil groups
Historical High Groundwater Areas	Six Basins Watermaster	---
Current Thickness of Unsaturated Zone	Six Basins Watermaster	---
Wells	Six Basins Watermaster	Proximity to active wells
Geotracker	California State Water Resources Control Board	Location of cleanup sites
Storm Sewer	LA County, Cities of La Verne and Pomona	Proximity to infrastructure
Historical Shallowest Groundwater Areas	Six Basins Watermaster	---
Percent Impervious	LA County Watershed Management Modeling System (WMMS), 2013	---

[1]For areas where the NRCS soil group was not rated or not available, the Hydraulic Soil Group was interpolated using the LA County Hydrology Manual's soil classification data from 2004.

Table 3-2
Universe of Potential Stormwater Harvesting and Recharge Sites

APN	Parcel Size[1] (acres)	Owner	Site Name	Ranking Criteria						Weights & Rankings							Rank Score by Site	Overall Rank by Site	Sub-basin Rank[5]
										2	2	2	2	1	1				
				Ownership Type	Hydrologic Soil Group[2]	Site Size (acres)	Distance from Storm Sewer[3] (feet)	Depth to historical shallowest groundwater (feet)	% Imper-viousness[4]	Ownership Type	Hydrologic Soil Group	Site Size	Distance from Storm Sewer	Depth to historical shallowest ground-water	% Imper-viousness	Rank Score by Parcel			
Ganesha Basin																			
8381-036-907	6.0	La Verne	Wheeler Avenue Park	Six Basins	C	6.0	0-200	50-100	0-10	10	2	4	10	3	5	34	34	31	G-01
8375-020-905	16.3	La Verne	Las Flores Park	Six Basins	C	16.3	0-200	50-100	51-90	10	2	6	10	3	1	32	32	36	G-02
8381-018-900	2.4	La Verne	Kuns Park	Six Basins	C	2.4	0-200	50-100	0-10	10	2	2	10	3	5	32	32	36	G-03
8375-023-902	38.4	Public Schools	Bonita High School	Public	C	38.4	0-200	50-100	51-90	6	2	8	10	3	1	30	30	40	G-04
8381-006-908	17.2	Government	Metropolitan Water District	Public	C	26.5	0-200	50-100	91-100	6	2	8	10	3	0	29	29	47	G-05
8381-006-909	9.3				C		0-200	50-100	91-100	6	2	8	10	3	0	29			
8381-036-029	24.9	Private	Damien High School	Potential Partners	C	24.9	0-200	50-100	51-90	2	2	8	10	3	1	26	26	49	G-06
8375-018-900	7.2	Public Schools	Roynon (J Marion) Elementary School	Public	C	7.2	0-200	50-100	51-90	6	2	4	10	3	1	26	26	49	G-07
8375-020-903	3.2	Public Schools	Unknown (8375020903)	Public	C	3.2	0-200	50-100	91-100	6	2	2	10	3	0	23	23	54	G-08
8378-022-909	58.8	LA County	Frank G Bonelli Regional Park[6]	Public	B	62.1	0-200	50-100	11-50	6	6	10	10	0	3	35	35	30	G-09
8378-022-900	2.0				B		0-200	50-100	51-90	6	6	10	10	0	1	33			
8378-021-904	1.0				B		0-200	50-100	91-100	6	6	10	10	0	0	32			
8378-022-901	0.2				B		0-200	50-100	91-100	6	6	10	10	0	0	32			
Live Oak Basin																			
8666-018-009	9.2	Private	Lutheran High School	Potential Partners	A	9.2	0-200	50-100	51-90	2	10	4	10	3	1	30	30	44	LO-01
8381-009-903	6.9	Public Schools	Miller (Grace) Elementary School	Public	C	6.9	0-200	50-100	51-90	6	2	4	10	3	1	26	26	49	LO-02
Pomona Basin																			
8314-001-006	85.9	Pomona College	Pomona College	Six Basins	A	85.9	0-200	>100	51-90	10	10	10	10	5	1	46	46	1	P-01
8366-017-900	19.3	Pomona	Palomares Park	Six Basins	A	19.3	0-200	>100	11-50	10	10	6	10	5	3	44	44	4	P-02
8308-020-080	30.6	Claremont University Consortium	Pitzer College - Site 2	Six Basins	A	30.6	0-200	>100	91-100	10	10	8	10	5	0	43	43	7	P-03
8308-014-020	27.7	Claremont University Consortium	Scripps College - Site 2	Six Basins	A	27.7	0-200	>100	91-100	10	10	8	10	5	0	43	43	7	P-04
8306-008-072	12.2	Claremont University Consortium	Harvey Mudd College - Site 1	Six Basins	A	12.2	200-500	>100	0-10	10	10	6	6	5	5	42	42	10	P-05
8308-020-078	11.4	Claremont University Consortium	Harvey Mudd College - Site 2	Six Basins	A	11.4	0-200	>100	51-90	10	10	6	10	5	1	42	42	10	P-06
8311-012-900	22.2	Public Schools	El Roble Middle School	Public	A	22.2	0-200	>100	51-90	6	10	8	10	5	1	40	40	16	P-07
8365-012-900	21.9	Public Schools	Palomares Middle School	Public	A	21.9	0-200	50-100	11-50	6	10	8	10	3	3	40	40	16	P-08
8311-008-900	12.0	Public Schools	Mountain View (Remote) Elementary School	Public	A	12.0	0-200	>100	51-90	6	10	6	10	5	1	38	38	20	P-09
8308-025-013	22.8	Private	Claremont McKenna College	Potential Partners	A	22.8	0-200	>100	51-90	2	10	8	10	5	1	36	36	24	P-10
8306-008-073	11.3	Claremont University Consortium	Scripps College - Site 1	Six Basins	A	11.3	0-200	50-100	0-10	2	10	6	10	3	5	36	36	24	P-11
8367-022-904	8.9	Public Schools	Harrison Elementary School	Public	A	8.9	0-200	>100	51-90	6	10	4	10	5	1	36	36	24	P-12
8316-011-900	6.6	Claremont	Wheeler Park	Six Basins	A	6.6	200-500	>100	51-90	10	10	4	6	5	1	36	36	24	P-13
8313-026-900	5.9	Public Schools	Oakmont Elementary School	Public	A	5.9	0-200	>100	51-90	6	10	4	10	5	1	36	36	24	P-14
8367-012-900	4.2	Pomona	Willie White Park (Harrison Park)	Six Basins	A	4.2	>500	>100	0-10	10	10	2	2	5	5	34	34	31	P-15
8313-001-188	3.2	Private	Unknown (8313001188)	Potential Partners	A	3.2	0-200	>100	0-10	2	10	2	10	5	5	34	34	31	P-16
8366-013-030	2.9	Private	Unknown (8366013030)	Potential Partners	A	2.9	200-500	>100	0-10	2	10	2	6	5	5	30	30	40	P-17
8366-015-030	2.8	Private	Unknown (8366015030)	Potential Partners	A	2.8	200-500	>100	0-10	2	10	2	6	5	5	30	30	40	P-18

Table 3-2
Universe of Potential Stormwater Harvesting and Recharge Sites

APN	Parcel Size[1] (acres)	Owner	Site Name	Ranking Criteria						Weights & Rankings							Rank Score by Site	Overall Rank by Site	Sub-basin Rank[5]
										2	2	2	2	1	1				
				Ownership Type	Hydrologic Soil Group[2]	Site Size (acres)	Distance from Storm Sewer[3] (feet)	Depth to historical shallowest groundwater (feet)	% Imper-viousness[4]	Ownership Type	Hydrologic Soil Group	Site Size	Distance from Storm Sewer	Depth to historical shallowest ground-water	% Imper-viousness	Rank Score by Parcel			
8309-016-902	4.8	Public Schools	Sycamore Elementary School	Public	A	4.8	0-200	<40	51-90	6	10	2	10	0	1	29	29	45	P-19
8313-007-063	14.5	Private	Unknown (8313007063)	Potential Partners	A	14.5	200-500	>100	91-100	2	10	6	6	5	0	29	29	45	P-20
8307-021-008	3.2		Bestpack Investments LLC		A		>500	>100	0-10	2	10	6	2	5	5	30			
8307-021-007	3.4	Private	CBM Investments Inc	Potential Partners	A	17.4	>500	>100	0-10	2	10	6	2	5	5	30	32	39	P-21
8307-021-006	2.9				A		>500	>100	0-10	2	10	6	2	5	5	30			
8307-003-066	7.9		Clare Properties LLC		A		200-500	>100	0-10	2	10	6	6	5	5	34			
8316-011-901	6.1	Public Schools	Vista del Valle Elementary School	Public	A	6.1	>500	>100	51-90	6	10	4	2	5	1	28	28	48	P-22
8371-004-907	3.1	La Verne	Unknown (8371004907)	Six Basins	C	3.1	200-500	>100	91-100	10	2	2	6	5	0	25	25	52	P-23
8313-008-004	2.5				A		>500	>100	91-100	2	10	2	2	5	0	21			
8313-008-025	1.2				A		200-500	>100	91-100	2	10	2	6	5	0	25			
8313-008-026	0.8	Private	Hibbard Properties LLC	Potential Partners	A	5.1	>500	>100	91-100	2	10	2	2	5	0	21	22	55	P-24
8313-008-024	0.5				A		200-500	>100	91-100	2	10	2	6	5	0	25			
8313-008-006	0.2				A		>500	>100	11-50	2	10	2	2	5	3	24			
8378-021-909	164.0				B		0-200	50-100	91-100	6	6	10	10	0	0	32			
8378-022-910	60.9	LA County	Brackett Field[6]	Public	B	237.0	0-200	40-50	91-100	6	6	10	10	1	0	33	32	35	P-25
8378-021-908	8.8				B		0-200	50-100	91-100	6	6	10	10	0	0	32			
8378-022-911	3.3				B		0-200	50-100	91-100	6	6	10	10	3	0	35			
Canyon Basin																			
8673-030-900	22.7	Claremont	Padua Avenue Park	Six Basins	A	23.90	0-200	>100	11-50	10	10	8	10	5	3	46	46	2	C-01
8673-033-900	1.2				A		200-500	>100	11-50	10	10	8	10	5	3	46			
8670-002-902	4.3				A		0-200	>100	0-10	10	10	2	10	5	5	42			
8670-030-900	0.2	Claremont	Higginbotham Park	Six Basins	A	4.73	0-200	>100	11-50	10	10	2	10	5	3	40	42	15	C-02
8670-031-900	0.2				A		200-500	>100	11-50	10	10	2	10	5	3	40			
8670-002-928	0.0				A		>500	>100	0-10	10	10	2	10	5	5	42			
8673-022-902	2.2	Claremont	Unknown (8673022902)	Six Basins	A	2.17	>500	>100	0-10	10	10	2	2	5	5	34	34	31	C-03
Lower Claremont Heights Basin																			
8305-017-902	9.0				A		0-200	50-100	11-50	10	10	6	10	3	3	42			
8305-017-901	8.5	Claremont	Cahuilla Park	Six Basins	A	17.75	0-200	50-100	11-50	10	10	6	10	3	3	42	42	9	LCH-01
8305-017-903	0.3				A		>500	50-100	0-10	10	10	6	10	3	5	44			
8303-008-902	2.3	Claremont	Alexander Hughes Community Center & Lewis Park	Six Basins	A	11.24	0-200	>100	0-10	10	10	4	10	5	5	44	39	19	LCH-02
8303-008-900	9.0				A		0-200	50-100	51-90	10	10	4	10	3	1	38			
8305-017-906	37.7	Public Schools	Claremont High School	Public	A	37.68	0-200	50-100	51-90	6	10	8	10	3	1	38	38	20	LCH-03
8304-005-901	9.4	Claremont	Griffith Park	Six Basins	A	9.45	200-500	50-100	0-10	10	10	4	6	3	5	38	38	20	LCH-04
8304-004-900	9.5	Public Schools	Sumner Elementary School	Public	A	9.53	200-500	>100	51-90	6	10	4	6	5	1	32	32	36	LCH-05
8305-008-900	9.0	Public Schools	Condit (Eleanor Daly) Elementary School	Public	A	9.02	200-500	50-100	51-90	6	10	4	6	3	1	30	30	40	LCH-06

Table 3-2
Universe of Potential Stormwater Harvesting and Recharge Sites

APN	Parcel Size[1] (acres)	Owner	Site Name	Ranking Criteria						Weights & Rankings							Rank Score by Site	Overall Rank by Site	Sub-basin Rank[5]
										2	2	2	2	1	1				
				Ownership Type	Hydrologic Soil Group[2]	Site Size (acres)	Distance from Storm Sewer[3] (feet)	Depth to historical shallowest groundwater (feet)	% Imper-viousness[4]	Ownership Type	Hydrologic Soil Group	Site Size	Distance from Storm Sewer	Depth to historical shallowest ground-water	% Imper-viousness	Rank Score by Parcel			
Upper Claremont Heights Basin																			
8306-008-060	49.6	Claremont University Consortium / Claremont Colleges Inc / Claremont Graduate Univerity	Rancho Santa Ana Botanic Garden	Six Basins	C	177.06	0-200	>100	11-50	10	2	10	10	5	3	40	45	3	UCH-01
8306-008-054	37.1				A		>500	>100	0-10	10	10	10	10	5	5	50			
8306-008-038	29.2				C		>500	>100	0-10	10	2	10	10	5	5	42			
8306-008-020	17.8				A		0-200	50-100	0-10	10	10	10	10	3	5	48			
8306-008-037	10.1				C		>500	>100	0-10	10	2	10	10	5	5	42			
8306-008-050	8.9				A		>500	>100	0-10	10	10	10	10	5	5	50			
8306-008-074	5.3				A		>500	50-100	0-10	10	10	10	10	3	5	48			
8306-008-022	4.4				A		0-200	50-100	0-10	10	10	10	10	3	5	48			
8306-008-069	3.9				A		>500	50-100	0-10	10	10	10	10	3	5	48			
8306-008-023	3.0				A		0-200	50-100	0-10	10	10	10	10	3	5	48			
8306-008-052	2.0				A		>500	50-100	11-50	10	10	10	10	3	3	46			
8306-007-060	1.6				A		>500	>100	0-10	10	10	10	10	5	5	50			
8306-008-066	1.1				A		>500	50-100	0-10	10	10	10	10	3	5	48			
8306-008-063	1.1				A		0-200	50-100	0-10	10	10	10	10	3	5	48			
8306-008-065	1.0				A		>500	50-100	0-10	10	10	10	10	3	5	48			
8306-008-001	1.0				A		>500	>100	11-50	10	10	10	10	5	3	48			
8670-003-900	18.7	Claremont	La Puerta Sports Park	Six Basins	A	18.72	0-200	>100	11-50	10	10	6	10	5	3	44	44	4	UCH-02
8671-005-901	5.5	Claremont	June Vail Park	Six Basins	A	6.14	0-200	>100	0-10	10	10	4	10	5	5	44	44	4	UCH-03
8671-005-902	0.7				A		200-500	>100	0-10	10	10	4	10	5	5	44			
8671-031-900	1.0	Claremont	Jaeger Park	Six Basins	A	3.56	0-200	>100	0-10	10	10	2	10	5	5	42	42	10	UCH-04
8671-030-900	0.9				A		0-200	>100	0-10	10	10	2	10	5	5	42			
8671-031-901	0.8				A		0-200	>100	0-10	10	10	2	10	5	5	42			
8671-031-902	0.8				A		0-200	>100	0-10	10	10	2	10	5	5	42			
8307-001-800	5.9	Golden State Water Company	Southern California Water Co - Site 1	Six Basins	A	5.91	0-200	50-100	0-10	10	10	4	10	3	5	42	42	10	UCH-05
8306-007-904	2.5	Claremont	Chaparral Park	Six Basins	A	2.51	0-200	>100	0-10	10	10	2	10	5	5	42	42	10	UCH-06
8306-008-071	11.9	Claremont University Consortium	Pitzer College - Site 1	Six Basins	A	11.90	200-500	>100	11-50	10	10	6	6	5	3	40	40	16	UCH-07
8670-010-800	3.1	Golden State Water Company	Southern California Water Co - Site 2	Six Basins	A	3.14	0-200	>100	91-100	10	10	2	10	5	0	37	37	23	UCH-08
8306-007-905	9.1	Public Schools	Chaparral Elementary School	Public	A	9.09	0-200	>100	51-90	6	10	4	10	5	1	36	36	24	UCH-09
8670-009-017	2.2	Private	Unknown (8670009010 & 8670009017)	Potential Partners	A	3.84	200-500	50-100	51-90	2	10	2	6	3	1	24	24	53	UCH-10
8670-009-010	1.6				A		200-500	50-100	91-100	2	10	2	6	3	0	23			

[1] Parcels less than 2 acres were retained when the sum of all parcels belonging to the same site totalled more than 2 acres.

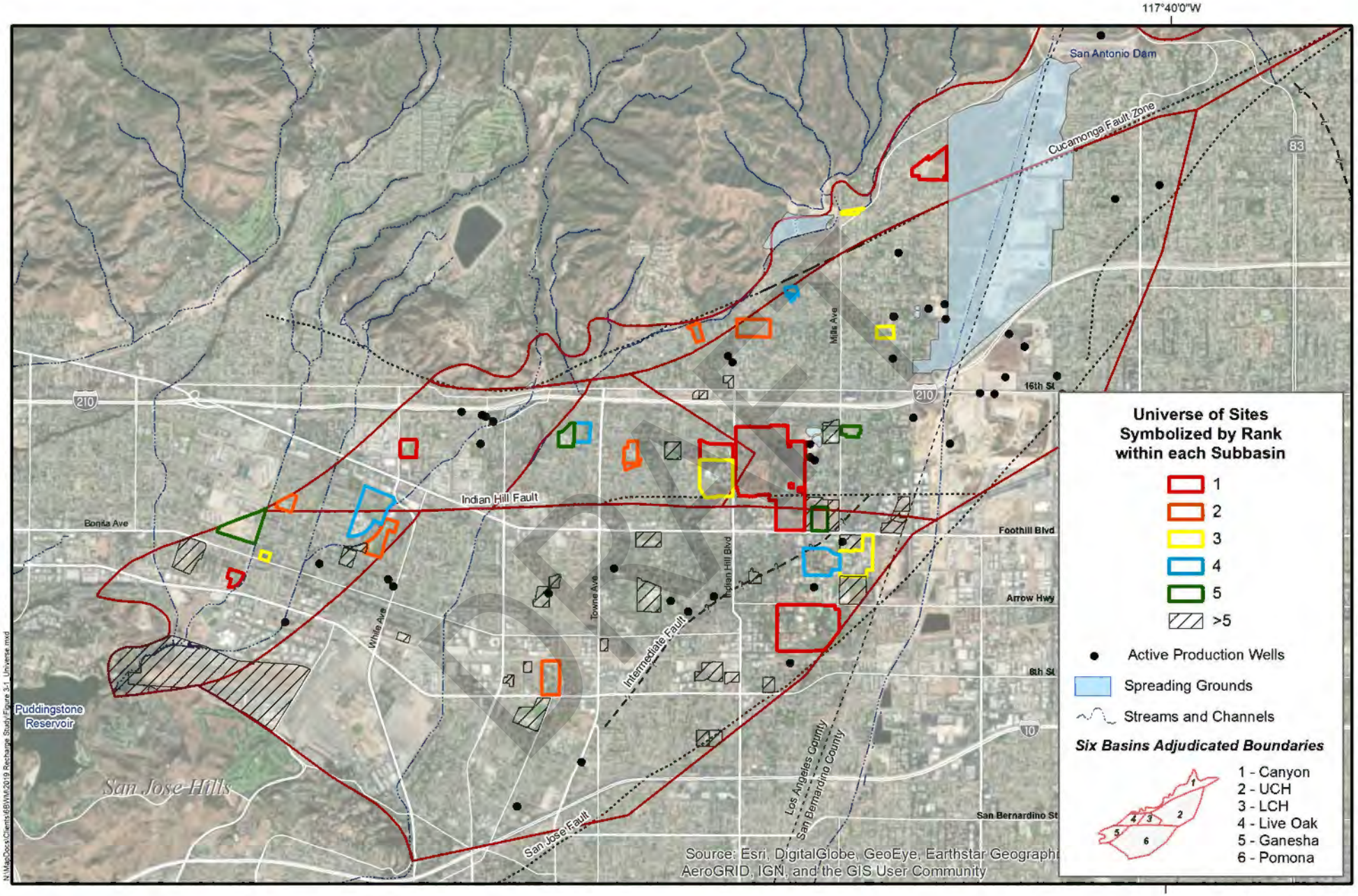
[2] Where areas have multiple soil types, the less desirable soil type is assumed for the site.

[3] The most favorable storm sewer proximity buffer distance was selected.

[4] % Impervious was collected from 2013 LA County WMMS data and adjusted through aerial analysis to reflect current conditions.

[5] Sites were ranked according to the subbasin in which the majority of the overall site area exists.

6. This site failed the pass/fail criteria, "The current thickness of the unsaturated zone underlying the site must be at least 50 feet." It has been included herein due to consideration of this site by LA County for MS4 projects. It has been assigned the lowest ranking due to the pass/fail criteria.



Produced by:

WEI
Wildermuth Environmental, Inc.

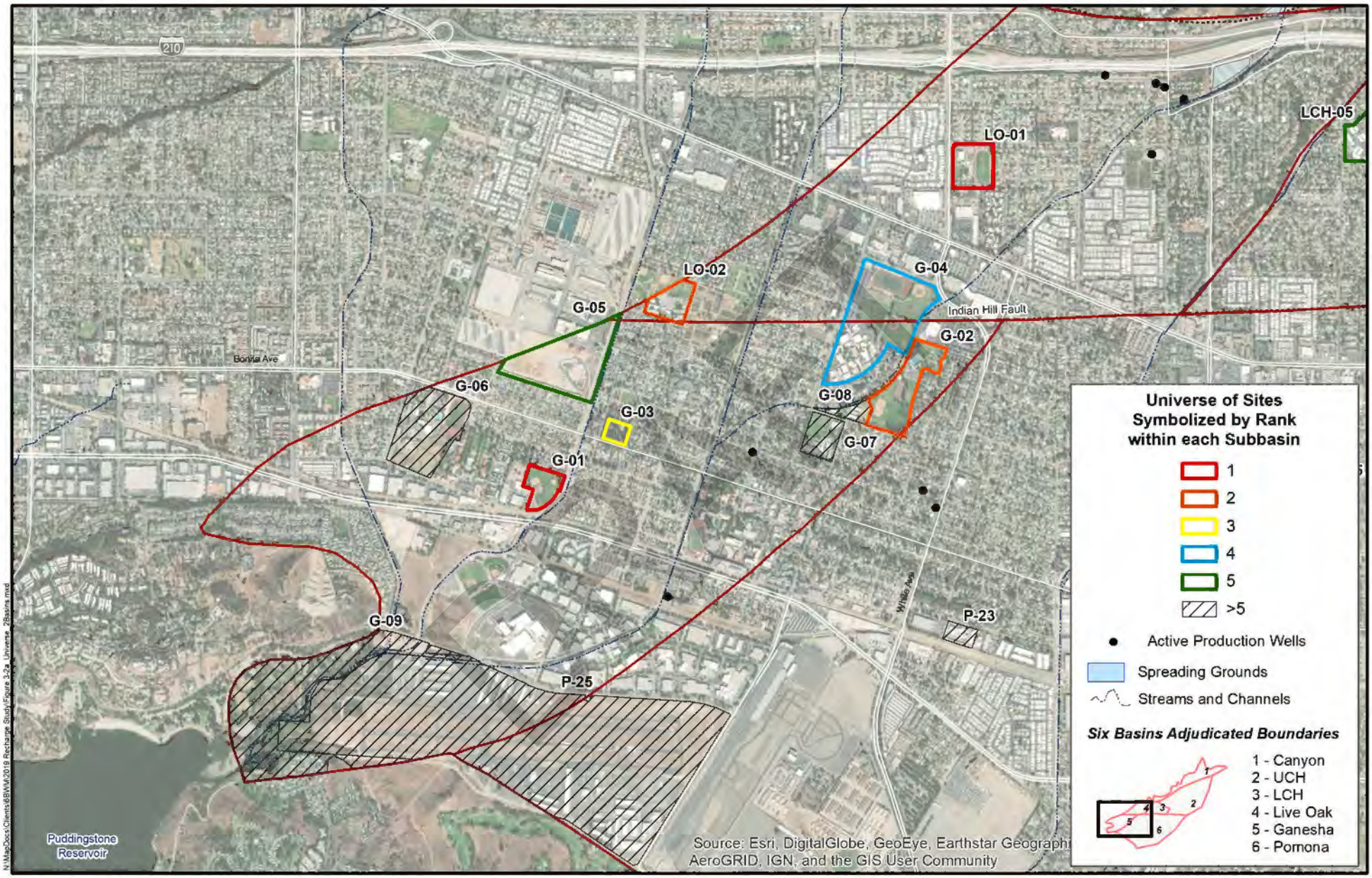
Author: CS
Date: 20190620

0 0.5 1 Miles
0 1 2 Kilometers

Universe of Potential Stormwater Harvesting and Recharge Sites

LA County Portion of the Six Basins

Figure 3-1



Produced by:

WEI
Wildermuth Environmental, Inc.

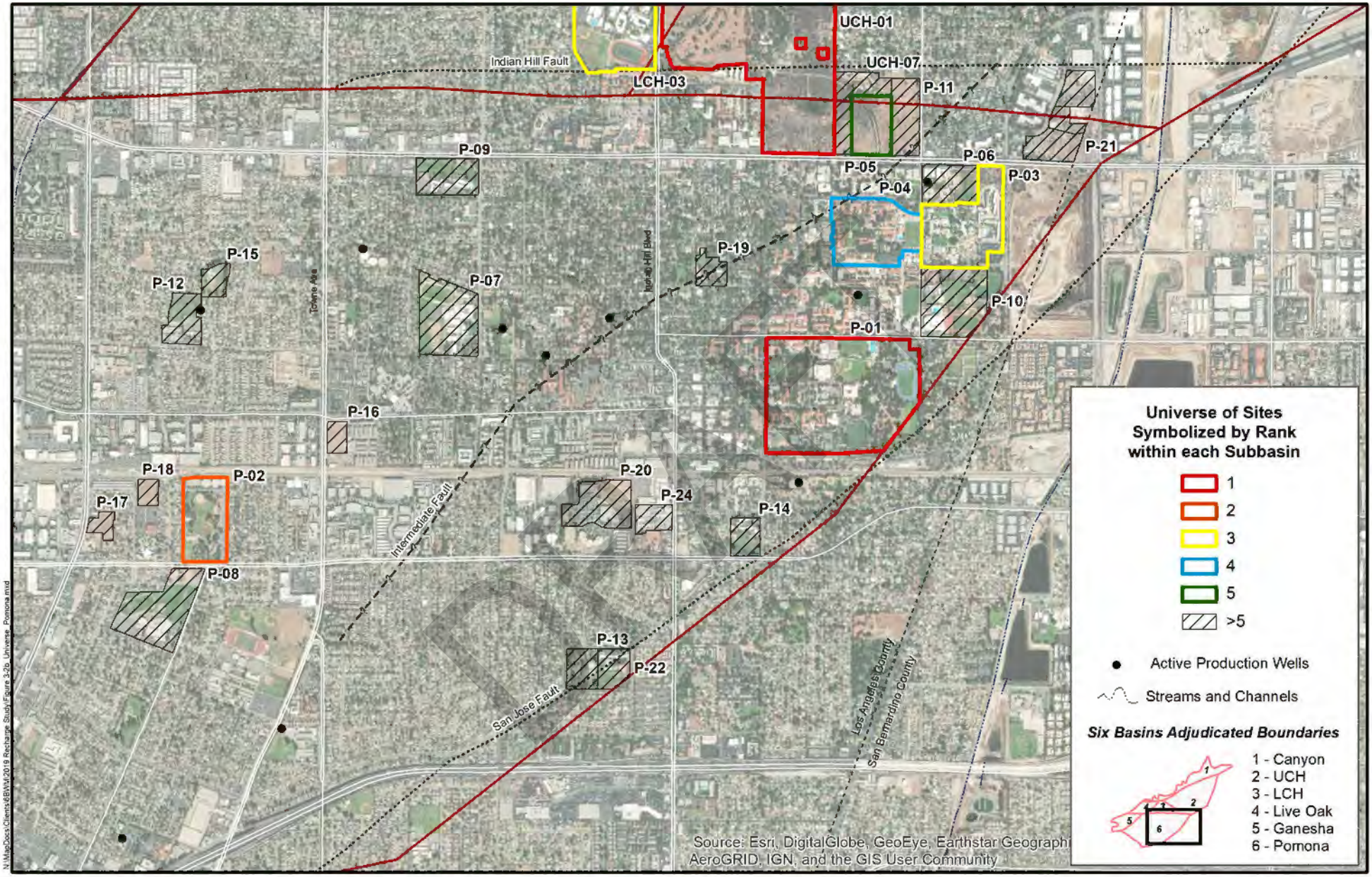
Author: CS
Date: 20190620

0 1,000 2,000 Feet
0 0.5 1 Kilometers

Universe of Potential Stormwater Harvesting and Recharge Sites

Two Basins

Figure 3-2a



Produced by:

WEI
Wildermuth Environmental, Inc.

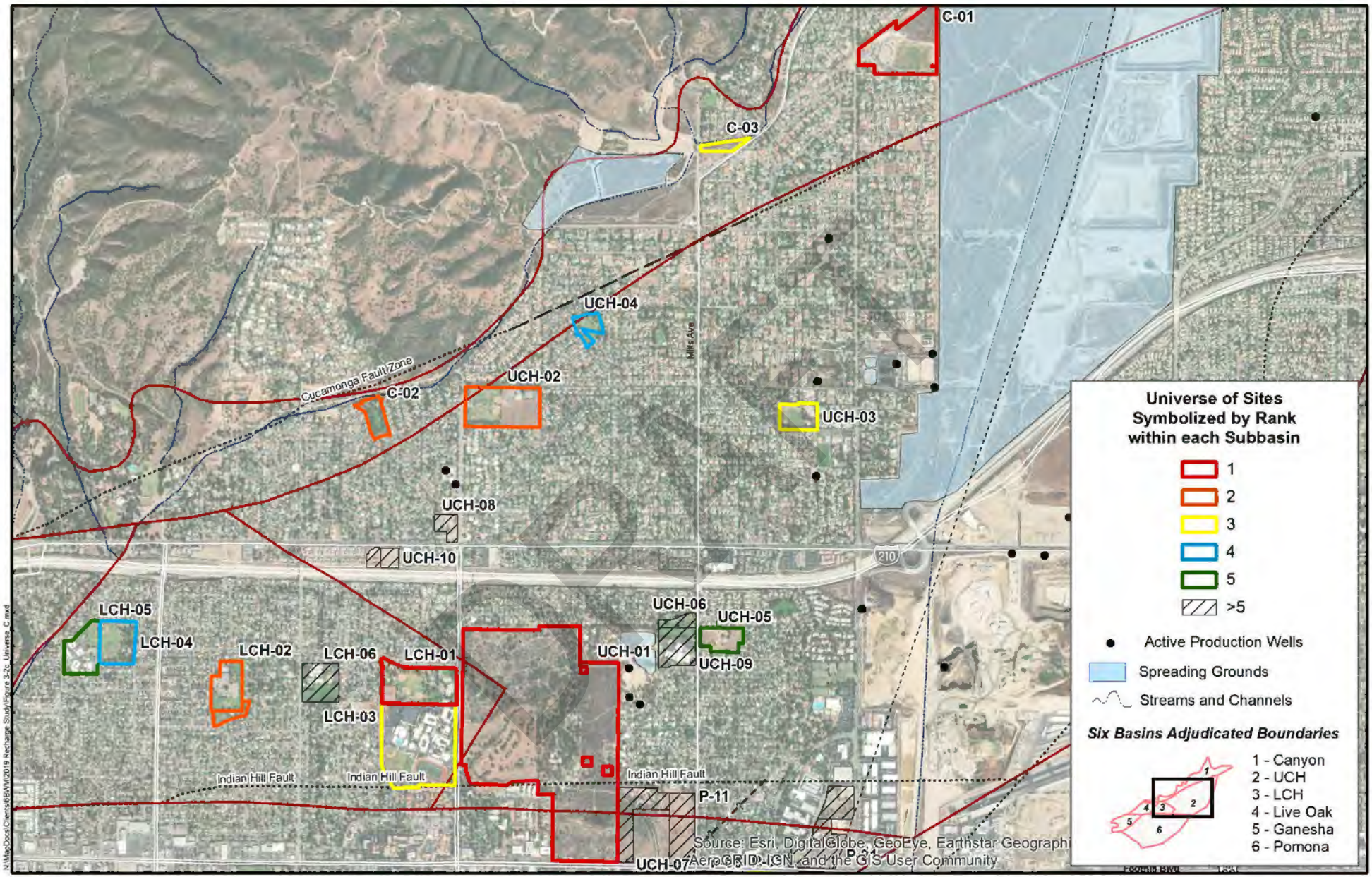
Author: CS
Date: 20190620

0 1,000 2,000 Feet
0 0.5 1 Kilometers

Universe of Potential Stormwater Harvesting and Recharge Sites

Pomona Basin

Figure 3-2b



Produced by:

WEI
Wildermuth Environmental, Inc.

Author: CS

Date: 20190620

0 1,000 2,000 Feet

0 0.5 1 Kilometers

Universe of Potential Stormwater Harvesting and Recharge Sites

Canyon, Upper and Lower Claremont Heights Basins

Figure 3-2c

Section 4 – Description and Performance of Potential Stormwater Harvesting and Recharge

This section describes the expected recharge performance and associated cost to construct and operate the stormwater harvesting/recharge projects at the sites identified in Section 3.

4.1 Characterize Availability of Water Sources for Recharge

The source waters available for artificial recharge within the Six Basins include stormwater, dry-weather flow, recycled water, and importer water.

First, the quantities and seasonal availability of stormwater and dry weather flow for recharge at the selected sites were described. This characterization provided the basis for the reconnaissance-level engineering design and operation of the proposed diversion and recharge facilities. For example, the quantity of stormwater availability can be used to design the diversion and recharge facilities with the appropriate capacity to capture and recharge all or a percentage of the available stormwater.

The recharge of imported and recycled waters is not the primary subject of this study, but these are potential supplemental water supplies that could augment recharge during periods when stormwater and dry-weather runoff do not occupy the recharge facilities. The existing infrastructure that can be used for supplemental water recharge is described at the end of this section.

4.1.1 Stormwater Availability

There are opportunities to divert stormwater runoff to constructed recharge facilities for percolation to groundwater and thereby increase the yield of the Six Basins and help comply with MS4 regulations. Figure 4-1 shows the watershed boundaries for stormwater runoff that is tributary to the Six Basins and the proposed recharge sites selected in Section 3.

The R4 Model (Rainfall, Runoff, Router, and Root Zone), a hydrologic simulation tool developed by WEI to estimate surface-water recharge to the Six Basins for the Strategic Plan, was used to estimate stormwater runoff from the urbanized areas of the Six Basins. The Runoff Module used a historical daily precipitation record, evapotranspiration data, hydrologic soil types, and land use data to calculate the amount of daily runoff. The Router Module used information from the Runoff Module to estimate the rate of stormwater flow at specific points of interest throughout the flood-control network of channels and storm drains.

Table 4-1 shows the average monthly volumes of stormwater that flow past each of the selected sites. Note the seasonal variability with the lowest flows in the summer months and the highest flows in the winter months.

The following estimates were made in Table 4-1:

1. The stormwater volumes that flow past each site assuming no to minimal changes to the stormwater drainage system.

2. The stormwater volumes that flow past each site assuming some changes to the drainage system to capture runoff from additional areas that are currently not tributary to the site. This was deemed possible for six of the ten sites.

3. The stormwater volumes that flow past each site if diversions can occur from receiving waters (i.e. Thompson Creek and Live Oak Wash). This analysis was conducted for La Puerta Sports Park (UCH-02) and the Fairplex due to their proximity to Thompson Creek and for Brackett Field (P-25) and Las Flores Park (G-02) due to their proximity to Live Oak Wash. The diversion of water from receiving waters, such as Thompson Creek and Live Oak Wash, which are considered waters of the U.S., would increase the availability of water at the sites and increase the potential for recharge. On the other hand, it would require significant permitting, including a Section 401 Water Quality Certification, Section 404 Army Corps of Engineers Permit, and U.S. Fish and Wildlife Streambed Alteration Permit. In addition to permit requirements, in order to comply with MS4, treatment of runoff must occur prior to the discharge of runoff into receiving waters.[4] Pursuant to the ESGV Watershed Management Plan (WMP), compliance will be determined on a sub-watershed by sub-watershed basis, based on the BMP capacity implemented. If the design storm volume is retained prior to discharge from a sub-watershed to receiving waters, then that sub-watershed area is in compliance with the receiving water limitations (RWLs) and water-quality-based effluent limitations (WQBELs) of the MS4 Permit regulated by the Los Angeles Regional Water Quality Control Board. By diverting water from receiving waters, a prospective project would not comply with federal regulations and the ESGV WMP and therefore will not achieve the required compliance credits set in the WMP.

4.1.2 Dry Weather Flow

Dry-weather flow in the Six Basins is urban runoff. Currently, urban runoff enters concrete-lined flood-control channels and exits the basin. Diverting these dry-weather flows and putting them to beneficial use through groundwater recharge will enhance the yield of the basin. The volume of dry weather flow was estimated based on research performed by the Southern California Coastal Water Research Project (2005). Table 4-2 shows the average annual dry-weather flow that is available at each site.

4.1.3 Imported Water

Imported water is available to the Six Basins parties from the Three Valleys Municipal Water District (TVMWD) and the Inland Empire Utilities Agency (IEUA); both are member agencies of the Metropolitan Water District of Southern California. Figure 4-2 shows the imported water infrastructure in the Six Basins. The site that could potentially receive imported water directly from the TVMWD distribution system with existing infrastructure is the La Puerta Sports Park (UCH-02). Additionally, sites that could receive water from Thompson Creek, Live Oak Creek, and San Antonio Creek have the potential to receive imported water through existing

[4] Pursuant to 40 Code of Federal Regulations (CFR) 131.10(a), diversions from receiving waters are currently not allowed. If regulations change in the future such that diversions to achieve MS4 compliance are allowable, coordination with and approval from the system owner will be required.

infrastructure if the imported water is discharged to the creeks and diverted to the sites. The remaining sites would require capital improvements for conveyance.

4.1.4 Recycled Water

Domestic and commercial wastewater originating in the Six Basins is treated by the Los Angeles County Sanitation Districts (LACSD) at the San Jose Creek Water Reclamation Plan (WRP) for the City of La Verne and at the Pomona WRP for the Cities of Pomona and Claremont and part of La Verne, and by the IEUA at Regional Plant #1 for the City of Upland. Recycled water from the Pomona WRP is an available supply source for the Six Basins. Based on existing agreements, the amount of recycled water available to the City of Pomona from the Pomona WRP is about 6,720 acre-feet per year (afy). The City of Pomona's recycled water distribution system extends to the southern portion of the Six Basins. Figure 4-2 shows the recycled water infrastructure in the Six Basins. The sites that could potentially receive recycled water with existing infrastructure are Brackett Field (P-25) and the Fairplex. The remaining sites would require capital improvements for conveyance.

4.2 Reconnaissance-level Engineering Design and Cost Estimates

Based on the site-selection process described in Section 3, the water availability characterized in Section 4.1, and input from the stakeholders, the seven MS4 sites shown in Table 4-1 (sites with Site ID) were narrowed down to five sites for further evaluation. Harvey Mudd/Pitzer/Scripps Colleges (P-05) was removed based on the future use of the site as an expansion to the existing Colleges, and Alexander Hughes Community Center and Lewis Part (LCH-02) was removed due to its small drainage area compared to the other Upper Claremont Heights Basins sites (UCH-01 and -02). Figure 4-3 shows the location of the eight selected sites.

Reconnaissance-level engineering designs were developed for prospective recharge facilities at the eight sites. The reconnaissance-level engineering designs were used to (1) develop Class-5[5] cost opinions for the construction and operations and maintenance (O&M) of each facility, (2) help characterize the recharge benefit of each facility, and (3) help characterize the water quality benefit pursuant to the MS4 permit. The stormwater-recharge and water-quality benefits are based on the Safe Clean Water Module that uses the LA County's Watershed Management Modeling System (WMMS). Appendix A includes the detailed designs, itemized cost-opinions, and stormwater-recharge and water-quality benefits for each of the eight sites. Each facility is summarized below:

- The **Las Flores Park Stormwater Infiltration Project** would be located at Las Flores Park, which is owned by the City of La Verne. The proposed project is to install an underground, double layer infiltration gallery within a 1.3-acre area of the existing southernmost sports field to infiltrate flows from a 127.9-acre drainage area. Based on the saturated hydraulic conductivity referenced from NRCS Web Soil Maps, the

[5] See AACE International Recommended Practice No. 18R97 Cost Estimate Classification System as Applied in Engineering, Procurement and Construction for the Process Industries.

assumed infiltration rate for this area with an applied safety factor[6] is 0.3 inches per hour. Therefore, the infiltration gallery would have the capacity to capture about 7.3 acre-feet (af) of stormwater from a 24-hour, 85th-percentile rainfall event. Pretreated flows would be pumped to the infiltration gallery from North White Avenue and from 8th Street. An emergency outfall pipe would discharge excess flow from the infiltration gallery into Live Oak Wash. The sports field would then be restored and enhanced at project completion.

- The **Lutheran High School Stormwater Infiltration Project** would be located at Lutheran High School, which is in the City of La Verne on land owned by the Faith Lutheran High School Association. The proposed project is to install an underground infiltration gallery within a 2,930 square-foot area of the school's existing sports field to infiltrate flows from a 39.4-acre drainage area. Based on the saturated hydraulic conductivity referenced from NRCS Web Soil Maps, the assumed infiltration rate for this area with an applied factor is 3.2 inches per hour. Therefore, the infiltration gallery would have the capacity to capture 2.4 af of stormwater from a 24-hour, 85th-percentile rainfall event. Pretreated flows from Amherst Street would flow via gravity to the infiltration gallery. In addition, pretreated flows from Iris Court and the eastern half of the sports field would be pumped to the infiltration gallery. An outfall pipe would discharge any excess flow from the infiltration gallery to an existing catch basin west of the sports field, which eventually flows to Fruit Street. The sports field would then be restored and enhanced at project completion.

- The **San Antonio Spreading Grounds Stormwater Infiltration Project** would be located in the City of Claremont on land owned by the Pomona Valley Protective Association. The proposed project is to install an open infiltration basin northeast of the East Miramar Avenue street end to infiltrate flows from a 225.4-acre drainage area. The basin would have a depth of 4-feet, including 1-foot of freeboard, and a bottom area of approximately 1 acre. Based on the saturated hydraulic conductivity referenced from NRCS Web Soil Maps, the assumed infiltration rate for this area with an applied safety factor is 4.2 inches per hour. Therefore, the infiltration gallery would have the capacity to capture 10.5 af of stormwater from a 24-hour, 85th-percentile rainfall event. Pretreated flows from Padua Avenue would flow via gravity to the infiltration basin. In addition, pretreated flows from East Miramar Avenue would be pumped to the infiltration basin. An outfall pipe would discharge excess flow into the existing flow path topography of the spreading grounds.

- The **La Puerta Sports Park Stormwater Infiltration Project** would be located at La Puerta Sports Park, which is in the City of Claremont on land owned by the Claremont Unified School District. The proposed project is to install an underground, double layer infiltration gallery within a 1.8-acre area of the southernmost sports field to infiltrate flows from a 439.3-acre drainage area. Based on the saturated hydraulic conductivity referenced from NRCS Web Soil Maps, the assumed infiltration rate for this area with an applied factor is 4.2 inches per hour. Therefore, the infiltration gallery would have the capacity to capture 17.7 af of stormwater from a 24-hour, 85th-percentile rainfall event. Pretreated flows would be diverted via gravity to the infiltration gallery from the

[6] A Safety Factor of 3 was applied for longterm siltation, plugging, and maintenance per LA County GS200.1.

parking lot adjacent to the Thompson Creek Trail and from the southern driveway on North Indian Hill Boulevard. An outfall pipe would discharge any excess flow from the infiltration gallery into an existing concrete-lined channel located along the southern edge of the overall park boundary. The sports field would then be restored and enhanced at project completion.

- The **Brackett Field Stormwater Infiltration Project** would be located at Brackett Field Airport the City of La Verne on land owned by the LA County Department of Public Works. The proposed project is to install an underground infiltration gallery within a 3.5-acre open area on the property to infiltrate flows from a 390.9-acre drainage area. Based on the saturated hydraulic conductivity referenced from NRCS Web Soil Maps, the assumed infiltration rate for this area with an applied factor is 1.3 inches per hour. Therefore, the infiltration gallery would have the capacity to capture 15.5 af of stormwater from a 24-hour, 85th-percentile rainfall event. Pretreated flows from 2nd Street, Arrow Highway, and Walnut Street would flow via gravity to the infiltration gallery. In addition, pretreated flows from Wright Avenue would be pumped to the infiltration gallery. An outfall pipe would discharge any excess flow from the infiltration gallery to Fairplex Drive. The field would then be restored at project completion.

- The **Fairplex Stormwater Infiltration Project** would be located at Fairplex, which is in the City of Pomona on land owned by LA County. The project proposes to install an underground, double layer infiltration gallery within a 5.6-acre area of the existing Grandstand Field to infiltrate flows from a 487.8-acre drainage area. Based on the saturated hydraulic conductivity referenced from NRCS Web Soil Maps, the assumed infiltration rate for this area with an applied safety factor is 1.3 inches per hour. Therefore, the infiltration gallery would have the capacity to capture 31.0 af of stormwater from a 24-hour, 85th-percentile rainfall event. Pretreated flows from Arrow Highway and adjacent to Thompson Creek would flow via gravity to the infiltration gallery. In addition, pretreated flows from West McKinley Avenue would be pumped to the infiltration gallery. An outfall pipe would discharge any excess flow from the infiltration gallery to Thompson Creek. The field would then be restored at project completion.

- The **Claremont Colleges Stormwater Infiltration Project** would be located at a former parking lot of the Claremont Golf Course, which is in the City of Claremont on land owned by the Claremont Colleges. This proposed project is to install an open infiltration basin to infiltrate flows from a 183.3-acre drainage area. The basin would have a depth of 4-feet, including 1-foot of freeboard, and a bottom area of approximately 0.3 acres. Based on the saturated hydraulic conductivity referenced from NRCS Web Soil Maps, the assumed infiltration rate for this area with an applied safety factor is 4.2 inches per hour. Therefore, the infiltration gallery would have the capacity to capture 6.3 acre-feet of stormwater from a 24-hour, 85th-percentile rainfall event. Pretreated flows from North Indian Hill Boulevard would flow by gravity into the basin. An outfall pipe would discharge any excess flow from the infiltration basin to the storm drain on North Indian Hill Boulevard.

- The **Pedley Stormwater Infiltration Project**, located in the City of Claremont on land owned by the City of Pomona, is an existing facility with three spreading basins that

have a ponding area of approximately 4.1 acres. The spreading grounds typically spread 500 acre-foot/year of local surface-water runoff from San Antonio Canyon. The proposed project is to deepen the basins by 2-feet to accommodate local urban runoff. The project proposes to divert pretreated flows from North Mills Avenue via gravity to the basins. In addition, as-builts show existing pipes that may convey flow from a 441.1-acre drainage area to the basins. However, it is unclear how much flow, if any flow, from these pipes reaches the basins. Therefore, as part of detailed design, site visits and a closed-circuit TV inspection should be performed to determine the existing conditions of the pipes and their connectivity. If the existing pipes are not contributing flow to the basins, the design would be modified to include this additional flow for infiltration.

Table 4-3 summarizes the drainage area, the Safe Clean Water Program score, new stormwater recharge, capital cost, annualized cost, and cost per af of recharge for each of the eight projects. The Safe Clean Water Program score and the stormwater recharge estimate are based on the Safe Clean Water Module, which uses the WMMS to estimate stormwater recharge. The capital cost includes the construction, planning, and design costs (detailed cost opinions are in Appendix A). The annualized cost is also based on the Safe Clean Water Module, which assumes a 3.375 percent amortization rate and a 30-year amortization period, and includes capital costs, operation and maintenance costs, and monitoring costs.

4.3 Institutional and Environmental Concerns

The common institutional and environmental challenges to implementing the eight projects described herein consist of the following:

- Determining a lead entity for California Environmental Quality Act (CEQA) review and project implementation.
- Determining cost-sharing partners and cost-share distribution.
- Obtaining agreements with property owners to construct, operate, and maintain the stormwater-recharge facilities. These agreements will include gaining access to sites to enable the construction, operation, and maintenance of the facilities. The time required to negotiate and approve these agreements could range from one to two years.
- Obtaining agreements with the resource agencies to address potential impacts to downstream environmental uses/users of stormwater.
- The need and funding for a monitoring program to determine if/how the projects will impact groundwater quality and create high-groundwater conditions in the Six Basins.
- The construction of new recharge facilities will temporarily disturb existing activities at project sites.

4.4 Modeling and Assumptions and Limitations

The stormwater recharge estimates are based on the Safe Clean Water Module, which uses the LA County's Watershed Management Modeling System (WMMS). To ensure that the WMMS

provided reasonable results, two projects were evaluated using the R4 model (see description of R4 model in Section 4.1.1) and compared to the stormwater recharge estimates developed using the Safe Clean Water Module. The projects analyzed were (1) the Fairplex, an underground recharge gallery with a drainage area of about 490 acres; and (2) the Rancho Santa Ana Botanical Gardens, a recharge basin with a drainage area of about 180 acres. Inset Table 1 below shows the stormwater recharge estimates from the two models.

Inset Table 1. Comparison of WMMS and R4 model stormwater recharge estimates (afy)

Model	Fairplex	Rancho Santa Ana Botanical Gardens
WMMS	336	69
R4	350	55

Based on these results, the WMMS model appears to provide reasonable results for stormwater recharge for the projects; thus, it was not necessary to model stormwater recharge for all projects using the R4 model.

There are several assumptions needed to estimate recharge, such as infiltration rates. The infiltration rates assumed for this project were based on the saturated hydraulic conductivity referenced from NRCS Web Soil Maps. Generally, the estimated hydraulic conductivity in the NRCS Web Soil Maps is for the top 72 inches (6 feet) of soil. Because most of these projects will require the excavation of this top layer of soil for construction, infiltration rate sensitivity runs were used to determine the impacts of this assumption. Inset Table 2 below shows the new stormwater recharge as estimated by the WMMS model at three different infiltration rates.

Inset Table 2. Comparison stormwater recharge estimates based on different infiltration rate assumptions (afy)

Infiltration Rate Assumption	Fairplex	Rancho Santa Ana Botanical Gardens
NRCS Web Soil Survey Infiltration Rate with applied Safety Factor	2.6 feet/day	8.4 feet/day
NRCS Web Soil Survey with applied Safety Factor	350	55
Half of NRCS Web Soil Survey with applied Safety Factor	289	40
0.5 feet/day (planning assumption in Table 2-3)	218	18

These results indicate that the infiltration rate has a significant impact on the stormwater recharge of the project. Thus, exploratory soil and infiltration field work is recommended prior to the final design and implementation of any of the projects described herein.

Table 4-1

Projected Average Monthly Stormwater Discharge Near Potential Recharge Sites

Site ID	Site	Characterization (see key below)	Month (af per month)												Annual Total (afy)
			Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
UCH-01	Rancho Santa Ana Botanical Gardens	1	5	15	30	51	49	31	11	2	0	0	1	2	198
		2	10	30	57	95	90	59	22	5	1	0	2	4	375
UCH-02	La Puerta Sports Park	1	1	2	4	6	6	4	1	0	0	0	0	0	24
		2	4	11	22	37	34	22	8	2	0	0	1	2	143
		3	4	13	34	116	127	67	19	4	1	0	1	2	388
P-25	Brackett Field	1	4	11	20	34	30	22	7	2	0	0	0	2	132
		3	87	260	549	976	921	583	211	50	7	2	12	40	3,697
G-02	Las Flores Park	1	1	2	4	6	6	4	2	0	0	0	0	0	26
		2	4	11	20	33	33	21	8	2	0	0	1	2	135
		3	5	18	35	93	99	52	17	4	1	0	1	2	327
P-05	Harvey Mudd/ Pitzer/ Scripps Colleges	1	1	4	8	13	12	8	3	1	0	0	0	1	51
		2	6	19	34	57	53	36	14	3	1	0	1	3	228
LO-01	Lutheran High School	1	1	2	4	7	7	5	2	1	0	0	0	0	29
LCH-02	Alexander Hughes Community Center & Lewis Park	1	1	2	4	6	5	4	1	0	0	0	0	0	23
		2	2	5	10	16	16	11	4	1	0	0	0	1	67
	San Antonio Spreading Grounds	1	2	6	13	25	23	15	5	1	0	0	0	1	91
	Pedley Spreading Grounds	1	1	3	6	10	10	7	3	1	0	0	0	0	42
		2	3	10	18	30	28	19	7	2	0	0	1	1	121
	Fairplex	1	19	48	86	144	127	93	33	8	1	0	2	10	571
		3	78	231	438	787	776	506	184	47	9	4	14	34	3,108

Characterization Key

1.The stormwater that flows past each of the selected sites assuming no to minimum changes to the drainage system.

2.The stormwater that flows past each of the selected sites assuming some changes to the drainage system.

3.The stormwater that flows past each of the selected sites assuming that diversions can occur from receiving waters (Thompson Creek and Live Oak Wash).

Table 4-2
Projected Average Annual Dry-Weather Flow Near Potential Recharge Sites

Site ID	Site	Characterization (see key below)	Urban Drainage Area (acres)	Average Annual Dry Weather Flow[a] (afy)
UCH-01	Rancho Santa Ana Botanical Gardens	1	330	71
		2	603	131
UCH-02	La Puerta Sports Park	1	67	15
		2	324	70
		3	324	70
P-25	Brackett Field	1	171	37
		3	3,499	759
G-02	Las Flores Park	1	42	9
		2	200	43
		3	363	79
P-05	Harvey Mudd/ Pitzer/ Scripps Colleges	1	89	19
		2	362	79
LO-01	Lutheran High School	1	42	9
LCH-02	Alexander Hughes Community Center & Lewis Park	1	32	7
		2	93	20
	San Antonio Spreading Grounds	1	164	36
	Pedley Spreading Grounds	1	65	14
		2	187	41
	Fairplex	1	651	141
		3	4,474	971

Characterization Key

1.The dry-weather flow that flows past each of the selected sites assuming no to minimum changes to the drainage system.

2.The dry-weather flow that flows past each of the selected sites assuming some changes to the drainage system

3.The dry-weather flow that flows past each of the selected sites assuming that diversions can occur from receiving waters (Thompson Creek and Live Oak Wash).

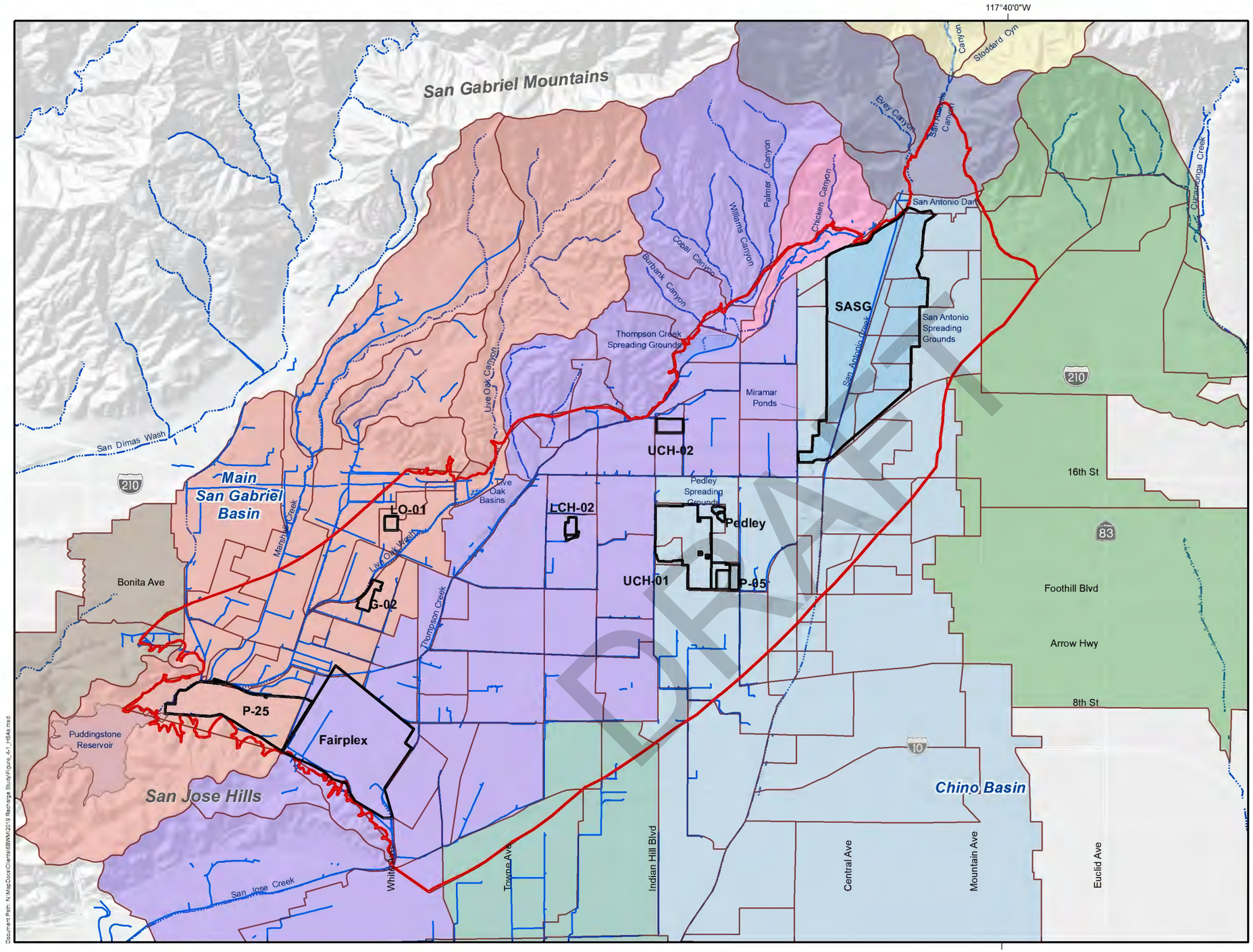
Notes

a -- Assumes there are 0.0003 cfs of dry weather flow per acre of urban drainage area. Source: *Dry weather flow in arid urban areas.* Presentation dated October 27, 2005 by Drew Ackerman and Eric Stein (2005). Southern California Coastal Water Research Project.

Table 4-3
Summary of Recharge Projects Drainage Area, Safe Clean Water Program Score, Recharge Benefit, and Cost

Site ID	Site	Urban Drainage Area (acres)	Safe Clean Water Program Score[1] (points)	Stormwater Recharge Benefit[2] (afy)	Total Capital Cost[3] ($)	Total Annualized Cost[4] ($)	Unit Cost ($/af)
G-02	Las Flores Park	128	60	71	$9,508,000	$410,000	$5,802
LO-01	Lutheran High School	39	60	14	$1,926,000	$110,000	$7,801
P-25	Brackett Field	321	66	180	$17,805,000	$670,000	$3,717
UCH-01	Rancho Santa Ana Botanical Gardens	183	69	69	$2,456,000	$180,000	$2,600
UCH-02	La Puerta Sports Park	439	74	229	$9,661,000	$600,000	$2,620
	Fairplex	488	79	336	$28,661,000	$1,140,000	$3,398
	Pedley Spreading Grounds	487	82	192	$2,569,000	$190,000	$992
	San Antonio Spreading Grounds	225	72	128	$9,290,000	$590,000	$4,596
	Total	**2,311**	**n/a**	**1,219**	**$81,876,000**	**$3,890,000**	**$3,192**

1 - Based on the Safe Clean Water Module.
2 - Based on the Safe Clean Water Module which uses the LA County's WMMS.
3 - Includes the construction and planning and design costs (see Appendix A)
4 - Based on the Safe Clean Water Module which assumes a 3.375 percent amortization rate and a 30-year amortization period, and includes capital costs, operation and maintenance costs, and monitoring costs.



Recharge Sites Being Evaluated

R4 Model Features

- Hydrologic Sub-area
- Storm Drains

Major Sub-watersheds

- Cucamonga Creek
- Chino Creek
- Chicken Creek
- Live Oak Canyon
- San Antonio
- San Antonio Dam
- San Antonio Mountains
- San Dimas Canyon
- Thompson Creek

Other Features

- Spreading Grounds
- Hydrologic Boundary of the Six Basins

Prepared by:

WEI
WILDERMUTH ENVIRONMENTAL, INC.

Author: CS
Date: 20180517

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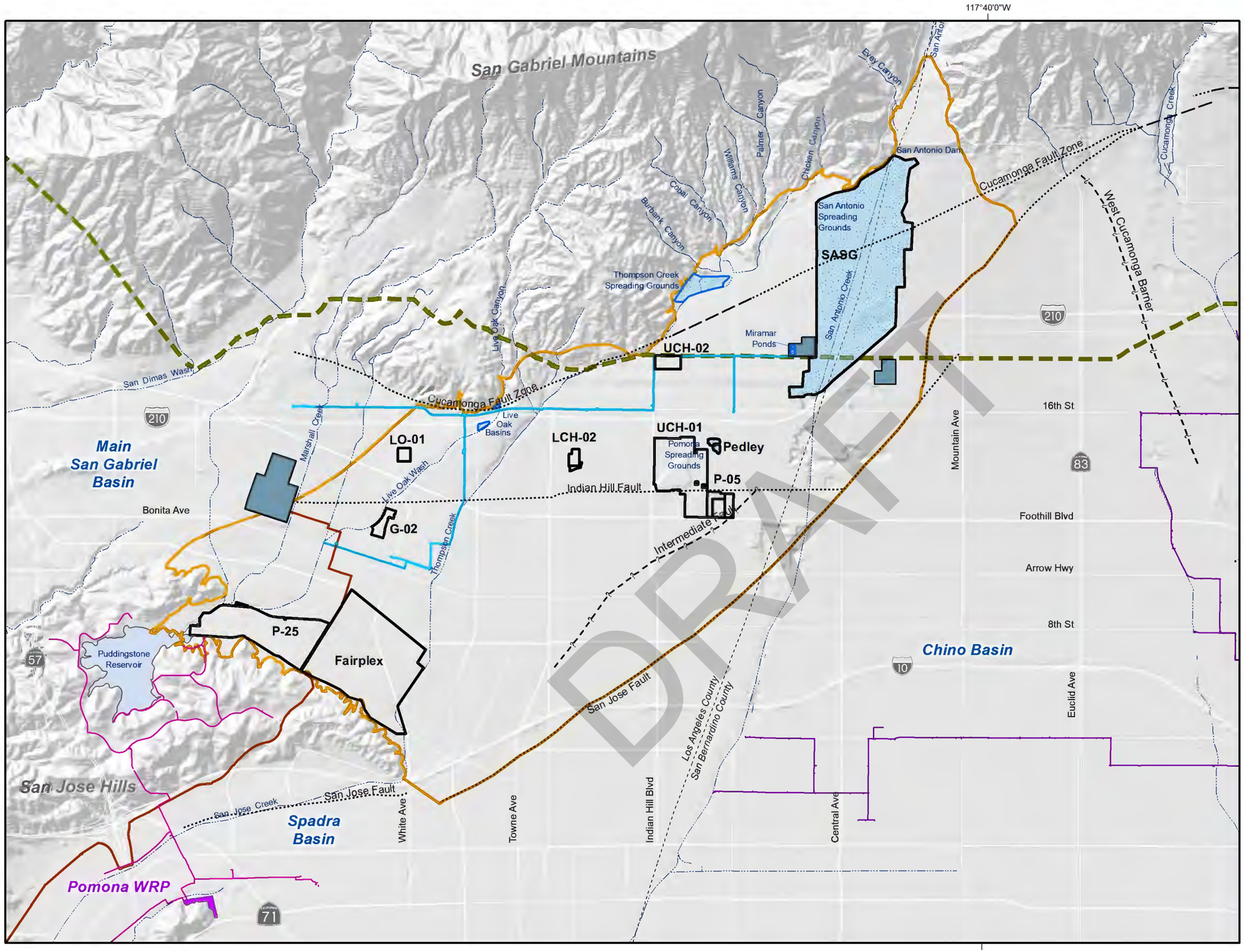
Hydrologic Sub-Areas Overlying and Tributary to the Six Basins and Recharge Sites Being Evaluated

Figure 4-1



Recharge Sites Being Evaluated

Imported Water Facilities
- Miramar Pipeline
- PWR Joint Feeder
- Foothill Feeder-Rialto Pipeline
- Imported Water Treatment Plant

Recycled Water Facilities
- City of Pomona Pipeline
- IEUA Pipeline
- Recycled Water Treatment Plant

Other Features
- Six Basins Hydrologic Boundary
- Spreading Basins

Faults
- Location Certain
- Location Approximate
- Location Concealed
- Location Uncertain

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Date: 20180810
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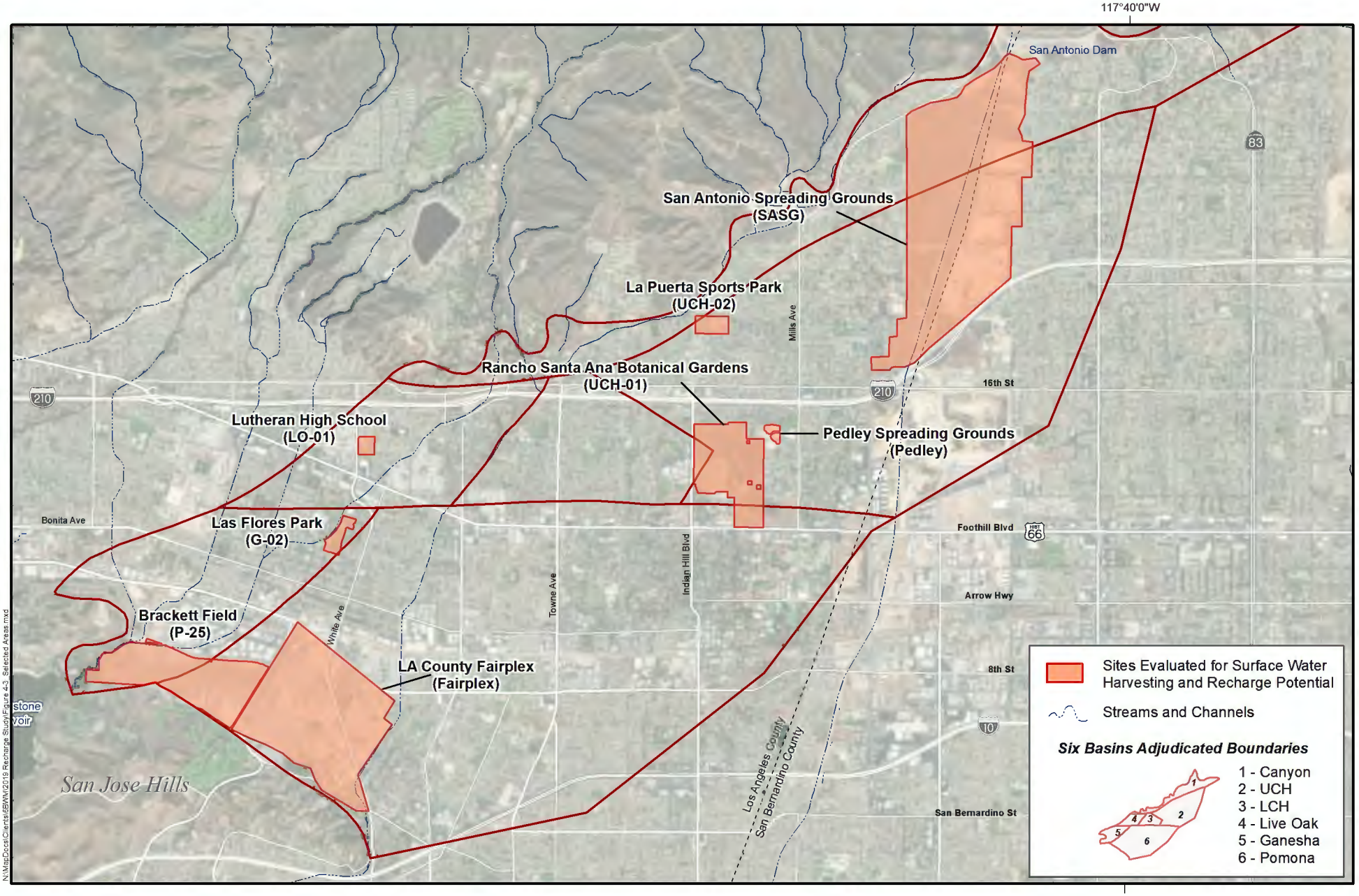
Imported Water and Recycled Water Facilities

Figure 4-2



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Author: RT
Date: 20200120

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Sites Evaluated for Surface Water Harvesting and Recharge Potential

Figure 4-3

Section 5 – Conclusions and Recommendations

This section summarizes the findings of this report and outlines recommendations for future actions.

5.1 Conclusions

Eight sites were evaluated for stormwater harvesting and recharge potential to satisfy the MS4 permit requirements and augment recharge in the Six Basins. The following are the main conclusions of this study:

- For the individual projects, new stormwater recharge is estimated to range between 14 afy to 336 afy as a long-term annual average. Together, all eight projects are estimated to increase stormwater recharge by about 1,220 afy as a long-term annual average. The project with the largest potential for stormwater recharge is the Fairplex Stormwater Infiltration Project.

- All eight projects meet the minimum criteria (60 points) to apply for the Safe Clean Water Program funding. The estimated Safe Clean Water Program scores ranged from 60 to 81 points. The project with the highest estimated score was the Pedley Stormwater Infiltration Project.

- A cost-benefit analysis was performed to characterize the cost per af of new stormwater recharge by project over a 30-year amortization period. For the eight projects, the cost per af of new stormwater recharge ranged from about $1,000 to $7,800/af. The melded unit cost if all eight projects were implemented would be about $3,000/af. The most cost-effective project is the Pedley Stormwater Infiltration Project.

- Grant funding would reduce the cost to the ESGV and other cost-sharing parties.

- All projects could be utilized to divert and recharge dry-weather runoff and/or supplemental waters during non-storm periods.

5.2 Potential Funding Sources

Existing funding sources include Measure W, Proposition 1, Proposition 68, and the Environmental Protection Agency (EPA) Clean Water State Revolving Fund.

- Measure W (the Safe Clean Water Program) levies a parcel tax on parcels within the Los Angeles County Flood Control District at a rate of 2.5 cents per square foot of impermeable area. Proceeds from the tax are used to fund projects that improve water quality and may also increase water supply.

- Proposition 1, the Water Bond, authorized $7.12 billion in general obligation bonds for state water supply infrastructure projects.

- Proposition 68, the Parks, Environment, and Water Bond, authorized $4 billion in general obligation bonds for state and local parks, environmental protection and restoration projects, water infrastructure projects, and flood protection projects.

- The EPA Clean Water State Revolving Fund provides communities a permanent, independent source of low-cost financing for a wide range of water-quality infrastructure projects.

In October 2019, LA County opened a call for projects under the Safe Clean Water Program with a deadline to apply by December 15, 2019. The ESGV applied for funding for the implementation of the Pedley Stormwater Infiltration Project and for technical assistance for the Fairplex and Brackett Field projects. The anticipated approval of applications for this round of applications is June 2020.

LA County will open its next call for projects under the Safe Clean Water Program in May or June 2020, with an application deadline of July 31, 2020. If the ESGV group and/or the Six Basins Watermaster intends to apply for funding at this time, the following milestones should be met:

- *March 2020*
    - Begin work on additional requirements under the Safe Clean Water Program funding application: Monitoring Plan, O&M Plan, Community Outreach Plan, and Vector Minimization Plan. The work developed by the ESGV group for the December 15, 2019 application can be leveraged to prepare these requirements.
    - Contact relevant agencies such as land-use owners, the LA County Flood Control District, etc.
- *April 2020* – Finalize work on additional requirements.
- *June 2020* – Prepare Safe Clean Water Program funding application.
- *July 2020* – Submit application for implementation, which should include the preparation of a Preliminary Design Report as describe above.

5.3 Recommendations

The following are recommendations based on the conclusions of this study:

- The eight facilities were designed to capture and recharge a 24-hour, 85th-percentile rainfall event. As mentioned earlier, a 24-hour, 85th-percentile rainfall event in the Six Basins corresponds to about one inch of rainfall over 24 hours. Daily precipitation in the Six Basins area, as measured at the San Antonio Dam precipitation station, can range from zero to about eight inches per day, indicating that there is additional water that these projects could capture if their diversion and storage capacities were increased. A sensitivity analysis should be performed to determine the project size that will achieve the greatest cost-benefit ratio.

- The site-specific infiltration rate will control the final project size and design to comply with the MS4 permit. Exploratory soil and infiltration work is recommended to support the preparation of the preliminary design report (PDR).

- The recharge projects described herein will augment the yield of the Six Basins. Thus, the Six Basins Watermaster Parties should be supportive of the ESGV in the implementation of these projects. If the ESGV and the Watermaster decide to collaborate and implement these projects, the following implementation steps are recommended:

  - *Apply for funding.* See Section 5.2.
  - *Develop a memorandum of understating (MOU) with entities to implement the project.* All Parties and other stakeholders that have an interest in the recharge projects need to be identified and should participate in the MOU. The MOU is a precursor to implementation agreements that follow the selection of the final project alternative (see bullet below). The MOU will define a preliminary governance structure for project investigation and will allocate costs for preliminary engineering, the CEQA process, and the development of financing alternatives.
  - *Prepare a preliminary design report (PDR).* The objectives of this task are to develop alternatives for the recharge projects described in this report. This will involve conducting engineering and geotechnical investigations, such as exploratory drilling, to better understand the suitability of the site for recharge. The alternatives may include expanding the capacities of the recharge projects to capture more than the 24-hour, 85th-percentile rainfall event or modifying the existing drainage system to increase the tributary area of a project.
  - *Complete CEQA.* Watermaster is in the process of developing a Programmatic Environmental Quality Report (PEIR) that will include a general description of the recharge facilities. Additional project-specific environmental documentation may be needed once the alternatives are developed and described in the PDR.
  - *Select preferred alternative.*
  - *Develop financing plan and implementation agreements.*
  - *Obtain permits.*
  - *Finalize design of recharge facilities.*
  - *Construct improvements.*

- Watermaster may direct Watermaster Staff to attend the ESGV group meetings to (1) promote the implementation of these and other MS4 projects that augment the yield of the Six Basins, (2) provide technical guidance and support to the ESGV Group, and (3) report back to the Board.

Appendix A

Information Sheets of the Sites Evaluated for Stormwater Harvesting and Recharge Potential

A.1 Summary Sheet Descriptions

Appendix A consists of information sheets for each site evaluated for stormwater harvesting and recharge potential. There are a total of eight sheets for each project. The eight sheets, and the assumptions and calculations related to the information included therein, are summarized below:

1. **Sheet 1 – Project Summary.** This sheet includes general project information such as project name, site land ownership, site coordinates, etc. It also provides an overview of the project design, benefits, and challenges. Some of the assumptions and calculations included in this sheet include:
    a. Net Capture Volume for Wet Weather: This value is the difference between the Safe Clean Water Program Module (module)-generated value for the annual average capture for water supply (see Sheet 2) and the dry weather flow volume (see bullet below).
    b. Net Capture Volume for Dry Weather: This value was estimated based on research performed by the Southern California Coastal Water Research Project which suggests assuming 0.0003 cubic feet per second (cfs) of dry-weather flow per 1 acre of tributary area.
    c. Opinion of Probable Capital Cost: This value was estimated based on the sum of the construction cost and planning and design cost (see Sheet 8). The planning and design cost was assumed to be 10% of the construction cost.
    d. Total Life-Cycle Cost: This is a module-generated value that incorporated capital costs (construction), annual costs (monitoring and operations and maintenance), and project life span (30 years).
2. **Sheet 2 – Safe Clean Water Program Criteria.** This sheet shows the information and scoring of the Safe Clean Water Program Module and include information such as pollutant reduction, water supply benefits, and community investment benefits. Some of the assumptions and calculations included in this sheet include:
    a. A.1 Wet Weather Water Quality Benefits
        i. 24-hour BMP Capacity: This value is determined based on the hydrograph for the overall drainage area (see Sheet 5)
        ii. Capital Cost: This value is the sum of the construction cost and planning and design cost. The planning and design cost was assumed to be 10% of the construction cost. (see Sheet 8)
        iii. Pollutant Reduction: This is a module-generated value estimated by performing a simulation with the Watershed Management Modeling System (WWMS) based on the provided information for design elements and 24-hour capacity.
    b. B.1 Water Supply Cost Effectiveness
        i. Runoff Captured for Water Supply: The Module provides an estimate by using the WMMS.

ii. Annualized Life-Cycle Cost: This is a module-generated value, which applies an amortization rate equal to 3.375%. Capital costs, annual costs, and project life span are incorporated into the calculation.

c. B.2 Water Supply Benefit Magnitude:

i. Annual Additional Water Supply Volume Resulting from Project: This is a module-generated value estimated by performing a simulation with the WMMS.

3. **Sheet 3 – Conceptual GIS Site Plan.**
4. **Sheet 4 – Conceptual Site Profile.**
5. **Sheet 5 –Hydrograph.** This sheet shows the 24-hour hydrograph for the overall drainage area.
6. **Sheet 6 – Site Information.** This sheet includes plan view as-built drawings of nearby storm drains, soil types at the site, nearby faults, depth to groundwater, and land use.
7. **Sheet 7 – Site Photos.** This sheet includes a location map of the site within the Six Basins and photos taken during the field-survey visit to the site conducted in 2019 as part of this study.
8. **Sheet 8 – Cost Estimation.** This sheet is the itemized cost-opinion for the project.

Project Name	Las Flores Park		
Site Land Ownership	City of La Verne		
Partner Agency (ies)	Six Basins		
Net Capture Volume (AFY)	Wet Weather:	43	Dry Weather: 28
Opinion of Probable Capital Cost (Class 5) ($-Millions)	10.46		
Total Life-Cycle Cost ($-Millions)	11.60		
Main Site Address	3175 Bolling Avenue, La Verne, CA 91750		
Main Site Size (acres)	16.3		
Site Coordinates	Latitude:	34.105	Longitude: -117.7644

Description

This project includes an underground infiltration gallery (NDS StormChamber) to be located on the existing southernmost sports field. Drainage from N White Ave would flow by gravity into a hydrodynamic separator for pretreatment and then to a pump well. An additional connection from 8th St would also flow stormwater by gravity to a second hydrodynamic separator and pump well. Flows would then be pumped to the infiltration gallery. The infiltration gallery emergency outfall will discharge into Live Oak Wash.

Current Site Use

City park including parking lot area, softball fields, tennis courts, swimming pool, and picnic areas.

Conceptual Design Criteria

Overview		BMP Design	
Tributary Watershed Name	Live Oak Creek	Name of Primary Tributary Pipeline	BI 9701 - Line A
Assumed Design Infiltration Rate (in/hr) [1]	0.28	Capacity of Primary Tributary Pipeline	48"
Assumed Drawdown Time (hrs)	96	US Connection Invert to BMP (ft)	1075.4
Tributary Area (acres)	127.90	Exist. Ground Surface Elevation at BMP (ft)	1087
Assumed Hydrologic Soil Group	C	Planned Invert at BMP (ft)	1078.33
85th-Percentile Design Storm (in)	1.0	Capacity of Facility (AF)	6.71
Gravity or Pumped Flow	Pumped	Distance to Nearest Well (mi)	0.19
Underground or Above Ground	Underground	Project Design Life (years)	30
Proximity to Recycled Water (mi)	NA	Preliminary SCWP Score	60

Additional Multi-Benefit Opportunities

Prevent and reduce amount of pollutants discharged into local water bodies, prepare for more extreme and frequent drought conditions by capturing and using runoff to reduce demand on water supplies, recharge groundwater.

Potential Challenges

Confirmation of utility conflicts required to validate concept design. The infiltration gallery should be located to avoid impacts to existing park trees.

Stage of Development

☒ Conceptual	☐ Planning	☐ Pre-Design
☐ Design	☐ Construction	☐ Other

Expected Project Timeline	Begin: May-21	End:	Jan-25

Potentially Applicable Federal and State Programs for Financial Assistance

☒ Measure W	☒ Prop 68	☐ Other _____
☒ Prop 1	☒ EPA Clean Water State Revolving Fund (CWSRF)	

Contact Person(s):

Lisa O'Brien, Senior Management Analyst, City of La Verne, 909-596-8741, lobrien@cityoflaverne.org

Notes

1 - Source: NRCS Web Soil Survey. A Safety Factor of 3 was applied for long-term siltation, plugging, and maintenance per LA County GS200.1.

Project Multi-Benefits (per Safe Clean Water Program Table 7)

A. Water Quality Benefits

A.1 Wet Weather Water Quality Benefits

A.1.1 Cost Effectiveness	0.77	AF / $-Millions	Resulting Points:	11
24-hr BMP Capacity [1]:	7.29	AF		
Construction Cost:	9.51	$ in Millions		
A.1.2 Quantify Pollutant Reduction [1]				
Primary Class Pollutants:	% Load Reduction			
Total Copper	87.3%		Resulting Points:	20
Second or More Class Pollutants:	% Load Reduction			
Total Zinc	88.9%		Resulting Points:	10

A.2 Dry Weather Water Quality Benefits (for 0.25" storms and below)

B. Significant Water Supply Benefits

B.1 Water Supply Cost Effectiveness

Cost Effectiveness	5801	$ / AF	Resulting Points:	0
Runoff Captured for Water Supply [1]	70.67	AF		
Annualized Life-Cycle Cost	0.41	$ in Millions		

B.2 Water Supply Benefit Magnitude

Annual Additional Water Supply Volume Resulting from Project [1]	70.67	AF/year	Resulting Points:	2

C. Community Investment Benefits

C.1 Project Benefits

☒ Improved flood management, flood conveyance, or flood risk mitigation
☒ Creation, enhancement, or restoration of parks
☐ Improved public access to waterways
☒ Enhanced or new recreational opportunities
☒ Creation or enhancement of green spaces at school
☐ Improved public health by reducing heat island effect
☐ Increased shade or planting of trees/other vegetation that increase carbon reduction/sequestration

Resulting Points: 5

D. Nature-Based Solutions

D.1 Project Solutions

☒ Implements natural processes or mimics natural processes to slow, detain, capture, and absorb/infiltrate water in a manner that protects, enhances and/or restores habitat, green space and/or usable open space (5 points)
☐ Utilizes natural materials such as soils and vegetation with a preference for native vegetation (5 points)
☐ Removes Impermeable Area from Project (1 point per 20% paved area removed)

Resulting Points: 5

E. Leveraging Funds and Community Support

E.1 Cost-Share

☒ >25% Funding Matched (3 points)
☐ >50% Funding Matched (6 points)

Resulting Points: 3

E.2 Community-Based Support

☒ The Project demonstrates strong local, community-based support and/or has been developed as part of a partnership with local NGOs/CBOs (4 points)

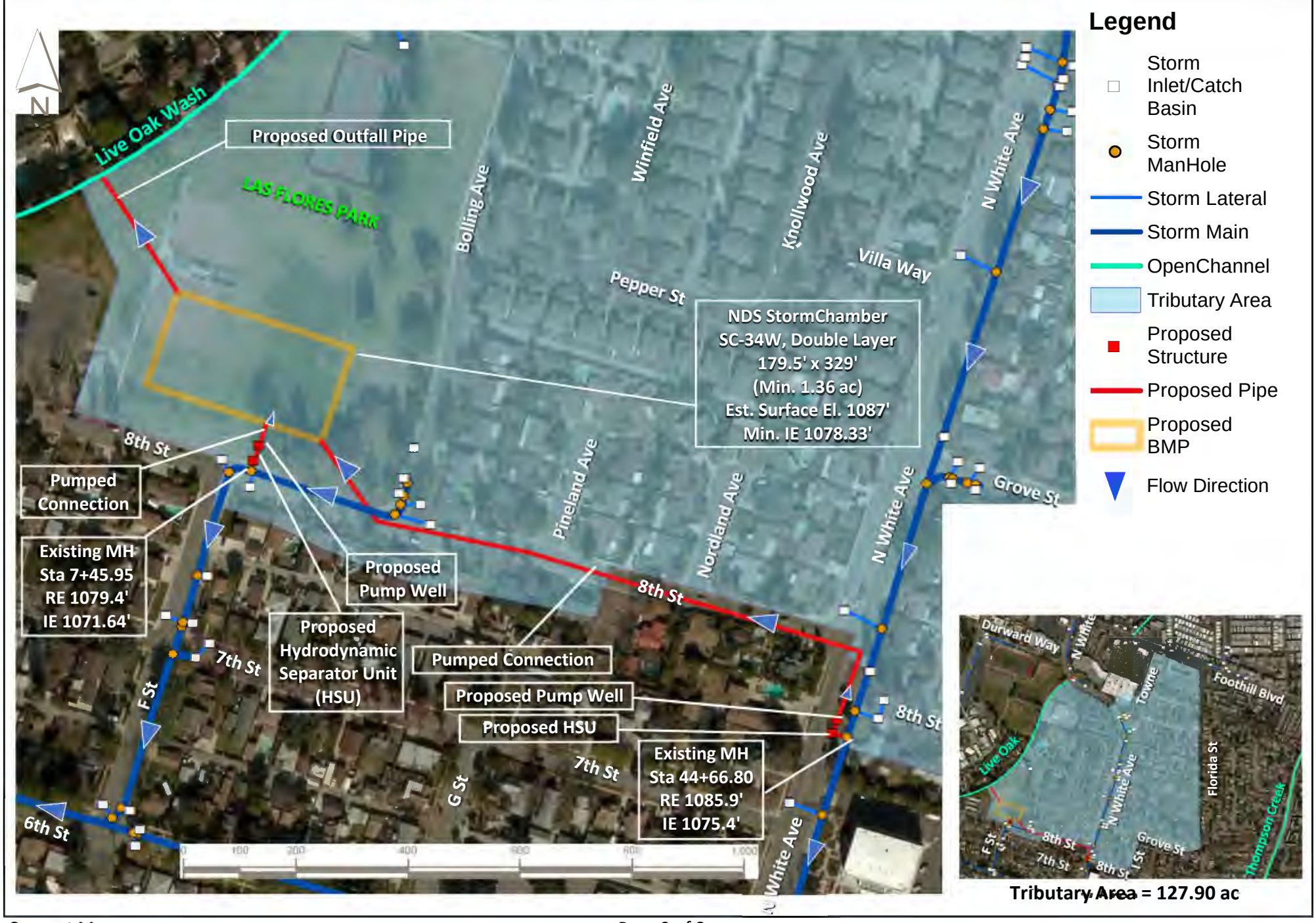
Resulting Points: 4

Notes **Final Score: 60**

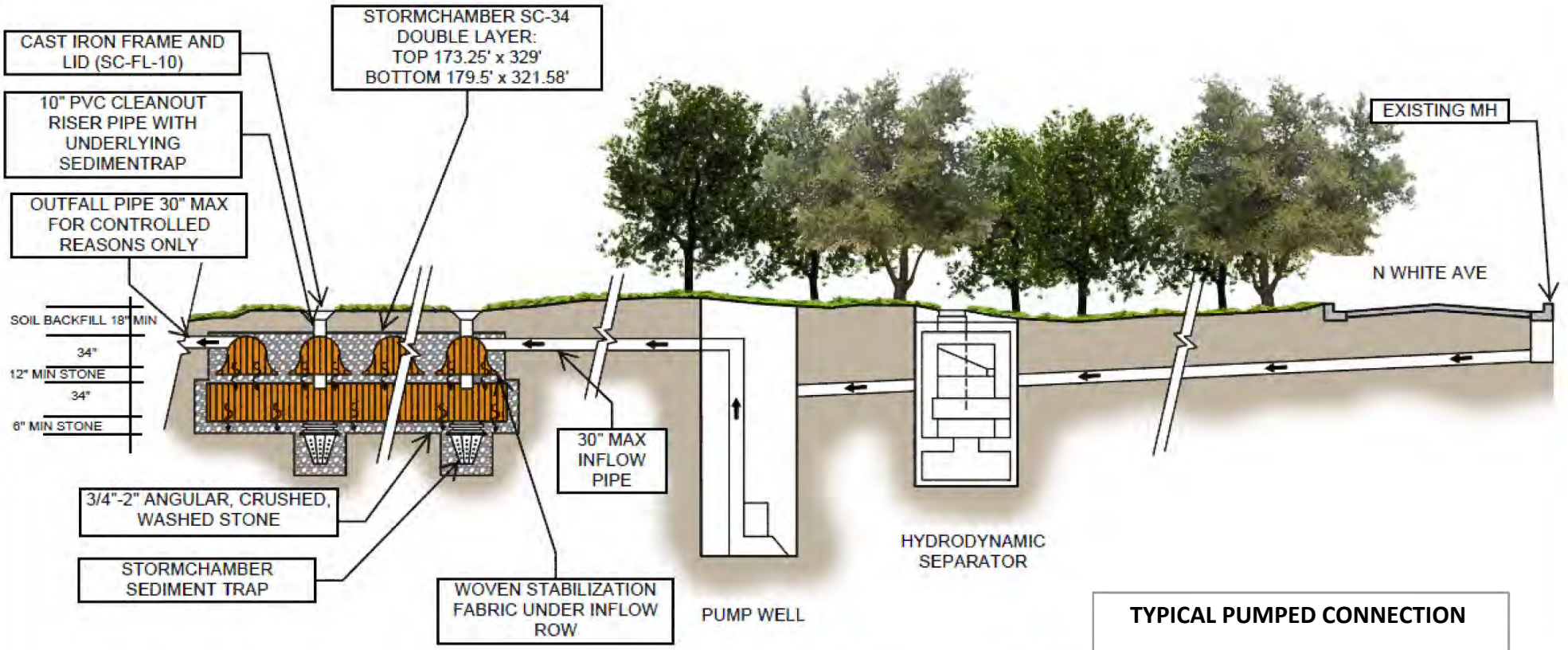
General - All Regional Program Projects must meet the Threshold Score of 60 points or more using the Project Scoring Criteria to be eligible for consideration.

1 - Preliminary estimates based on blended hydrograph inputs to the SCW Project Module.

Conceptual GIS Site Plan



Conceptual Site Profile

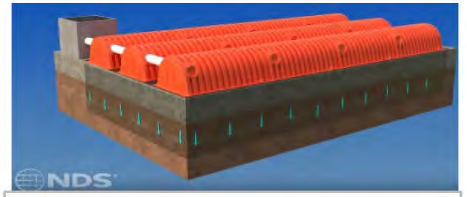


TYPICAL PUMPED CONNECTION

PVC Cleanouts (vertical)
Flow Connection Pipes (horizontal)

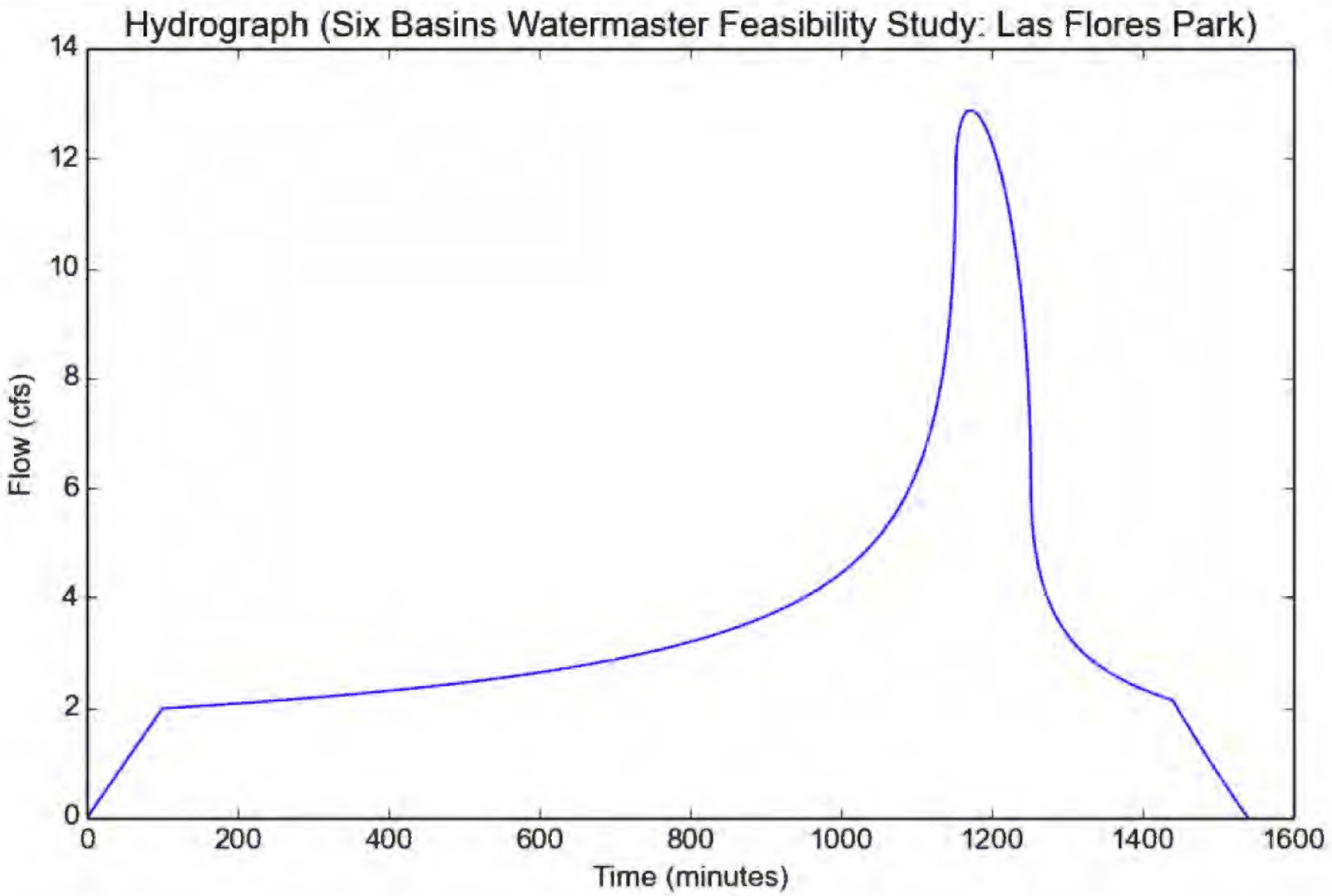
Crushed Washed Stone Cover

EXAMPLE STORMCHAMBER PHOTOS



System View

Hydrograph



Note: This data is based on a blended hydrograph for the overall drainage area.

Design Capture Volume (AF)	7.290271	Design Capture Volume (cu ft)	317564.2	Peak Flow (cfs)	12.87

Site Information

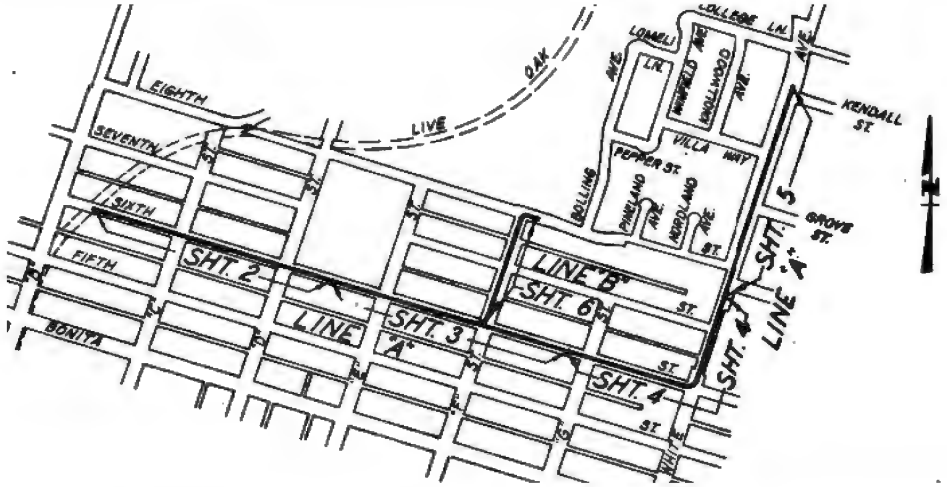


Figure 1 - Primary Tributary Pipeline/Channel As-Built

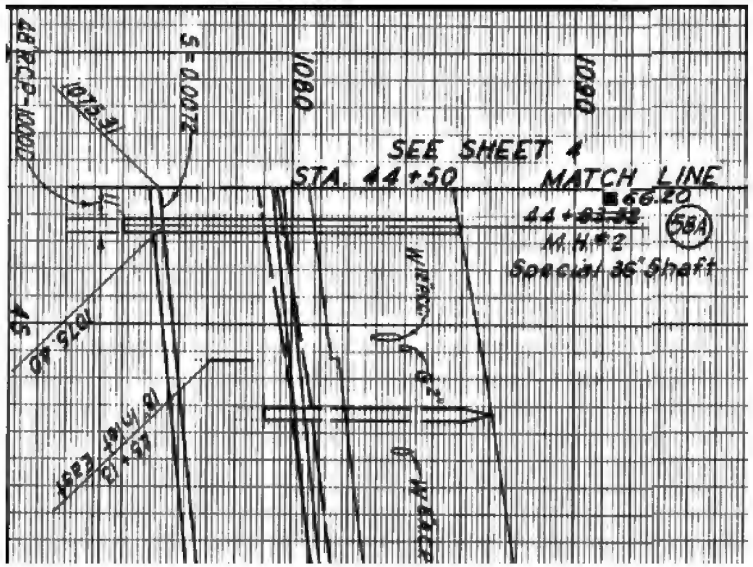


Figure 2 - Primary Connection Manhole As-Built

Name	BI 9701 - Line A			Name	MH #2 - Sta. 44+66.80 (prev. 44+63.52)		
Location	N White Avenue			Location	Approx. 75' south of N White Avenue & 8th Street		
Capacity	48"	Drawing No.	PD044599	Invert Elevation	1075.40	Drawing No.	PD044603
		Drawing Date	5/5/1972	Rim Invert Elevation	1085.90	Drawing Date	3/1/1973

Figure 3 - Soil Types & Faults

Figure 4 - Depth to Groundwater

Site Information

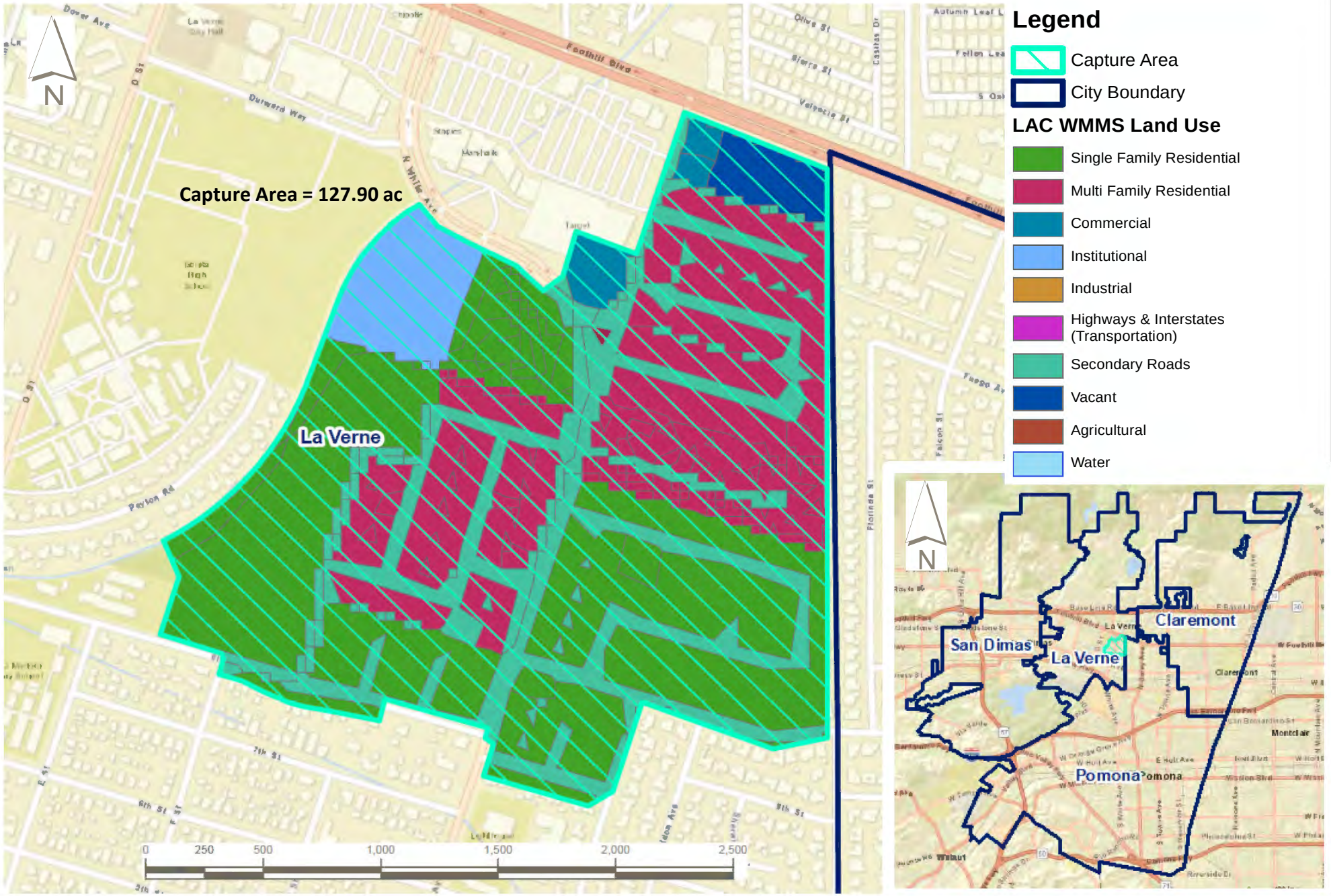
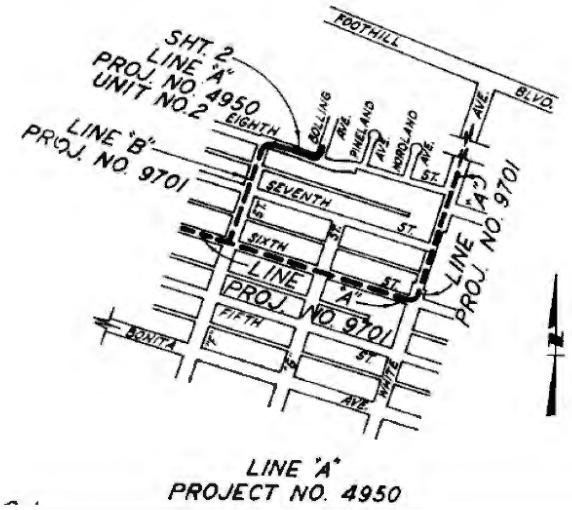


Figure 5 - Capture Area & Land Use

Site Information



LINE "A"
PROJECT NO. 4950

Figure 6 - Secondary Tributary Pipeline/Channel As-Built

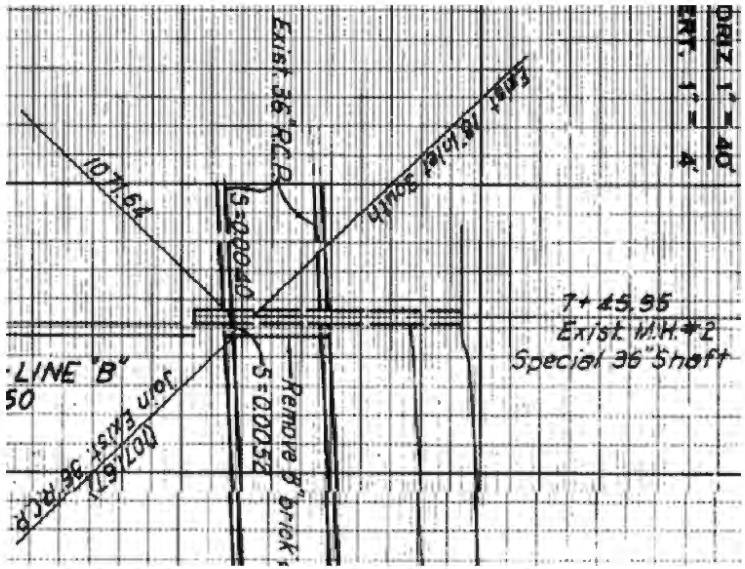


Figure 7 - Secondary Connection Manhole As-Built

Name	BI 4950 - Line A, Unit 2		
Location	8th Street		
Capacity	36"	Drawing No.	PD042079
		Drawing Date	5/5/1972

Name	MH #2 - Sta. 7+45.95		
Location	Approx. 51' east of F St & 8th Street		
Invert Elevation	1071.64	Drawing No.	PD042080
Rim Invert Elevation	1079.40	Drawing Date	8/1/1973

Site Photos

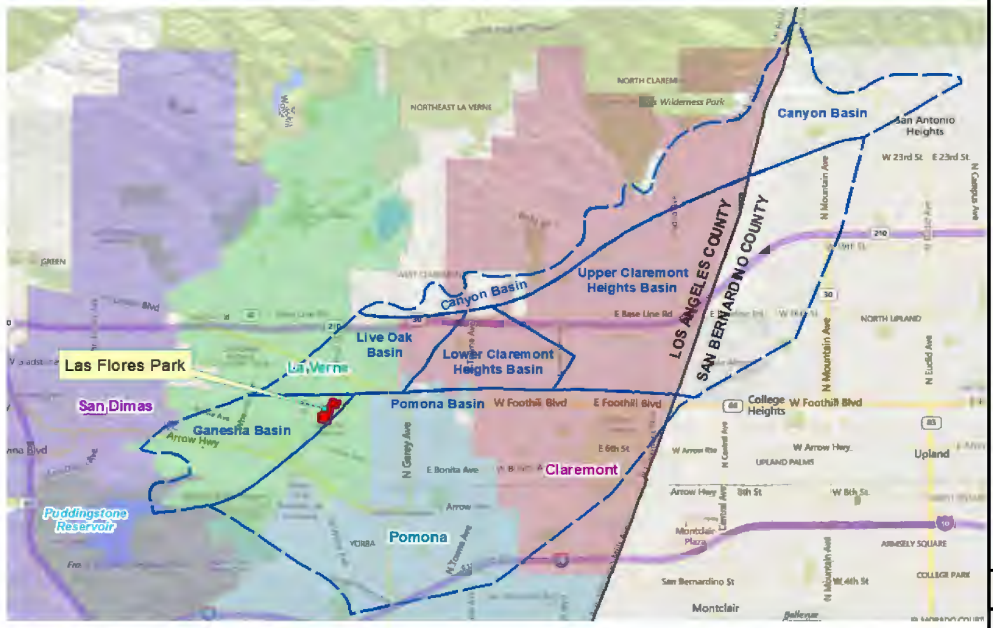


Photo 1 - Site Location

Photo 2 - Primary Connection Location

Description	MH #2 - Sta. 44+66.80 (prev. 44+63.52)		
Photo Date	4/1/17	Photo Time	NA
Direction Facing	East (Photo from Google Street View)		

Photo 3 - Site Looking North

Description			
Photo Date	9/24/19	Photo Time	1:30 PM

Photo 4 - Site Looking East

Description			
Photo Date	9/24/19	Photo Time	1:30 PM

Photo 5 - Secondary Connection Location			
Description	MH #2 - Sta. 7+45.95		
Photo Date	10/23/19	Photo Time	12:30 PM
Direction Facing	West		

Cost Estimation

Item #	Description	Quantity	UOM	Unit Cost	Total Cost
1	Basin Excavation/Preparation				$ 436,646
1	Strip Top Grass/Vegetative Layer - 3"	610	cys	$11.48	$7,000
2	Haul-off/Dispose of Organics	61	lds	$375	$22,875
3	Dump Fees	61	lds	$100	$6,100
4	Haul-off/Dispose of Non-Organics (Sprinkler System, etc.)	8	lds	$450	$3,431
5	Dump Fees	8	lds	$250	$1,906
6	Excavate Basin to Stockpile - Top 2' + Ramp Fill + Bench Volume	6,509	cys	$2.75	$17,900
7	Excavate Basin to Waste (Balance), 8.6' Depth	12,291	cys	$4.00	$49,163
8	Haul-off Cost for Surplus Clean Dirt Spoils	12,291	cys	$25.00	$307,270
9	Prep & Compact Foundation	7,000	sys	$3.00	$21,000
2	Install Stormchamber System				$ 1,654,269
1	Purchase Stormchamber System	1	ls	$889,007	$889,007
2	Stage/Inventory Stormchamber System	3	dys	$4,500	$13,500
3	Purchase/Import Aggregate Stone Backfill	19,000	tns	$16.00	$304,000
4	Excavate/Install Sediment Traps (4)	4	dys	$3,500	$14,000
5	Place/Compact Bottom Aggregate Base Layer - 6"	1,380	tns	11.00	$15,180
6	Install Woven Filter Fabric	61,000	sf	0.25	$15,250
7	Position/Install Stormchambers - 2 Rows	2,639	ea	12.86	$33,930
8	Backfill Stormchamber with Aggregate Base	17,620	tns	13.00	$229,060
9	Install Second Layer Filter Fabric	61,000	sf	0.25	$15,250
10	Supplemental PVC Piping Materials - Lateral Flow & Cleanouts	1	ls	$10,000	$10,000
11	Install PVC Flow Piping	10	dys	$5,000	$50,000
12	Backfill Basin	6,509	cys	$10.00	$65,092
3	Connection Piping				$ 2,135,620
1	Design/Fab/Deliver Pkg Lift Station	2	ea	$200,000	$400,000
2	Install Pkg Lift Station	1	ls	$140,000	$140,000
3	Pkg Lift Station Electrical	1	ls	$250,000	$250,000
4	Design/Fab/Deliver Pkg Hydrodynamic Units	2	ea	$150,000	$300,000
5	Install Pkg Lift Station	1	ls	$105,000	$105,000
6	Force Main - 24" (Paved)	1,250	lf	$600.00	$750,000
7	Gravity Main -24" (Paved)	103	lf	$540.00	$55,620
8	Gravity Main -24" (Unpaved)	250	lf	$480.00	$120,000
9	Manhole Connections	2	ea	$7,500.00	$15,000
4	Site Restoration				$ 252,500
1	Replace Sprinkler System	65,000	sf	$1.50	$97,500
2	Replace Sod	65,000	sf	$2.00	$130,000
3	Miscellaneous	1	ls	$25,000.00	$25,000
A	Contract Allowances & Contingent Bid Items				$ 33,593
1	Contractor Quality Control	1	ls	0.75%	$33,593

Item #	Description	Quantity	UOM	Unit Cost	Total Cost
B	Pre-construction/Mobilization/Temporary Works				$ 41,000
1	Submittals/Procurement/POs/Resource Coordination	1	mo	$15,000	$15,000
2	Establish Baseline Survey / Alignment / As-builts	40	hrs	$275	$11,000
3	Initial Equipment Mobilization	10	lds	$1,000	$10,000
4	Third Party Design Services / Outside Consultants	1	ls	$5,000	$5,000
C	Startup/Commission/Owner Training				$ 45,126
1	All Required	1	ls	1.00%	$45,126
D	Direct Cost Allowances				$ 229,938
1	Estimating Allowance	1	ls	5.0%	$229,938
E	Contractor Markups/Indirect Costs				$ 1,774,197
1	Prime Contractor General Conditions	1	ls	8.0%	$253,695
2	Subcontractor General Conditions	1	ls	8.0%	$132,600
3	Subcontractor Overheads & Markups	1	ls	15%	$268,515
4	Prime Contractor OH&P on Subs	1	ls	6.0%	$123,517
5	Prime Contractor OH&P on Self-Perform	1	ls	12.0%	$411,000
6	Contractor Insurance Program	1	ls	2.5%	$150,450
7	Subcontractor Bonding	1	ls	1.5%	$24,863
8	Escalation from Current PL to NTP (Q3 2020 = 3/4 year)	1	ls	2.63%	$162,575
9	Escalation During Field Construction (2 mos total, or 1.5 mos to MPC)	1	ls	0.44%	$27,807
10	State Sales Taxes (CA)	35%	ls	9.20%	$199,425
11	Contractor Furnished Permits	1	ls	0.30%	$19,749
	Budget Contingency				$ 1,320,578
12	Budget Contingency	1	ls	20.0%	$1,320,578
F	Owner Project Allowances				$ 1,584,694
1	Owner Costs - All	1	ls	20%	$1,584,694
	Total Project Costs (TPC)				**$9,508,000**

Project Name	Lutheran High School		
Site Land Ownership	Faith Lutheran High School Association		
Partner Agency (ies)	City of La Verne		
Net Capture Volume (AFY)	Wet Weather: 6	Dry Weather:	9
Opinion of Probable Capital Cost (Class 5)($-Millions)	0.39		
Total Life-Cycle Cost ($-Millions)	3.26		
Main Site Address	3960 Fruit Street, La Verne, CA 91750		
Main Site Size (acres)	9.2		
Site Coordinates	Latitude: 34.115	Longitude:	-117.760

Description

This project includes an underground infiltration gallery (NDS StormChamber) to be located on the existing sports field at Lutheran High School. Drainage from Amherst Street would flow by gravity into a hydrodynamic separator for pretreatment and then into the infiltration gallery. Additional connections from the existing high school site drains and Iris Circle would flow by gravity to second hydrodynamic separator and then pumped to the infiltration gallery. The infiltration gallery emergency outfall will discharge into an existing catch basin west of the field which eventually flows onto Fruit Street.

Current Site Use

Private high school with parking area and 2 acre athletic field.

Conceptual Design Criteria

Overview		BMP Design	
Tributary Watershed Name	Live Oak Creek	Name of Tributary Pipeline	NA
Assumed Design Infiltration Rate (in/hr) [1]	3.22	Capacity of Tributary Pipeline	24"
Assumed Drawdown Time (hrs)	96	US Connection Invert to BMP (ft)	1171.35
Tributary Area (acres)	39.44	Exist. Ground Surface Elevation at BMP (ft)	1169.6
Assumed Hydrologic Soil Group	A	Min. Planned Invert at BMP (ft)	1165.27
85th-Percentile Design Storm (in)	1.0	Capacity of Facility (AF)	0.151
Gravity or Pumped Flow	Both	Distance to Nearest Well (mi)	0.39
Underground or Above Ground	Underground	Project Design Life (years)	30
Proximity to Recycled Water (mi)	NA	Preliminary SCWP Score	60

Additional Multi-Benefit Opportunities

Prevent and reduce amount of pollutants discharged into local water bodies, prepare for more extreme and frequent drought conditions by capturing and using runoff to reduce demand on water supplies, recharge groundwater.

Potential Challenges

Limited setback/easement available for the Iris Circle junction structure connection. Placement of pump well may interfere with sport field use. Confirmation of utility conflicts and City of La Verne/High School-site storm drain inverts required to validate concept design. Authorization from and collaboration with Lutheran High School would be required.

Stage of Development

☒ Conceptual	☐ Planning	☐ Pre-Design
☐ Design	☐ Construction	☐ Other

Expected Project Timeline	Begin: TBD	End:	TBD

Potentially Applicable Federal and State Programs for Financial Assistance

☒ Measure W	☒ Prop 68	☐ Other _____
☒ Prop 1	☒ EPA Clean Water State Revolving Fund (CWSRF)	

Contact Person(s):

TBD

Notes

1 - Source: NRCS Web Soil Survey. A Safety Factor of 3 was applied for long-term siltation, plugging, and maintenance per LA County GS200.1.

Project Multi-Benefits (per Safe Clean Water Program Table 7)

A. Water Quality Benefits

A.1 Wet Weather Water Quality Benefits (for 0" storms and above)

A.1.1 Cost Effectiveness	1.27	AF / $-Millions	Resulting Points:	20
24-hr BMP Capacity [1]:	2.44	AF		
Construction Cost:	1.93	$ in Millions		
A.1.2 Quantify Pollutant Reduction [1]				
Primary Class Pollutants:	% Load Reduction			
Total Nitrogen	64.5%		Resulting Points:	15
Second or More Class Pollutants:	% Load Reduction			
Total Phosphorous	57.3%		Resulting Points:	5

A.2 Dry Weather Water Quality Benefits (for 0.25" storms and below)

B. Significant Water Supply Benefits

B.1 Water Supply Cost Effectiveness

Cost Effectiveness	7799	$ / AF	Resulting Points:	0
Runoff Captured for Water Supply [1]	14.10	AF		
Annualized Life-Cycle Cost	0.11	$ in Millions		

B.2 Water Supply Benefit Magnitude

Annual Additional Water Supply Volume Resulting from Project [1]	14.10	AF/year	Resulting Points:	0

C. Community Investment Benefits

C.1 Project Benefits

☒ Improved flood management, flood conveyance, or flood risk mitigation
☒ Creation, enhancement, or restoration of parks
☐ Improved public access to waterways
☒ Enhanced or new recreational opportunities
☒ Creation or enhancement of green spaces at school
☐ Improved public health by reducing heat island effect
☐ Increased shade or planting of trees/other vegetation that increase carbon reduction/sequestration

Resulting Points: 5

D. Nature-Based Solutions

D.1 Project Solutions

☒ Implements natural processes or mimics natural processes to slow, detain, capture, and absorb/infiltrate water in a manner that protects, enhances and/or restores habitat, green space and/or usable open space (5 points)
☐ Utilizes natural materials such as soils and vegetation with a preference for native vegetation (5 points)
☐ Removes Impermeable Area from Project (1 point per 20% paved area removed)

Resulting Points: 5

E. Leveraging Funds and Community Support

E.1 Cost-Share

☐ >25% Funding Matched (3 points)
☒ >50% Funding Matched (6 points) Resulting Points: 6

E.2 Community-Based Support

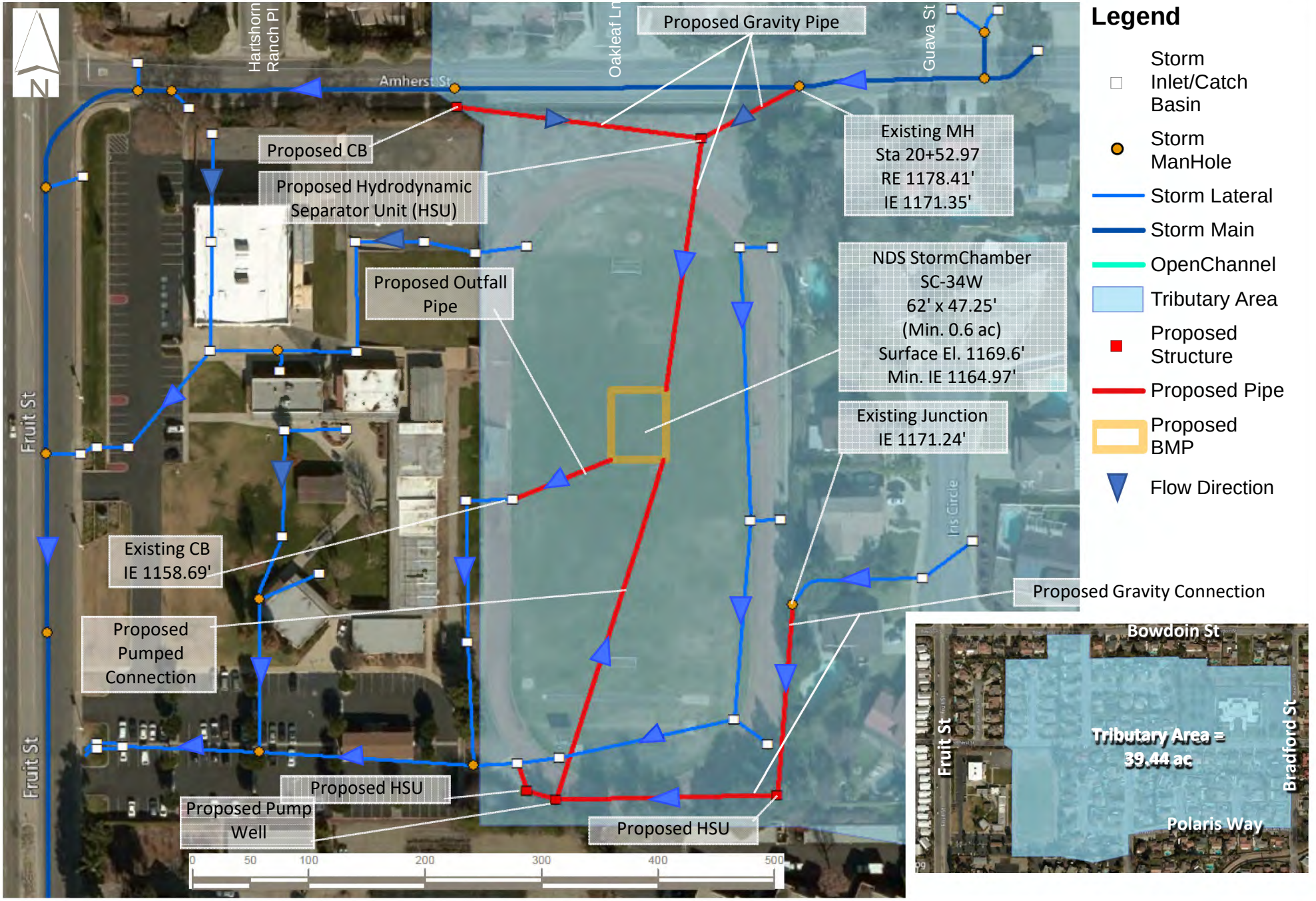
☒ The Project demonstrates strong local, community-based support and/or has been developed as part of a partnership with local NGOs/CBOs (4 points) Resulting Points: 4

Notes **Final Score: 60**

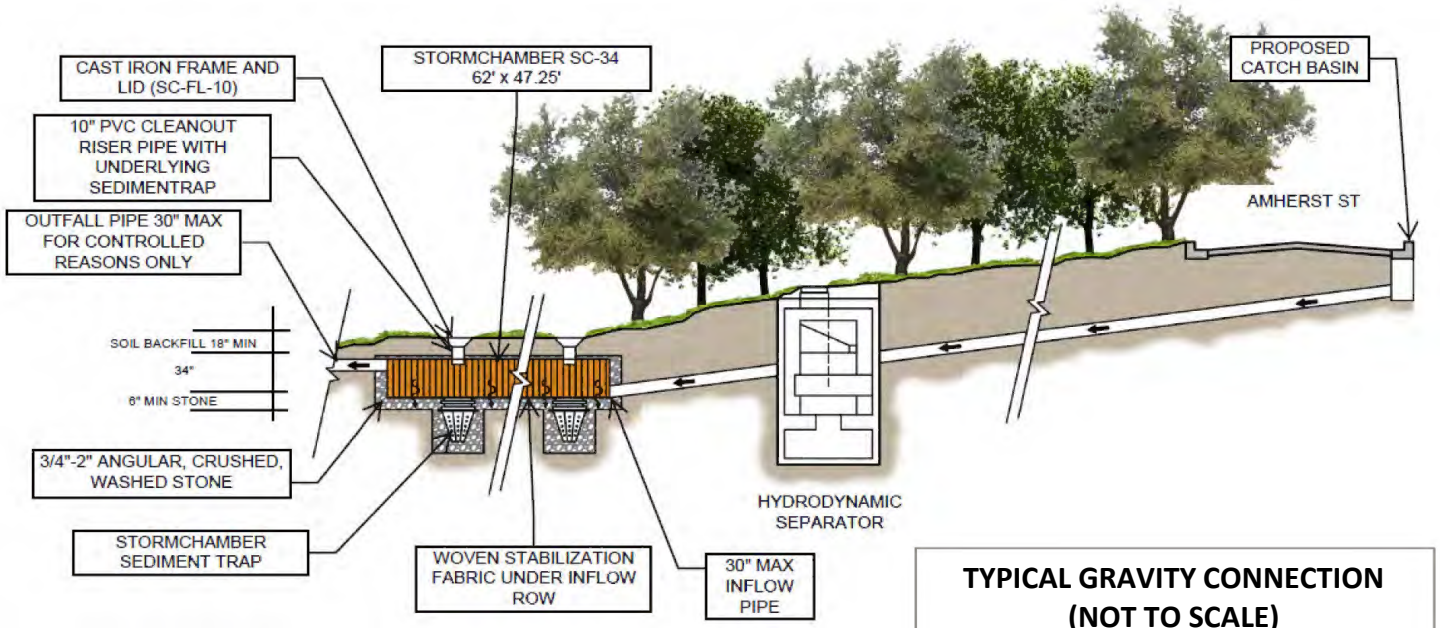
General - All Regional Program Projects must meet the Threshold Score of 60 points or more using the Project Scoring Criteria to be eligible for consideration.

1 - Preliminary estimates based on blended hydrograph inputs to the SCW Project Module.

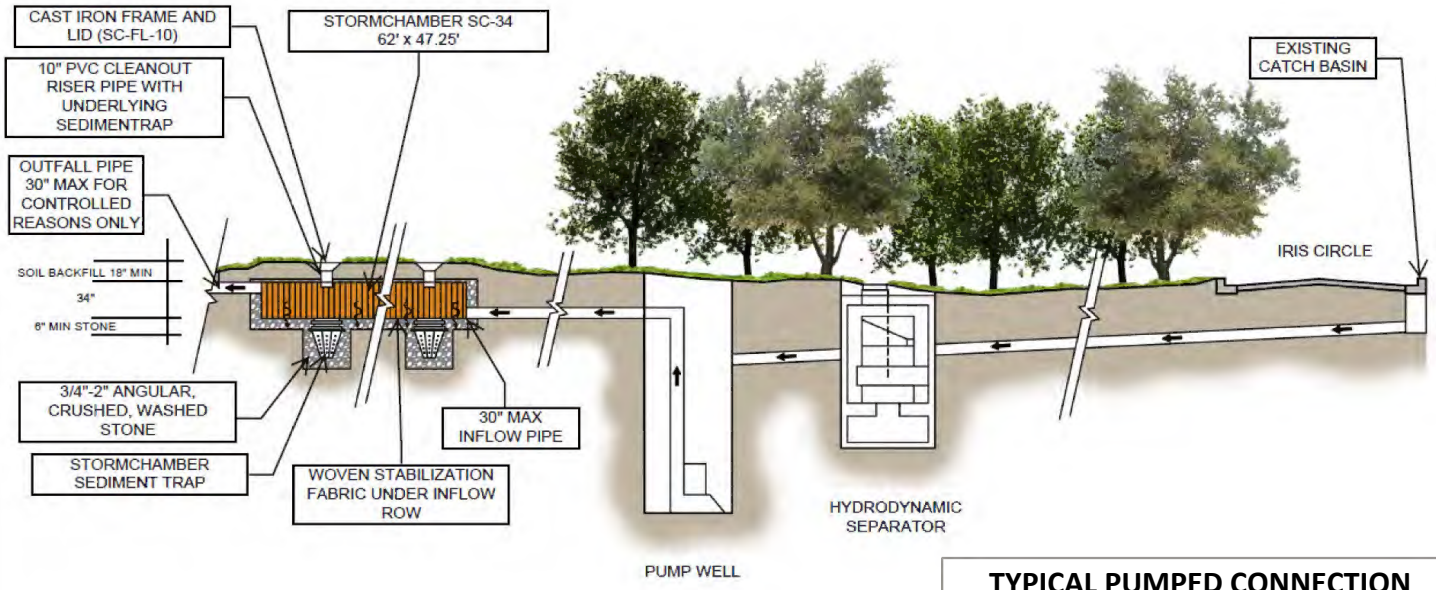
Conceptual GIS Site Plan



Conceptual Site Profile

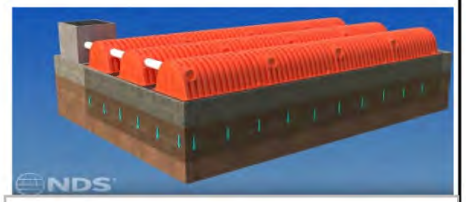


TYPICAL GRAVITY CONNECTION (NOT TO SCALE)



TYPICAL PUMPED CONNECTION (NOT TO SCALE)

EXAMPLE STORMCHAMBER PHOTOS

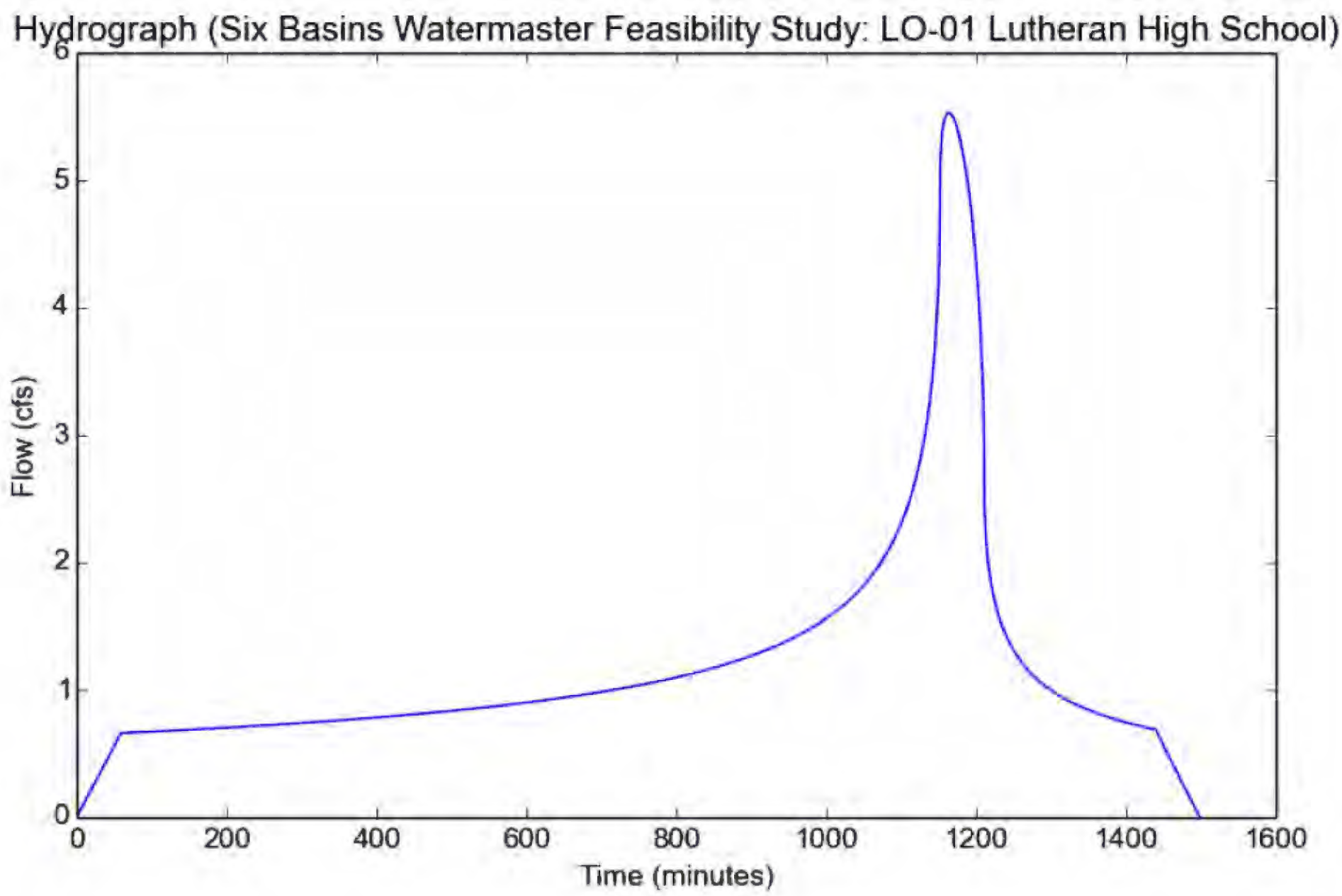


System View

Crushed Washed Stone Cover

PVC Cleanouts (vertical)
Flow Connection Pipes (horizontal)

Hydrograph



Note: This data is based on a blended hydrograph for the overall drainage area.

Design Capture Volume (AF)	2.4432	Design Capture Volume (cu ft)	106425	Peak Flow (cfs)	5.5289

Site Information

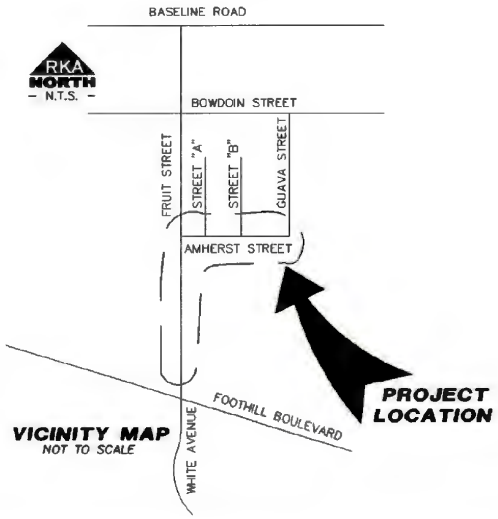


Figure 1 - Tributary Pipeline/Channel As-Built

Name	Storm Drain Improvement Plans, Line 'A', City of La Verne		
Location	Amherst Street		
Capacity	24"	Drawing No.	11341-1
		Drawing Date	11/20/2000

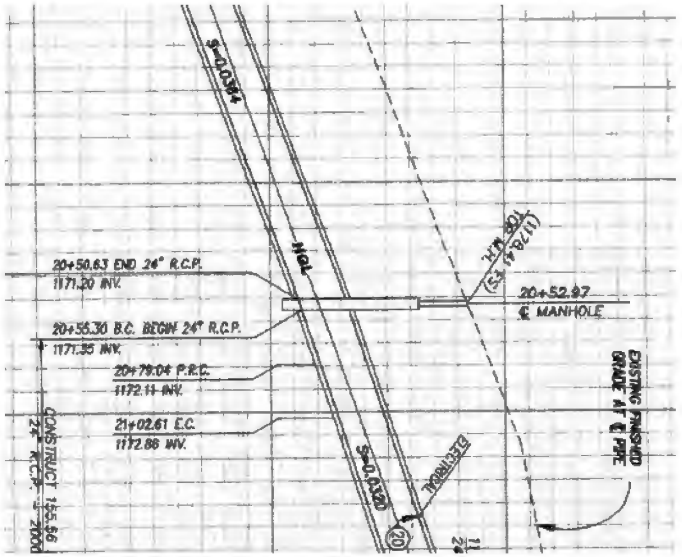


Figure 2 - Connection Manhole As-Built

Name	MH - Sta 20+52.97		
Location	Approx. 150' east of Amherst Street & Oakleaf Lane		
Invert Elevation	1171.35	Drawing No.	11341-3
Rim Invert Elevation	1178.41	Drawing Date	11/20/2000

Figure 3 - Soil Types & Faults

Figure 4 - Depth to Groundwater

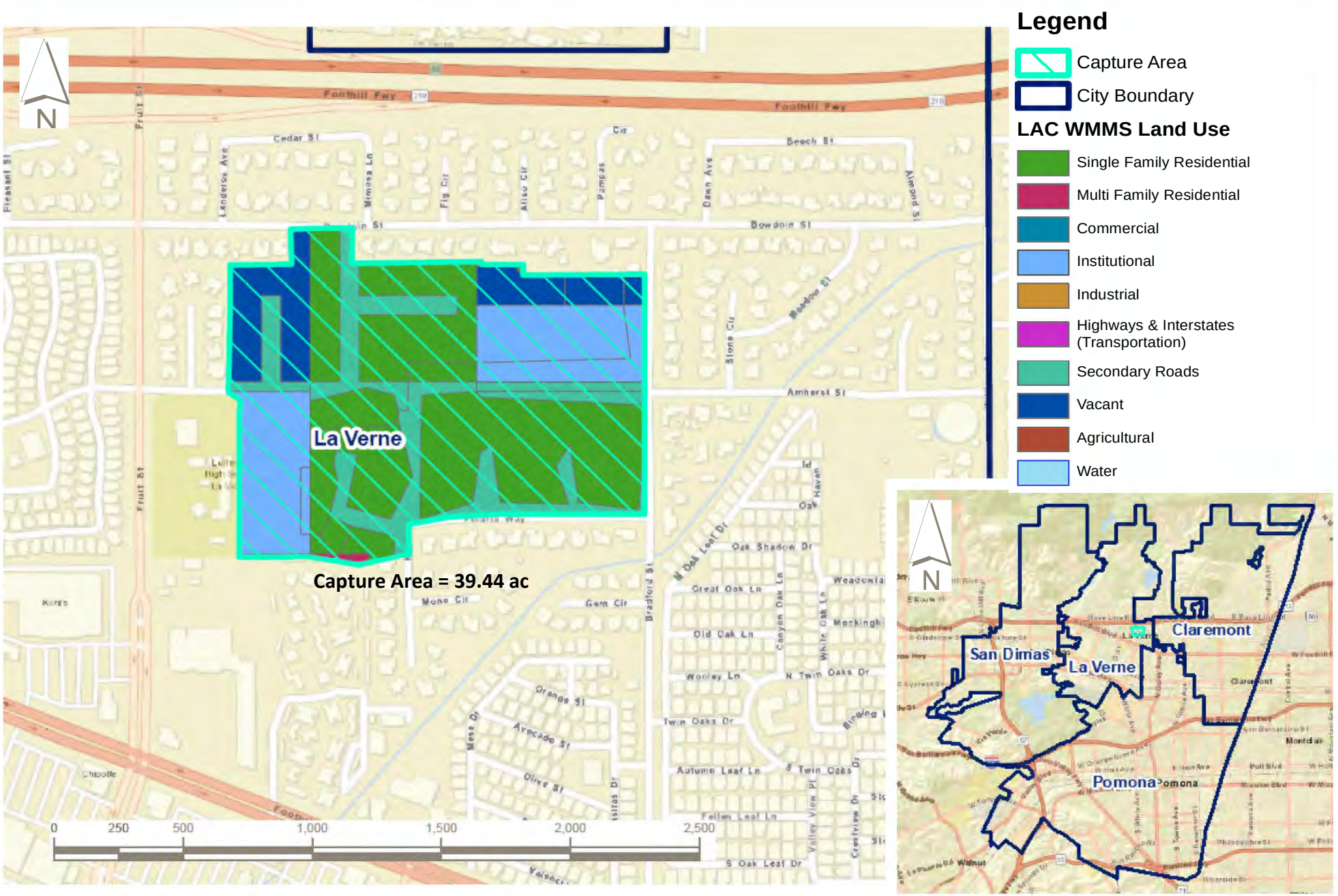


Figure 5 - Capture Area & Land Use

Site Photos

Photo 1 - Site Location

Photo 2 - Connection Location

Description	MH - Sta 20+52.97		
Photo Date	9/25/19	Photo Time	11:30 AM
Direction Facing	West		

Photo 3 - Site Looking South

Description	Athletic field, facing south		
Photo Date	9/24/19	Photo Time	2:00 PM

Photo 4 - Site Looking East

Description	Eastern edge of athletic field		
Photo Date	9/24/19	Photo Time	2:00 PM

Cost Estimation

Item #	Description	Quantity	UOM	Unit Cost	Total Cost
1	Basin Excavation/Preparation				$ 24,263
1	Strip Top Grass/Vegetative Layer - 3"	30	cys	$116.67	$3,500
2	Haul-off/Dispose of Organics	3	lds	$375	$1,125
3	Dump Fees	3	lds	$100	$300
4	Haul-off/Dispose of Non-Organics (Sprinkler System, etc.)	0.4	lds	$450	$169
5	Dump Fees	0.4	lds	$250	$94
6	Excavate Basin to Stockpile - Top 2' + Ramp Fill + Bench Volume	550	cys	$5.50	$3,025
7	Excavate Basin to Waste (Balance), 4.8' Depth	350	cys	$8.00	$2,800
8	Haul-off Cost for Surplus Clean Dirt Spoils	350	cys	$25.00	$8,750
9	Prep & Compact Foundation	1,000	sys	$4.50	$4,500
2	Install Stormchamber System				$ 126,871
1	Purchase Stormchamber System	1	ls	$26,985	$26,985
2	Stage/Inventory Stormchamber System	1	dys	$4,500	$4,500
3	Purchase/Import Aggregate Stone Backfill	1,000	tns	$16.00	$16,000
4	Excavate/Install Sediment Traps (4)	4	dys	$3,500	$14,000
5	Place/Compact Bottom Aggregate Base Layer - 6"	70	tns	22.00	$1,540
6	Install Woven Filter Fabric	2,700	sf	0.50	$1,350
7	Position/Install Stormchambers - 2 Rows	57	ea	25.71	$1,466
8	Backfill Stormchamber with Aggregate Base	930	tns	26.00	$24,180
9	Install Second Layer Filter Fabric	2,700	sf	0.50	$1,350
10	Supplemental PVC Piping Materials - Lateral Flow & Cleanouts	1	ls	$5,000	$5,000
11	Install PVC Flow Piping	5	dys	$5,000	$25,000
12	Backfill Basin	550	cys	$10.00	$5,500
3	Connection Piping				$ 730,360
1	Design/Fab/Deliver Pkg Hydrodynamic Units	1	ea	$150,000	$150,000
2	Install Pkg Lift Station	1	ls	$52,500	$52,500
3	Gravity Main -24" (Paved)	534	lf	$540.00	$288,360
4	Gravity Main -24" (Unpaved)	359	lf	$480.00	$172,320
5	Overflow Length	91	lf	$480.00	$43,680
6	Manhole Connections	2	ea	$7,500	$15,000
7	Catch Basin	1	ea	$8,500	$8,500
4	Site Restoration				$ 17,250
1	Replace Sprinkler System	3,500	sf	$1.50	$5,250
2	Replace Sod	3,500	sf	$2.00	$7,000
3	Miscellaneous	1	ls	$5,000	$5,000
A	Contract Allowances & Contingent Bid Items				$ 6,741
1	Contractor Quality Control	1	ls	0.75%	$6,741
B	Pre-construction/Mobilization/Temporary Works				$ 28,000
1	Submittals/Procurement/POs/Resource Coordination	0.50	mo	$15,000	$7,500

Item #	Description	Quantity	UOM	Unit Cost	Total Cost
2	Establish Baseline Survey / Alignment / As-builts	20	hrs	$275	$5,500
3	Initial Equipment Mobilization	10	lds	$1,000	$10,000
4	Third Party Design Services / Outside Consultants	1	ls	$5,000	$5,000
C	Startup/Commission/Owner Training				$ 9,055
1	All Required	1	ls	1.00%	$9,055
D	Direct Cost Allowances				$ 47,127
1	Estimating Allowance	1	ls	5.0%	$47,127
E	Contractor Markups/Indirect Costs				$ 347,740
1	Prime Contractor General Conditions	1	ls	8.0%	$61,593
2	Subcontractor General Conditions	1	ls	8.0%	$17,600
3	Subcontractor Overheads & Markups	1	ls	15%	$35,603
4	Prime Contractor OH&P on Subs	1	ls	6.0%	$16,377
5	Prime Contractor OH&P on Self-Perform	1	ls	12.0%	$99,800
6	Contractor Insurance Program	1	ls	2.5%	$30,516
7	Subcontractor Bonding	1	ls	1.5%	$3,296
8	Escalation from Current PL to NTP (Q3 2020 = 3/4 year)	1	ls	2.63%	$32,929
9	Escalation During Field Construction (2 mos total, or 1.5 mos to MPC)	1	ls	0.44%	$5,632
10	State Sales Taxes (CA)	35%	ls	9.20%	$40,393
11	Contractor Furnished Permits	1	ls	0.30%	$4,000
	Budget Contingency				$ 267,481
12	Budget Contingency	1	ls	20.0%	$267,481
F	Owner Project Allowances	1	ls		$ 320,978
1	Owner Costs - All	1	ls	20%	$320,978
	Total Project Costs (TPC)				**$1,926,000**

Project Name	Brackett Field		
Site Land Ownership	LA County Department of Public Works		
Partner Agency (ies)	City of La Verne		
Net Capture Volume (AFY)	Wet Weather 110	Dry Weather:	70
Opinion of Probable Capital Cost (Class 5) ($-Millions)	17.98		
Total Life-Cycle Cost ($-Millions)	19.13		
Main Site Address	1615 McKinley Dr, La Verne, CA 91750		
Main Site Size (acres)	236.1		
Site Coordinates	Latitude: 34.092	Longitude:	-117.774

Description

This project proposes an underground NDS StormChamber infiltration gallery located within Brackett Field municipal airport. Drainage from Wright Ave would flow via a pump well into a hydrodynamic separator for pretreatment before being conveyed into the infiltration gallery. Additional connections from 2nd St, Walnut St, would flow via gravity to a separate hydrodynamic separator before being conveyed to the infiltration gallery. The infiltration gallery will discharge onto Fairplex Dr.

Current Site Use

Conceptual Design Criteria

Overview		BMP Design	
Tributary Watershed Name	Live Oak Creek	Name of Primary Tributary Pipeline	MTD NO. 1310 - Line B
Assumed Design Infiltration Rate (in/hr) [1]	1.31	Capacity of Primary Tributary Pipeline	45"
Assumed Drawdown Time (hrs)	96	US Connection Invert to BMP (ft)	1025.35
Tributary Area (acres)	320.92	Exist. Ground Surface Elevation at BMP (ft)	1004
Assumed Hydrologic Soil Group	B	Planned Invert at BMP (ft)	997.75
85th-Percentile Design Storm (in)	1.00	Capacity of Facility (AF)	12.61
Gravity or Pumped Flow	Both	Distance to Nearest Well (mi)	0.25
Underground or Above Ground	Underground	Project Design Life (years)	30
Proximity to Recycled Water (mi)	0.88	Preliminary SCWP Score	66

Additional Multi-Benefit Opportunities

Prevent and reduce amount of pollutants discharged into local water bodies, prepare for more extreme and frequent drought conditions by capturing and using runoff to reduce demand on water supplies, recharge groundwater.

Potential Challenges

Confirmation of utility conflicts required to validate concept design.

Stage of Development

☒ Conceptual	☐ Planning	☐ Pre-Design
☐ Design	☐ Construction	☐ Other

Expected Project Timeline	Begin: TBD	End:	TBD

Potentially Applicable Federal and State Programs for Financial Assistance

☒ Measure W	☒ Prop 68	☐ Other _____
☒ Prop 1	☒ EPA Clean Water State Revolving Fund (CWSRF)	

Contact Person(s):

Richard Smith, Chief, Aviation Division, Los Angeles County Public Works, 626-300-4600, rsmith@dpw.lacounty.gov

Notes

1 - Source: NRCS Web Soil Survey. A Safety Factor of 3 was applied for long-term siltation, plugging, and maintenance per LA County GS200.1.

Project Multi-Benefits (per Safe Clean Water Program Table 7)

A. Water Quality Benefits

A.1 Wet Weather Water Quality Benefits

A.1.1 Cost Effectiveness	0.87	AF / $-Millions	Resulting Points:	14
24-hr BMP Capacity:	15.50	AF		
Construction Cost:	17.81	$ in Millions		
A.1.2 Quantify Pollutant Reduction				
Primary Class Pollutants:	% Load Reduction			
Total Copper	99.4%		Resulting Points:	20
Second or More Class Pollutants:	% Load Reduction			
Total Zinc	99.7%		Resulting Points:	10

A.2 Dry Weather Water Quality Benefits (for 0.25" storms and below)

B. Significant Water Supply Benefits

B.1 Water Supply Cost Effectiveness

Cost Effectiveness	3717	$ / AF	Resulting Points:	0
Water Supply	180.25	AF		
Annualized Life-Cycle Cost	0.67	$ in Millions		

B.2 Water Supply Benefit Magnitude

Annual Additional Water Supply Volume Resulting from Project	180.25	AF/year	Resulting Points:	5

C. Community Investment Benefits

C.1 Project Benefits

☒ Improved flood management, flood conveyance, or flood risk mitigation
☒ Creation, enhancement, or restoration of parks
☐ Improved public access to waterways
☐ Enhanced or new recreational opportunities
☐ Creation or enhancement of green spaces at school
☐ Improved public health by reducing heat island effect
☐ Increased shade or planting of trees/other vegetation that increase carbon reduction/sequestration

Resulting Points: 2

D. Nature-Based Solutions

D.1 Project Solutions

☒ Implements natural processes or mimics natural processes to slow, detain, capture, and absorb/infiltrate water in a manner that protects, enhances and/or restores habitat, green space and/or usable open space (5 points)
☐ Utilizes natural materials such as soils and vegetation with a preference for native vegetation (5 points)
☐ Removes Impermeable Area from Project (1 point per 20% paved area removed)

Resulting Points: 5

E. Leveraging Funds and Community Support

E.1 Cost-Share

☐ >25% Funding Matched (3 points)
☒ >50% Funding Matched (6 points) Resulting Points: 6

E.2 Community-Based Support

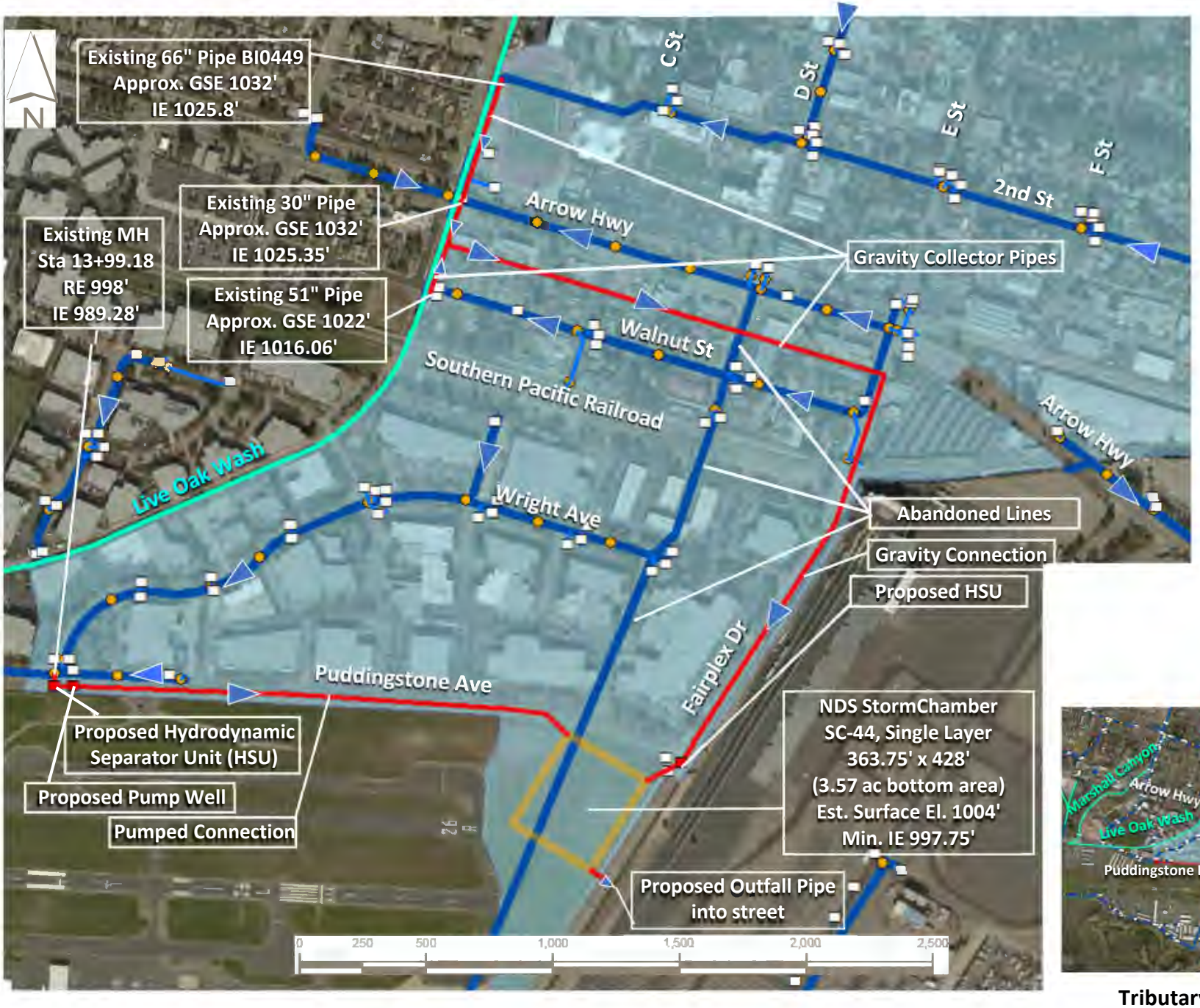
☒ The Project demonstrates strong local, community-based support and/or has been developed as part of a partnership with local NGOs/CBOs (4 points) Resulting Points: 4

Notes **Final Score: 66**

General - All Regional Program Projects must meet the Threshold Score of 60 points or more using the Project Scoring Criteria to be eligible for consideration.

1 - Preliminary estimates based on blended hydrograph inputs to the SCW Project Module.

Conceptual GIS Site Plan

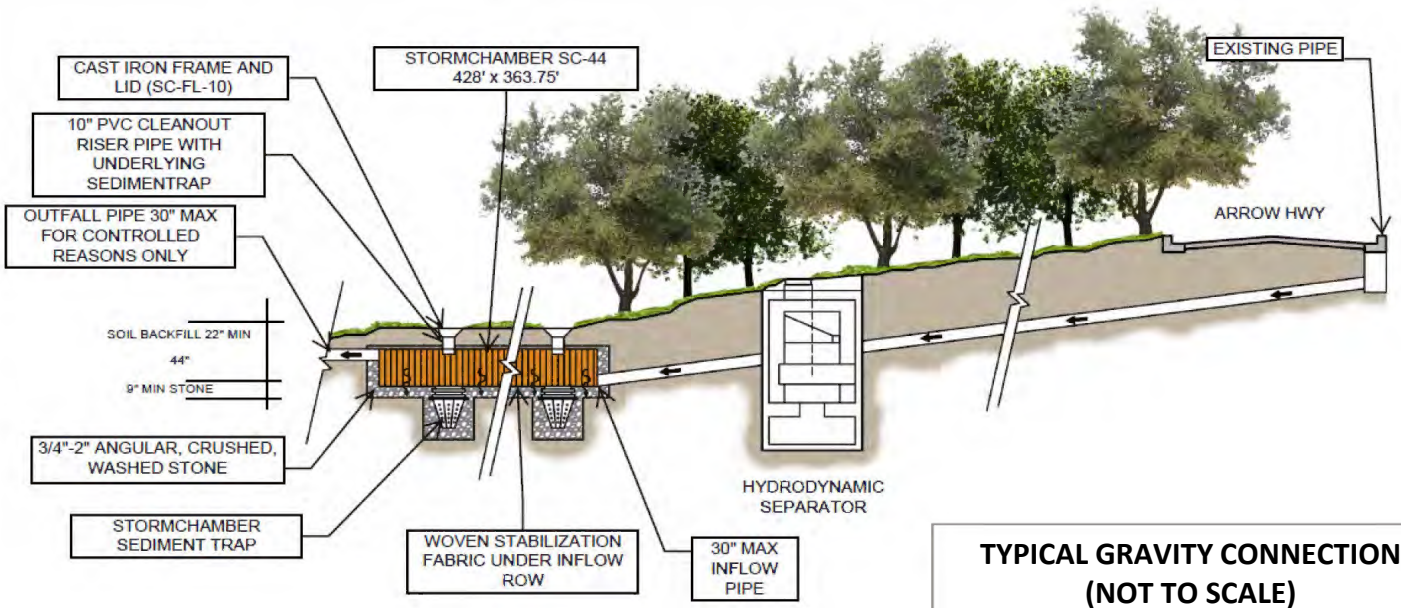


Legend

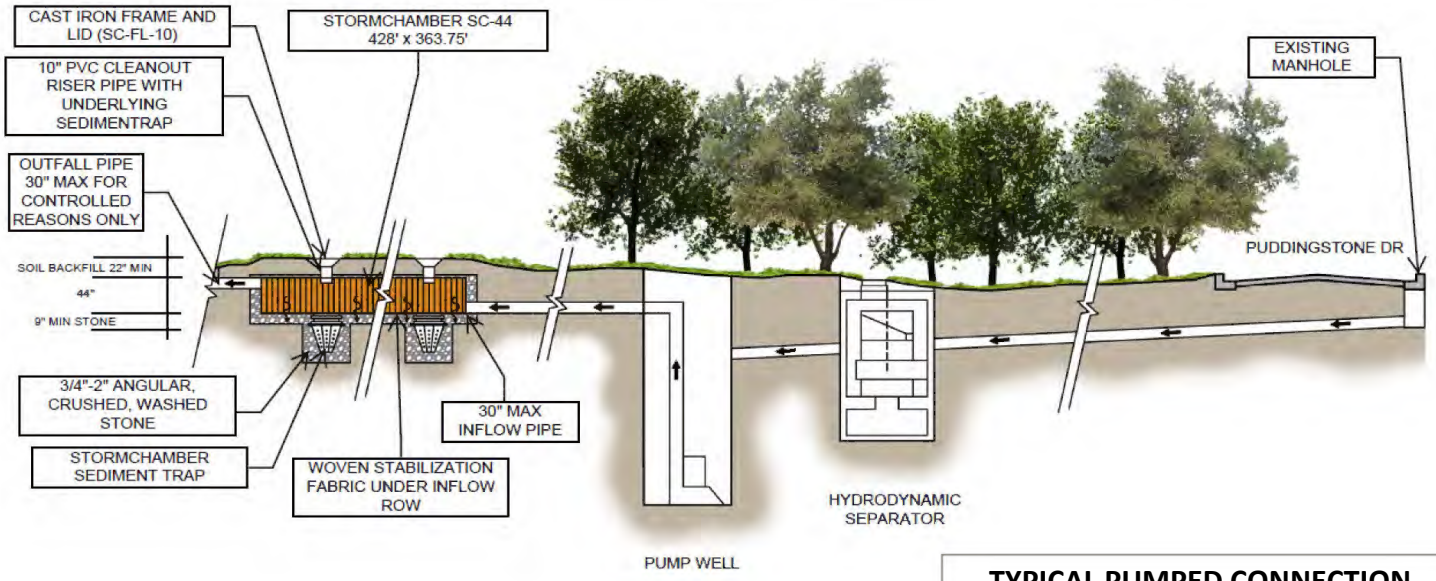
- Storm Inlet/Catch Basin
- Storm ManHole
- Storm Lateral
- Storm Main
- OpenChannel
- Tributary Area
- Proposed Structure
- Proposed Pipe
- Proposed BMP
- Flow Direction

Tributary Area = 320.92 ac

Conceptual Site Profile

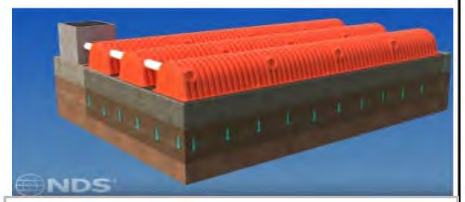


TYPICAL GRAVITY CONNECTION (NOT TO SCALE)



TYPICAL PUMPED CONNECTION (NOT TO SCALE)

EXAMPLE STORMCHAMBER PHOTOS

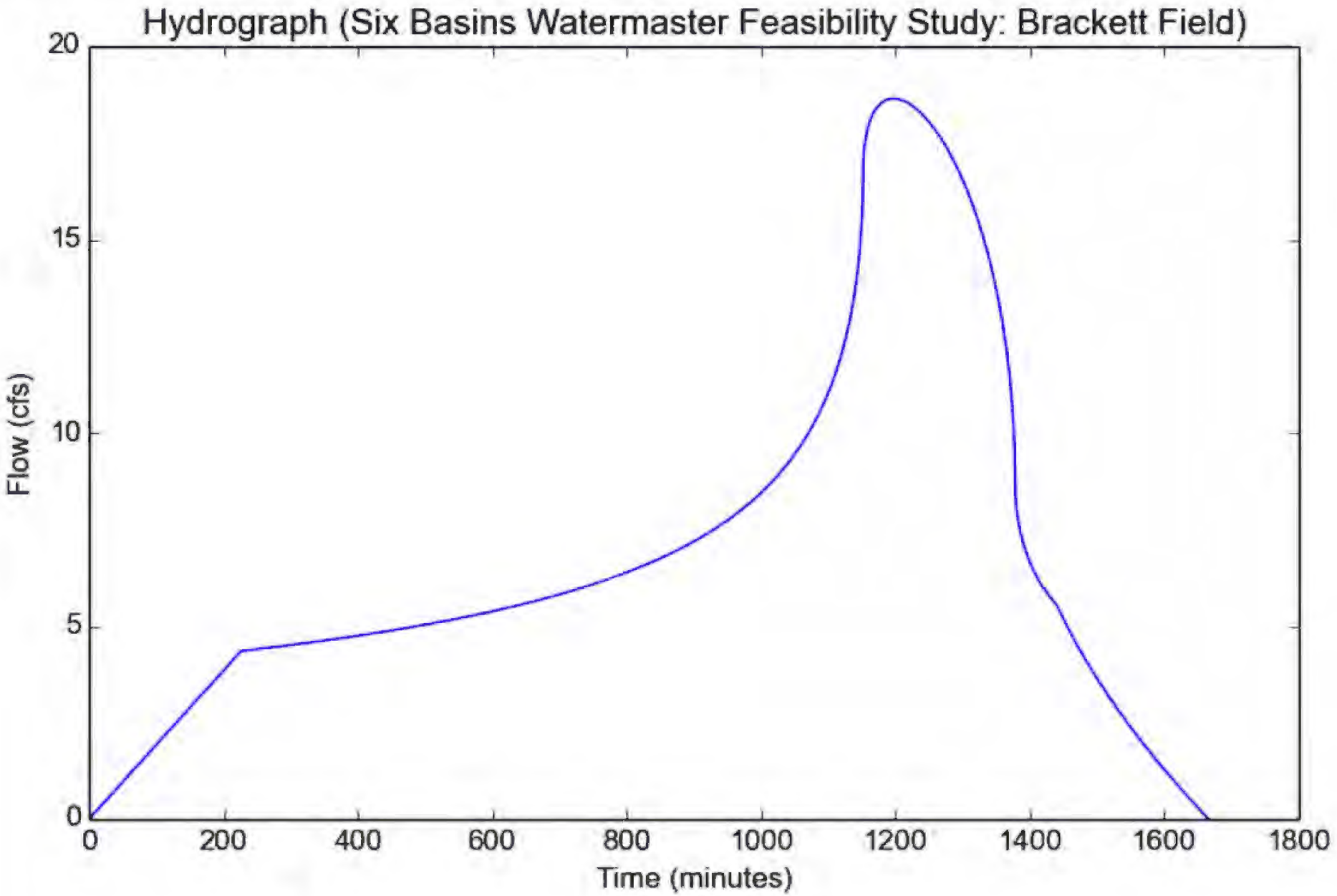


System View

Crushed Washed Stone Cover

PVC Cleanouts (vertical)
Flow Connection Pipes (horizontal)

Hydrograph



Note: This data is based on a blended hydrograph for the overall drainage area.

Design Capture Volume (AF)	15.5013	Design Capture Volume (cu ft)	675237.4	Peak Flow (cfs)	18.6474

Site Information

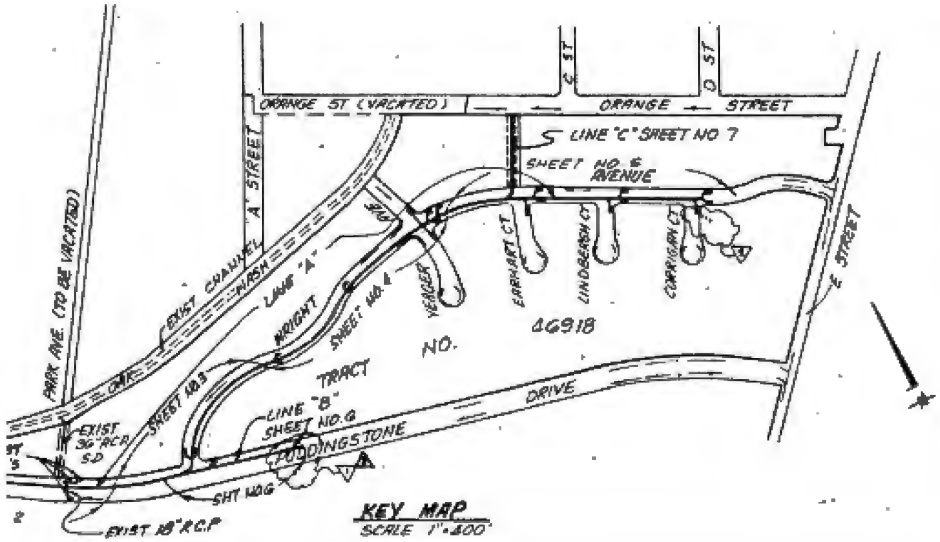


Figure 1 - Pumped Connection - Tributary Pipeline/Channel As-Built

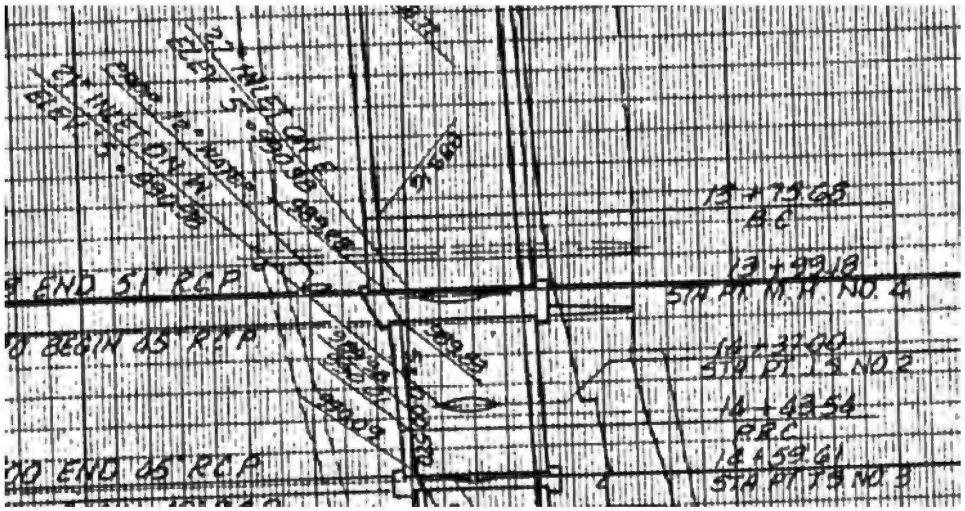


Figure 2 - Pumped Connection - Connection Manhole As-Built

Name	MTD NO. 1310 - Line B		
Location	Puddingstone Drive		
Capacity	45"	Drawing No.	PF518890
		Drawing Date	5/22/1989

Name	MH Sta 13+99.18		
Location	Puddingstone Dr & Wright Ave		
Invert Elevation	989.28	Drawing No.	PF518892
Rim Invert Elevation	998.00	Drawing Date	5/22/1989

Figure 3 - Soil Types & Faults

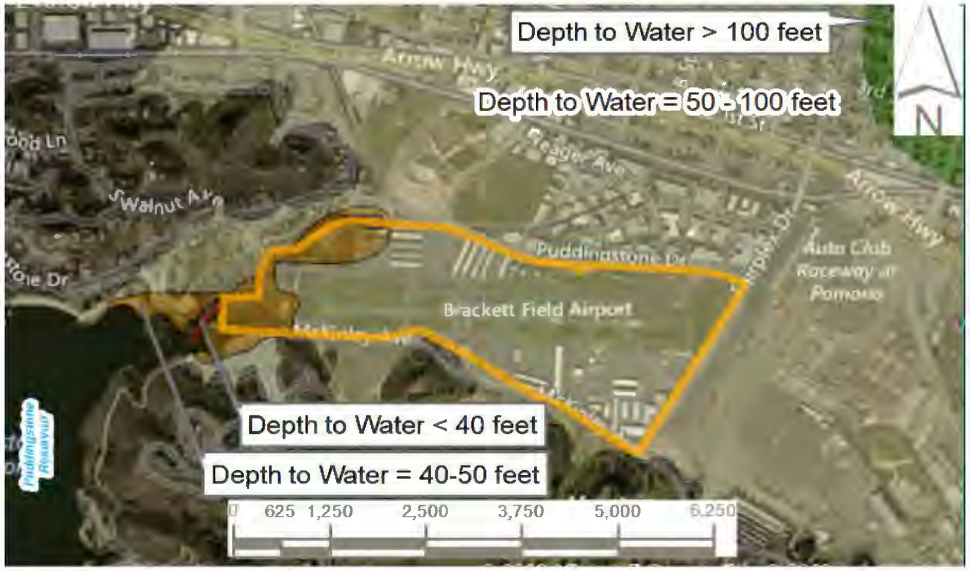


Figure 4 - Depth to Groundwater

Site Information

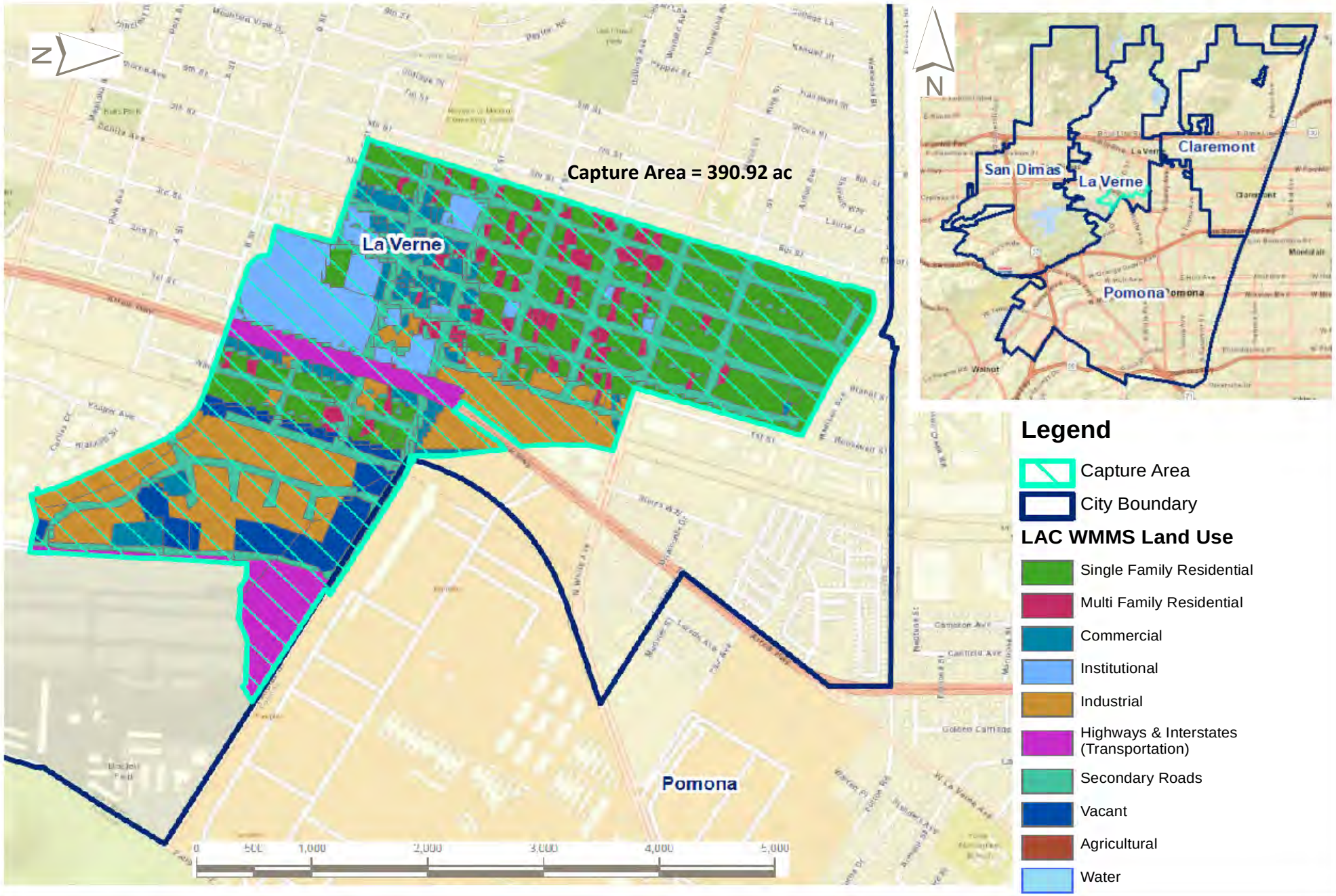


Figure 5 - Capture Area & Land Use

Site Information

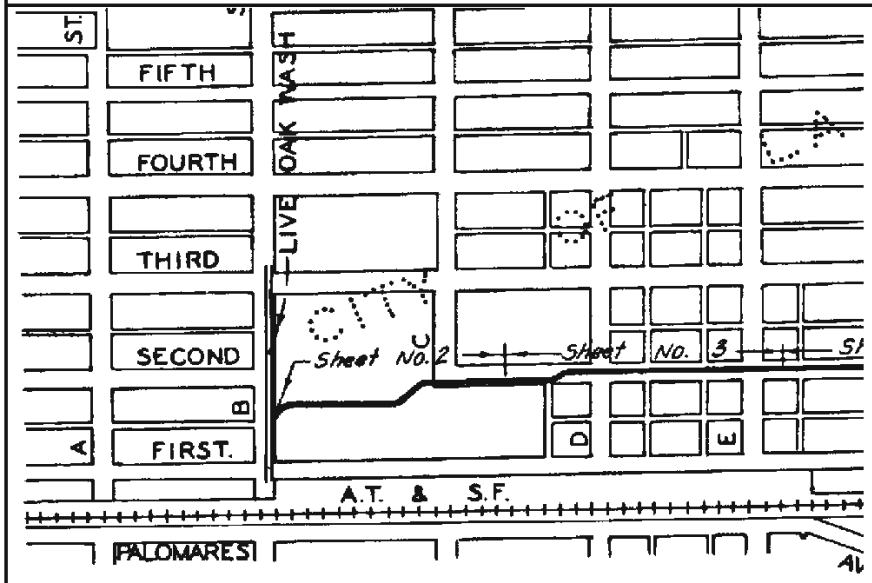


Figure 6 - Tributary Pipeline/Channel As-Built

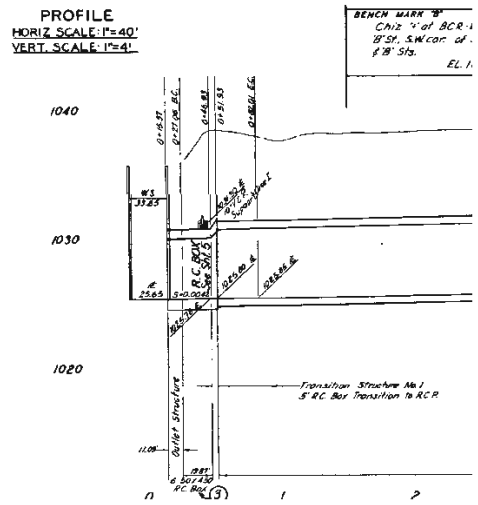


Figure 7 - Connection Manhole As-Built

Name	BI0449		
Location	B St & 1 st		
Capacity	66"	Drawing No.	PD028719
		Drawing Date	10/25/1960

Name	MH Sta 0+51.93		
Location	B street & 2nd street		
Invert Elevation	1025.80	Drawing No.	PD028720
Rim Invert Elevation	1032.00	Drawing Date	6/15/1974

Site Information

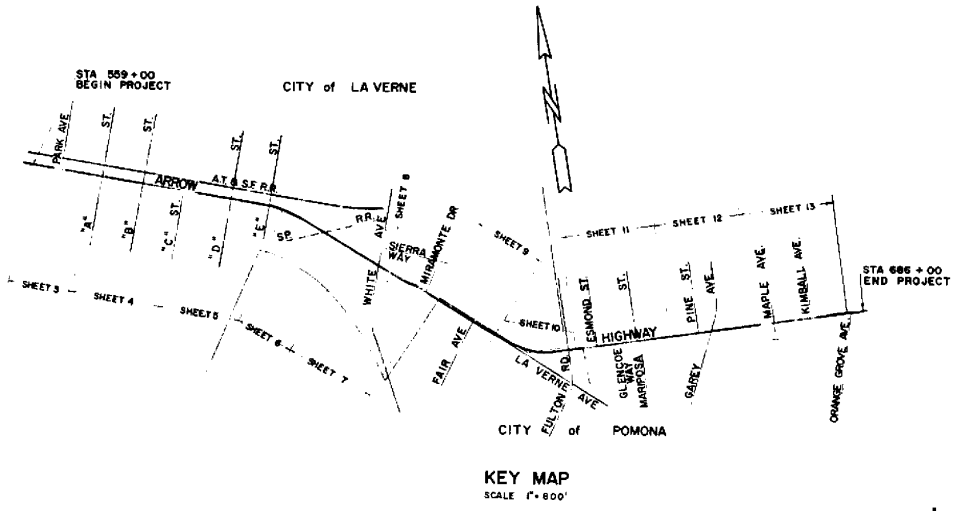


Figure 6 - Tributary Pipeline/Channel As-Built

Name	RDD 0084		
Location	Arrow Hwy		
Capacity	30"	Drawing No.	PH055798
		Drawing Date	1/6/1969

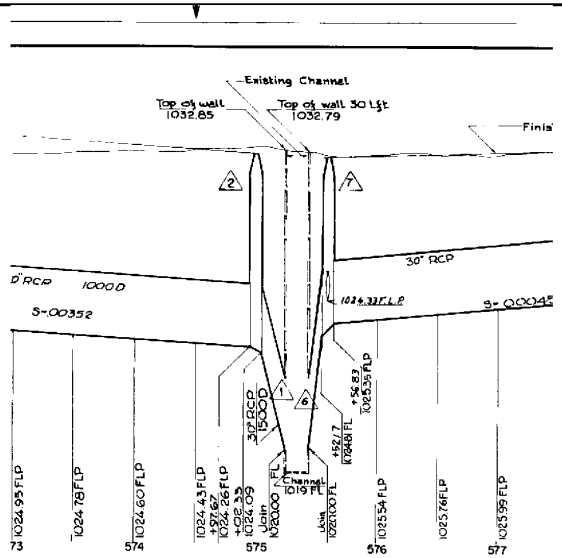


Figure 7 - Connection Manhole As-Built

Name	MH Sta 575+45		
Location	Live Oak Channel & Arrow Hwy		
Invert Elevation	1025.35	Drawing No.	PH055812
Rim Invert Elevation	1032.00	Drawing Date	1/6/1969

Site Information

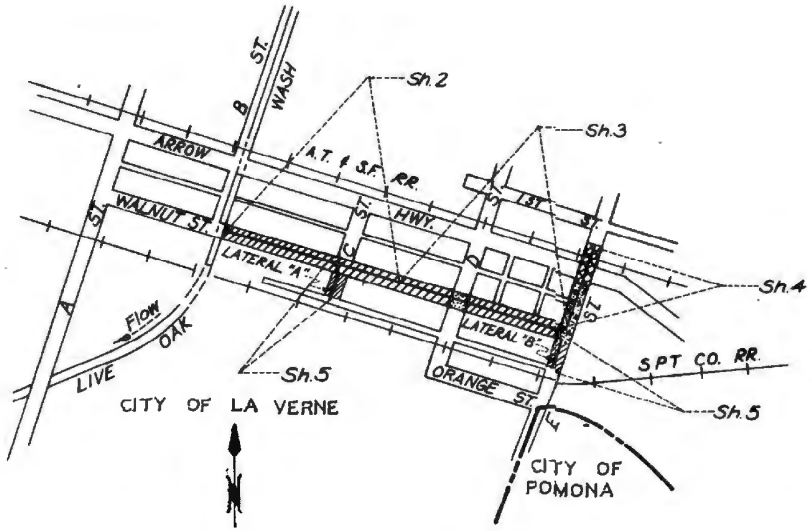


Figure 6 - Tributary Pipeline/Channel As-Built

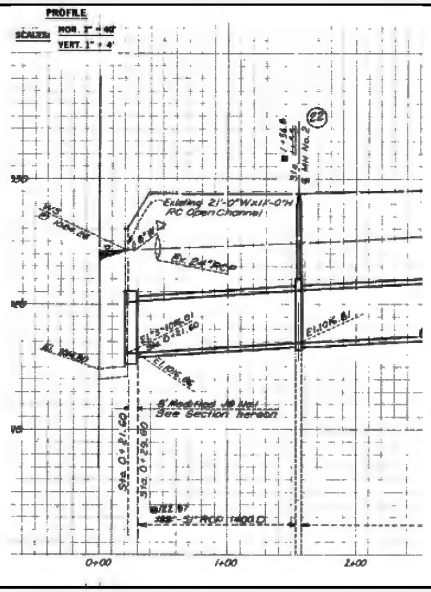


Figure 7 - Connection Manhole As-Built

Name	E Street Drain		
Location	Walnut Street		
Capacity	51"	Drawing No.	PD021718
		Drawing Date	8/1/1990

Name	Manhole No. 2 Sta 1+56.8		
Location	Walnut St & Live Oak Wash		
Invert Elevation	1016.06	Drawing No.	PD021718
Rim Invert Elevation	1022.00	Drawing Date	8/1/1990

Site Photos

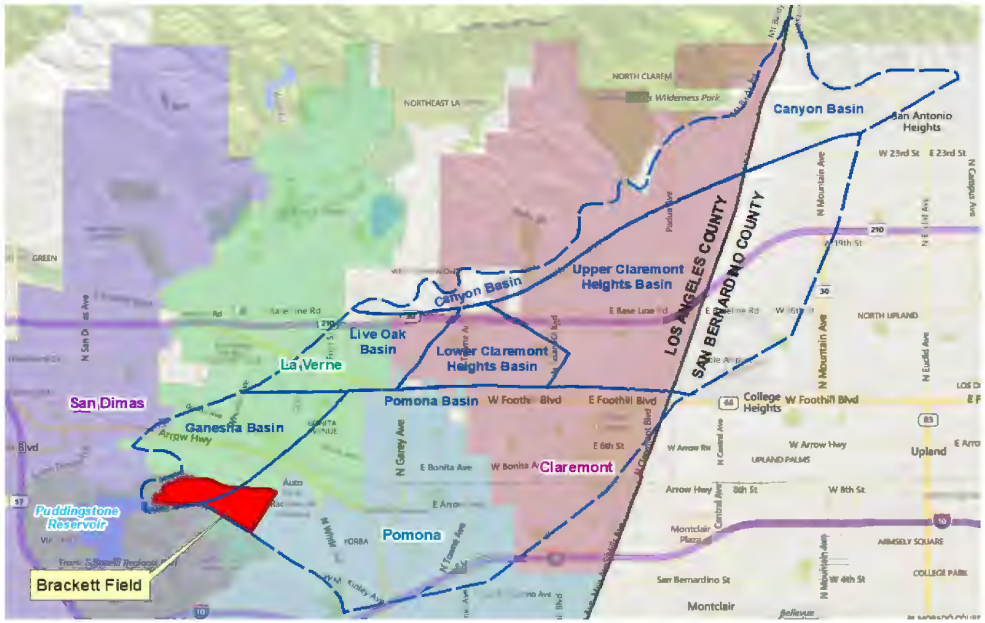


Photo 1 - Site Location

Photo 2 - Pumped Connection Location

Description	MH Sta. 13+99.18		
Photo Date	6/1/15	Photo Time	NA
Direction Facing	Northeast (photo from Google Street View)		

Photo 3 - Site Looking Northeast

Description	NDS infiltration basin location		
Photo Date	9/24/19	Photo Time	10:30 AM

Photo 4 - Site Looking West

Description	NDS infiltration basin location		
Photo Date	9/24/19	Photo Time	10:30 AM

Site Photos

Photo 5 - Gravity Connection Location

Description	MH Sta 0+51.93		
Photo Date	10/1/19	Photo Time	NA
Direction Facing	NW		

Photo 6 - Gravity Connection Location

Description	Manhole No. 2 Sta 1+56.8		
Photo Date	9/28/19	Photo Time	12:34 PM
Direction Facing	NE		

Description			
Photo Date		Photo Time	

Description			
Photo Date		Photo Time	

Cost Estimation

Item #	Description	Quantity	UOM	Unit Cost	Total Cost
1	Basin Excavation/Preparation				$ 446,745
1	Strip Top Grass/Vegetative Layer - 3"	1,420	cys	$4.93	$7,000
2	Haul-off/Dispose of Organics	142	lds	$375	$53,250
3	Dump Fees	142	lds	$100	$14,200
4	Haul-off/Dispose of Non-Organics (Sprinkler System, etc.)	18	lds	$450	$7,988
5	Dump Fees	18	lds	$250	$4,438
6	Excavate Basin to Stockpile - Top 2' + Ramp Fill + Bench Volume	13,011	cys	$2.75	$35,781
7	Excavate Basin to Waste (Balance), 8.6' Depth	9,417	cys	$4.00	$37,668
8	Haul-off Cost for Surplus Clean Dirt Spoils	9,417	cys	$25.00	$235,422
9	Prep & Compact Foundation	17,000	sys	$3.00	$51,000
2	Install Stormchamber System				$ 2,803,339
1	Purchase Stormchamber System	1	ls	$1,410,484	$1,410,484
2	Stage/Inventory Stormchamber System	4	dys	$4,500	$18,000
3	Purchase/Import Aggregate Stone Backfill	35,000	tns	$16.00	$560,000
4	Excavate/Install Sediment Traps (4)	6	dys	$3,500	$21,000
5	Place/Compact Bottom Aggregate Base Layer - 6"	790	tns	11.00	$8,690
6	Install Woven Filter Fabric	98,325	sf	0.25	$24,581
7	Position/Install Stormchambers - 2 Rows	4,210	ea	15.71	$66,162
8	Backfill Stormchamber with Aggregate Base	34,210	tns	13.00	$444,730
9	Install Second Layer Filter Fabric	98,325	sf	0.25	$24,581
10	Supplemental PVC Piping Materials - Lateral Flow & Cleanouts	1	ls	$20,000	$20,000
11	Install PVC Flow Piping	15	dys	$5,000	$75,000
12	Backfill Basin	13,011	cys	$10.00	$130,111
3	Connection Piping				$ 4,772,800
1	Design/Fab/Deliver Pkg Lift Station	1	ea	$ 200,000.00	$ 200,000
2	Install Pkg Lift Station	1	ls	$ 70,000.00	$ 70,000
3	Pkg Lift Station Electrical	1	ls	$ 250,000.00	$ 250,000
4	Design/Fab/Deliver Pkg Hydrodynamic Units	3	ea	$ 150,000.00	$ 450,000
5	Install Pkg Lift Station	1	ls	$ 157,500.00	$ 157,500
6	Force Main - 24" (Paved)	511	lf	$ 600.00	$ 306,600
7	Gravity Main -24" (Paved)	4159	lf	$ 540.00	$ 2,245,860
8	Gravity Main -24" (Unpaved)	2115	lf	$ 480.00	$ 1,015,200
9	Overflow -24"	68	lf	$ 480.00	$ 32,640
10	Manhole Connections	2	ea	$ 7,500.00	$ 15,000
11	New Manhole	2	ea	$ 15,000.00	$ 30,000
4	Site Restoration				$ 558,610
1	Replace Sprinkler System	152460	sf	$ 1.50	$ 228,690
2	Replace Sod	152460	sf	$ 2.00	$ 304,920
3	Miscellaneous	1	ls	$ 25,000.00	$ 25,000

Item #	Description	Quantity	UOM	Unit Cost	Total Cost
A	Contract Allowances & Contingent Bid Items				$ 64,361
1	Contractor Quality Control	1	ls	0.75%	$ 64,361
B	Pre-construction / Mobilization /Temporary Works				$ 41,000
1	Submittals/Procurement/POs/Resource Coordination	1	mo	$ 15,000.00	$ 15,000
2	Establish Baseline Survey / Alignment / As-builts	40	hrs	$ 275.00	$ 11,000
3	Initial Equipment Mobilization	10	lds	$ 1,000.00	$ 10,000
4	Third Party Design Services / Outside Consultants	1	ls	$ 5,000.00	$ 5,000
C	Startup/Commission/Owner Training				$ 86,459
1	All Required	1	ls	1%	$ 86,459
D	Direct Cost Allowances				$ 438,666
1	Estimating Allowance	1	ls	5%	$ 438,666
E	Contractor Markups/Indirect Costs				$ 3,152,753
1	Prime Contractor General Conditions	1	ls	8.0%	$623,670
2	Subcontractor General Conditions	1	ls	8.0%	$113,300
3	Subcontractor Overheads & Markups	1	ls	15%	$229,412
4	Prime Contractor OH&P on Subs	1	ls	6.0%	$105,529
5	Prime Contractor OH&P on Self-Perform	1	ls	12.0%	$1,010,300
6	Contractor Insurance Program	1	ls	2.5%	$282,355
7	Subcontractor Bonding	1	ls	1.5%	$21,242
8	Escalation from Current PL to NTP (Q3 2020 = 3/4 year)	1	ls	2.63%	$304,442
9	Escalation During Field Construction (2 mos total, or 1.5 mos to MPC)	1	ls	0.44%	$52,072
10	State Sales Taxes (CA)	35%	ls	9.20%	$373,449
11	Contractor Furnished Permits	1	ls	0.30%	$36,983
	Budget Contingency				$ 2,472,947
12	Budget Contingency	1	ls	20%	$ 2,472,947
F	Owner Project Allowances				$ 2,967,536
1	Owner Costs - All	1	ls	20%	$ 2,967,536
	Total Project Cost			**$**	**17,805,000**

Project Name	The Claremont Colleges (formerly Rancho Santa Ana Botanic Garden (RSABG))		
Site Land Ownership	The Claremont Colleges (TCC)		
Partner Agency (ies)	City of Claremont		
Net Capture Volume (AFY)	Wet Weather: 29	Dry Weather:	40
Opinion of Probable Capital Cost (Class 5) ($-Millions)	2.70		
Total Life-Cycle Cost ($-Millions)	3.45		
Main Site Address	N Indian Hill Blvd & Via Zurita St		
Main Site Size (acres)	33.6 (Approx. Claremont Golf Course site area)		
Site Coordinates	Latitude: 34.112	Longitude:	-117.720

Description

This project includes an open infiltration basin to be located at the former Claremont Golf Course. Drainage from the Indian Hill Drain would flow by gravity into a hydrodynamic separator for pretreatment, and then into the infiltration basin. The infiltration basin will replace approximately 0.46 acres of pavement where the existing parking lot is located. The outlet structure/emergency outfall would discharge into an existing downstream manhole on the Indian Hill Drain.

Current Site Use

Former site of the Claremont Golf Course. The Claremont Colleges indicated no current use for the site, but retain the property for future campus expansion.

Conceptual Design Criteria

Overview		BMP Design	
Tributary Watershed Name	San Antonio	Name of Primary Tributary Pipeline	Indian Hill Drain
Assumed Design Infiltration Rate (in/hr) [1]	4.20	Capacity of Primary Tributary Pipeline	39"
Assumed Drawdown Time (hrs)	96	US Connection Invert to BMP (ft)	1313.76
Tributary Area (acres)	183.28	Exist. Ground Surface Elevation at BMP (ft)	1308
Assumed Hydrologic Soil Group	A	Planned Invert at BMP (ft)	1304
85th-Percentile Design Storm (in)	0.9	Capacity of Facility (AF)	1.55
Gravity or Pumped Flow	Gravity	Distance to Nearest Well (mi)	0.43
Underground or Above Ground	Above	Project Design Life (years)	Approx. 30
Proximity to Recycled Water (mi)	NA	Preliminary SCWP Score	69

Additional Multi-Benefit Opportunities

Prevent and reduce amount of pollutants discharged into local water bodies, prepare for more extreme and frequent drought conditions by capturing and using runoff to reduce demand on water supplies, recharge groundwater. Conversion of 0.46 acres of existing paved area to on-site water feature.

Potential Challenges

Confirmation of utility conflicts required to validate concept design.

Stage of Development

☒ Conceptual	☐ Planning	☐ Pre-Design
☐ Design	☐ Construction	☐ Other

Expected Project Timeline	Begin: TBD	End:	TBD

Potentially Applicable Federal and State Programs for Financial Assistance

☒ Measure W	☒ Prop 68	☐ Other _____
☒ Prop 1	☒ EPA Clean Water State Revolving Fund (CWSRF)	

Contact Person(s):

Katherine Hauser Rubel, Director Of Real Estate And Housing, The Claremont Colleges, (909) 621-8036, katherine_rubel@cuc.claremont.edu

Notes

1 - Source: NRCS Web Soil Survey. A Safety Factor of 3 was applied for long-term siltation, plugging, and maintenance per LA County GS200.1.

Project Multi-Benefits (per Safe Clean Water Program Table 7)

A. Water Quality Benefits

A.1 Wet Weather Water Quality Benefits

A.1.1 Cost Effectiveness	2.57	AF / $-Millions	Resulting Points:	20
24-hr BMP Capacity [1]:	6.30	AF		
Construction Cost:	2.46	$ in Millions		

A.1.2 Quantify Pollutant Reduction [1]

Primary Class Pollutants:	% Load Reduction		
Total Zinc	80.3%	Resulting Points:	20

Second or More Class Pollutants:	% Load Reduction		
Total Nitrogen	87.3%	Resulting Points:	10

A.2 Dry Weather Water Quality Benefits (for 0.25" storms and below)

B. Significant Water Supply Benefits

B.1 Water Supply Cost Effectiveness

Cost Effectiveness	2600	$-Millions / AF	Resulting Points:	0
Runoff Captured for Water Supply [1]	69.23	AF		
Annualized Life-Cycle Cost	0.18	$ in Millions		

B.2 Water Supply Benefit Magnitude

Annual Additional Water Supply Volume Resulting from Project [1]	69.23	AF/year	Resulting Points:	2

C. Community Investment Benefits

C.1 Project Benefits

☒ Improved flood management, flood conveyance, or flood risk mitigation
☒ Creation, enhancement, or restoration of parks or habitats
☐ Improved public access to waterways
☐ Enhanced or new recreational opportunities
☐ Creation or enhancement of green spaces at school
☐ Improved public health by reducing heat island effect
☐ Increased shade or planting of trees/other vegetation that increase carbon reduction/sequestration

Resulting Points: 2

D. Nature-Based Solutions

D.1 Project Solutions

☒ Implements natural processes or mimics natural processes to slow, detain, capture, and absorb/infiltrate water in a manner that protects, enhances and/or restores habitat, green space and/or usable open space (5 points)
☐ Utilizes natural materials such as soils and vegetation with a preference for native vegetation (5 points)
☐ Removes Impermeable Area from Project (1 point per 20% paved area removed)

Resulting Points: 5

E. Leveraging Funds and Community Support

E.1 Cost-Share

☐ >25% Funding Matched (3 points)
☒ >50% Funding Matched (6 points) Resulting Points: 6

E.2 Community-Based Support

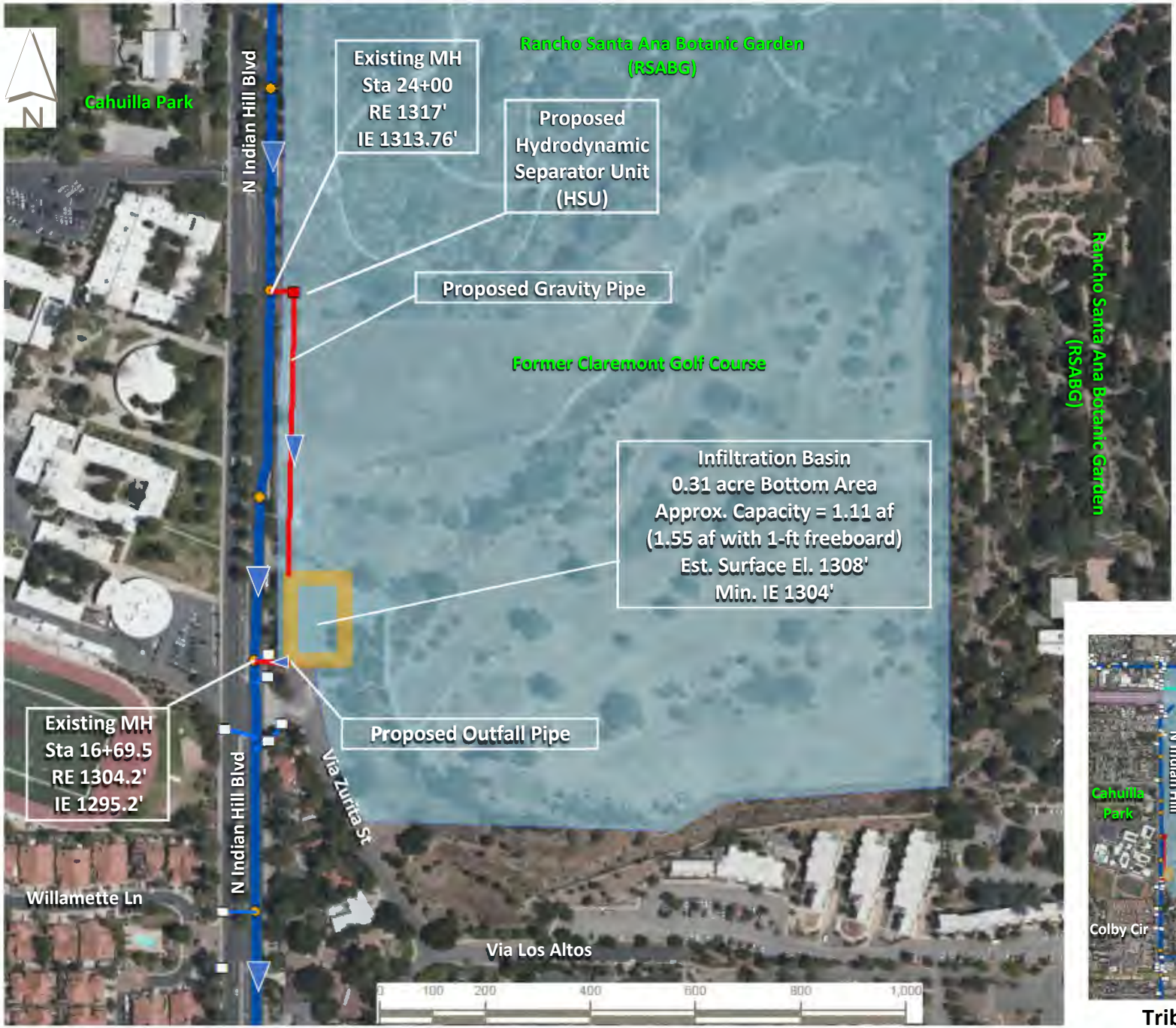
☒ The Project demonstrates strong local, community-based support and/or has been developed as part of a partnership with local NGOs/CBOs (4 points) Resulting Points: 4

Notes **Final Score: 69**

General - All Regional Program Projects must meet the Threshold Score of 60 points or more using the Project Scoring Criteria to be eligible for consideration.

1 - Preliminary estimates based on blended hydrograph inputs to the SCW Project Module.

Conceptual GIS Site Plan

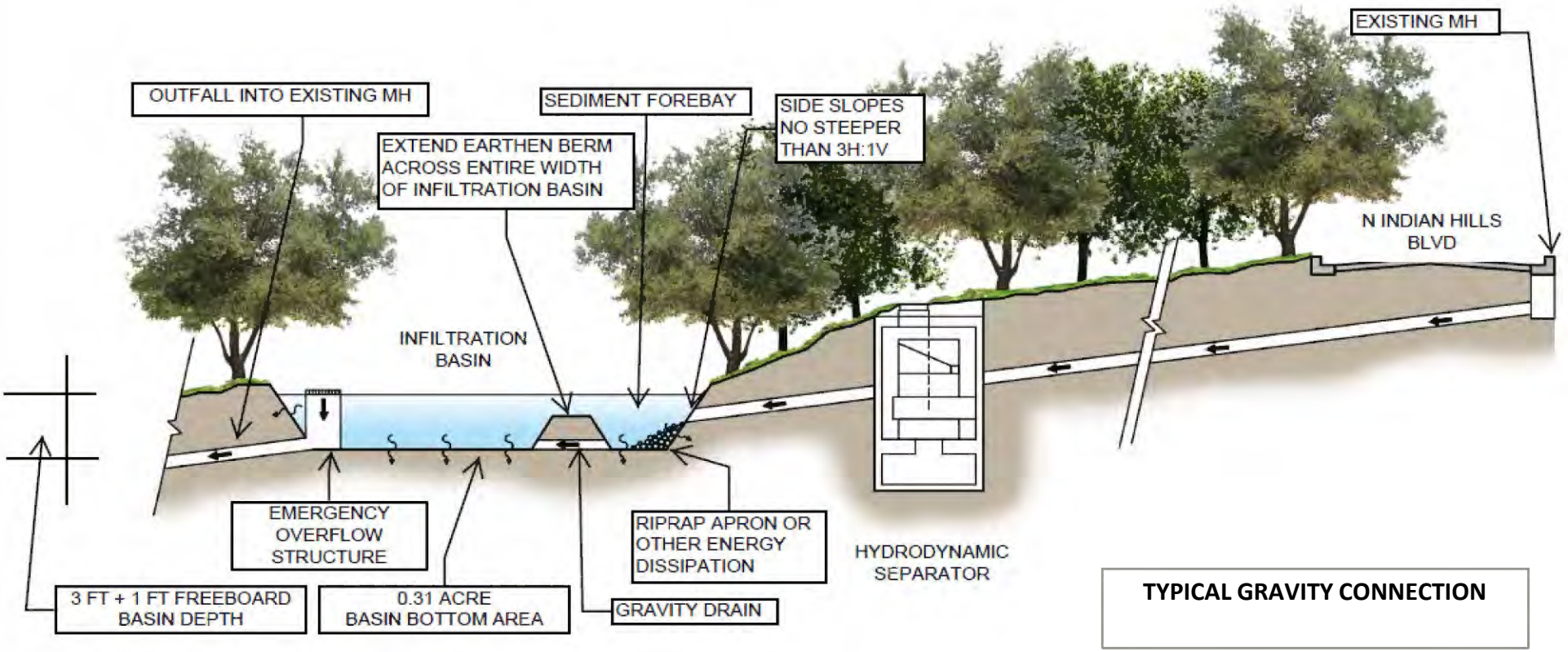


Legend

- Storm Inlet/Catch Basin
- Storm ManHole
- Storm Lateral
- Storm Main
- OpenChannel
- Tributary Area
- Proposed Structure
- Proposed Pipe
- Proposed BMP
- Flow Direction

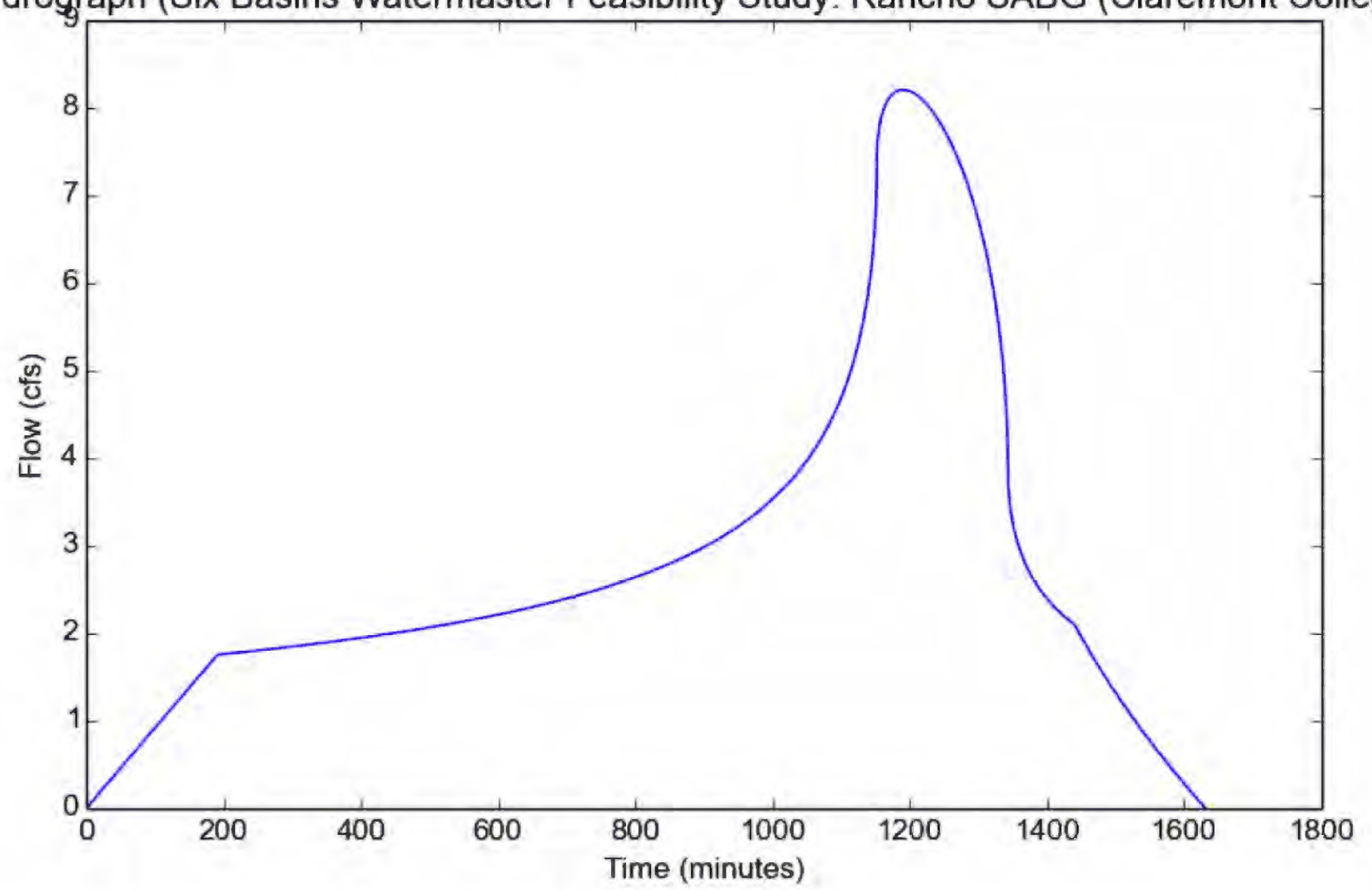
Tributary Area = 183.28 ac

Conceptual Site Profile



TYPICAL GRAVITY CONNECTION

Hydrograph



Note: This data is based on a blended hydrograph for the overall drainage area.

Design Capture Volume (AF)	6.303	Design Capture Volume (cu ft)	274557.2	Peak Flow (cfs)	8.208

Site Information

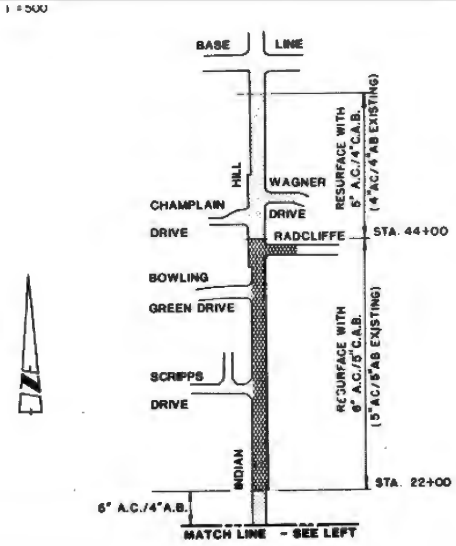


Figure 1 - Tributary Pipeline/Channel As-Built

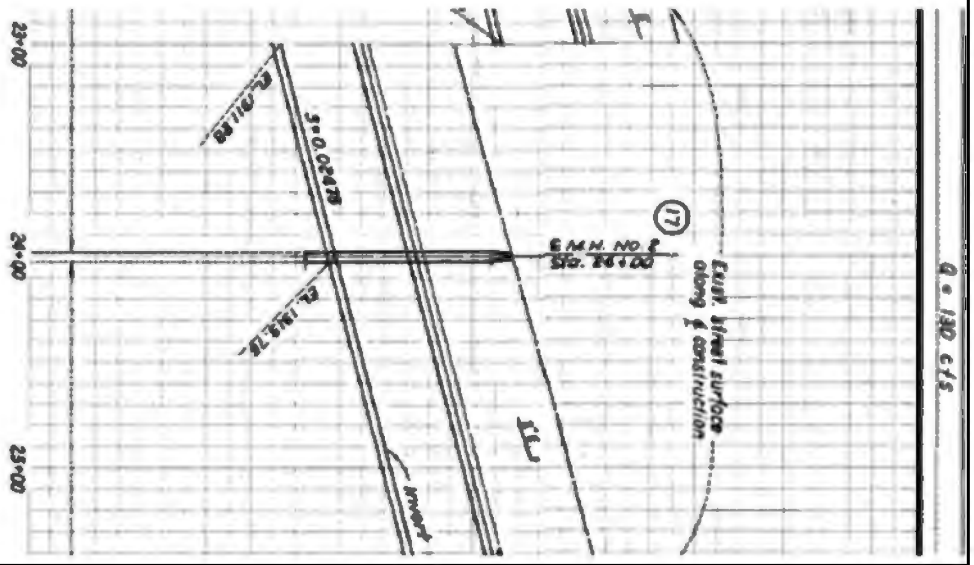


Figure 2 - Connection Manhole As-Built

Name	Indian Hill Drain			Name	MH #2 - Sta. 24+00		
Location	N Indian Hill Blvd			Location	Approx. 805' of N Indian Hill Blvd & Via Zurita St		
Capacity	39"	Drawing No.	PD020235	Invert Elevation	1313.76	Drawing No.	PD02038
		Drawing Date	8/3/1990	Rim Invert Elevation	1317	Drawing Date	8/3/1990

Figure 3 - Soil Types & Faults

Figure 4 - Depth to Groundwater

Site Information

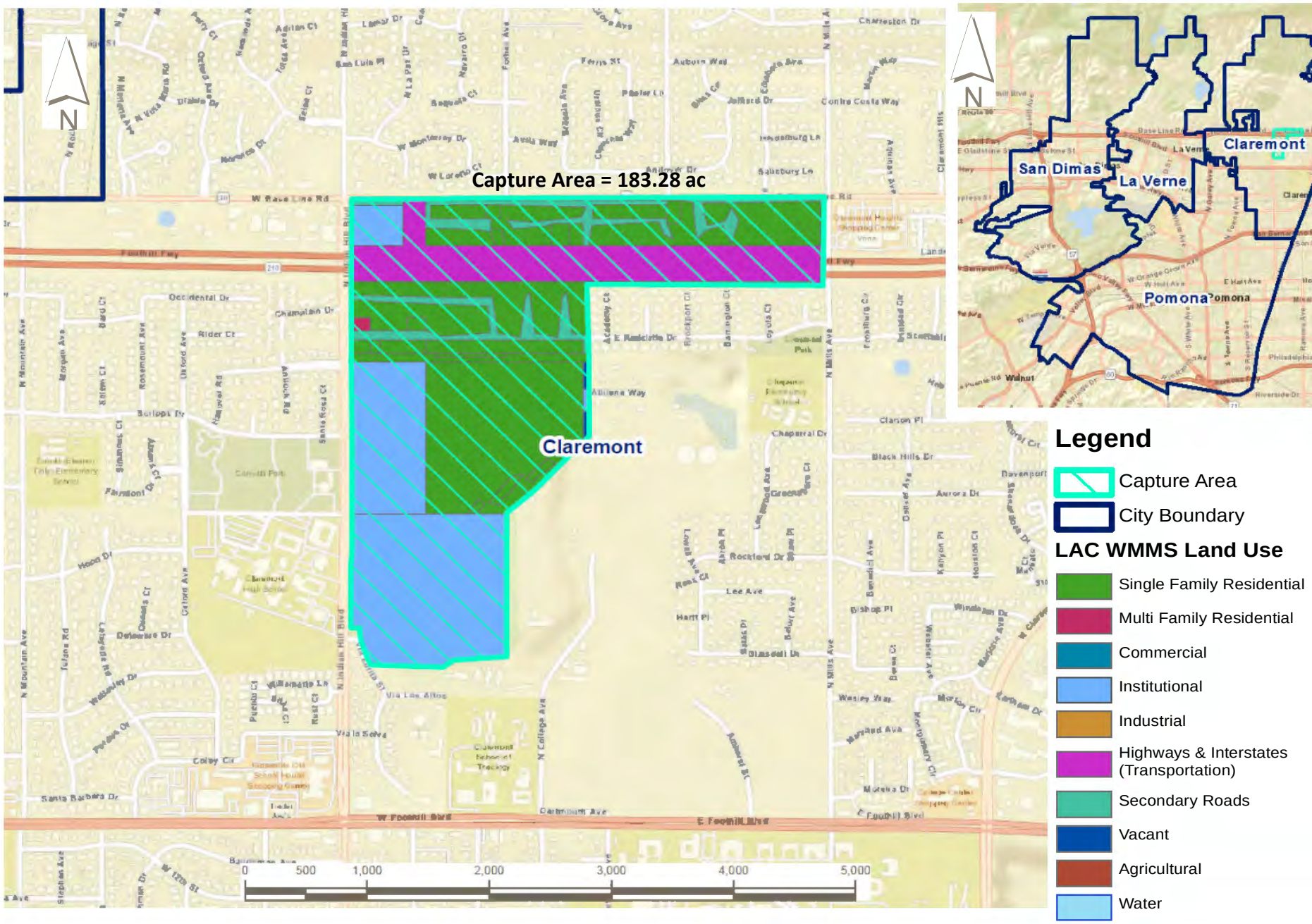


Figure 5 - Capture Area & Land Use

Site Information

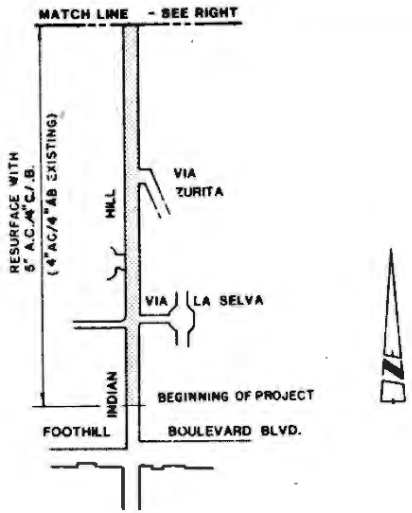


Figure 6 - Proposed Outfall Pipeline/Channel As-Built

Name	Indian Hill Drain		
Location	N Indian Hill Blvd		
Capacity	39"	Drawing No.	PD020235
		Drawing Date	8/3/1990

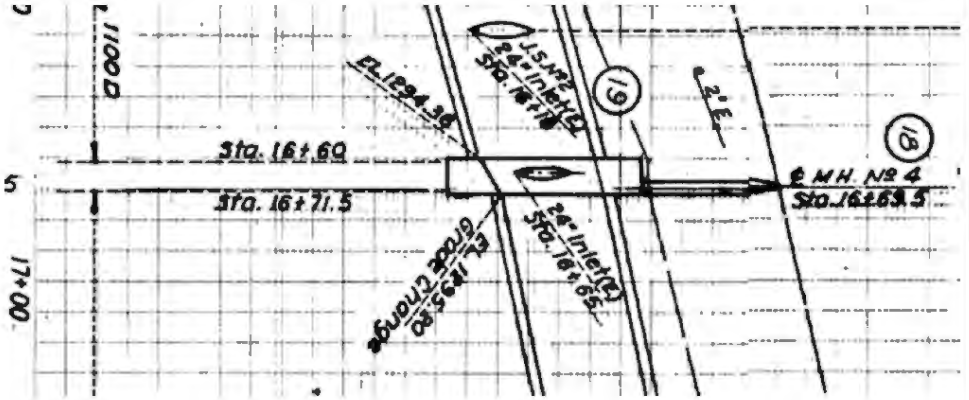


Figure 7 - Proposed Outfall Connection Manhole As-Built

Name	MH #2 - Sta. 16+69.5		
Location	Approx. 93' of N Indian Hill Blvd & Via Zurita St		
Invert Elevation	1295.2	Drawing No.	PD02037
Rim Invert Elevation	1304.2	Drawing Date	8/3/1990

Site Photos

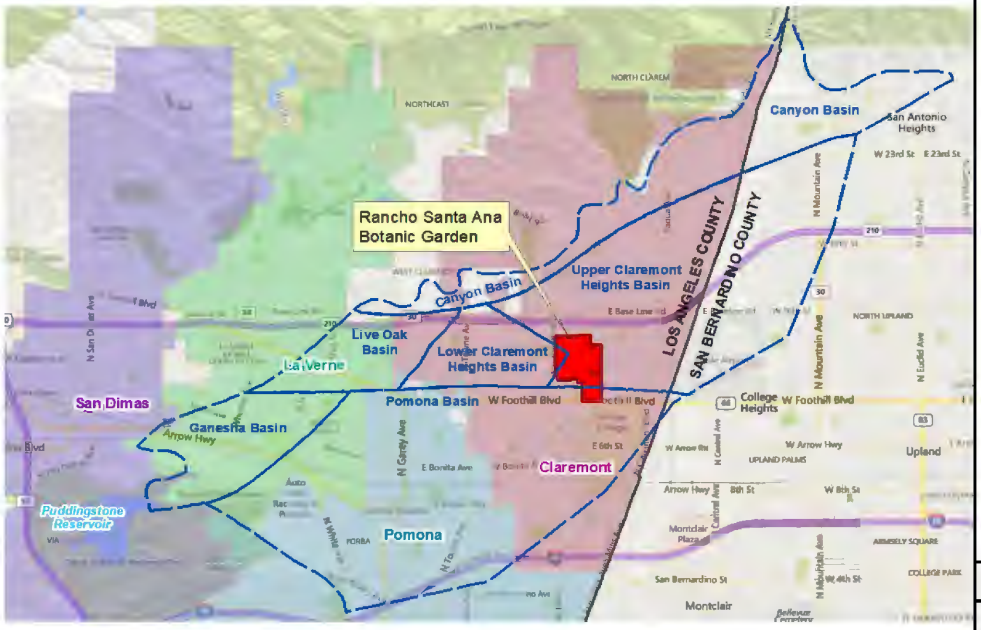


Photo 1 - Site Location

Photo 2 - Connection Location

Description	Existing MH - Sta. 24+00		
Photo Date	10/23/19	Photo Time	11:45 AM
Direction Facing			

Photo 3 - Site Looking South

Description	Former Claremont Golf Course parking lot		
Photo Date	10/23/19	Photo Time	11:45 AM

Photo 4 - Site Looking East

Description	Former Claremont Golf Course parking lot		
Photo Date	10/23/19	Photo Time	11:45 AM

Cost Estimation

Item #	Description	Quantity	UOM	Unit Cost	Total Cost
1	Basin Excavation/Preparation				$ 495,696
1	Strip Top Grass/Vegetative Layer - 3"	130	cys	$53.85	$7,000
2	Haul-off/Dispose of Organics	13	lds	$375	$4,875
3	Dump Fees	13	lds	$100	$1,300
4	Haul-off/Dispose of Non-Organics (Sprinkler System, etc.)	2	lds	$450	$731
5	Dump Fees	2	lds	$250	$406
6	Excavate Basin to Waste (Balance), 8.6' Depth	16,496	cys	$4.00	$65,984
7	Haul-off Cost for Surplus Clean Dirt Spoils	16,496	cys	$25.00	$412,400
8	Prep & Compact Foundation	1,000	sys	$3.00	$3,000
2	Connection Piping				$ 602,160
1	Design/Fab/Deliver Pkg Hydrodynamic Units	1	ea	$ 150,000	$ 150,000.00
2	Install Pkg Lift Station	1	ls	$ 52,500	$ 52,500.00
3	Force Main - 24" (Paved)	604	lf	$ 600	$ 362,400.00
4	Overflow Pipe	62	lf	$ 480	$ 29,760.00
5	Manhole Connections	1	ea	$ 7,500	$ 7,500.00
3	Site Restoration				$ 15,000.00
1	Miscellaneous	1	ls	$15,000	$15,000
A	Contract Allowances & Contingent Bid Items				$ 8,346
1	Contractor Quality Control	1	ls	0.75%	$8,346
B	Pre-construction/Mobilization/Temporary Works				$ 41,000
1	Submittals/Procurement/POs/Resource Coordination	1	mo	$15,000	$15,000
2	Establish Baseline Survey / Alignment / As-builts	40	hrs	$275	$11,000
3	Initial Equipment Mobilization	10	lds	$1,000	$10,000
4	Third Party Design Services / Outside Consultants	1	ls	$5,000	$5,000
C	Startup/Commission/Owner Training				$ 11,212
1	All Required	1	ls	1.00%	$11,212
D	Direct Cost Allowances				$ 58,671
1	Estimating Allowance	1	ls	5.0%	$58,671
E	Contractor Markups/Indirect Costs				$ 473,535
1	Prime Contractor General Conditions	1	ls	8.0%	$52,175
2	Subcontractor General Conditions	1	ls	8.0%	$46,400
3	Subcontractor Overheads & Markups	1	ls	15%	$93,945
4	Prime Contractor OH&P on Subs	1	ls	6.0%	$43,215
5	Prime Contractor OH&P on Self-Perform	1	ls	12.0%	$84,500
6	Contractor Insurance Program	1	ls	2.5%	$38,808
7	Subcontractor Bonding	1	ls	1.5%	$8,699

Item #	Description	Quantity	UOM	Unit Cost	Total Cost
8	Escalation from Current PL to NTP (Q3 2020 = 3/4 year)	1	ls	2.63%	$41,995
9	Escalation During Field Construction (2 mos total, or 1.5 mos to MPC)	1	ls	0.44%	$7,183
10	State Sales Taxes (CA)	35%	ls	9.20%	$51,514
11	Contractor Furnished Permits	1	ls	0.30%	$5,102
	Budget Contingency				$ 341,124
12	Budget Contingency	1	ls	20.0%	$341,124
F	Owner Project Allowances				$ 409,348
1	Owner Costs - All	1	ls	20%	$409,348
	Total Project Costs (TPC)				**$2,456,000**

Project Name	La Puerta Sports Park		
Site Land Ownership	Claremont Unified School District		
Partner Agency (ies)	City of Claremont		
Net Capture Volume (AFY)	Wet Weather:	134	Dry Weather: 95
Opinion of Probable Capital Cost (Class 5) ($-Millions)	10.63		
Total Life-Cycle Cost ($-Millions)	11.51		
Main Site Address	2430 N Indian Hill Boulevard, Claremont, CA 91711		
Main Site Size (acres)	9.0		
Site Coordinates	Latitude:	34.128	Longitude: -117.719

Description

This project includes a double layer underground infiltration gallery (NDS StormChamber) to be located on the existing southernmost sports field at La Puerta Sports Park. Drainage collected at the MH in the Thompson Creek Trail parking lot would flow by gravity into a hydrodynamic separator unit (HSU) for pretreatment and then into the infiltration gallery. A second gravity connection is proposed at a new combined Catch Basin/HSU to be located at the southwest driveway. The infiltration gallery outfall will discharge into an existing concrete-lined channel located along the southern edge of the overall park boundary.

Current Site Use

City park including parking lot area, and soccer and softball fields.

Conceptual Design Criteria

Overview		BMP Design	
Tributary Watershed Name	Thompson Creek	Name of Tributary Pipeline	Pomalamar Drain
Assumed Design Infiltration Rate (in/hr) [1]	4.20	Capacity of Tributary Pipeline	63"
Assumed Drawdown Time (hrs)	96	US Connection Invert to BMP (ft)	1447
Tributary Area (acres)	439.25	Exist. Ground Surface Elevation at BMP (ft)	1454.6
Assumed Hydrologic Soil Group	A	Planned Invert at BMP (ft)	1445.93
85th-Percentile Design Storm (in)	0.76	Capacity of Facility (AF)	9.09
Gravity or Pumped Flow	Gravity	Distance to Nearest Well (mi)	0.58
Underground or Above Ground	Underground	Project Design Life (years)	30
Proximity to Recycled Water (mi)	NA	Preliminary SCWP Score	74

Additional Multi-Benefit Opportunities

Prevent and reduce amount of pollutants discharged into local water bodies, prepare for more extreme and frequent drought conditions by capturing and using runoff to reduce demand on water supplies, recharge groundwater.

Potential Challenges

Confirmation of utility conflicts and City of Claremont storm drain inverts required to validate concept design.

Stage of Development

☒ Conceptual	☐ Planning	☐ Pre-Design
☐ Design	☐ Construction	☐ Other

Expected Project Timeline	Begin:	TBD	End: TBD

Potentially Applicable Federal and State Programs for Financial Assistance

☒ Measure W	☒ Prop 68	☐ Other _____
☒ Prop 1	☒ EPA Clean Water State Revolving Fund (CWSRF)	

Contact Person(s):

TBD

Notes

1 - Source: NRCS Web Soil Survey. A Safety Factor of 3 was applied for long-term siltation, plugging, and maintenance per LA County GS200.1.

Project Multi-Benefits (per Safe Clean Water Program Table 7)

A. Water Quality Benefits

A.1 Wet Weather Water Quality Benefits

A.1.1 Cost Effectiveness	1.84	AF / $-Millions	Resulting Points:	20
24-hr BMP Capacity [1]:	17.73	AF		
Construction Cost:	9.66	$ in Millions		
A.1.2 Quantify Pollutant Reduction [1]				
Primary Class Pollutants:	% Load Reduction			
Total Copper	78.2%		Resulting Points:	15
Second or More Class Pollutants:	% Load Reduction			
Total Zinc	86.3%		Resulting Points:	10

A.2 Dry Weather Water Quality Benefits (for 0.25" storms and below)

B. Significant Water Supply Benefits

B.1 Water Supply Cost Effectiveness

Cost Effectiveness	2620	$ / AF	Resulting Points:	0
Runoff Captured for Water Supply [1]	228.97	AF		
Annualized Life-Cycle Cost	0.60	$ in Millions		

B.2 Water Supply Benefit Magnitude

Annual Additional Water Supply Volume Resulting from Project [1]	228.97	AF/year	Resulting Points:	9

C. Community Investment Benefits

C.1 Project Benefits

☒ Improved flood management, flood conveyance, or flood risk mitigation
☒ Creation, enhancement, or restoration of parks
☐ Improved public access to waterways
☒ Enhanced or new recreational opportunities
☐ Create or enhance green spaces at school
☐ Improved public health by reducing heat island effect
☐ Increased shade or planting of trees/other vegetation that increase carbon reduction/sequestration

Resulting Points: 5

D. Nature-Based Solutions

D.1 Project Solutions

☒ Implements natural processes or mimics natural processes to slow, detain, capture, and absorb/infiltrate water in a manner that protects, enhances and/or restores habitat, green space and/or usable open space (5 points)
☐ Utilizes natural materials such as soils and vegetation with a preference for native vegetation (5 points)
☐ Removes Impermeable Area from Project (1 point per 20% paved area removed)

Resulting Points: 5

E. Leveraging Funds and Community Support

E.1 Cost-Share

☐ >25% Funding Matched (3 points)
☒ >50% Funding Matched (6 points) Resulting Points: 6

E.2 Community-Based Support

☒ The Project demonstrates strong local, community-based support and/or has been developed as part of a partnership with local NGOs/CBOs (4 points) Resulting Points: 4

Notes **Final Score: 74**

General - All Regional Program Projects must meet the Threshold Score of 60 points or more using the Project Scoring Criteria to be eligible for consideration.

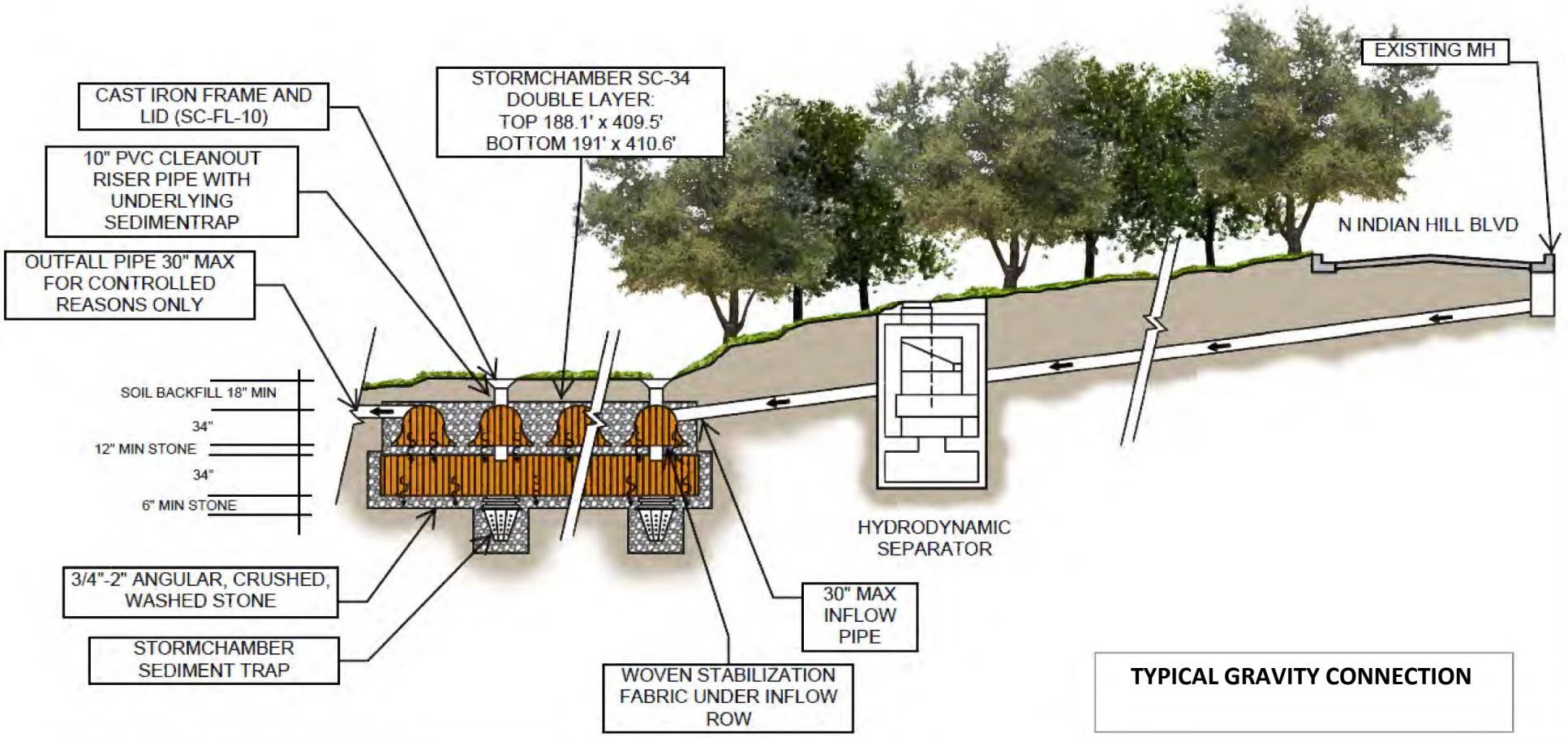
1 - Preliminary estimates based on blended hydrograph inputs to the SCW Project Module.

Conceptual GIS Site Plan

Legend

- Storm Inlet/Catch Basin
- Storm ManHole
- Storm Lateral
- Storm Main
- OpenChannel
- Tributary Area
- Proposed Structure
- Proposed Pipe
- Proposed BMP
- Flow Direction

Conceptual Site Profile

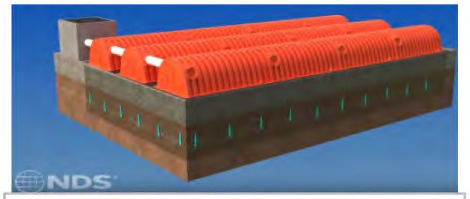


TYPICAL GRAVITY CONNECTION

PVC Cleanouts (vertical)
Flow Connection Pipes (horizontal)

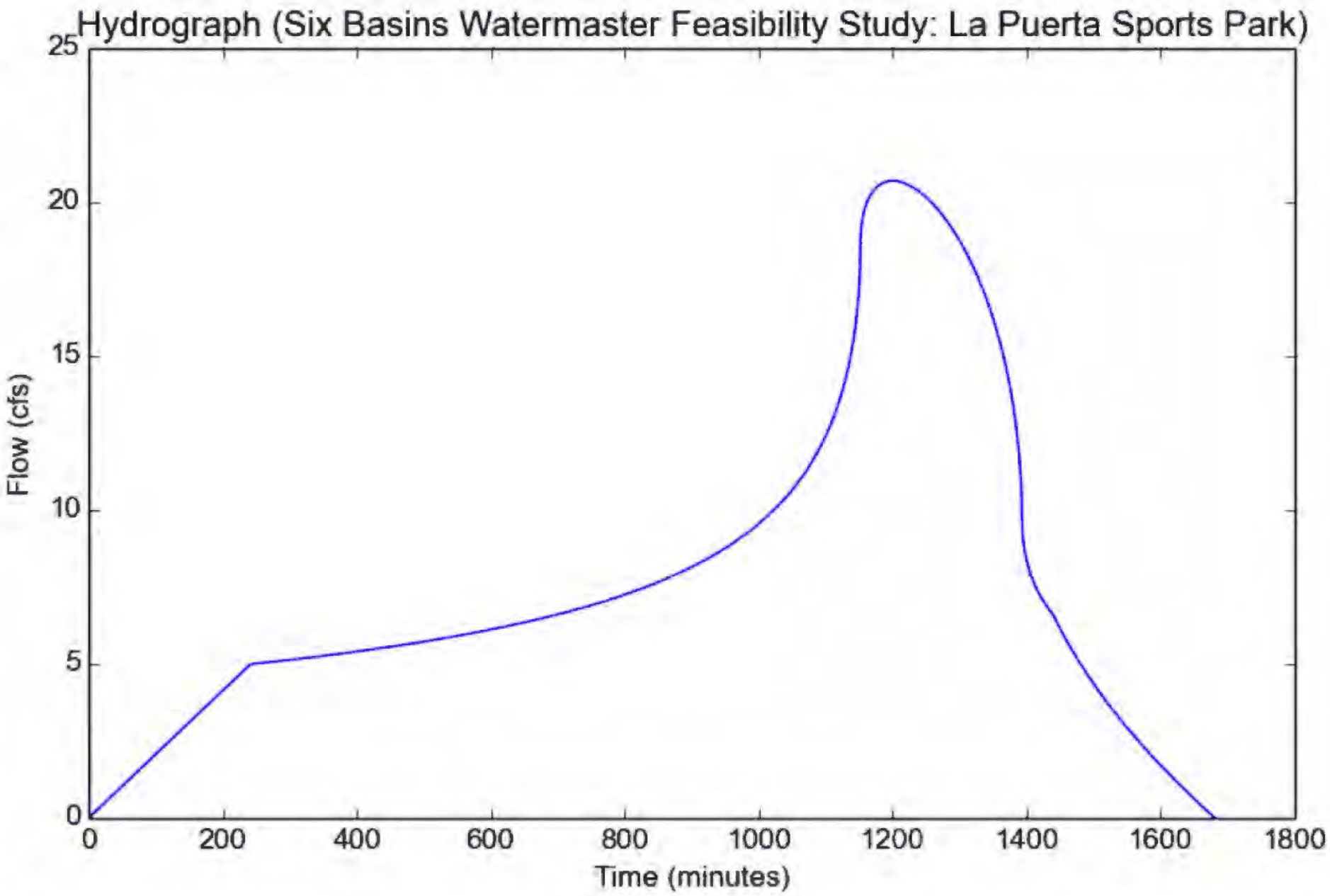
Crushed Washed Stone Cover

EXAMPLE STORMCHAMBER PHOTOS



System View

Hydrograph



Note: This data is based on a blended hydrograph for the overall drainage area.

Design Capture Volume (AF)	17.73363	Design Capture Volume (cu ft)	772477.1	Peak Flow (cfs)	20.70

Site Information

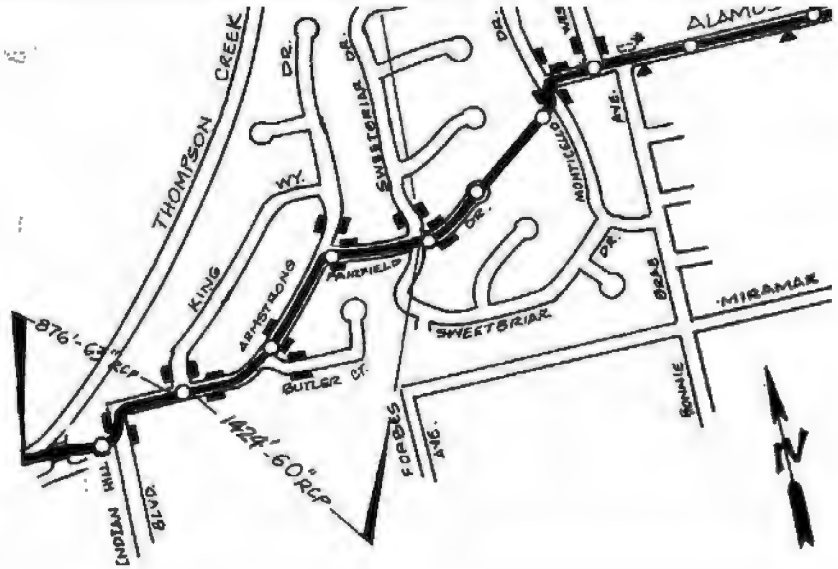


Figure 1 - Tributary Pipeline/Channel As-Built

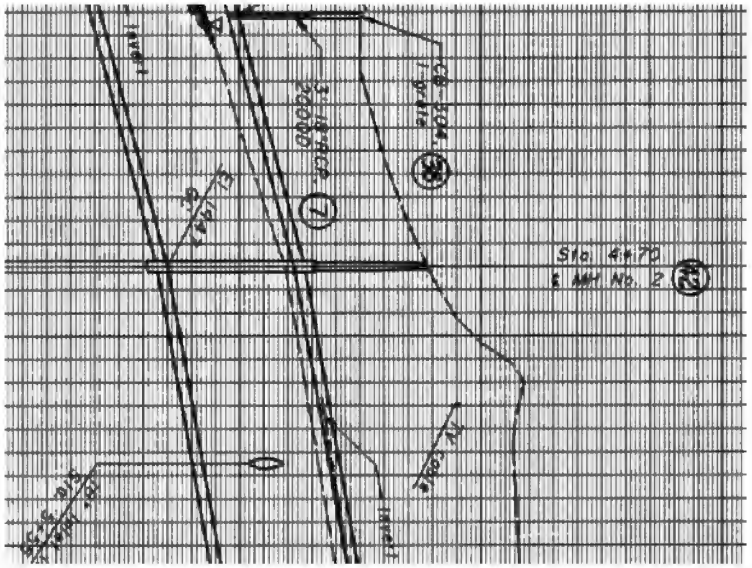


Figure 2 - Connection Manhole As-Built

Name	Pomalamar Drain		
Location	N Indian Hill Blvd		
Capacity	63"	Drawing No.	PD022398
		Drawing Date	3/1/1993

Name	MH No 2 - Sta 4+70		
Location	270' SW of Armstrong Dr & N Indian Hill Blvd		
Invert Elevation	1447'	Drawing No.	PD022400
Rim Invert Elevation	1457.9'	Drawing Date	6/4/1992

Figure 3 - Soil Types & Faults

Figure 4 - Depth to Groundwater

Site Information

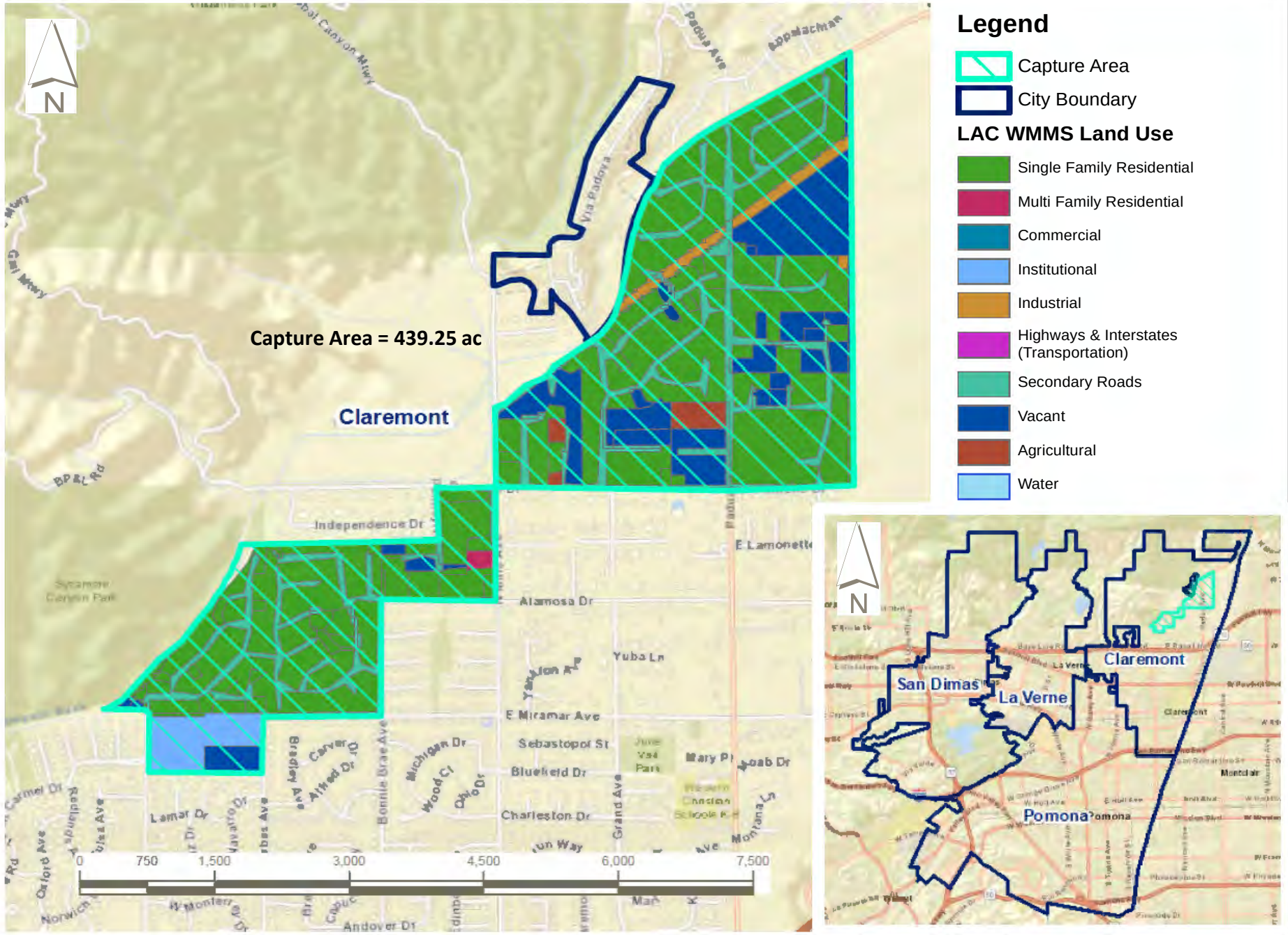


Figure 5 - Capture Area & Land Use

Site Photos

Photo 1 - Site Location

Photo 2 - Connection Location

Description	MH No 2 - Sta 4+70 in Thompson Creek Trail parking lot		
Photo Date	10/23/19	Photo Time	12:00 PM
Direction Facing	Northeast		

Photo 3 - Site Looking North

Description	Southernmost sport field, facing north		
Photo Date	9/24/19	Photo Time	4:00 PM

Photo 4 - Site Looking East

Description	Southernmost sport field, facing east		
Photo Date	9/24/19	Photo Time	4:00 PM

Site Photos

Photo 5 - Existing Channel, Located South of Sport Fields

Description	Channel outfall at N Indian Hills Blvd		
Photo Date	9/25/19	Photo Time	1:00 PM
Direction Facing	West		

Photo 6 - Existing Channel, Located South of Sport Fields

Description	Upstream of channel outfall		
Photo Date	9/25/19	Photo Time	1:00 PM
Direction Facing	East		

Description			
Photo Date		Photo Time	

Description			
Photo Date		Photo Time	

Cost Estimation

Item #	Description	Quantity	UOM	Unit Cost	Total Cost
1	Basin Excavation/Preparation				$ 561,739
1	Strip Top Grass/Vegetative Layer - 3"	810	cys	$8.64	$7,000
2	Haul-off/Dispose of Organics	81	lds	$375	$30,375
3	Dump Fees	81	lds	$100	$8,100
4	Haul-off/Dispose of Non-Organics (Sprinkler System, etc.)	10	lds	$450	$4,556
5	Dump Fees	10	lds	$250	$2,531
6	Excavate Basin to Stockpile - Top 2' + Ramp Fill + Bench Volume	8,109	cys	$2.75	$22,300
7	Excavate Basin to Waste (Balance), 8.6' Depth	15,858	cys	$4.00	$63,431
8	Haul-off Cost for Surplus Clean Dirt Spoils	15,858	cys	$25.00	$396,445
9	Prep & Compact Foundation	9,000	sys	$3.00	$27,000
2	Install Stormchamber System				$ 2,209,965
1	Purchase Stormchamber System	1	ls	$1,199,859	$1,199,859
2	Stage/Inventory Stormchamber System	4	dys	$4,500	$18,000
3	Purchase/Import Aggregate Stone Backfill	25,000	tns	$16.00	$400,000
4	Excavate/Install Sediment Traps (4)	4	dys	$3,500	$14,000
5	Place/Compact Bottom Aggregate Base Layer - 6"	1,770	tns	11.00	$19,470
6	Install Woven Filter Fabric	79,000	sf	0.25	$19,750
7	Position/Install Stormchambers - 2 Rows	3,582	ea	12.86	$46,054
8	Backfill Stormchamber with Aggregate Base	23,230	tns	13.00	$301,990
9	Install Second Layer Filter Fabric	79,000	sf	0.25	$19,750
10	Supplemental PVC Piping Materials - Lateral Flow & Cleanouts	1	ls	$15,000	$15,000
11	Install PVC Flow Piping	15	dys	$5,000	$75,000
12	Backfill Basin	8,109	cys	$10.00	$81,092
3	Connection Piping				$ 1,549,220
1	Design/Fab/Deliver Pkg Lift Station	2	ea	$200,000	$400,000
2	Install Pkg Lift Station	1	ls	$140,000	$140,000
3	Pkg Lift Station Electrical	1	ls	$250,000	$250,000
4	Design/Fab/Deliver Pkg Hydrodynamic Units	2	ea	$150,000	$300,000
5	Install Pkg Lift Station	1	ls	$105,000	$105,000
6	Gravity Main -24" (Paved)	589	lf	$540.00	$318,060
7	Gravity Main -24" (Unpaved)	42	lf	$480.00	$20,160
8	Manhole Connections	1	ea	$7,500	$7,500
9	Catch Basin	1	ea	$8,500	$8,500
4	Site Restoration				$ 299,428
1	Replace Sprinkler System	78,408	sf	$1.50	$117,612
2	Replace Sod	78,408	sf	$2.00	$156,816
3	Miscellaneous	1	ls	$25,000.00	$25,000
A	Contract Allowances & Contingent Bid Items				$ 34,653
1	Contractor Quality Control	1	ls	0.75%	$34,653

Item #	Description	Quantity	UOM	Unit Cost	Total Cost
B	Pre-construction/Mobilization/Temporary Works				$ 41,000
1	Submittals/Procurement/POs/Resource Coordination	1	mo	$15,000	$15,000
2	Establish Baseline Survey / Alignment / As-builts	40	hrs	$275	$11,000
3	Initial Equipment Mobilization	10	lds	$1,000	$10,000
4	Third Party Design Services / Outside Consultants	1	ls	$5,000	$5,000
C	Startup/Commission/Owner Training				$ 46,550
1	All Required	1	ls	1.00%	$46,550
D	Direct Cost Allowances				$ 237,128
1	Estimating Allowance	1	ls	5.0%	$237,128
E	Contractor Markups/Indirect Costs				$ 1,729,475
1	Prime Contractor General Conditions	1	ls	8.0%	$322,020
2	Subcontractor General Conditions	1	ls	8.0%	$76,400
3	Subcontractor Overheads & Markups	1	ls	15%	$154,624
4	Prime Contractor OH&P on Subs	1	ls	6.0%	$71,127
5	Prime Contractor OH&P on Self-Perform	1	ls	12.0%	$521,700
6	Contractor Insurance Program	1	ls	2.5%	$153,139
7	Subcontractor Bonding	1	ls	1.5%	$14,316
8	Escalation from Current PL to NTP (Q3 2020 = 3/4 year)	1	ls	2.63%	$165,192
9	Escalation During Field Construction (2 mos total, or 1.5 mos to MPC)	1	ls	0.44%	$28,255
10	State Sales Taxes (CA)	35%	ls	9.20%	$202,635
11	Contractor Furnished Permits	1	ls	0.30%	$20,067
	Budget Contingency				$ 1,341,832
12	Budget Contingency	1	ls	20.0%	$1,341,832
F	Owner Project Allowances				$ 1,610,198
1	Owner Costs - All	1	ls	20%	$1,610,198
	Total Project Costs (TPC)				**$9,661,000**

Project Name	Fairplex		
Site Land Ownership	LA County		
Partner Agency (ies)	City of Pomona		
Net Capture Volume (AFY)	Wet Weather: 230	Dry Weather:	106
Opinion of Probable Capital Cost (Class 5) ($-Millions)	$31.53		
Total Life-Cycle Cost ($-Millions)	$1.14		
Main Site Address	1101 W McKinley Ave, Pomona, CA 91768		
Main Site Size (acres)	460.0		
Site Coordinates	Latitude: 34.085	Longitude:	-117.765

Description

This project proposes an underground infiltration gallery (NDS StormChamber) to be located on the existing Grandstand field on the Fairplex grounds. Drainage from w Arrow Hwy would flow via gravity into the infiltration gallery. A second gravity connection is proposed at a new catch basin to be located adjacent to Thompson Creek, which will flow into a hydrodynamic separator for pretreatment before being conveyed into the infiltration gallery. A third connection would flow via pump well from W McKinley Ave into the infiltration basin. The infiltration gallery will discharge into Thompson Creek.

Current Site Use

Multievent commercial campus that hosts the LA County Fair among other year-round businesses.

Conceptual Design Criteria

Overview		BMP Design	
Tributary Watershed Name	Thompson Creek	Name of Primary Tributary Pipeline	RDD 0086 - Thompson Creek
Assumed Design Infiltration Rate (in/hr) [1]	1.31	Capacity of Primary Tributary Pipeline	48"
Assumed Drawdown Time (hrs)	96	US Connection Invert to BMP (ft)	1022.86
Tributary Area (acres)	487.84	Exist. Ground Surface Elevation at BMP (ft)	975
Assumed Hydrologic Soil Group	B	Planned Invert at BMP (ft)	966.33
85th-Percentile Design Storm (in)	1.0	Capacity of Facility (AF)	28.18
Gravity or Pumped Flow	Both	Distance to Nearest Well (mi)	0.43
Underground or Above Ground	Underground	Project Design Life (years)	30
Proximity to Recycled Water (mi)	0.97	Preliminary SCWP Score	79

Additional Multi-Benefit Opportunities

Prevent and reduce amount of pollutants discharged into local water bodies, prepare for more extreme and frequent drought conditions by capturing and using runoff to reduce demand on water supplies, recharge groundwater.

Potential Challenges

Confirmation of utility conflicts required to validate concept design; may require utility relocation at the basin site.

Stage of Development

☒ Conceptual	☐ Planning	☐ Pre-Design
☐ Design	☐ Construction	☐ Other

Expected Project Timeline	Begin: TBD	End:	TBD

Potentially Applicable Federal and State Programs for Financial Assistance

☒ Measure W	☒ Prop 68	☐ Other _____
☒ Prop 1	☒ EPA Clean Water State Revolving Fund (CWSRF)	

Contact Person(s):

Dwight Richards, Vice President of Operations, Fairplex, 909.865.4202, richards@fairplex.com

Notes

1 - Source: NRCS Web Soil Survey. A Safety Factor of 3 was applied for long-term siltation, plugging, and maintenance per LA County GS200.1.

Project Multi-Benefits (per Safe Clean Water Program Table 7)

A. Water Quality Benefits

A.1 Wet Weather Water Quality Benefits

A.1.1 Cost Effectiveness	1.08	AF / $-Millions	Resulting Points:	20
24-hr BMP Capacity [1]:	31.04	AF		
Construction Cost:	28.66	$ in Millions		
A.1.2 Quantify Pollutant Reduction [1]				
Primary Class Pollutants:	% Load Reduction			
Total Copper	97.9%		Resulting Points:	20
Second or More Class Pollutants:	% Load Reduction			
Total Zinc	98.1%		Resulting Points:	10

A.2 Dry Weather Water Quality Benefits (for 0.25" storms and below)

B. Significant Water Supply Benefits

B.1 Water Supply Cost Effectiveness

Cost Effectiveness	3398	$ / AF	Resulting Points:	0
Runoff Captured for Water Supply [1]	335.51	AF		
Annualized Life-Cycle Cost	1.14	$ in Millions		

B.2 Water Supply Benefit Magnitude

Annual Additional Water Supply Volume Resulting from Project [1]	335.51	AF/year	Resulting Points:	12

C. Community Investment Benefits

C.1 Project Benefits

☒ Improved flood management, flood conveyance, or flood risk mitigation
☒ Creation, enhancement, or restoration of parks
☐ Improved public access to waterways
☐ Enhanced or new recreational opportunities
☐ Create or enhance green spaces at school
☐ Improved public health by reducing heat island effect
☐ Increased shade or planting of trees/other vegetation that increase carbon reduction/sequestration

Resulting Points: 2

D. Nature-Based Solutions

D.1 Project Solutions

☒ Implements natural processes or mimics natural processes to slow, detain, capture, and absorb/infiltrate water in a manner that protects, enhances and/or restores habitat, green space and/or usable open space (5 points)
☐ Utilizes natural materials such as soils and vegetation with a preference for native vegetation (5 points)
☐ Removes Impermeable Area from Project (1 point per 20% paved area removed)

Resulting Points: 5

E. Leveraging Funds and Community Support

E.1 Cost-Share

☐ >25% Funding Matched (3 points)
☒ >50% Funding Matched (6 points)

Resulting Points: 6

E.2 Community-Based Support

☒ The Project demonstrates strong local, community-based support and/or has been developed as part of a partnership with local NGOs/CBOs (4 points)

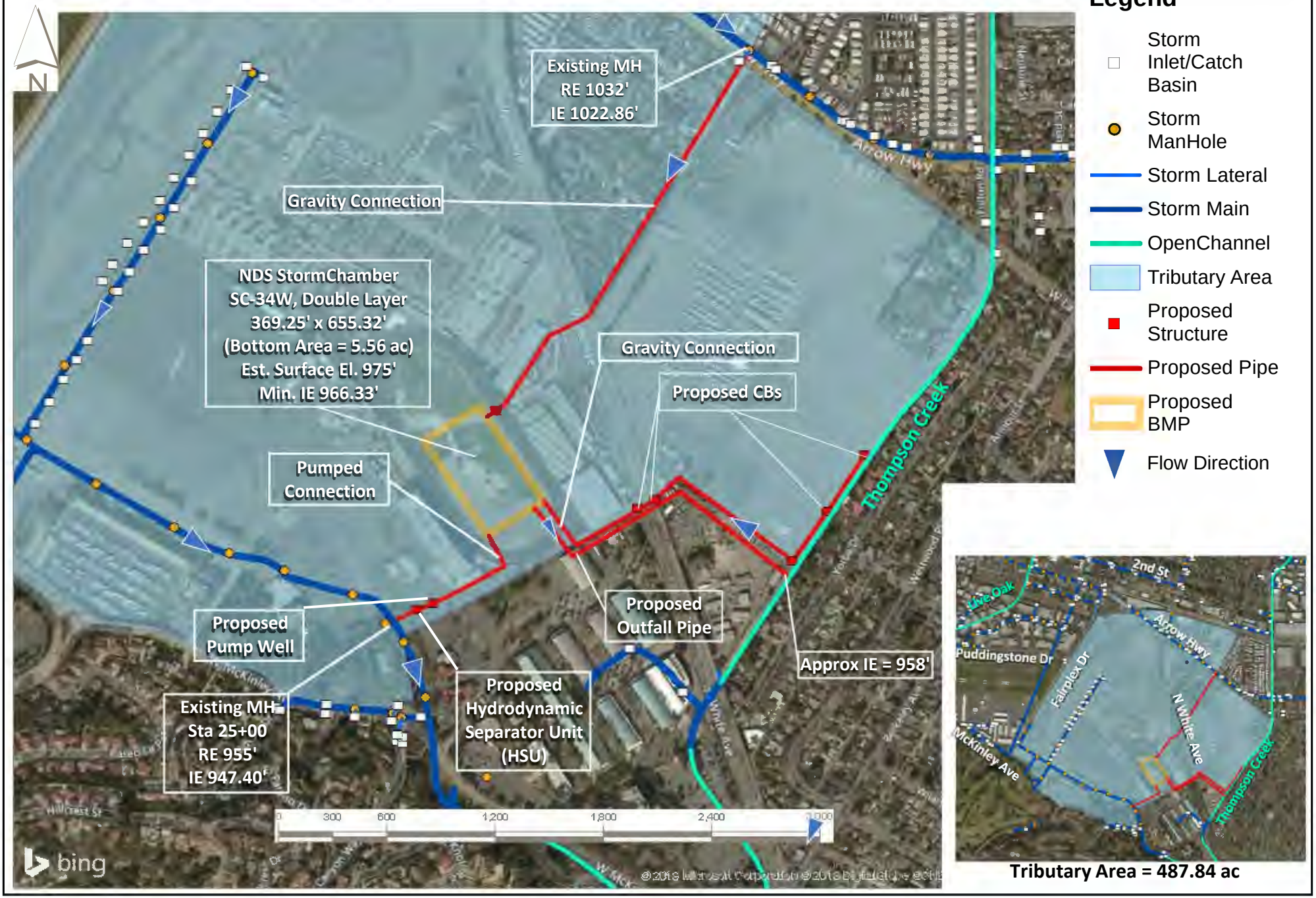
Resulting Points: 4

Notes **Final Score: 79**

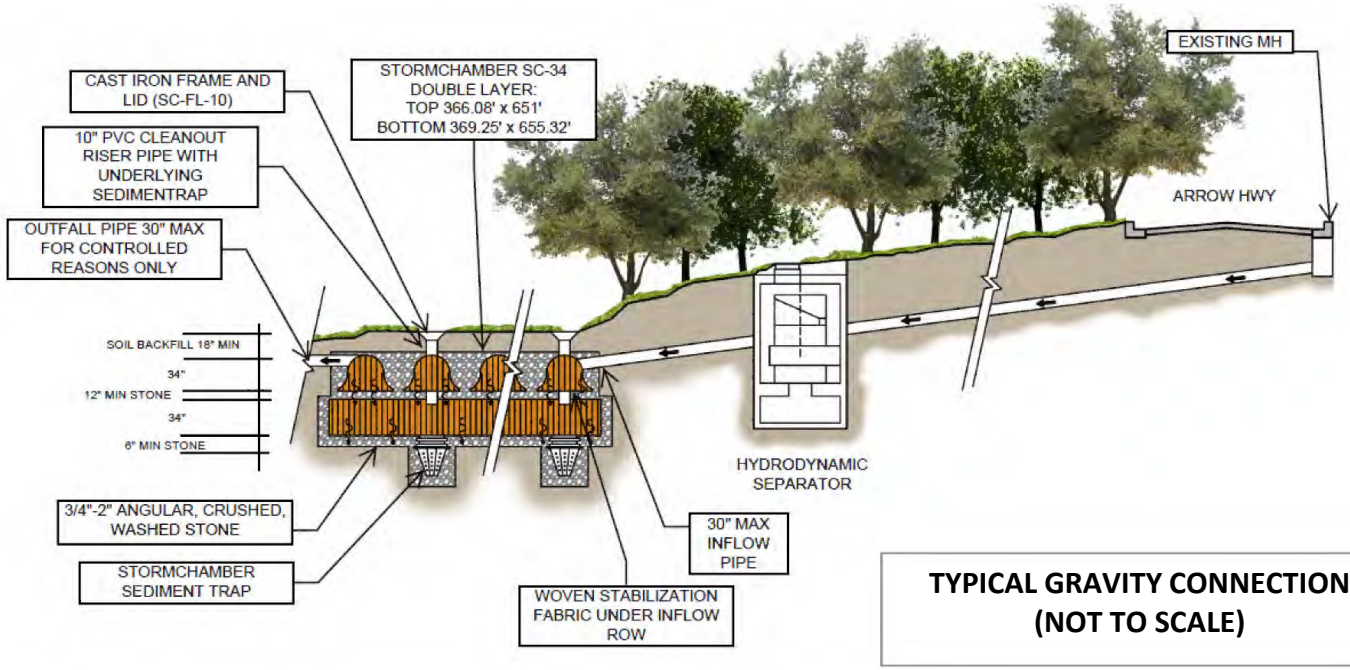
General - All Regional Program Projects must meet the Threshold Score of 60 points or more using the Project Scoring Criteria to be eligible for consideration.

1 - Preliminary estimates based on blended hydrograph inputs to the SCW Project Module.

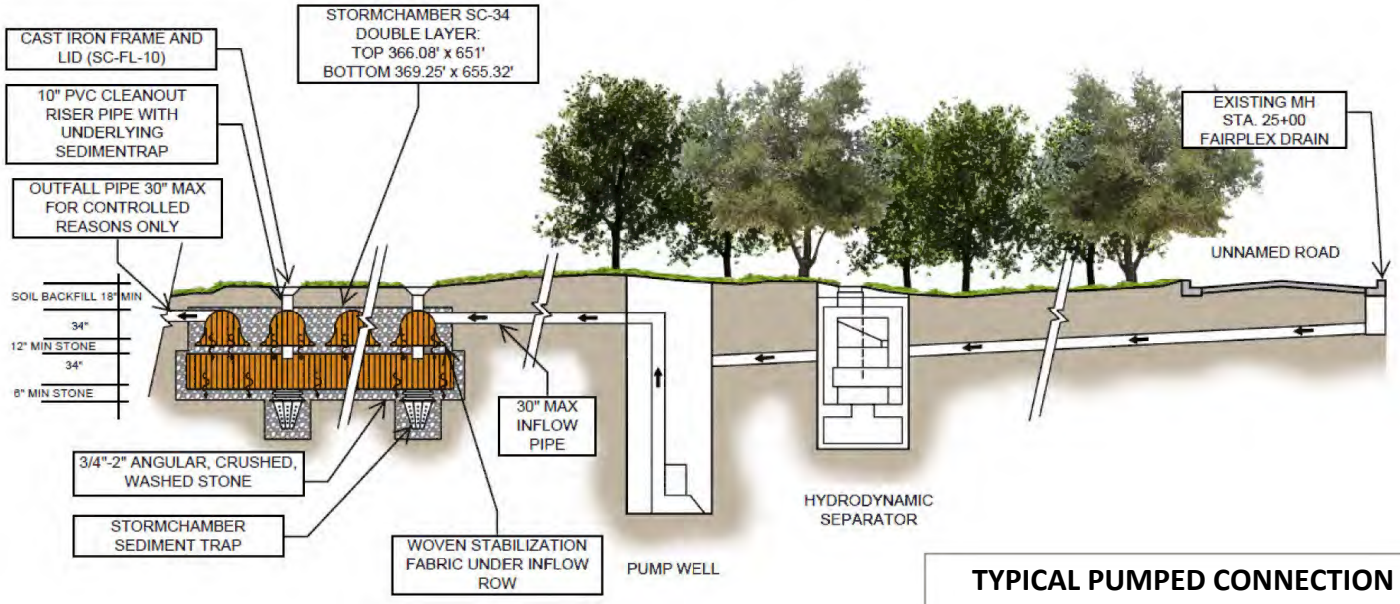
Conceptual GIS Site Plan



Conceptual Site Profile

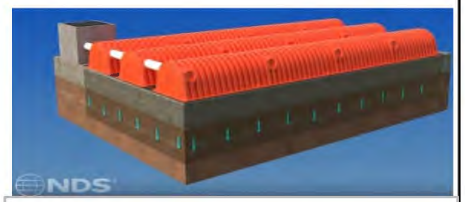


TYPICAL GRAVITY CONNECTION (NOT TO SCALE)



TYPICAL PUMPED CONNECTION (NOT TO SCALE)

EXAMPLE STORMCHAMBER PHOTOS

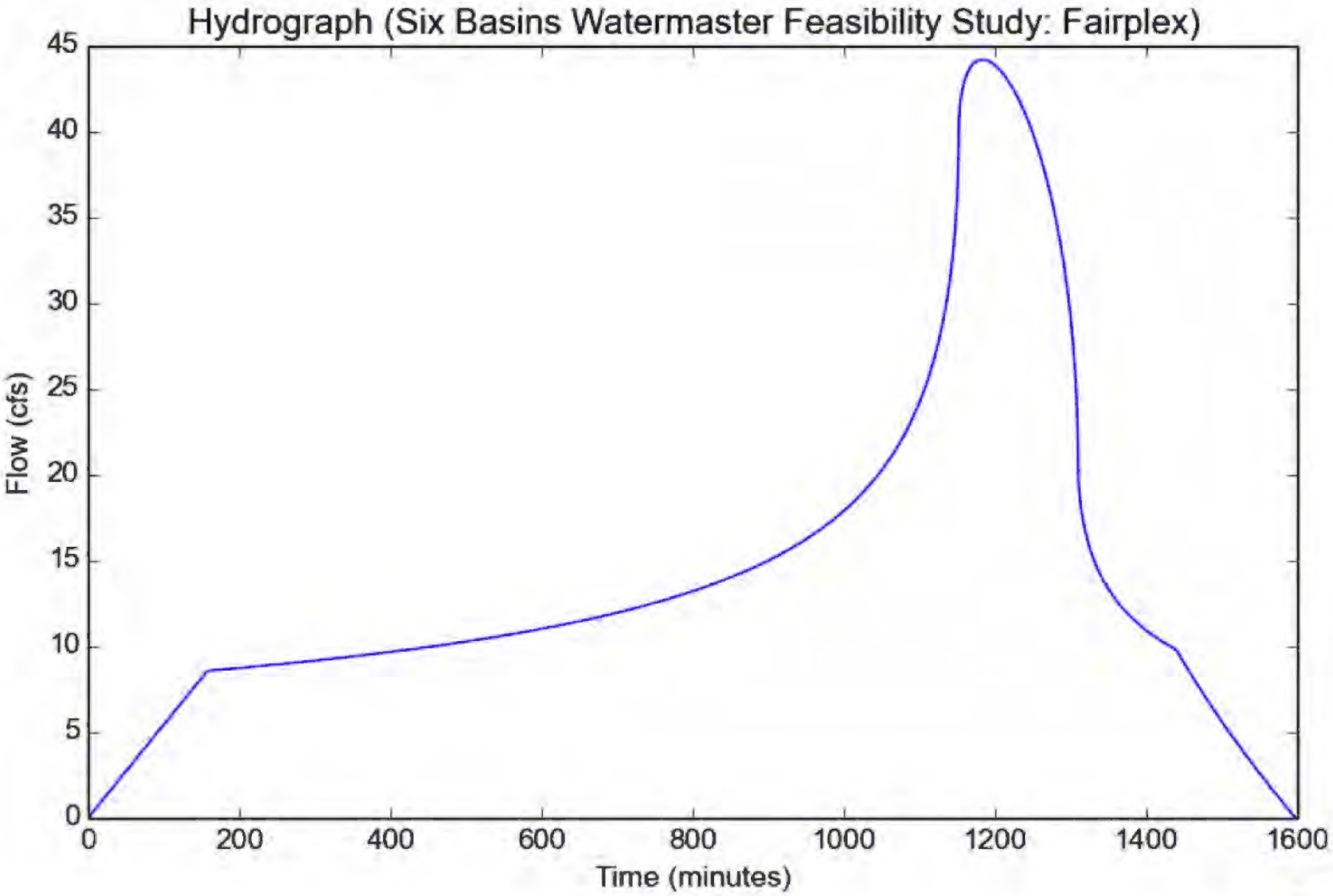


System View

Crushed Washed Stone Cover

PVC Cleanouts (vertical)
Flow Connection Pipes (horizontal)

Hydrograph



Note: This data is based on a blended hydrograph for the overall drainage area.

Design Capture Volume (AF)	31.042	Design Capture Volume (cu ft)	1352194	Peak Flow (cfs)	44.201

Site Information

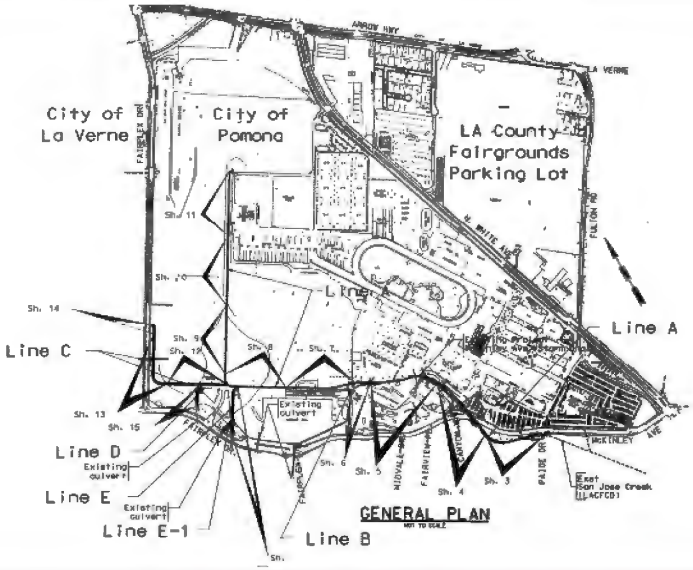


Figure 1 - Tributary Pipeline/Channel As-Built

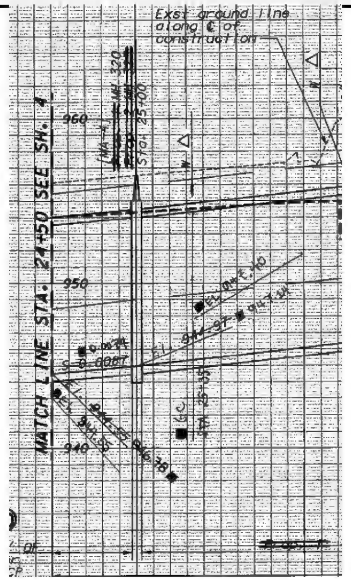


Figure 2 - Connection Manhole As-Built

Name	Fairplex Drain		
Location	W McKinley Ave		
Capacity	72"	Drawing No.	PD050090
		Drawing Date	3/10/2004

Name	MH 320 - Sta. 25+00		
Location	Approx. 117' SE of Canyon Way & W McKinley Ave		
Invert Elevation	947.4	Drawing No.	PD050094
Rim Invert Elevation	955	Drawing Date	10/7/2004

Figure 3 - Soil Types & Faults

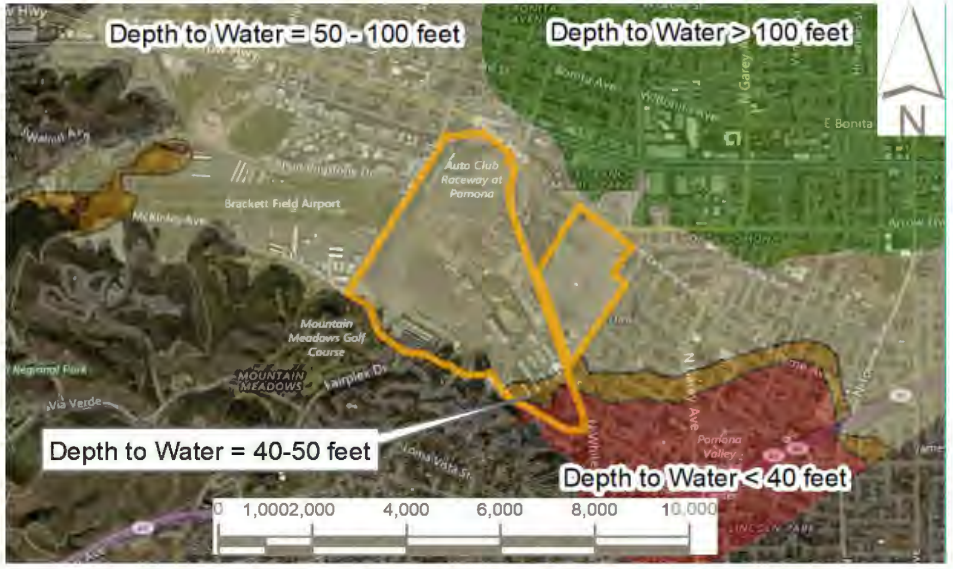


Figure 4 - Depth to Groundwater

Site Information

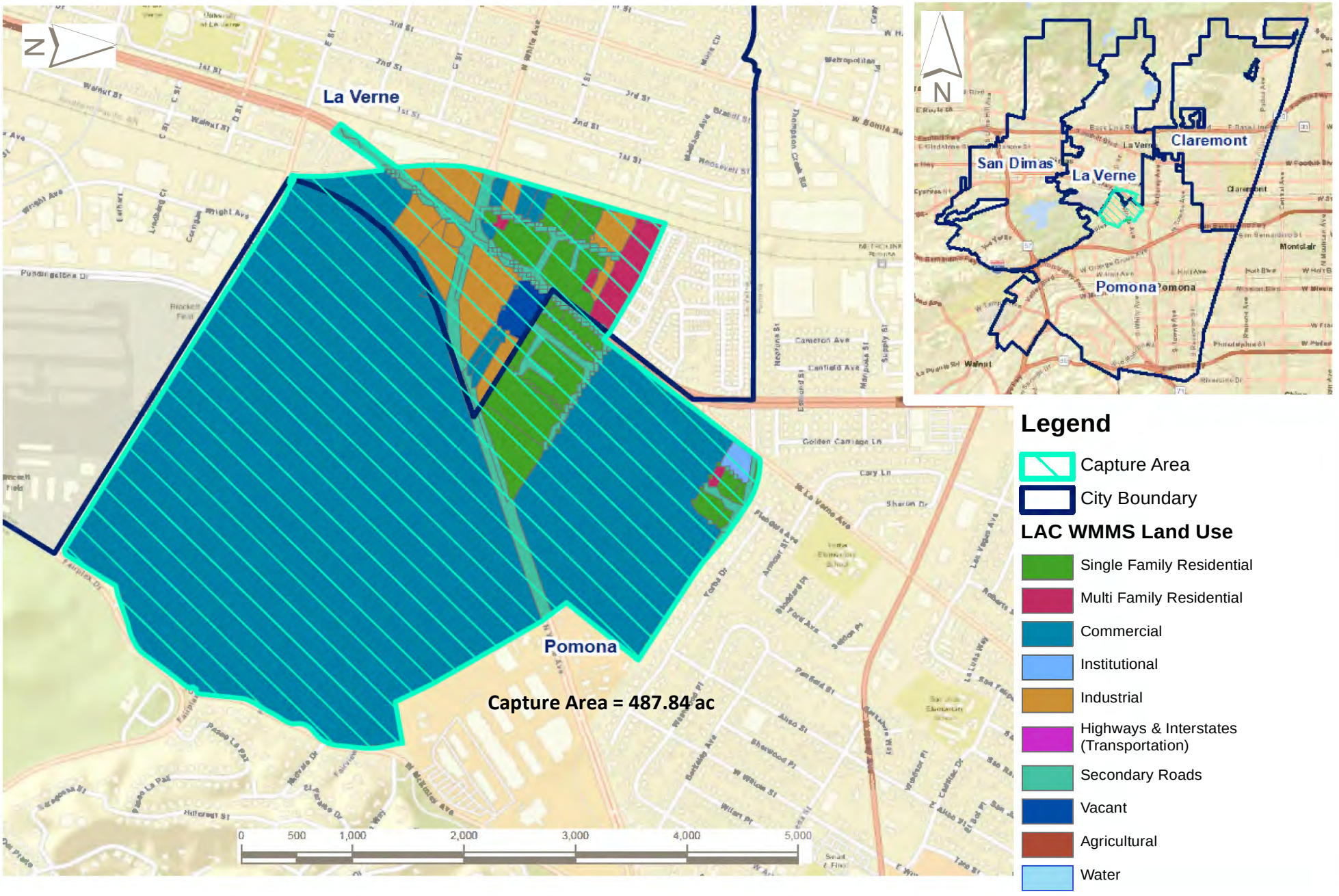


Figure 5 - Capture Area & Land Use

Site Information

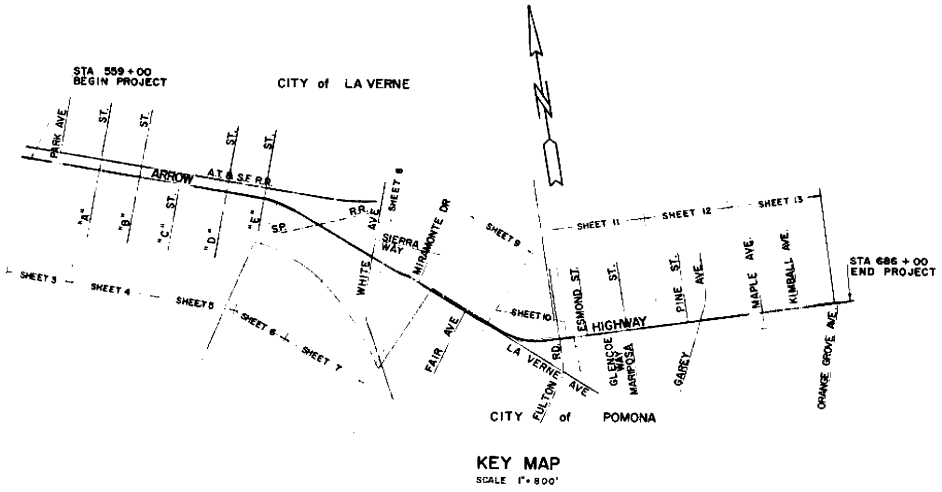


Figure 6 - Secondary Tributary Pipeline/Channel As-Built

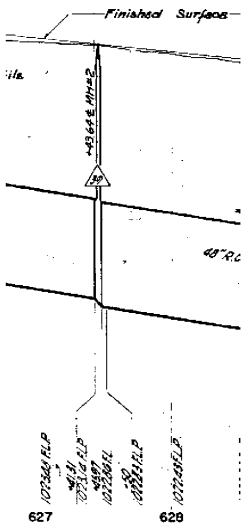


Figure 7 - Secondary Connection Manhole As-Built

Name	RDD 0086 - Thompson Creek			Name	Manhole #2		
Location	Arrow Hwy			Location	Approx 70 ft from Fair Ave & Arrow Hwy		
Capacity	48"	Drawing No.	PH055798	Invert Elevation	1022.86	Drawing No.	PH055817
		Drawing Date	3/1/1971	Rim Invert Elevation	1032.00	Drawing Date	1/6/1969

Site Photos

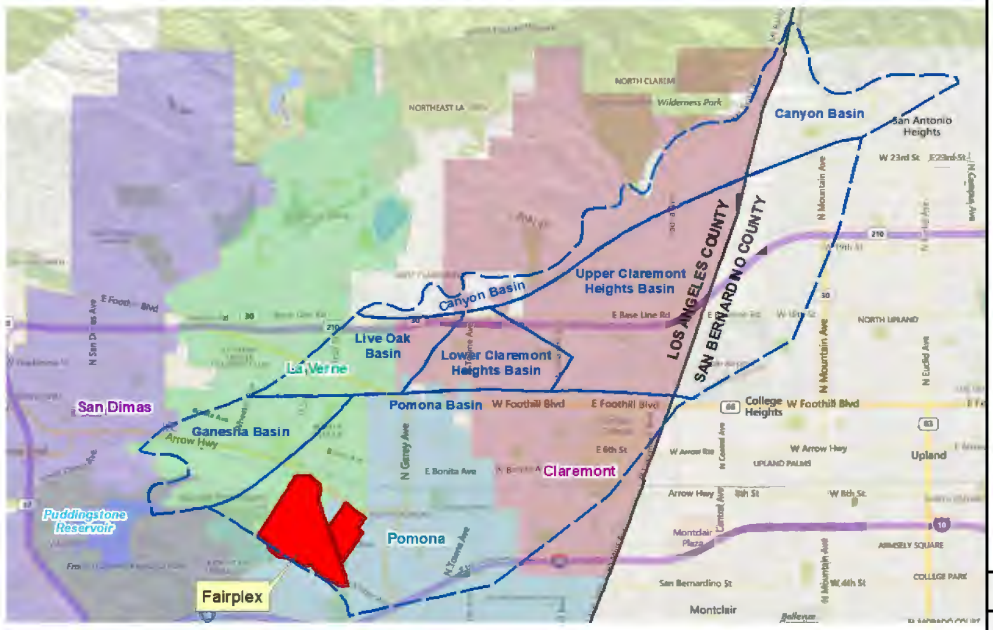


Photo 1 - Site Location

Photo 2 - Connection Location

Description	M.H. #2		
Photo Date	5/1/19	Photo Time	NA
Direction Facing	North		

Photo 3 - Site Looking North

Description	Fairplex field		
Photo Date	9/24/19	Photo Time	11:00 AM

Photo 4 - Site Looking East

Description	Fairplex field		
Photo Date	9/24/19	Photo Time	11:00 AM

Cost Estimation

Item #	Description	Quantity	UOM	Unit Cost	Total Cost
1	Basin Excavation/Preparation				$ 1,980,786.00
1	Strip Top Grass/Vegetative Layer - 3"	330	cys	$21	$7,000
2	Haul-off/Dispose of Organics	33	lds	$375	$12,375
3	Dump Fees	33	lds	$100	$3,300
4	Haul-off/Dispose of Non-Organics (Sprinkler System, etc.)	4	lds	$450	$1,856
5	Dump Fees	4	lds	$250	$1,031
6	Excavate Basin to Stockpile - Top 2' + Ramp Fill + Bench Volume	4311	cys	$3	$11,856
7	Excavate Basin to Waste (Balance), 8.6' Depth	66599	cys	$4	$266,396
8	Haul-off Cost for Surplus Clean Dirt Spoils	66599	cys	$25	$1,664,972
9	Prep & Compact Foundation	4000	sys	$3	$12,000
2	Install Stormchamber System				$ 6,231,916.00
1	Purchase Stormchamber System	1	ls	$3,735,083	$3,735,083
2	Stage/Inventory Stormchamber System	5	dys	$4,500	$22,500
3	Purchase/Import Aggregate Stone Backfill	74000	tns	$16	$1,184,000
4	Excavate/Install Sediment Traps (4)	6.00	dys	$3,500	$21,000
5	Place/Compact Bottom Aggregate Base Layer - 6"	790	tns	$11	$8,690
6	Install Woven Filter Fabric	35000	sf	$0.25	$8,750
7	Position/Install Stormchambers - 2 Rows	11149	ea	$14	$153,302
8	Backfill Stormchamber with Aggregate Base	73210	tns	$13	$951,730
9	Install Second Layer Filter Fabric	35000	sf	$0.25	$8,750
10	Supplemental PVC Piping Materials - Lateral Flow & Cleanouts	1	ls	$20,000	$20,000
11	Install PVC Flow Piping	15	dys	$5,000	$75,000
12	Backfill Basin	4311	cys	$10	$43,111
3	Connection Piping				$ 5,452,360.00
1	Design/Fab/Deliver Pkg Lift Station	1	ea	$200,000	$200,000
2	Install Pkg Lift Station	1	ls	$70,000	$70,000
3	Pkg Lift Station Electrical	1	ls	$250,000	$250,000
4	Design/Fab/Deliver Pkg Hydrodynamic Units	3	ea	$150,000	$450,000
5	Install Pkg Lift Station	1	ls	$157,500	$157,500
6	Force Main - 24" (Paved)	2,619	lf	$600	$1,571,400
7	Gravity Main -24" (Paved)	2,544	lf	$540	$1,373,760
8	Gravity Main -24" (Unpaved)	941	lf	$480	$451,680
9	Overflow -24"	1,849	lf	$480	$887,520
10	Manhole Connections	2	ea	$7,500	$15,000
11	Catch Basin	3	ea	$8,500	$25,500
4	Site Restoration				$ 145,443.00
1	Replace Sprinkler System	34412	sf	$1.50	$51,619
2	Replace Sod	34412	sf	$2.00	$68,825
3	Miscellaneous	1	ls	$25,000	$25,000

Item #	Description	Quantity	UOM	Unit Cost	Total Cost
A	Contract Allowances & Contingent Bid Items				$ 103,579.00
1	Contractor Quality Control	1	ls	0.75%	$103,579
B	Pre-Construction/Mobilization/Temporary Works				$ 41,000.00
1	Submittals/Procurement/POs/Resource Coordination	1	mo	$15,000	$15,000
2	Establish Baseline Survey / Alignment / As-builts	40	hrs	$275	$11,000
3	Initial Equipment Mobilization	10	lds	$1,000	$10,000
4	Third Party Design Services / Outside Consultants	1	ls	$5,000	$5,000
C	Startup/Commission/Owner Training				$ 139,141.00
1	All Required	1	ls	1.00%	$139,141
D	Direct Cost Allowances				$ 704,711.00
1	Estimating Allowance	1	ls	5.0%	$704,711
E	Contractor Markups/Indirect Costs				$ 5,104,743.00
1	Prime Contractor General Conditions	1	ls	8.0%	$977,967
2	Subcontractor General Conditions	1	ls	8.0%	$206,000
3	Subcontractor Overheads & Markups	1	ls	15.0%	$417,052
4	Prime Contractor OH&P on Subs	1	ls	6.0%	$191,844
5	Prime Contractor OH&P on Self-Perform	1	ls	12.0%	$1,584,300
6	Contractor Insurance Program	1	ls	2.5%	$454,402
7	Subcontractor Bonding	1	ls	1.5%	$38,615
8	Escalation from Current PL to NTP (Q3 2020 = 3/4 year)	1	ls	2.63%	$490,064
9	Escalation During Field Construction (2 mos total, or 1.5 mos to MPC)	1	ls	0.44%	$83,821
10	State Sales Taxes (CA)	0.35	ls	9.2%	$601,146
11	Contractor Furnished Permits	1	ls	0.3%	$59,532
	Budget Contingency				$ 3,980,736.00
12	Budget Contingency	1	ls	20.0%	$3,980,736
F	Owner Project Allowances				$ 4,776,884.00
1	Owner Costs - All	1	ls	20.0%	$4,776,884
	Total Project Costs (TPC)				**$28,661,000**

Project Name	Pedley Spreading Grounds		
Site Land Ownership	Pomona Water Department		
Partner Agency (ies)	City of Pomona		
Net Capture Volume (AFY)	Wet Weather:	86	Dry Weather: 106
Opinion of Probable Capital Cost (Class 5) ($-Millions)	2.83		
Total Life-Cycle Cost ($-Millions)	3.57		
Main Site Address	Claremont, CA		
Main Site Size (acres)	6.0		
Site Coordinates	Latitude:	34.116	Longitude: -117.710

Description

Pedley Spreading Grounds (PSG) is an existing facility with three spreading basins. The 2017 Strategic Plan for the Six Basins states that PSG does not receive stormwater or dry-weather runoff from the surrounding urbanized areas for recharge. This project proposes to deepen the ponds to accommodate local urban runoff. As-builts (Tract 29019) show an existing 18" pipe at the northwest corner of Basin 1 to capture drainage from the residential areas north of the PSG. In addition, the City of Pomona Mills Avenue 2003 As-Builts show two existing pipes, which connect at a junction manhole, and discharge at the northeastern corner of Basin 2. One pipe is a 30" pipe, which diverts flow from Baseline Road down N Mills Ave, and crosses through Chaparral Park; the other pipe is a 42" pipe through an easement between Loyola Court and Barrington Court. To include additional flows, a connection is proposed at an existing manhole at Chaparral Dr and N Mills Ave. Flows from the proposed connection would then enter a hydrodynamic separator for pretreatment, and then discharge into Basin 3. The existing basins have a ponding area of approximately 4.09 acres. The design depth to accommodate the urban runoff would require 1 ft of depth plus an additional 1 ft of freeboard.

Current Site Use

Recharge spreading grounds for water diverted from San Antonio Creek via the Canon Pipeline that surpasses the Pedley Treatment Plant capacity, high turbidity flows, and/or treatment plant backwash.

Conceptual Design Criteria

Overview		BMP Design	
Tributary Watershed Name	San Antonio	Name of Proposed Tributary Pipeline	BI 2401 - Line C
Assumed Design Infiltration Rate (in/hr) [1]	4.20	Capacity of Proposed Tributary Pipeline	24"
Assumed Drawdown Time (hrs)	96	US Connection Invert to BMP (ft)	1404
Tributary Area (acres)	486.93	Exist. Ground Surface Elevation at BMP (ft)	1389
Assumed Hydrologic Soil Group	A	Planned Invert at BMP (ft)	1387
85th-Percentile Design Storm (in)	0.76	Added Capacity of Facility (AF)	8.18
Gravity or Pumped Flow	Gravity	Distance to Nearest Well (mi)	0.01
Underground or Above Ground	Above	Project Design Life (years)	Approx. 30
Proximity to Recycled Water (mi)	NA	Preliminary SCWP Score	82

Additional Multi-Benefit Opportunities

Prevent and reduce amount of pollutants discharged into local water bodies, prepare for more extreme and frequent drought conditions by capturing and using runoff to reduce demand on water supplies, recharge groundwater.

Potential Challenges

Confirmation of utility conflicts required to validate concept design.

Stage of Development

☒ Conceptual	☐ Planning	☐ Pre-Design
☐ Design	☐ Construction	☐ Other

Expected Project Timeline	Begin:	May-21	End: Jan-25

Potentially Applicable Federal and State Programs for Financial Assistance

☒ Measure W	☒ Prop 68	☐ Other _____
☒ Prop 1	☒ EPA Clean Water State Revolving Fund (CWSRF)	

Contact Person(s):

Jack Martinez, Water Treatment Plant Crew Chief, Pomona Water Resources, 909-802-7427, jack_martinez@ci.pomona.ca.us

Notes

1 - Source: NRCS Web Soil Survey. A Safety Factor of 3 was applied for long-term siltation, plugging, and maintenance per LA County GS200.1.

Project Multi-Benefits (per Safe Clean Water Program Table 7)

A. Water Quality Benefits

A.1 Wet Weather Water Quality Benefits

A.1.1 Cost Effectiveness	4.20	AF / $-Millions	Resulting Points:	20
24-hr BMP Capacity:	10.78	AF		
Construction Cost:	2.57	$ in Millions		

A.1.2 Quantify Pollutant Reduction

Primary Class Pollutants:	% Load Reduction		
Total Copper	99.7%	Resulting Points:	20

Second or More Class Pollutants:	% Load Reduction		
Total Zinc	100.0%	Resulting Points:	10

A.2 Dry Weather Water Quality Benefits (for 0.25" storms and below)

B. Significant Water Supply Benefits

B.1 Water Supply Cost Effectiveness

Cost Effectiveness	992	$ / AF	Resulting Points:	13
Runoff Captured for Water Supply[1]	191.53	AF		
Annualized Life-Cycle Cost	0.19	$ in Millions		

B.2 Water Supply Benefit Magnitude

Annual Additional Water Supply Volume Resulting from Project	191.53	AF/year	Resulting Points:	5

C. Community Investment Benefits

C.1 Project Benefits

☒ Improved flood management, flood conveyance, or flood risk mitigation
☒ Creation, enhancement, or restoration of parks
☐ Improved public access to waterways
☐ Enhanced or new recreational opportunities
☐ Creation or enhancement of green spaces at school
☐ Improved public health by reducing heat island effect
☐ Increased shade or planting of trees/other vegetation that increase carbon reduction/sequestration

Resulting Points: 2

D. Nature-Based Solutions

D.1 Project Solutions

☒ Implements natural processes or mimics natural processes to slow, detain, capture, and absorb/infiltrate water in a manner that protects, enhances and/or restores habitat, green space and/or usable open space (5 points)
☐ Utilizes natural materials such as soils and vegetation with a preference for native vegetation (5 points)
☐ Removes Impermeable Area from Project (1 point per 20% paved area removed)

Resulting Points: 5

E. Leveraging Funds and Community Support

E.1 Cost-Share

☒ >25% Funding Matched (3 points)
☐ >50% Funding Matched (6 points) Resulting Points: 3

E.2 Community-Based Support

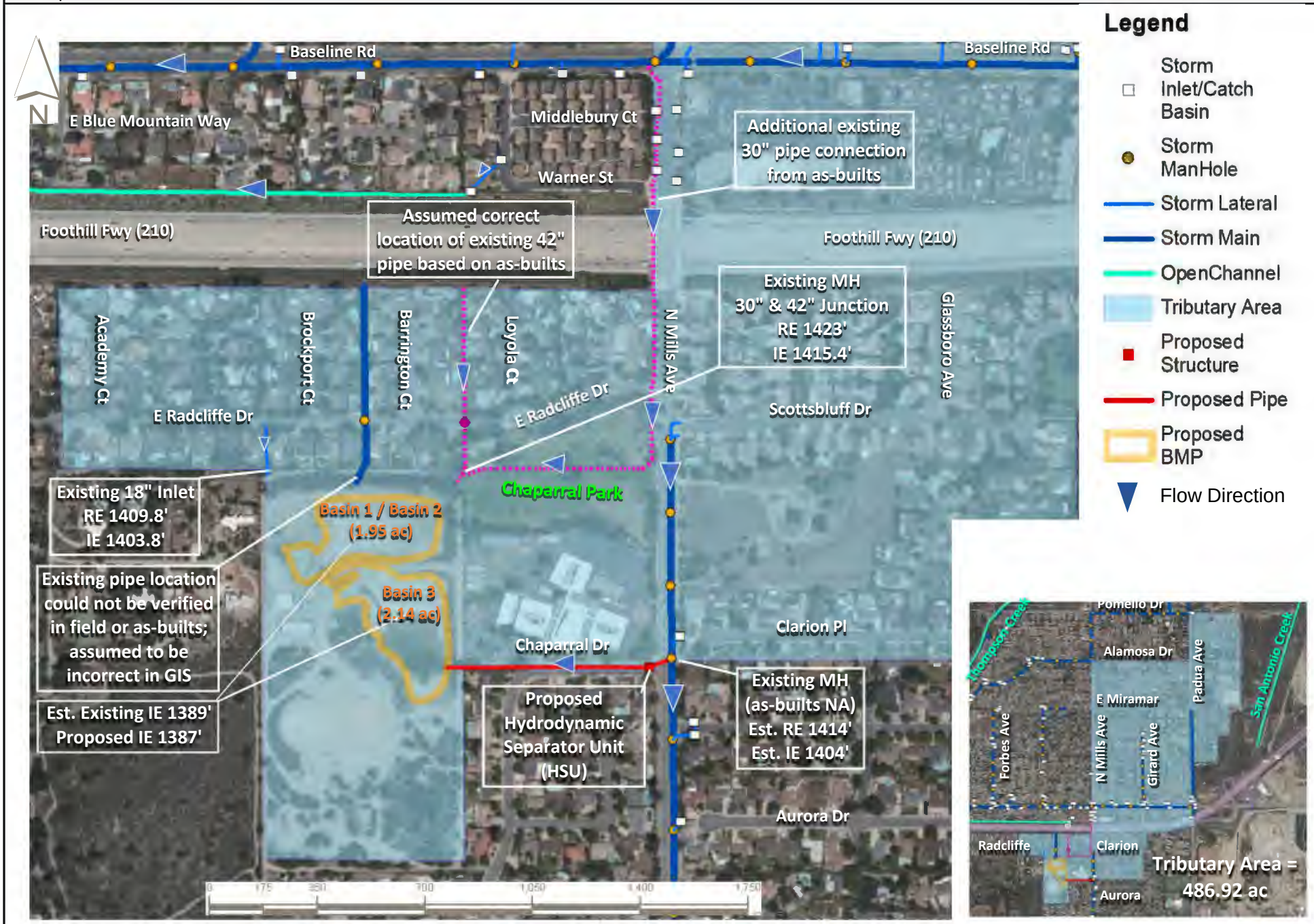
☒ The Project demonstrates strong local, community-based support and/or has been developed as part of a partnership with local NGOs/CBOs (4 points) Resulting Points: 4

Notes **Final Score: 82**

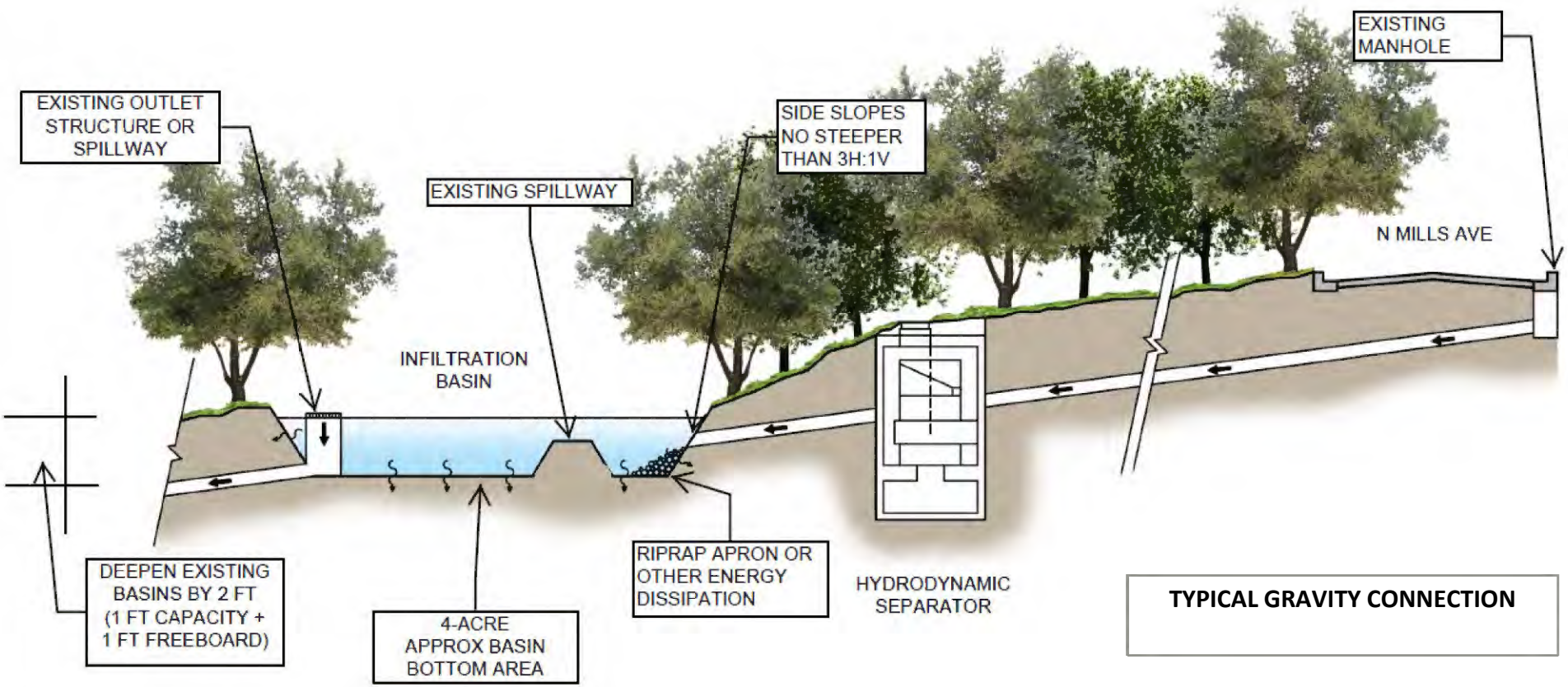
General - All Regional Program Projects must meet the Threshold Score of 60 points or more using the Project Scoring Criteria to be eligible for consideration.

1 - Preliminary estimates based on blended hydrograph inputs to the SCW Project Module.

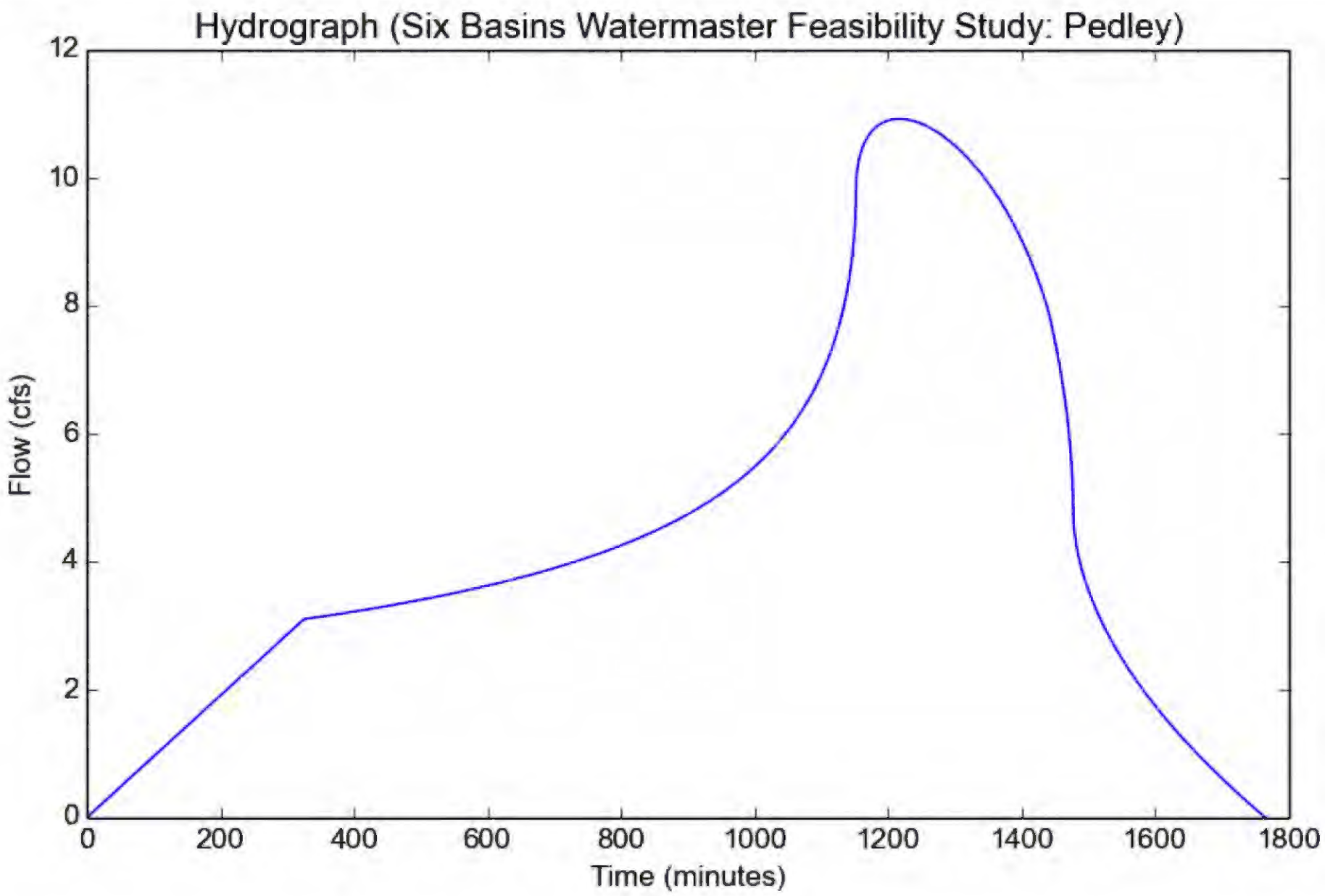
Conceptual GIS Site Plan



Conceptual Site Profile



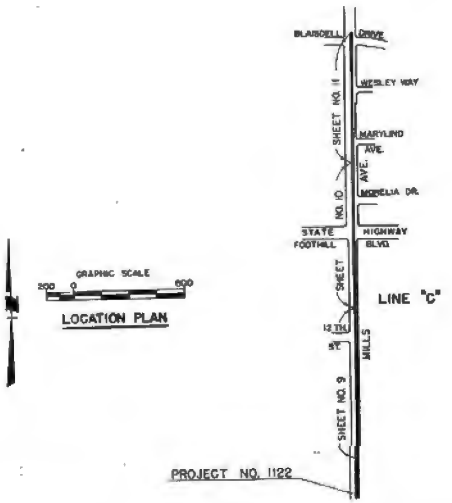
Hydrograph



Note: This data is based on a blended hydrograph for the overall drainage area.

Design Capture Volume (AF)	10.77999	Design Capture Volume (cu ft)	469576.3	Peak Flow (cfs)	10.9223

Site Information



Pipes north of Blaisdell Drive were not shown on the as-built drawings. See Site Photos for Proposed Connection in-field measurements.

Figure 1 - Proposed Tributary Pipeline/Channel As-Built

Name	BI 2401 - Line C		
Location	N Mills Ave		
Capacity	24"	Drawing No.	PD035780
		Drawing Date	6/1/1968

As-builts NA

See Site Photos for Proposed Connection

Figure 2 - Proposed Connection Manhole As-Built

Name			
Location			
Invert Elevation		Drawing No.	
Rim Invert Elevation		Drawing Date	

Figure 3 - Soil Types & Faults

Figure 4 - Depth to Groundwater

Site Information

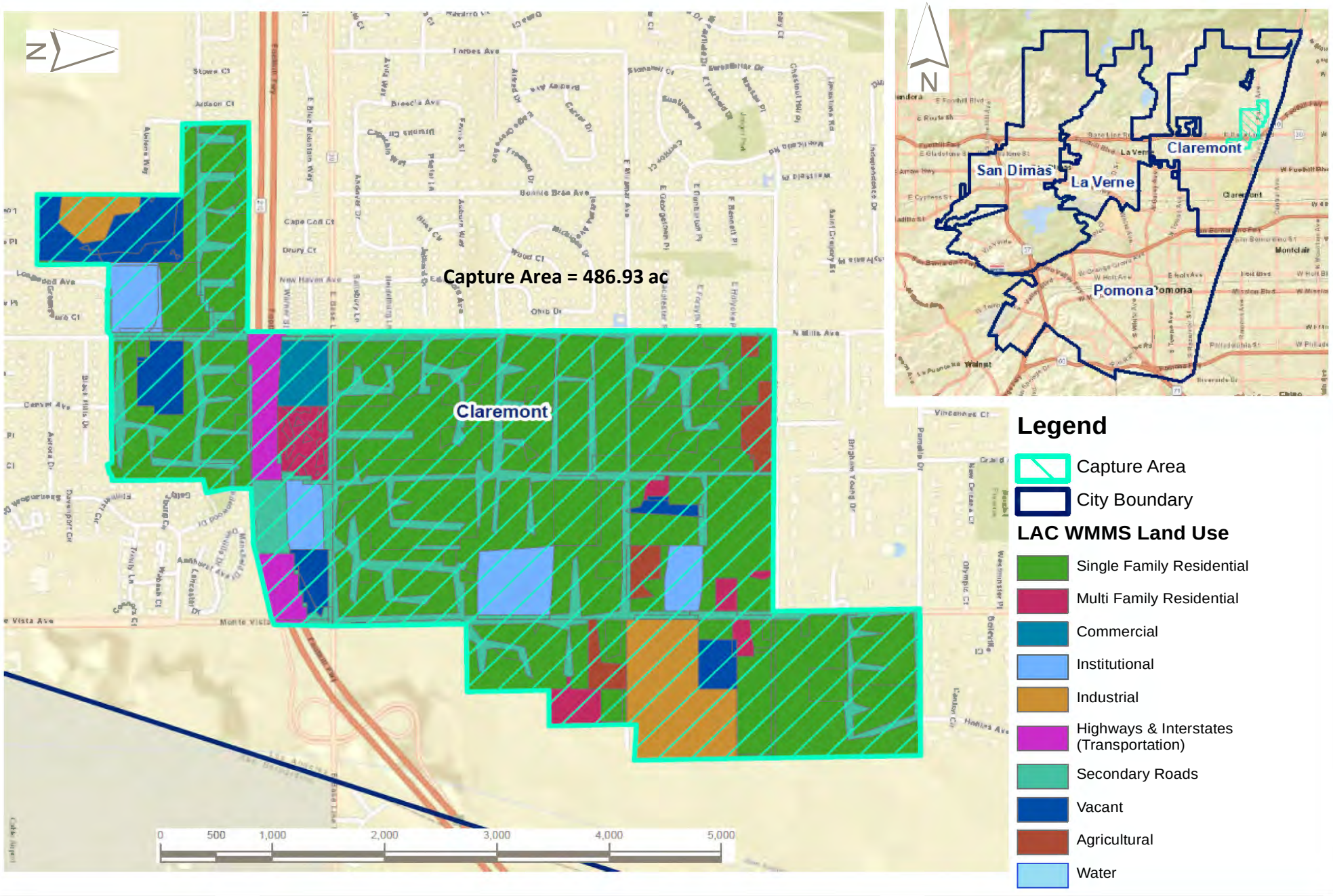


Figure 5 - Capture Area & Land Use

Site Information

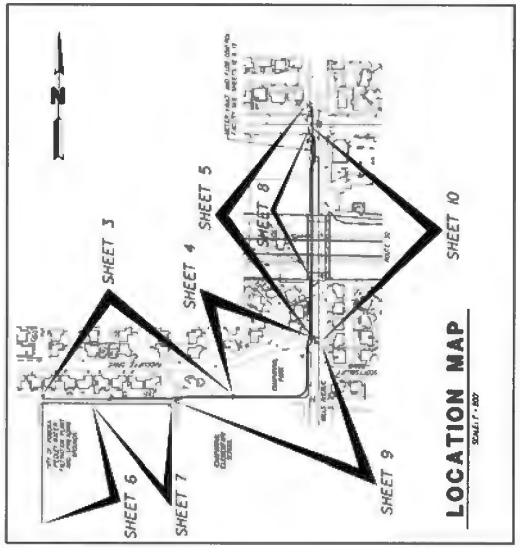


Figure 6 - Pre-existing Tributary Pipeline/Channel As-Built

Name	Pomona Water Dept. CO No. 3194 (3123)		
Location	N Mills Ave / through Chaparral Park		
Capacity	30" & 42"	Drawing No.	3194 (2 of 13)
		Drawing Date	8/30/2001

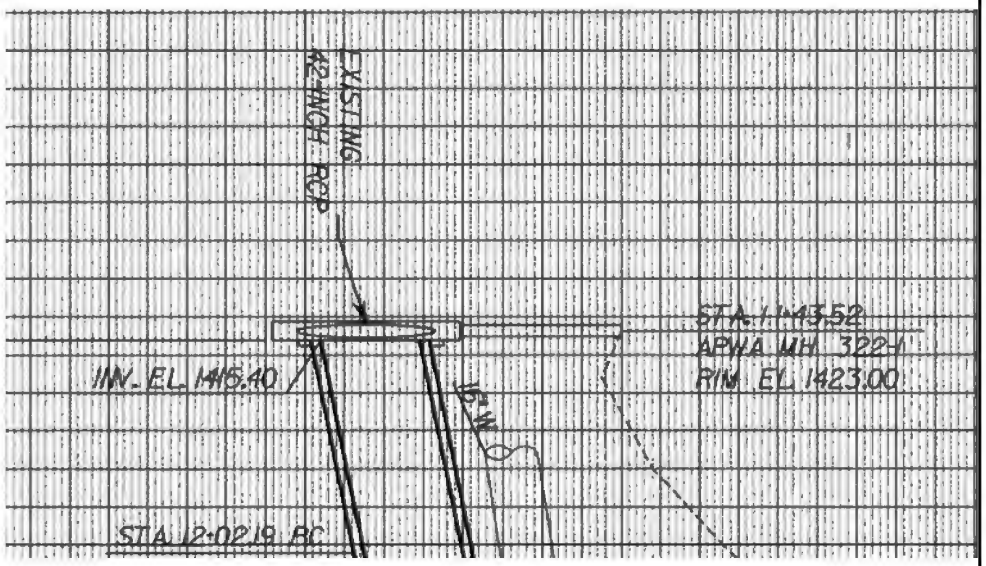


Figure 7 - Pre-existing Connection Manhole As-Built

Name	MH Sta. 11+43.52		
Location	Northeast corner of Existing Basin 2		
Invert Elevation	1415.40	Drawing No.	3194 (9 of 13)
Rim Invert Elevation	1423.00	Drawing Date	8/30/2001

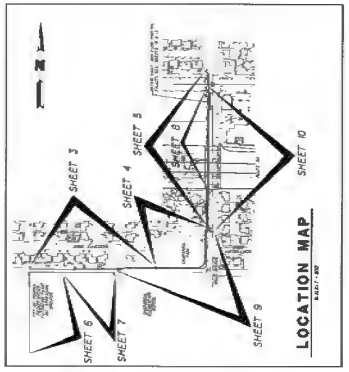


Figure 8 - Pre-existing Tributary Pipeline/Channel As-Built

Name	NA		
Location	Radcliffe Dr		
Capacity	18"	Drawing No.	3194 (2 of 13)
		Drawing Date	8/30/2001

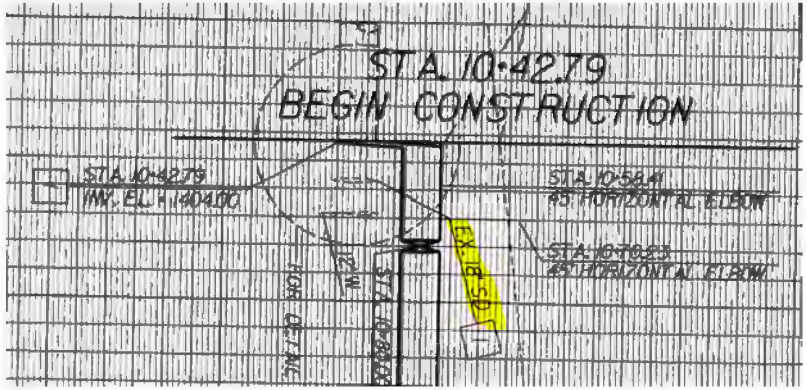


Figure 9- Pre-existing Connection Manhole As-Built

Name	NA		
Location	Northwest corner of Existing Basin 1		
Invert Elevation	Est. 1403.8	Drawing No.	3194 (3 of 13)
Rim Invert Elevation	Est. 1409.8	Drawing Date	8/30/2001

Site Photos

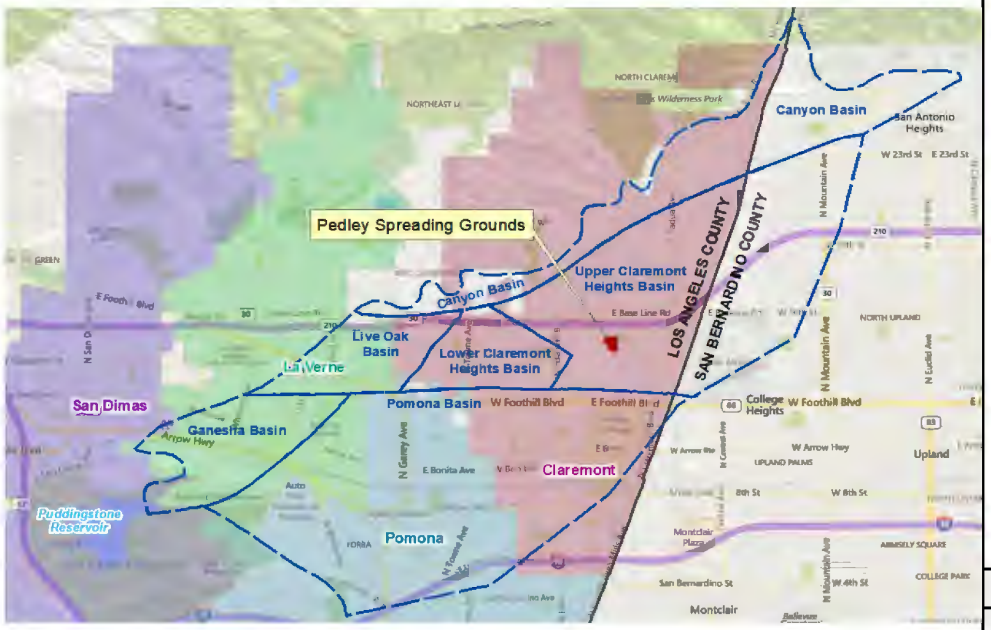


Photo 1 - Site Location

Photo 2 - Proposed Connection Location

Description	MH @Chaparral Dr & N Mills Ave - IE Measured 9.94'		
Photo Date	9/24/19	Photo Time	3:30 PM
Direction Facing	North		

Photo 3 - Site Looking North

Description	Basins 1, 2, & 3		
Photo Date	9/25/19	Photo Time	10:45 AM

Photo 4 - Site Looking East

Description	Basins 1, 2, & 3		
Photo Date	9/25/19	Photo Time	10:45 AM

Cost Estimation

Item #	Description	Quantity	UOM	Unit Cost	Total Cost
1	Basin Excavation/Preparation				$ 495,696.00
1	Strip Top Grass/Vegetative Layer - 3"	130	cys	$53.85	$7,000
2	Haul-off/Dispose of Organics	13	lds	$375	$4,875
3	Dump Fees	13	lds	$100	$1,300
4	Haul-off/Dispose of Non-Organics (Sprinkler System, etc.)	2	lds	$450	$731
5	Dump Fees	2	lds	$250	$406
6	Excavate Basin to Waste (Balance), 8.6' Depth	16496	cys	$4.00	$65,984
7	Haul-off Cost for Surplus Clean Dirt Spoils	16496	cys	$25.00	$412,400
8	Prep & Compact Foundation	1000	sys	$3.00	$3,000
2	Connection Piping				$ 650,400.00
1	Design/Fab/Deliver Pkg Hydrodynamic Units	1	ea	$150,000	$150,000
2	Install Pkg Lift Station	1	ls	$52,500	$52,500
4	Force Main - 24" (Paved)	734	lf	$600.00	$440,400
5	Manhole Connections	1	ea	$7,500.00	$7,500
3	Site Restoration				$ 15,000.00
1	Miscellaneous	1	ls	$15,000.00	$15,000
A	Contract Allowances & Contingent Bid Items				$ 8,708.00
1	Contractor Quality Control	1	ls	0.75%	$8,708.00
B	Pre-Construction/Mobilization/Temporary Works				$ 41,000.00
1	Submittals/Procurement/POs/Resource Coordination	1	mo	$15,000	$15,000
2	Establish Baseline Survey / Alignment / As-builts	40	hrs	$275	$11,000
3	Initial Equipment Mobilization	10	lds	$1,000	$10,000
4	Third Party Design Services / Outside Consultants	1	ls	$5,000	$5,000
C	Startup/Commission/Owner Training				$ 11,698.00
1	All Required	1	ls	1.00%	$11,698
D	Direct Cost Allowances				$ 61,125.00
1	Estimating Allowance	1	ls	5.0%	$61,125
E	Contractor Markups/Indirect Costs				$ 500,596.00
1	Prime Contractor General Conditions	1	ls	8.0%	$50,058
2	Subcontractor General Conditions	1	ls	8.0%	$52,700
3	Subcontractor Overheads & Markups	1	ls	15%	$106,590
4	Prime Contractor OH&P on Subs	1	ls	6.0%	$49,031
5	Prime Contractor OH&P on Self-Perform	1	ls	12.0%	$81,100
6	Contractor Insurance Program	1	ls	2.5%	$40,578
7	Subcontractor Bonding	1	ls	1.5%	$9,869
8	Escalation from Current PL to NTP (Q3 2020 = 3/4 year)	1	ls	2.63%	$43,931
9	Escalation During Field Construction (2 mos total, or 1.5 mos to MPC)	1	ls	0.44%	$7,514
10	State Sales Taxes (CA)	35%	ls	9.20%	$53,888
11	Contractor Furnished Permits	1	ls	0.30%	$5,337
	Budget Contingency				$ 356,845.00
12	Budget Contingency	1	ls	20.0%	$356,845
F	Owner Project Allowances				$ 428,212.00
1	Owner Costs - All	1	ls	20%	$428,212
	Total Project Costs (TPC)				**$2,569,000**

Project Name	San Antonio Spreading Grounds		
Site Land Ownership	Pomona Valley Protective Association (PVPA)		
Partner Agency (ies)	Three Valleys MWD, City of Upland, City of Pomona, City of Claremont		
Net Capture Volume (AFY)	Wet Weather: 79	Dry Weather:	49
Opinion of Probable Capital Cost (Class 5) ($-Millions)	10.22		
Total Life-Cycle Cost ($-Millions)	10.97		
Main Site Address	NA		
Main Site Size (acres)	891.6		
Site Coordinates	Latitude: 34.130	Longitude:	-117.693

Description

This project includes an open infiltration basin to be located northeast of the E Miramar Ave street end. Drainage from the residential areas south of Mt Baldy would flow by gravity into a hydrodynamic separator for pretreatment on Pomello Dr, and then into the infiltration basin. An additional connection is proposed at E Miramar Ave through a proposed catch basin, hydrodynamic separator, and ultimately to a pump well before entering the basin. The infiltration basin concept includes a bottom area of 1.04 ac and design depth of 3 ft plus an additional 1 ft of freeboard. The outlet structure/emergency outfall would discharge into the existing flow path topography of the spreading grounds for flows exceeding the 85th percentile event.

Current Site Use

Recharge spreading grounds for water diverted from San Antonio Creek.

Conceptual Design Criteria

Overview		BMP Design	
Tributary Watershed Name	San Antonio	Name of Tributary Pipeline	Pomalamar Drain
Assumed Design Infiltration Rate (in/hr) [1]	4.20	Capacity of Tributary Pipeline	33"
Assumed Drawdown Time (hrs)	96	US Connection Invert to BMP (ft)	1674.75
Tributary Area (acres)	225.44	Exist. Ground Surface Elevation at BMP (ft)	1666
Assumed Hydrologic Soil Group	A	Planned Invert at BMP (ft)	1650
85th-Percentile Design Storm (in)	0.75	Capacity of Facility (AF)	3.120
Gravity or Pumped Flow	Both	Distance to Nearest Well (mi)	0.05
Underground or Above Ground	Above	Project Design Life (years)	Approx. 30
Proximity to Recycled Water (mi)	NA	Preliminary SCWP Score	72

Additional Multi-Benefit Opportunities

Prevent and reduce amount of pollutants discharged into local water bodies, prepare for more extreme and frequent drought conditions by capturing and using runoff to reduce demand on water supplies, recharge groundwater by capturing and infiltrating runoff.

Potential Challenges

Confirmation of utility conflicts are required to validate concept design. Compaction during construction may occur thereby reducing infiltration.

Stage of Development

☒ Conceptual	☐ Planning	☐ Pre-Design
☐ Design	☐ Construction	☐ Other

Expected Project Timeline	Begin: TBD	End:	TBD

Potentially Applicable Federal and State Programs for Financial Assistance

☒ Measure W	☒ Prop 68	☐ Other _____
☒ Prop 1	☒ EPA Clean Water State Revolving Fund (CWSRF)	

Contact Person(s):

Ray Evangelista, Engineer, Three Valleys Municipal Water District, revangelista@tvmwd.com, 909-621-5568 ext. 110

Notes

1 - Source: NRCS Web Soil Survey. A Safety Factor of 3 was applied for long-term siltation, plugging, and maintenance per LA County GS200.1.

Project Multi-Benefits (per Safe Clean Water Program Table 7)

A. Water Quality Benefits

A.1 Wet Weather Water Quality Benefits (for 0" storms and above)

A.1.1 Cost Effectiveness	1.13	AF / $-Millions	Resulting Points:	20
24-hr BMP Capacity [1]:	10.46	AF		
Construction Cost:	9.29	$ in Millions		
A.1.2 Quantify Pollutant Reduction [1]				
Primary Class Pollutants:	% Load Reduction			
Total Zinc	92.5%		Resulting Points:	20
Second or More Class Pollutants:	% Load Reduction			
Total Nitrogen	92.9%		Resulting Points:	10

A.2 Dry Weather Water Quality Benefits (for 0.25" storms and below)

B. Significant Water Supply Benefits

B.1 Water Supply Cost Effectiveness

Cost Effectiveness	4596	$ / AF	Resulting Points:	0
Runoff Captured for Water Supply [1]	128.38	AF		
Annualized Life-Cycle Cost	0.59	$ in Millions		

B.2 Water Supply Benefit Magnitude

Annual Additional Water Supply Volume Resulting from Project [1]	128.38	AF/year	Resulting Points:	5

C. Community Investment Benefits

C.1 Project Benefits

☒ Improved flood management, flood conveyance, or flood risk mitigation
☐ Creation, enhancement, or restoration of parks
☐ Improved public access to waterways
☐ Enhanced or new recreational opportunities
☐ Creation or enhancement of green spaces at school
☐ Improved public health by reducing heat island effect
☐ Increased shade or planting of trees/other vegetation that increase carbon reduction/sequestration

Resulting Points: 2

D. Nature-Based Solutions

D.1 Project Solutions

☒ Implements natural processes or mimics natural processes to slow, detain, capture, and absorb/infiltrate water in a manner that protects, enhances and/or restores habitat, green space and/or usable open space (5 points)
☐ Utilizes natural materials such as soils and vegetation with a preference for native vegetation (5 points)
☐ Removes Impermeable Area from Project (1 point per 20% paved area removed)

Resulting Points: 5

E. Leveraging Funds and Community Support

E.1 Cost-Share

☐ >25% Funding Matched (3 points)
☒ >50% Funding Matched (6 points) Resulting Points: 6

E.2 Community-Based Support

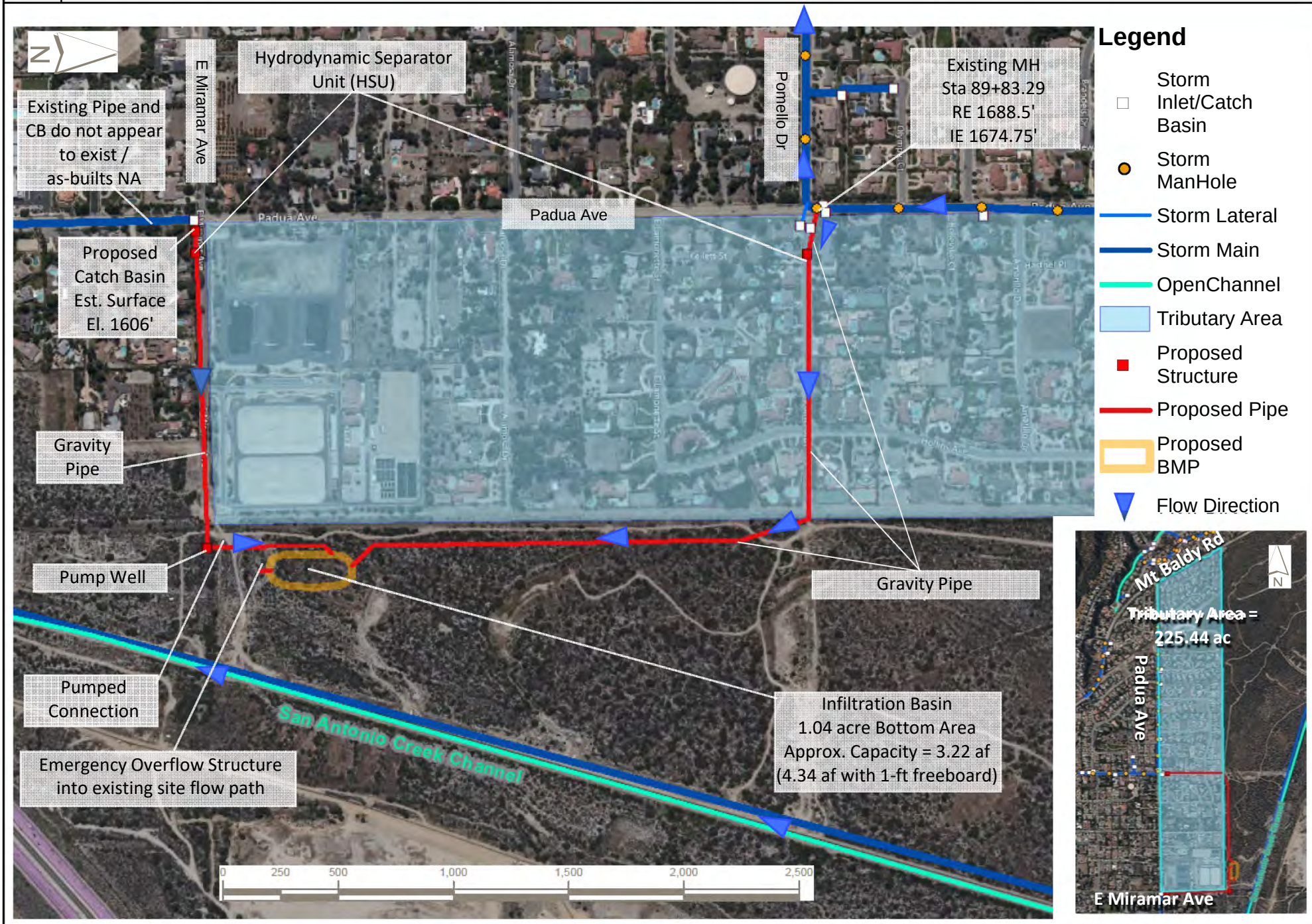
☒ The Project demonstrates strong local, community-based support and/or has been developed as part of a partnership with local NGOs/CBOs (4 points) Resulting Points: 4

Notes **Final Score: 72**

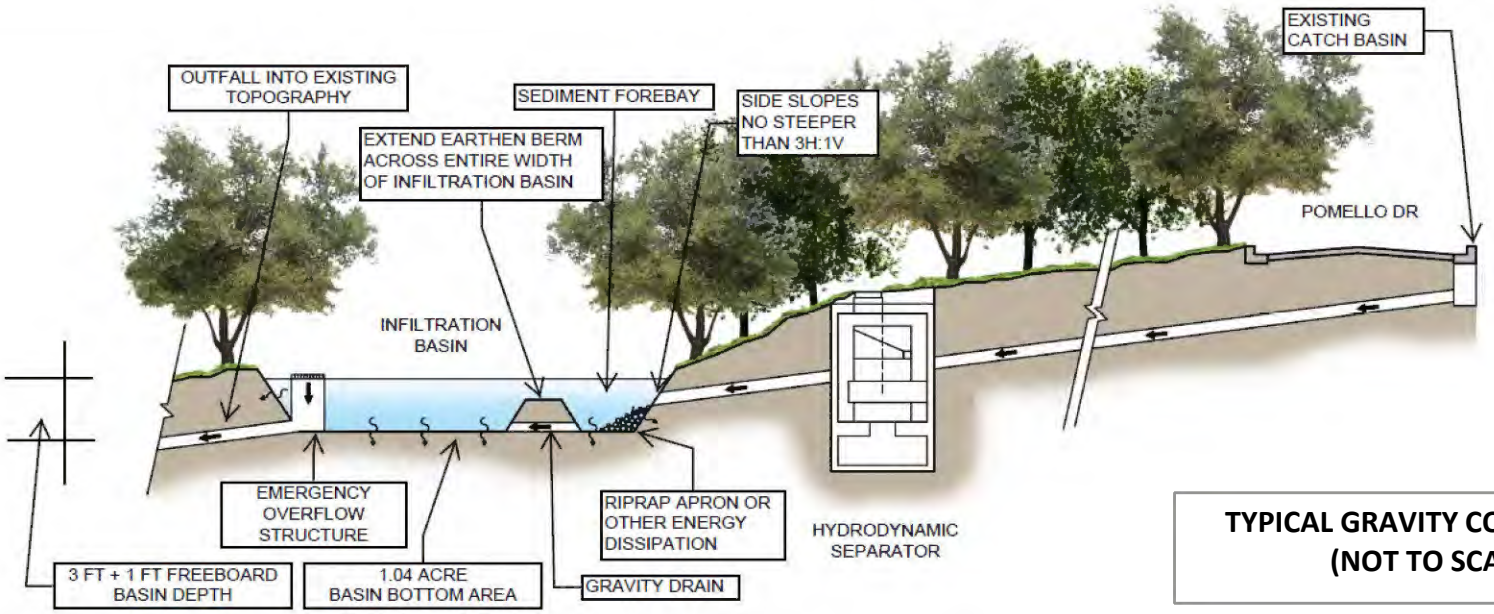
General - All Regional Program Projects must meet the Threshold Score of 60 points or more using the Project Scoring Criteria to be eligible for consideration.

1 - Preliminary estimates based on blended hydrograph inputs to the SCW Project Module.

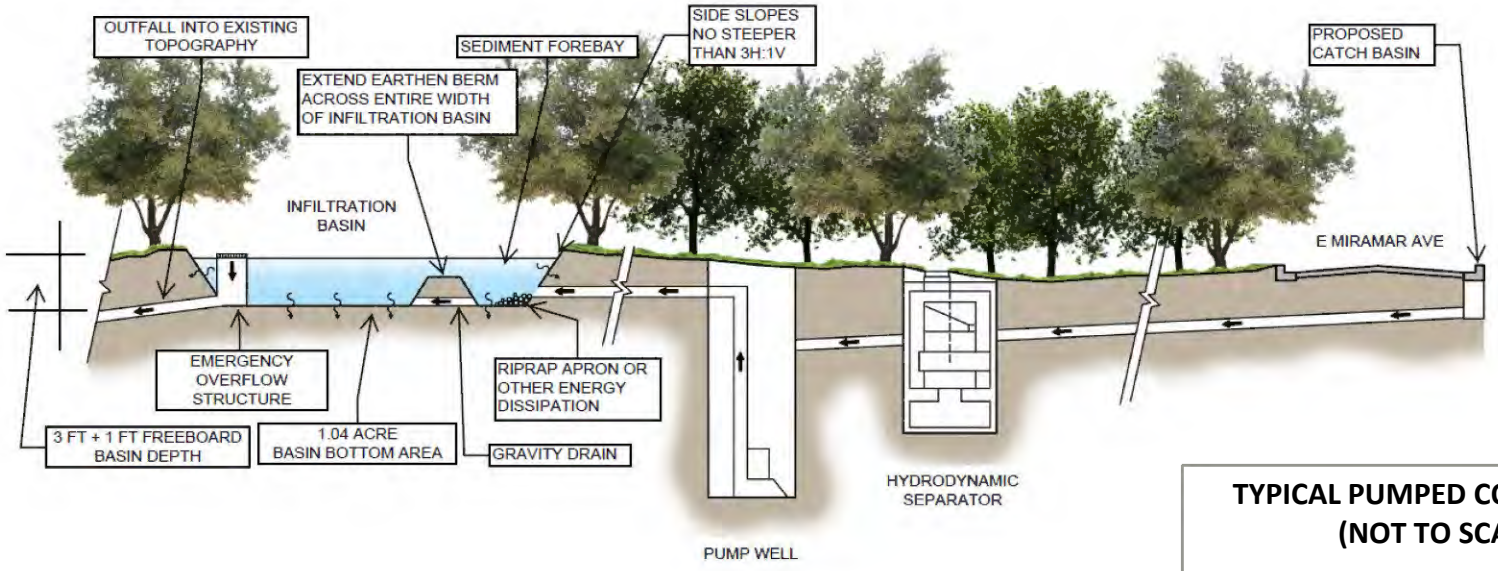
Conceptual GIS Site Plan



Conceptual Site Profile

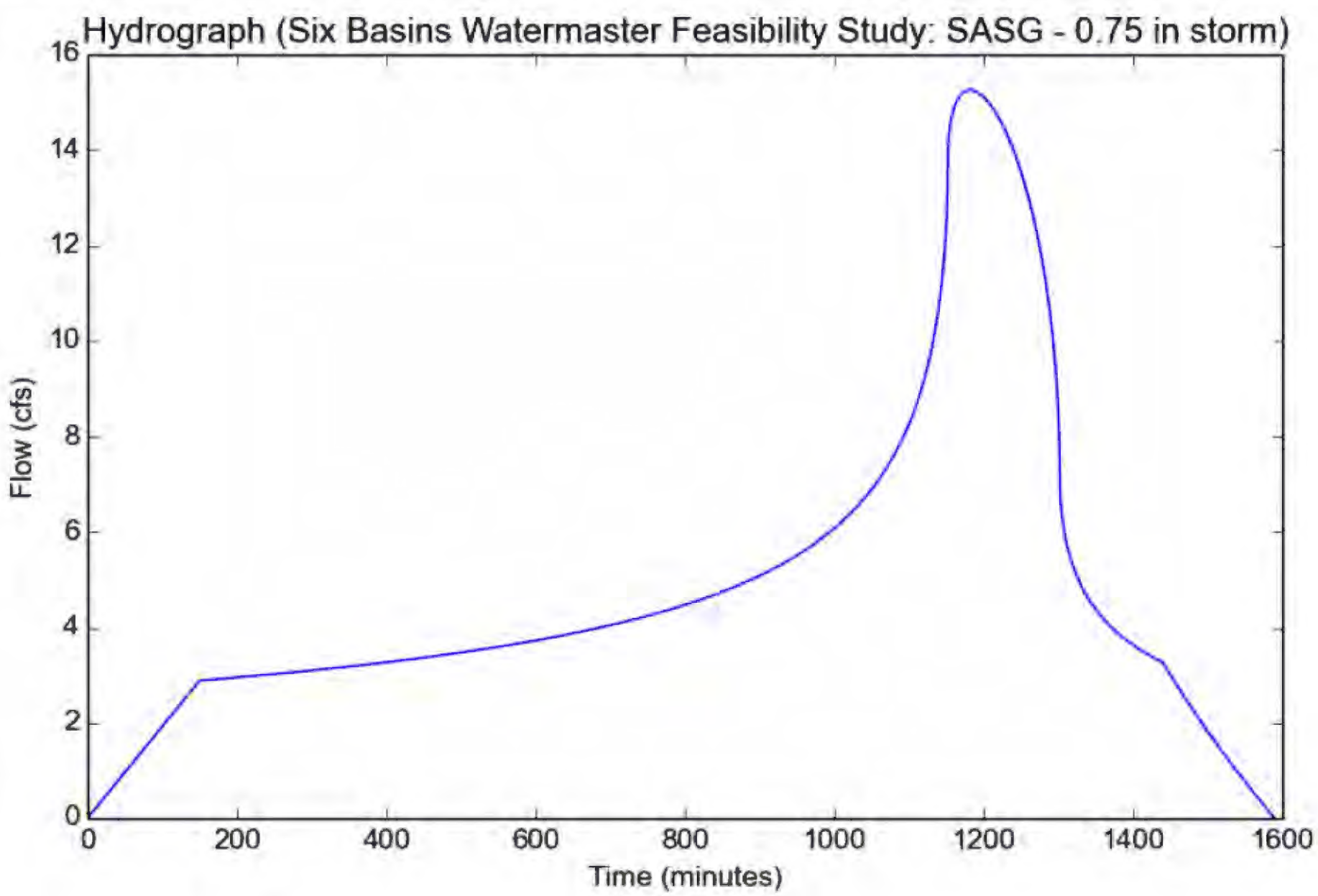


TYPICAL GRAVITY CONNECTION (NOT TO SCALE)



TYPICAL PUMPED CONNECTION (NOT TO SCALE)

Hydrograph



Note: This data is based on a blended hydrograph for the overall drainage area.
Per the LAC LID Manual, the 0.75-inch storm event was modeled due to the 85th percentile depth at SASG < 0.75 inches.

Design Capture Volume (AF)	10.455	Design Capture Volume (cu ft)	455440	Peak Flow (cfs)	15.256

Site Information

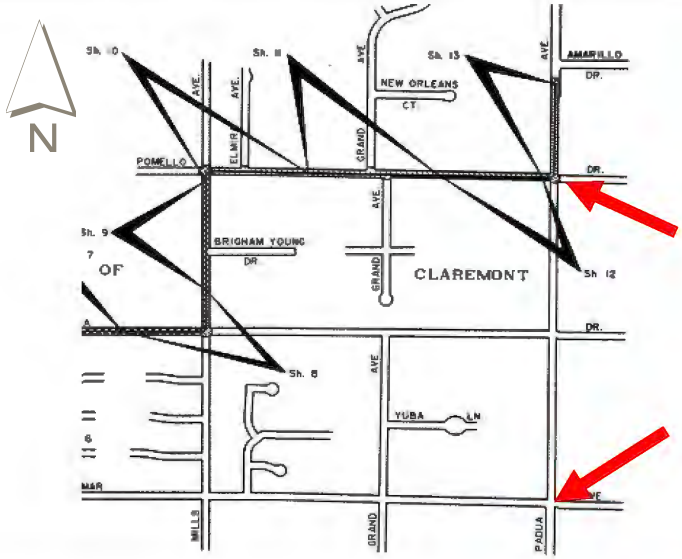


Figure 1 - Tributary Pipeline/Channel As-Built

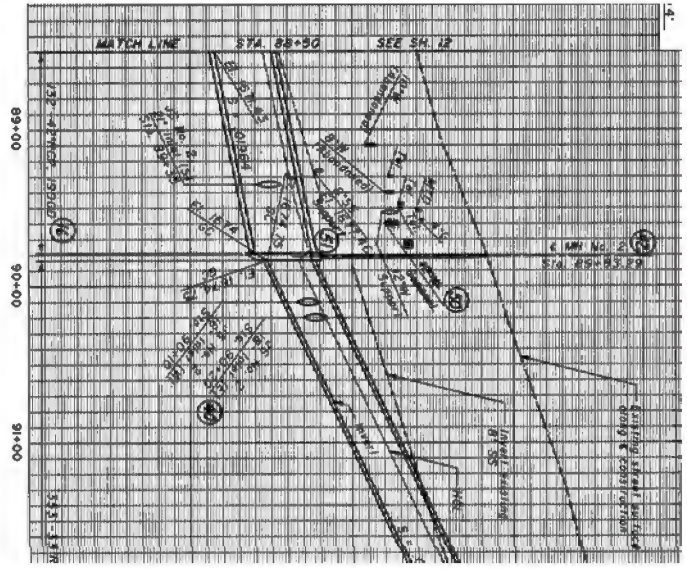


Figure 2 - Connection Manhole As-Built

Name	Pomalamar Drain		
Location	Padua Ave		
Capacity	33"	Drawing No.	PD022398
		Drawing Date	6/4/1992

Name	MH No 2 - Sta 89+83.29		
Location	NW corner, Padua Ave & Pomello Dr		
Invert Elevation	1674.75	Drawing No.	PD022410
Rim Invert Elevation	1688.5	Drawing Date	5/7/1991

Figure 3 - Soil Types & Faults

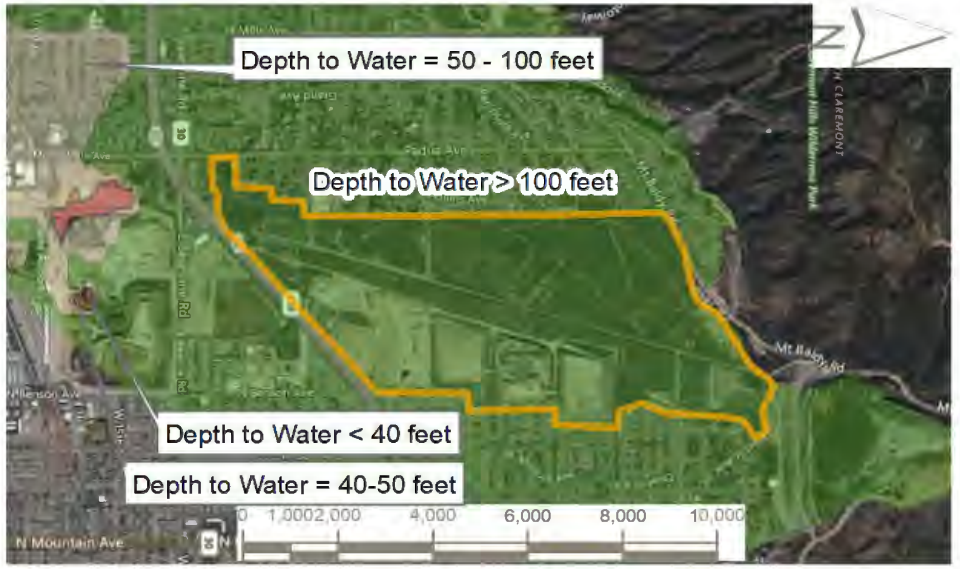


Figure 4 - Depth to Groundwater

Site Information

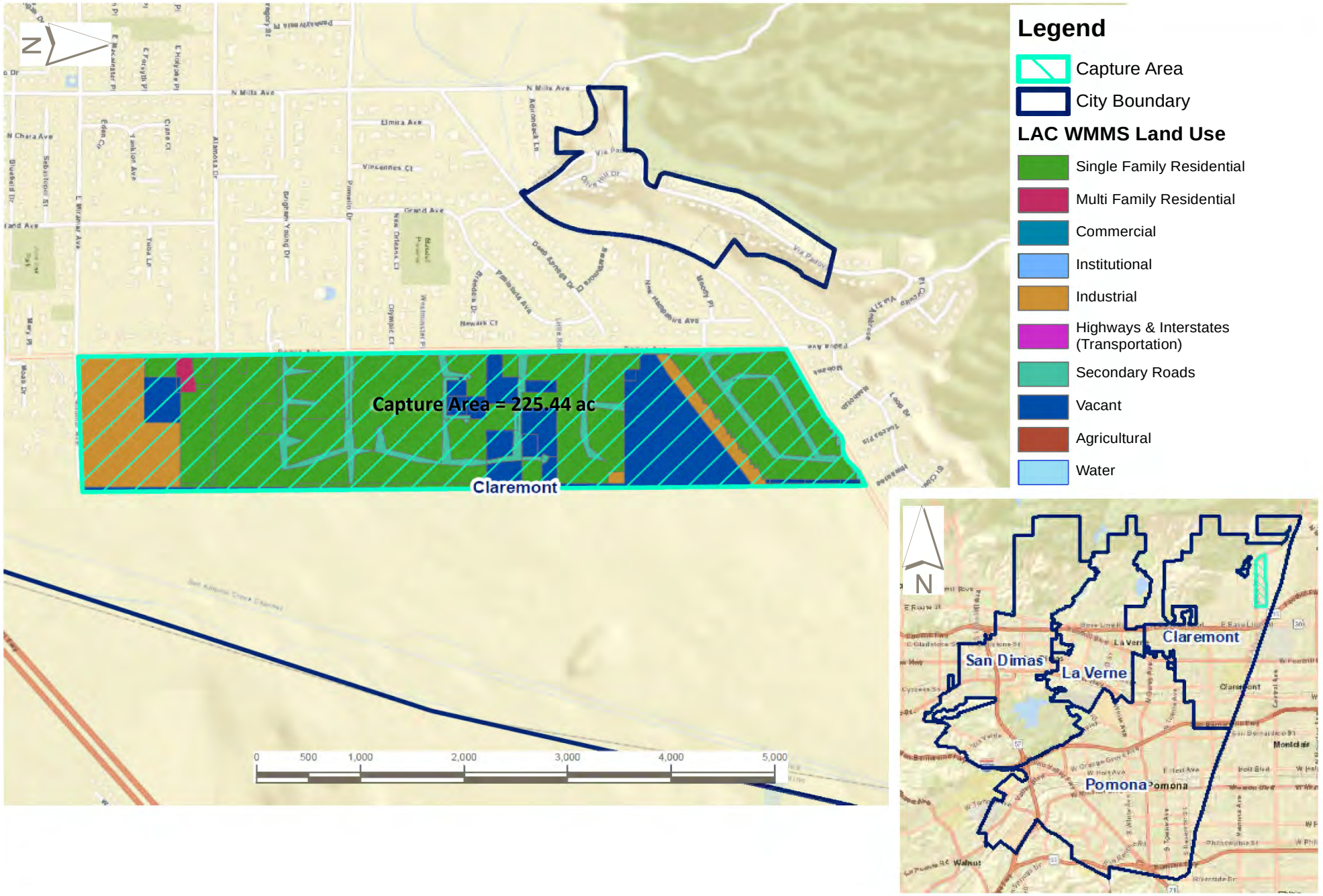


Figure 5 - Capture Area & Land Use

Site Photos

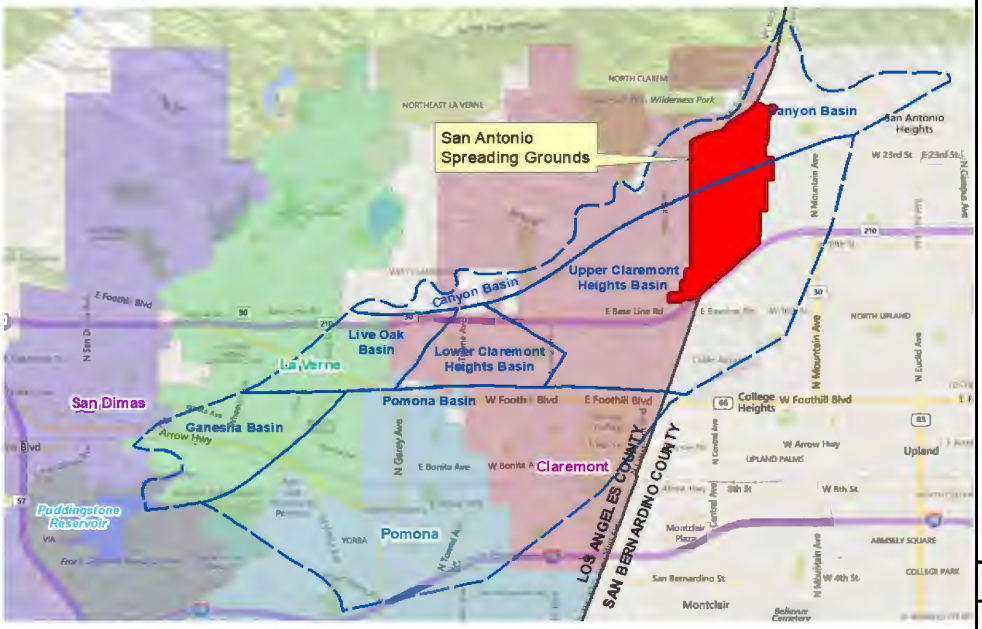


Photo 1 - Site Location

Photo 2 - Connection Location

Description	Pomello Dr & Padua Ave		
Photo Date	9/24/19	Photo Time	4:30 PM
Direction Facing	North		

Photo 3 - Connection Location

Description	E Miramar Ave & Padua Ave (Google Street View)		
Photo Date	3/1/19	Photo Time	NA
Direction Facing	North		

Photo 4 - Site Looking Northeast

Description	Along E Miramar Ave, facing Northeast		
Photo Date	9/25/19	Photo Time	2:45 PM

Cost Estimation

Item #	Description	Quantity	UOM	Unit Cost	Total Cost
1	Basin Excavation/Preparation				$ 280,737
1	Strip Top Grass/Vegetative Layer - 3"	70	cys	$100.00	$7,000
2	Haul-off/Dispose of Organics	7	lds	$375	$2,625
3	Dump Fees	7	lds	$100	$700
4	Haul-off/Dispose of Non-Organics (Sprinkler System, etc.)	1	lds	$450	$394
5	Dump Fees	1	lds	$250	$219
6	Excavate Basin to Waste (Balance), 8.6' Depth	9,200	cys	$4.00	$36,800
7	Haul-off Cost for Surplus Clean Dirt Spoils	9,200	cys	$25.00	$230,000
8	Prep & Compact Foundation	1,000	sys	$3.00	$3,000
2	Connection Piping				$ 4,054,940
1	Design/Fab/Deliver Pkg Lift Station	1	ea	$200,000	$200,000
2	Install Pkg Lift Station	1	ls	$70,000	$70,000
3	Pkg Lift Station Electrical	1	ls	$250,000	$250,000
4	Design/Fab/Deliver Pkg Hydrodynamic Units	2	ea	$150,000	$300,000
5	Install Pkg Lift Station	1	ls	$105,000	$105,000
6	Force Main - 24" (Paved)	2,022	lf	$600.00	$1,213,200
7	Gravity Main -24" (Paved)	3,431	lf	$540.00	$1,852,740
8	Gravity Main -24" (Unpaved)	100	lf	$480.00	$48,000
9	Manhole Connections	1	ea	$7,500.00	$7,500
10	CB	1	ea	$8,500.00	$8,500
3	Site Restoration				$ 15,000
1	Miscellaneous	1	ls	$15,000.00	$15,000
A	Contract Allowances & Contingent Bid Items				$ 32,630
1	Contractor Quality Control	1	ls	0.75%	$32,630
B	Pre-construction/Mobilization/Temporary Works				$ 41,000
1	Submittals/Procurement/POs/Resource Coordination	1	mo	$15,000	$15,000
2	Establish Baseline Survey / Alignment / As-builts	40	hrs	$275	$11,000
3	Initial Equipment Mobilization	10	lds	$1,000	$10,000
4	Third Party Design Services / Outside Consultants	1	ls	$5,000	$5,000
C	Startup/Commission/Owner Training				$ 43,833
1	All Required	1	ls	1.00%	$43,833
D	Direct Cost Allowances				$ 223,407
1	Estimating Allowance	1	ls	5.0%	$223,407
E	Contractor Markups/Indirect Costs				$ 1,760,126
1	Prime Contractor General Conditions	1	ls	8.0%	$224,668
2	Subcontractor General Conditions	1	ls	8.0%	$150,700
3	Subcontractor Overheads & Markups	1	ls	15%	$305,085
4	Prime Contractor OH&P on Subs	1	ls	6.0%	$140,339
5	Prime Contractor OH&P on Self-Perform	1	ls	12.0%	$364,000

Item #	Description	Quantity	UOM	Unit Cost	Total Cost
6	Contractor Insurance Program	1	ls	2.5%	$146,908
7	Subcontractor Bonding	1	ls	1.5%	$28,248
8	Escalation from Current PL to NTP (Q3 2020 = 3/4 year)	1	ls	2.63%	$158,852
9	Escalation During Field Construction (2 mos total, or 1.5 mos to MPC)	1	ls	0.44%	$27,170
10	State Sales Taxes (CA)	35%	ls	9.20%	$194,858
11	Contractor Furnished Permits	1	ls	0.30%	$19,297
	Budget Contingency				$ 1,290,335
12	Budget Contingency	1	ls	20.0%	$1,290,335
F	Owner Project Allowances				$ 280,737
1	Owner Costs - All	1	ls	20%	$1,548,400
	Total Project Costs (TPC)				**$9,290,000**