



## SAFE, CLEAN WATER PROGRAM

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# FEASIBILITY STUDY REPORT

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### *Regional Program Projects Module*

PROJECT NAME	Barnes Park
PROJECT LEAD(S)	City of Baldwin Park
SCW WATERSHED AREA	Upper San Gabriel River
PRELIMINARY SCORE	74
TOTAL FUNDING REQUESTED	\$ 14,735,690.00
PROJECT CAPITAL COST	\$ 17,318,419.00

**Created On: Thursday, January 2, 2020**

**Created By: David Marquez (John Beshay)**

## OVERVIEW

The objective of the Regional Infrastructure Program under the Safe, Clean Water (SCW) Program is to plan, build, and maintain multi-benefit watershed-based projects that improve water quality and increase water supply and/or enhance communities. A Feasibility Study is required before a project can be submitted for consideration and scoring for funding through the Los Angeles Region Safe, Clean Water (SCW) Program's Regional Infrastructure Program. Each Feasibility Study should provide enough information about a potential project to allow the Watershed Area Steering Committee members to make an informed decision for as to which projects should move forward for consideration for funding. The Minimum Feasibility Study Requirements for the Scoring and Consideration of Regional Infrastructure Program Projects is available at: <https://portal.safecleanwaterla.org/projects-module/>.

This document is based upon an output from the web-based tool called the 'SCW Regional Projects Module' (<https://portal.safecleanwaterla.org/projects-module/>). This output summarizes the information and data provided to Regional Projects Module, and also provides an initial estimate of project scoring per the SCW Infrastructure Program Project Scoring Criteria.

***IMPORTANT: ALL SCORING ESTIMATES GENERATED BY THE PROJECTS MODULE ARE PRELIMINARY AND SUBJECT TO REVIEW AND REVISION BY THE SCORING COMMITTEE.***

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# 1 GENERAL INFORMATION

This section provides general information on the project including location and project description.

## 1.1 Overview

The following table provides an overview of the project and the Project Developer(s):

Project Name:	Barnes Park
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<p>Project Description:</p>	<p>Barnes Park is located in Baldwin Park, within a 384-acre watershed that drains through the upstream storm drain system directly into the San Gabriel River Tributary, which runs adjacent to the west side of the park. Park amenities include two fully equipped playground areas, basketball courts, a large field, and game room highlighted with a pool table, foosball, a Sony Playstation 2 and three Hewlett-Packard tablet computers. Access to the park is provided on Patriitti Avenue.</p> <p>The Barnes Park Multi-Benefit Project (proposed project) would feature an underground stormwater vault that would capture and infiltrate runoff from an 81-inch storm drain that collects stormwater from the residential area northeast of the park. Runoff from this wash would be diverted to a pretreatment system and then to an underground infiltration vault. Treated water would infiltrate to the groundwater for recharge, or be directed back to the storm drain if the vault is full. Additional housing for pumping/filtration infrastructure may necessitate the construction of a small utility building.</p> <p>Construction is anticipated to begin in 2022 with a duration of approximately 18 months. Construction activities would include heavy earth-moving and crane equipment for both the excavation of the site as well as the placement of pre-fabricated concrete vault structures in the ground once excavation has occurred. Excess excavated soil would be removed off-site.</p> <p>Once the vault structure is in place, it would be connected to the existing storm drain, requiring later excavation and installation of additional pipeline. Construction in the existing storm drain would be required to install connective infrastructure there and would involve permanent placement of a grated drop inlet to divert flows to the underground unit. Once installation is complete, fill would be placed back on top of the unit up to the existing park restored back to the grassy field it once was (landscape replacement-in-kind).</p>
<p>SCW Watershed Area:</p>	<p>Upper San Gabriel River</p>
<p>Call for Projects year:</p>	<p>FY20-21</p>
<p>Total Funding Requested:</p>	<p>\$ 14,735,690.00</p>

Project Weather Type:	Wet
Project Lead(s):	City of Baldwin Park
Additional Project Collaborators:	The Upper San Gabriel River Enhanced Watershed Management Program Group (EWMP)
Additional Project Collaborators:	Los Angeles County Flood Control District
Additional Project Collaborators:	N/A
Is this a non-municipal project?	No

## 1.2 Project Location

The following table summarizes the project location:

Latitude:	34.069714
Longitude:	-117.9996
Street Address:	3251 Patritti Ave,
City:	Baldwin Park
State:	CA
Zip Code:	91706

Please see the following attachment(s) for a project location map.

Attachments for this Section	
Attachment Name	Description
Barnes Park Land Ownership and Right of Way.pdf	Map describing Land Ownership and Property Right of Way

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

Yes

**Provide a summary of how the project will benefit its DAC with a discussion of measures on displacement avoidance.**

Disadvantaged Community Service Direct Benefits

According to the State of California Office of Hazardous Health Assessment DAC assessment tool, CalEnviroScreen 3.0, the pollution burden in the census tract, where Barnes Park is located, is at the 96th percentile, or more generally among the worst in the State. The rate of toxic releases is also rated in the same range.

The project, when completed, will benefit the community of Baldwin Park by providing the following benefits:

1. Improving health outcomes in obesity levels due to anticipated increase in biking, walking, and agriculture sustainability projects;
2. Inspiring families/youth/seniors to walk, exercise, and eat healthier in and around resurfaced open space and playing fields with educational amenities.

Additionally, the Project will provide the following environmental benefits:

Climate Change Adaptation/Greenhouse Gas Reductions

1. Protect/restore urban watershed health to improve watershed storage capacity, forest health, protection of life and property, stormwater resource management, and greenhouse gas reduction.

2. Reduced air temperature through urban island heat mitigation from expanded tree plantings, shrubs;
3. Reduce the usage of vehicles to travel to adjacent parks/regional trails.
4. GHG benefit carbon stored in live project trees will result in a reduction of CO<sub>2</sub>.

## 1.3 Project Description

**Provide a detailed description and historical background of the project. Please also state which regional water management plan includes the proposed project (SWRP, E/WMP, IRWMP, or other [must identify and justify as equivalent per 18.07.B.1.c.3]):**

The Upper San Gabriel River Enhanced Watershed Management Group (USGREWMG) was formed on October 24, 2013 and is comprised of the County of Los Angeles, the Los Angeles County Flood Control District (LACFCD), and the cities of Baldwin Park, Covina, Glendora, City of Industry, La Puente, and West Covina (the Cities). The group completed the development of an Enhanced Watershed Management Program (EWMP) and obtained approval from the Los Angeles Regional Quality Control Board on April 11, 2016.

The USGREWM Group was formed in response to provisions of National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit Order No. R4-2012-0175 (Permit). The USGREWM Group, through a cooperative and collaborative process, developed an EWMP to demonstrate compliance with water quality standards.

The EWMP identified a suite of watershed control measures and structural Best Management Practices (BMPs), and identified priority projects including the subject Barnes Park. As required by the EWMP, a screening geotechnical investigation was conducted at the site (Ninyo and Moore, 2015). The County, the LACFD and the Cities are now taking the next step in implementing the EWMP by developing this Preliminary Design Report. The City of Industry represents the USGREWMG and is the lead agency for this effort.

Barnes Park was considered a high priority site for a regional stormwater capture project due to its proximity to the San Gabriel River channel, and to an 81-inch diameter reinforced concrete stormdrain pipe running in the east-west direction under Bess Avenue and extending underneath the northern edge of the park area (north of the area being considered for the infiltration BMP) to the San Gabriel River channel. The area included in this investigation encompasses area of the park immediately south of the parking lot and the park recreational center facilities as indicated on Figure 2.

At this moment no specific information regarding the location, depth, and size of the proposed diversion structures, pre-treatment units, and pump station is available. Therefore, the designer should verify with the Geotechnical Engineer the applicability of the considerations contained herein once the design configuration is decided. For the storage and infiltration units several alternatives are being considered including corrugated metal pipes, plastic pipes, precast concrete units, and cast-in-place concrete units. It is estimated that the invert of the infiltration facilities will be located at a depth between 10 and 25 feet.

## 2 DESIGN ELEMENTS

This section provides an overview of the project design details.

### 2.1 Configuration

The following table is a summary of the project configuration:

Project Configuration Summary	
BMP Type:	Treatment Facility
Infiltration Footprint Area:	1 ac
Ponding Depth:	10 ft
Media Layer Depth:	0 ft
Media Layer Porosity:	0 ft
Underdrain Layer Depth:	0 ft
Underdrain Layer Porosity:	0 ft

Calculated Storage Volume	
Module-generated Storage Volume:	10.0000 ac-ft

Please upload a description and detailed schematic of the project layout including its anticipated footprint and key components such as, but not limited to: inlets, outlets, diversion point, recreational components, nature-based components, pumps, treatment facilities, underdrains, conveyance, above ground improvements, and other project components.

Attachments for this Section	
Attachment Name	Description
Barnes Park Schematic.pdf	Combined Landscape and Site Plan

### 2.2 Capture Area

The size and land uses of the capture area upstream of a project plays an important role in its water quality and water supply benefits. The capture area information here is used by the Module for scoring:

Capture Area Summary	
Capture Area:	440 ac
Impervious Area:	252 ac
Pervious Area:	188 ac

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

Breakdown of Impervious Acreage in Capture Area		
Land Use Type	Percent Impervious	Acres
Single Family Residential	51.31 %	129.3
Multi Family Residential	11.97 %	30.16
Commercial	4.95 %	12.47
Institutional	3.64 %	9.17
Industrial	3.5 %	8.82
Highways and Interstates	2.56 %	6.45
Secondary Roads and Alleys	22.07 %	55.62

Attachments for this Section	
Attachment Name	Description
Barnes Park Capture Area.pdf	Multi-Benefit Stormwater Capture Project Above Ground Improvements

## 2.3 Diversion

Diversion Structures generally apply to ‘off-line’ regional projects where stormwater is diverted from a major water conveyance (e.g., gravity main) and directed to the project at a predetermined maximum rate. Smaller distributed projects, like bioretention, do not normally utilize these devices.

**Does the project have a diversion structure?**

Yes

**The following table provides details on the diversion type and maximum diversion rate:**

Diversion Details	
Type of Diversion	Typical Max Diversion Rate (cfs)
Gravity Flow	50 cfs

**Estimated Average Inflow Captured by Project:**

50 cfs

**Description of Diversion:**

Type of diversion is Gravity/Pump

## 2.4 Site Conditions & Constraints

**Please provide an upload for each of the attachments below that describes the methods, outcomes and how the information will be incorporated into the project design.:**

Geotechnical Summary

Based on the results of the field exploration and engineering analyses, it is determined that the proposed construction, for the Barnes Park Project, is feasible from a geotechnical standpoint, provided that the recommendations contained in the Preliminary Geotechnical Investigation Report are incorporated into the design plans and implemented during construction. It should be noted that this study did not evaluate SCW Feasibility Study Report

the possible presence of hazardous materials on any portion of the site.

A Phase 1 Environmental Assessment (ESA) and a Preliminary Initial Study (IS) have been prepared for this site. A summary of the report findings is provided in the attached Geotechnical Report.

The Phase 1 ESA included visual observation of the Site, inspection of the surrounding properties from curbside, review of historical property ownership and use, review of regulatory listings, review of Internet resources, and interviews with persons knowledgeable about the Site.

At the project site, no recognized environmental conditions (RECs), no controlled RECs (CRECs), no historical RECs (HRECs), one potential environmental concern (PEC), and one business environmental risk (BER) in connection with the Site.

#### Site Conditions and Limitations

The attached Geotechnical Design Report includes preliminary design considerations for the proposed infiltration BMP at Barnes Park. It is not intended to be the geotechnical document suitable for final design of the proposed development as the extent and scope of the performed field and laboratory testing and engineering analyses was not developed for the anticipated relatively complex specific configuration of the proposed development. Consequently, additional field and laboratory investigation and engineering analyses will be required once the scope and configuration of the project are determined.

The recommendations included in the report are based on a review of background documents and on information obtained from the current geotechnical investigation. It should be noted that this study did not evaluate the possible presence of hazardous materials on any portion of the site.

Due to the limited nature of the field explorations, conditions not observed and described in the report may be present on the site. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface evaluation and laboratory testing will be performed upon request. It should be understood that conditions different from those anticipated in this report may be encountered during grading operations, for example, the extent of unsuitable soil and the associated additional effort required to mitigate them.

Site conditions, including groundwater level, can change with time as a result of natural processes or the activities of man at the subject site or at nearby sites. Changes to the applicable laws, regulations, codes, and standards of practice may occur as a result of government action or the broadening of knowledge.

The findings of the Geotechnical Report may, therefore, be invalidated over time, in part or in whole. It is recommended that the report should be reviewed and recertified if it were to be used for a project design commencing more than 1 year after the date of its issuance.

Potential environmental impacts/environmental constraints associated with the proposed project are addressed in the Initial Study (IS) in the attached report. The environmental factors that could be potentially affected by this project and/or require additional study to determine impact are listed below and are discussed further in the checklist.

- Biological resources
- Greenhouse gas emissions
- Transportation/traffic
- Mandatory findings of significance
- Cultural resources
- Hazards & hazardous materials
- Tribal cultural resources
- Air quality
- Hydrology/water quality
- Noise
- Recreation
- Utilities/service systems

#### **Does the project involve LACFCD infrastructure, facilities, or right-of-way?**

No

**Please see the following attachments for additional details on geotechnical, hydrology, right-of-way and/or LACFCD, and utility conditions.**

Attachments for this Section	
Attachment Name	Description
GEOTECHNICAL - Barnes Park.pdf	Preliminary Limited Geotechnical Design Report

Attachments for this Section	
Attachment Name	Description
FEASIBILITY STUDY-Hydrology Information - Barnes Park SW.pdf	Hydrology report by TetraTech

Attachments for this Section	
Attachment Name	Description
Barnes Park Right of Way- Site Plans-1.pdf	Barnes Park Right of Way

## 2.5 Cost

The following tables provide details on the project’s capital and annualized costs:

Capital Cost Breakdown	
Construction Cost:	\$ 12,813,644.00
Planning and Design Cost*	\$ 4,504,775.00

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

Annual Cost Breakdown	
Annual Maintenance Cost:	\$ 33,636.00
Annual Operation Cost:	\$ 3,364.00
Annual Monitoring Cost:	\$ 32,400.00
Project Life Span:	50 years

The following table provide details on calculated life-cycle costs for the project (either calculated the Module, or estimated by the Project Developer).

*Note: these life-cycle costs are used in Section 4.3 of this output for Water Supply Benefit scoring.*

Module-generated Life-Cycle Cost for Project*	\$ 18,983,595.71
Module-generated Annualized Cost for Project*	\$ 791,184.22
Use Project Developer estimate instead?	No
Custom Value specified by User:	N/A
Please provide a description of methods used to calculate Life Cycle costs, and attach supplemental information with details of the methodology, assumptions and calculations:	N/A
Supporting PDF	See attachment if applicable.

\*Applies an annual discount rate as a static rate equal to 3.375%. The only costs not included in total life-cycle cost are the dismantling and replacement costs at the end of life.

## 2.6 Schedule

Provide a preliminary schedule required to design, permit, construct, operate, and maintain the

**Project:**

Schedule	
Milestone Name	Completion Date
Environmental Documentation: Prepare Preliminary Draft IS/MND	07/31/2019
Complete Environmental Documentation	11/29/2019
Design	05/01/2020
LACFCD Permit	10/01/2020
Construction	07/16/2021

## 2.7 Monitoring

This section provides an overview of monitoring data related to the project.

**Has any monitoring data been compiled related to the project?**

**No**

**Please provide an overview of the monitoring performed to date:**

N/A

**Please upload a monitoring plan to measure the effectiveness of the proposed project once completed, including metrics specific to the identified benefits. Also attach supplemental information on monitoring conducted to date, if applicable.**

Attachments for this Section	
Attachment Name	Description
MONITORING PLAN - Barnes Park.pdf	

## 2.8 O & M

**Provide an overview of the plan for how operations and maintenance of the Project will be carried out. Identify the responsible party and describe any technical expertise required for O&M.**

The City of Baldwin Park is currently operating as the Project Manager, and will continue to oversee the Operations and Maintenance of the Project beyond the final construction phase.

### Overview of Operations and Maintenance

Construction is anticipated to begin in 2022 with a duration of approximately 18 months. Construction activities would include heavy earth-moving and crane equipment for both the excavation of the site as well as the placement of pre-fabricated concrete vault structures in the ground once excavation has occurred. Excess excavated soil would be removed off-site.

Once the vault structure is in place, it would be connected to the existing storm drain, requiring later excavation and installation of additional pipeline. Construction in the existing storm drain would be required to install connective infrastructure there and would involve permanent placement of a grated drop inlet to divert flows to the underground unit. Once installation is complete, fill would be placed back on top of the unit up to the existing park grade and the area would be restored back to the grassy field it once was (landscape replacement-in-kind).

Approximately 25 personnel would be used for the project construct typically occurring Monday through

Friday between the hours of 7:00 am and 6:00 pm.

During project construction, park facilities to the north of the field would remain open and available for park users. The area surrounding the field would be secured with construction fencing and would be closed to the public. The parking lot would also be used as a construction ingress/egress area.

#### Maintenance Activities

Ongoing maintenance activities would be required to ensure the unit and pretreatment devices are kept free of debris so that sediment and larger materials do not accumulate. These maintenance activities would typically take a day of work on a monthly ongoing schedule and would involve a vacuum truck on-site at access locations for the unit.

Attachments for this Section	
Attachment Name	Description
MONITORING PLAN - Barnes Park.pdf	Monitoring Plan, Methodology and Schedule

### 3 WATER QUALITY BENEFITS

This section provides an overview of project elements related to water quality benefits, including calculations used for Section A (Water Quality Benefits) of SCW Project Scoring Criteria.

#### 3.1 24-hour Storm Capacity

Please enter information below regarding key parameters of the project’s capacity. The Module will use those values to estimate the 24-hour capacity:

24-hour Storm Capacity Breakdown	
Effective Draw Down Rate:	12 in/hr
Stormwater Use During 24-hr Design Event:	0 gal

Calculated 24-hour Storm Capacity	
Module-generated 24-hr Capacity:	34.0000 ac-ft
Use Project Developer estimate instead?	No
Custom Value specified by User:	N/A
Please provide a description of methods used to calculate 24-hour capacity, and attach supplemental information with details of the methodology, assumptions and calculations.	N/A

## 3.2 Event-based Design Details

In this section, details regarding the project inlets and outlets are provided, along with estimates generated for the project design event. The event-based information is envisioned as basic estimates that would be generated during the project design, and will support review of the project details.

### Estimated Total Inflow Volume during Design Event:

13.28 ac-ft

### Describe the event used for project design. Describe the portion of the peak inflow that would be retained by the project through infiltration, capture, diversion, use, or other means. Tooltip for ‘Treatment Description’ under outlets:

For the Barnes Park Study, the Los Angeles County Watershed Management Modeling System (WMMS) was used within the Loading Simulation Program C++ (LSPC) to simulate the contaminant loading, runoff volume, and flow rate associated with a long-term, continuous time series (Water Year 2002 to Water Year 2011) at the proposed regional stormwater facility. The WMMS is accepted by the Los Angeles Water Quality Control Board for performance of compliance analyses in the context of WMP development. This section outlines the known conditions and analyses performed to establish the baseline against which to measure all reductions.

The EWMP Reasonable Assurance Analysis (RAA) details MS4 pollutant loading requirements for subwatershed areas draining to the Upper San Gabriel River Tributary. Barnes Park is located in the area draining directly to the San Gabriel River, and specific compliance requirements for this subwatershed area have been stipulated by the Permit. These are detailed in Table 1-1, with a specific target for the reduction of the 90th percentile critical storm loading of Zinc, the limiting pollutant in the watershed, as well as capture of runoff from the 90th percentile critical storm for E. coli. Based on the WMMS pollutant loadings throughout the entire San Gabriel River watershed, the EWMP set a critical storm Zinc reduction target of 64% and full capture of runoff for the critical storm for E. coli for areas in the San Gabriel River subwatershed of the Upper San Gabriel Tributary.

To establish the baseline hydrology and water quality and to determine the maximum benefit that the project at Barnes Park could have, the drainage area delineation was developed utilizing LA County digital stormwater pipe inventories and high-resolution Light Detection and Ranging (LiDAR) elevation data. The delineation of drainage areas to the diversion point accounts for fine-scale surface drainage patterns and infrastructure pathways to accurately reflect the maximum potential drainage area to be treated by this project.

### Describe whether and how the 85th percentile is being captured/diverted. If not, is there opportunity to do so? If feasible but not incorporated, explain why. If not feasible, explain why.

The recommended BMP size is capable of fully capturing the 85th percentile storm event, but a larger, less cost-effective would be necessary to fully capture the Bacteria Critical Storm (Table 2-2). While this could be built if desired, the more expensive BMP would not result in significant additional water quality benefit.

### The following tables detail inflow and outflow from the project during the design event:

Inlets	
Estimated Max Inflow Rate (cfs)	Total Inflow (ac-ft)

35 cfs	13.28 ac-ft
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Outlets			
Estimated Max Outflow Rate (cfs)	Treated?	Treatment Description	Percent of Volume Treated (%)
0 cfs	No	N/A	N/A

**Describe the methods used to generate estimates:**

The USGR EWMP Feasibility Study provides the method for determining the inflow, outflow, and peak rates. This is based on the Watershed Management Modeling System model to generate these flows.

For this study, the Los Angeles County (WMMS) was used within the Loading Simulation Program C++ (LSPC) to simulate the contaminant loading, runoff volume, and flow rate associated with a long-term, continuous time series (Water Year 2002 to Water Year 2011) at the proposed regional stormwater facility. The WMMS is accepted by the Los Angeles Water Quality Control Board for performance of compliance analyses in the context of WMP development. This section outlines the known conditions and analyses performed to establish the baseline against which to measure all reductions.

Attachments for this Section	
Attachment Name	Description
Barnes Park Water Quality.pdf	Existing Water Quality/Treatment

### 3.3 Long-term Performance

This section present details of the calculation of long term (10-year) water quality benefit for Section A.1.2 (Water Quality Benefit) of SCW Project Scoring Criteria. These estimates were either generated by the Module using a 10-year hourly simulation with the Watershed Management Modeling System (WMMS), or generated by the Project Developer.

**The following tables present selected primary and secondary pollutants and calculated reductions for water quality benefit per Section A.1.2 (Water Quality Benefit) of SCW Project Scoring Criteria.**

*Note: these estimates are based on the hourly 10-year WMMS simulation performed by the Module, or as estimated by the Project Developer.*

Primary Pollutant	
Primary Pollutant	Total Zinc
Reduction Method used for Scoring	Method 2 (% Load Reduction)
Justification for selecting Primary Pollutant	
Calculated 10-year Pollutant Reduction	N/A
Use Project Developer estimate instead?	Yes
Own Value	100 %
Justification for using own value	All diverted stormwater and associated pollutant load will be pretreated and then exit the BMP via infiltration. Sediment and captured pollutants will be removed through O&M activities. Thus, all diverted pollutant load is reduced (100%).
Secondary Pollutant	
Secondary Pollutant	Bacteria
Reduction Method used for Scoring	Method 2 (% Load Reduction)
Justification for selecting Secondary Pollutant	
Calculated 10-year Pollutant Reduction	N/A
Use Project Developer estimate instead?	Yes
Own Value	100 %

Justification for using own value	All diverted stormwater and associated pollutant load will be pretreated and then exit the BMP via infiltration. Sediment and captured pollutants will be removed through O&M activities. Thus, all diverted pollutant load is reduced (100%).
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**The following table presents calculated water quality benefit achieved by the project based on the hourly 10-year WMMS simulation performed by the Module, for all the simulated pollutants.**

*Note: this output includes all pollutants and methods, including those not selected as Primary or Secondary for scoring.*

Pollutant Name	Method 1 (% Concentration Reduction)	Method 2 (% Load Reduction)	Method 3 (% Exceedance Reduction)
Total Zinc	56.0 %	95.8 %	N/A
Total Copper	45.4 %	94.8 %	N/A
Total Lead	53.3 %	95.6 %	N/A
Total Nitrogen	26.9 %	93.1 %	N/A
Total Phosphorous	26.9 %	93.1 %	N/A
<i>E.coli</i>	28.3 %	93.2 %	N/A
Toxics	N/A	N/A	N/A
Chloride	N/A	N/A	N/A
Trash	N/A	N/A	N/A
N/A = Modeling results not available from Projects Module, must be manually generated by user			

The following table presents inflow and outflow details for calculated water quality benefit achieved by the project based on the hourly 10-year WMMS simulation performed by the Module, for all the simulated pollutants.

Note: this output includes pollutants not selected as Primary or Secondary for scoring, and reduction methods not selected for scoring.

Metric	Runoff from Capture Area	Minimally Treated Outflow from Project	Inflow into Project Inlet	Outflow from Project Outlet	Reduction by Project	% Reduction by Project
Runoff Volume (ac-ft)	208.894	17.966	190.350	17.966	172.384	90.561 %
Total Zinc (ug/L)	223.540	99.750	226.470	99.750	126.720	55.954 %
Total Zinc (lbs)	126.986	4.874	117.228	4.874	112.354	95.843 %
Total Copper (ug/L)	73.750	40.060	73.380	40.060	33.320	45.407 %
Total Copper (lbs)	41.894	1.957	37.986	1.957	36.028	94.847 %
Total Lead (ug/L)	51.750	24.370	52.200	24.370	27.830	53.314 %
Total Lead (lbs)	29.399	1.190	27.018	1.190	25.828	95.594 %
Total Nitrogen (mg/L)	3.049	2.230	3.053	2.230	0.822	26.943 %
Total Nitrogen (lbs)	1732.121	108.961	1580.165	108.961	1471.204	93.104 %
Total Phosphorous (mg/L)	0.480	0.351	0.480	0.351	0.129	26.884 %
Total Phosphorous (lbs)	272.462	17.148	248.478	17.148	231.330	93.099 %
E.coli (#/100mL)	1.271E+005	9.149E+004	1.276E+005	9.149E+004	3.608E+004	28.282 %
E.coli (#)	3.275E+014	2.027E+013	2.995E+014	2.027E+013	2.792E+014	93.231 %
Toxics	N/A	N/A	N/A	N/A	N/A	N/A
Chloride	N/A	N/A	N/A	N/A	N/A	N/A
Trash	N/A	N/A	N/A	N/A	N/A	N/A
N/A Modeling results not available from Projects Module, must be manually generated by user						

## 4 WATER SUPPLY BENEFITS

This section provides an overview of project elements related to water supply benefits, including calculations used for Section B (Significant Water Supply Benefits) of SCW Project Scoring Criteria.

### 4.1 Water Supply Nexus

**Please describe and clearly justify the nexus between water supply and the stormwater and/or urban runoff that is captured/infiltrated/diverted by the Project:**

Rainwater will be captured from approximately 20 acres of tributary area. Some of that water will enter Walnut Creek Nature Park from Frazier St to a Bio swale and filtration stream to a basin in the park. The basin has about 3 feet of head before reaching an overflow point. Overflow water enters the Walnut Creek wash through a flood gate. Water entering Walnut creek further infiltrates through the confluence of the San Gabriel River (unlined) and Walnut Creek. Walnut Creek basin has an infiltration rate of 0.6 inched per hours due to high sand soil content. It is rare to see standing water in the basin

**Does this project capture water for onsite irrigation use?**

No

**Description of onsite use by the project:**

**Does this project capture water used for water recycling by a wastewater treatment facility?**

No

**Description of water recycling by the project:**

N/A

**Is the project connected to a managed water supply aquifer?**

No

**If Yes, managed Aquifer Name:**

N/A

**If this project is augmenting groundwater supply, please provide confirmation that the agency managing the groundwater basin concurs with the added benefit.**

## 4.2 Benefit Magnitude

Project Scoring Criteria Section B is based upon estimates of annual average water supply benefit. Water supply benefit can include, but is not limited to, water diverted to a separate groundwater recharge facility, into a water treatment plant, to a sanitary sewer to be converted into recycled water, etc. This section provides documentation of estimates of annual average water supply benefit.

### Average dry weather inflow to project:

0.001 cfs

### Describe the methods used to estimate average dry weather inflow to the project:

The Feasibility Study used an investigation of the SUSTAIN runoff timeseries.

### The following tables present calculated annual inflow the project.

*Note these estimates are based on an hourly 20-year hourly WMMS simulation performed by the Module, or as estimated by the Project Developer.*

Module-generated annual average inflow to project:	N/A ac-ft
Use Project Developer estimate instead?	Yes
Custom Value specified by User:	283 ac-ft
Please provide a description of methods used to calculate water supply inflow values	These values are provided in the project input data tables in the feasibility report and are based in modeling from the USGR EWMP Feasibility Study.
Supporting PDF	See attached PDF if applicable.

Attachments for this Section	
Attachment Name	Description
Barnes Park Water Capture.pdf	BMP Design Relative to Water Capture

### The following tables present calculated annual average capture by the project, which is used for the Section B2 scoring calculation (Benefit Magnitude of SCW Scoring Criteria).

*Note these estimates are based on an hourly 20-year hourly WMMS simulation performed by the Module, or as estimated by the Project Developer.*

Module-generated annual average capture for water supply:	N/A ac-ft
Use Project Developer estimate instead?	Yes
Custom Value specified by User:	171 ac-ft
Please provide a description of methods used to calculate water supply benefit	These values are provided in the project input data tables in the feasibility report and are based in modeling from the USGR EWMP Feasibility Study.
Supporting PDF	See attached PDF if applicable.

Attachments for this Section	
Attachment Name	Description
Barnes Park Water Capture.pdf	BMP Design Components Relative to Water Capture

### 4.3 Cost Effectiveness

Project Scoring Criteria Section B2 incorporates life-cycle costs. The cost-effectiveness for water supply benefit is calculated from other sections in the Module. The calculation for B2 scoring is based on a numerator of life-cycle cost (from Design Elements > Cost) and a denominator of annual average benefit magnitude (from Water Supply > Benefit Magnitude).

Module-generated water supply cost-effectiveness:	\$ 4,626.81 per ac-ft
Use Project Developer estimate instead?	No
Custom Value specified by User:	\$ N/A
Justification	N/A
Supporting PDF	See attached PDF if applicable.

## 5 COMMUNITY INVESTMENT BENEFITS

This section provides an overview of project elements related to community investment benefits, which are used in calculations for Section C (Community Investment Benefits) of SCW Project Scoring Criteria.

The following table details the project’s community investment benefits:

Community Investment		
Investment Type	Applicable?	Detailed Description
Does this project improve flood management, flood conveyance, or flood risk mitigation?	Yes	The Project proposes to improve stormwater runoff flowing to the San Gabriel Rivershed in the Walnut Creek subwatershed. The Barnes Park Project will capture and treat urban and stormwater runoff from nearby Los Angeles County Flood Control Storm Drain(s) into underground storage basins. Collected urban or stormwater runoff will first go through treatment before being infiltrated into the ground or returned to the storm drain (when capacity is exceeded).
Does this project create, enhance, or restore park space, habitat, or wetland space?	Yes	The project will create passive-use green space with the removal of pavement and concrete, which will be replaced with natural materials. Further, the park will be enhanced with the planting of drought tolerant trees, providing additional shade, native plants and grasses.
Does this project improve public access to waterways?	No	N/A
Does this project create or enhance new recreational opportunities?	Yes	The Project, when completed, is expected to increase use of the park, including basketball, and other areas dedicated to active/recreational use. The Park will provide opportunities, with improved access for both passive use and active recreational play.
Does this project create or enhance green spaces at school?	No	N/A

<p>Does this project reduce heat local island effect and increase shade?</p>	<p>Yes</p>	<p>The Project will include planting of 17 trees. The tree species included in the tree/plant palette are selected based on their excellent carbon sequestration quality, canopy size, and drought tolerance. These qualities will help reduce the local heat island effect</p>
<p>Does this project increase shade or the number of trees or other vegetation at the site location?</p>	<p>Yes</p>	<p>The project will include the planting of 17 trees, selected for their respective canopy size (when mature). Also, nearly 6,900 square feet of shrubs and native plants will be added to the park, and approximately 69,000 square feet of area will be reseeded.</p>

## 6 NATURE-BASED SOLUTIONS

This section provides an overview of project elements that leverage nature-based solutions, which are used in calculations for Section D (Nature-Based Solutions) of SCW Project Scoring Criteria.

### Does this project implement natural processes?

Yes

#### Natural Processes Description:

The Project will restore natural system functions that contribute to water supply, water quality, or flood management. Infiltration and treatment runoff will preserve water and create a reduction in the level of identified pollutants; and native drought tolerant planting in open space will areas will reduce storm-water runoff/enhance conservation efforts.

### Does this project utilize natural materials?

Yes

#### Natural Materials Description:

The Project will include the planting of 17 drought tolerant trees, native plants, shrubs and grasses to deliver air quality benefits through the cooling effects of shade and by removing certain pollutants.

**Description of how nature-based solutions are utilized to the maximum extent feasible. If nature-based solutions are not used, include a description of what options were considered and why they were not included.**

Approximately 13,000 square feet of asphalt and concrete paving, and replaced with natural/sustainable material. Also, nearly 68,000 Square feet of area will be reseeded, and replanted in the effort to expand green space to the maximum extent possible at the park.

**The following table details the impermeable area removed by the project:**

Removed Impermeable Area by Project	
Pre-Project Impervious Area:	Post-Project Impervious Area:
0.032 ac	0.032 ac

## 7 LEVERAGING FUNDS & LOCAL SUPPORT

This section provides an overview of the project’s funding and community support, which are used in calculations for Section E (Leverage Funds and Community Support) of SCW Project Scoring Criteria.

### 7.1 Cost Share

**Is additional funding being provided as a Cost Share for this project?**

No

**The following is a summary of what other sources of funding were explored and/or why funding could not be secured through these other sources:**

The City is currently exploring funding options to ensure a 25% match is secured before the implementation of the Project. The City is considering, as a potential source of matching funds, Quimby funds, Measure W City Site funds, and other local, state, and possibly federal grant opportunities.

**The following table details the additional funding attained for the project:**

Additional Funding			
Funding Type	Description	Funding Amount	PDF
None provided	N/A	N/A	N/A

## 7.2 Local Support

### Please describe the Outreach Plan conducted for this project:

The City of Baldwin Park, in coordination with the EWMP Group, is strongly committed to providing the opportunity for meaningful stakeholder input throughout the development of the project. The EWMP Group and the City of Baldwin Park has previously sponsored working groups/workshops to facilitate collaboration among stakeholders and the Technical Advisory Committee (TAC). The EWMP Group and the City conducted a stakeholder meeting on May 5, 2014, and to receive feedback from stakeholders on the progress to date and future plans, and subsequently on March 9, 2016 to update stakeholders on EWMP progress. The City and the EWMP, along with local community partners such as Emerald Necklace Coalition-Amigos de los Rios, neighborhood groups, and regional partners such as the San Gabriel Valley COG, the Rivers Mountains Conservancy, and other interested agencies will engage in a series of workshops. Recently, the City completed a series of workshops specific to Barnes Park in preparation for a State of California Parks and Recreation Prop 68 Statewide Park Program application. These workshops were well attended by a diverse array of stakeholders. The City will continue to use this proven approach during the course of development of the Project.

Specifically, the City through its Public Works Department and Public Information Officer, and the City will use proven social media tools and communication tools (local media outlets include: City Website, community surveys, utility bill announcements), to organize community meetings and ensure strong participation, and create an environment at each event that fosters a high level of input, as well as update stakeholders on the project's progress, from the planning to implementation process. This development is the City's and its residents, as expressed in previous workshops, is the priority water quality improvement project.

### Does this demonstrate strong local, community-based support?

Yes

The following table details the support by local, community-based organizations for the project (also see attachments):

Local Support		
Organization Name	Description	PDF

<p>Emerald Necklace Coalition- Amigos de los Rios</p>	<p>The Emerald Necklace Coalition is comprised of 37 member agencies of government and organizations in and around Los Angeles. All have signed on to the Emerald Necklace Accord a legal document that pledges its signatories to work collaboratively to preserve the Los Angeles and San Gabriel watersheds and their rivers and tributaries for recreational, open space, environmental education, job training, native habitat restoration and conservation, and non-vehicular transportation purposes</p>	<p>N/A</p>
<p>Active SGV</p>	<p>The City has partnered with ActiveSGV on a variety of sustainability related projects and programs over the past 5 years. The agency has provided outreach, training and education in partnership with the City, and will continue to do so with the Barnes Park Project. The Project, when completed, will create opportunities for the community that are consistent with the City's intent and Active SGV's mission to support a more sustainable, equitable, and livable community by partnering with community groups, public health agencies, and other stakeholders to promote active transportation, and improve air quality.</p>	<p>N/A</p>

<p>San Gabriel Valley Conservation Corps</p>	<p>The SGVCC has partnered with the City on many tree planting and landscaping project. The City anticipates continued assistance, with a focus on tree planting and landscaping. SGVCC will include youth from the local community to participate in the Project. SGVCC provides youth, guided by adult leaders, who serve as mentors, role models, technical trainers and supervisors to participate in work in crews of 5-10 to rebuild or revitalize blighted areas in their communities, usually areas of low-income.</p>	<p>N/A</p>
<p>Nature for All</p>	<p>Nature for All, a San Gabriel Valley based community organization, is currently partnering with the City to develop stewardship opportunities for youth and their families to support the development of greenspace and trails. The proximity of Barnes Park to the San Gabriel River Trail and the recreational and educational opportunities that will emerge from the Project will be enhanced, throughout its development and beyond.</p> <p>The organization's goals, which are consistent with the Project's objective include the following:</p> <ul style="list-style-type: none"> <li>• Protect the mountains and rivers in our area, to conserve habitat and water resources and be more climate-resilient.</li> <li>• Create more natural spaces, such as parks and bike paths, in our historically underserved neighborhoods.</li> <li>• Connect people to public lands through transit access programs and improved recreation facilities which will lead to better public health.</li> </ul>	<p>N/A</p>

<p>San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy (RMC)</p>	<p>The San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy (RMC) has served as a critical collaborative partner and resource in the City's effort to develop open space in our park poor community. The RMC is fully aware and supportive of the Project, and will serve as a key regional partner in the development of the Barnes Park Project.</p>	<p>N/A</p>
<p>Los Angeles County (Public Works and Flood Control District)</p>	<p>The Upper San Gabriel River Enhanced Watershed Management Program Group (EWMP Group) is comprised of the County of Los Angeles, Los Angeles County Flood Control District (LACFCD), and the Cities of Baldwin Park, Covina, Glendora, Industry, and La Puente (Group Members). The County is an essential partner in project. The City/EWMP Group will coordinate activities, and monitor the development of the project.</p>	<p>N/A</p>

## 8 ADDITIONAL FEASIBILITY INFORMATION

This section presents additional information regarding project feasibility and technical details gathered during project design and feasibility assessment.

### 8.1 Environmental Documents and Permits

**Discuss what potential environmental documentations (e.g. CEQA, NEPA, etc.) will be required or has been completed for the Project. Describe potential permitting challenges and associated time requirements and costs.**

The City does not anticipate any permitting challenges.

Attachments for this Section	
Attachment Name	Description
Barnes Park Permit Approval Environmental Checklist.pdf	Environmental Checklist

## 8.2 Vector Minimization

This following provides details on vector minimization strategies.

### Does the project have vector minimization plan?

Yes

Please see an attachment with proposed vector minimization plan.

Attachments for this Section	
Attachment Name	Description
Vector Minimization Plan.pdf	Vector Minimization Plan Statement

## 8.3 Alternatives Studied

### Describe alternatives that were considered and evaluated as part of the Project development:

BMP Design Components: BMP Structural Alternatives

Underground storage tanks provide initial stormwater detention and allow for implementation where surface space is limited such as around paved streets, parking lots, and buildings. Precast concrete storage systems, such as the StormTrap, Oldcastle, and Jensen StormVault systems, made from durable, reinforced, and high-strength concrete would be the most appropriate modular unit for this project (as opposed to plastic modular units). They can be designed to exceed HS-20 loading, have varying depths of cover, and overcome buoyancy forces. Internal heights can vary to meet the designed storage volume. Cast-in-place structures were not considered a viable solution due to the time required to form, pour, and cure the structure. The additional time would create an additional burden on park operations and could extend the construction schedule.

The StormTrap Double Trap system allows for a maximum headroom of 11'-4", and will provide water storage for more than 10.0 acre-feet of water while allowing for 1 foot of freeboard in the system. The system will be configured to allow for infiltration through the bottom of the system. The modular pieces are constructed offsite and delivered to the project site via truck and lifted into place with a crane. A typical day of installation may allow for 30 to 40 units to be placed in one day. The exact number of modules will depend on the selected vendor.

## 8.4 Effectiveness

### Describe the effectiveness of similar types of projects already constructed if applicable:

Maine Ave Complete Street constructed in 2018 and has been tested with some of the most severe storms for over a decade. Maine Avenue includes the Construction of Rain Gardens that have been trenched down to about four feet at most of the intersections from Los Angeles Street to Olive St. surface street water is captured within the rain gardens and the plantings help remediate the street rain water before infiltrating or overflowing onto the street. When compared to the rainwater flows on Maine from Arrow Highway to Olive Street they are much higher and many of the intersections experience high water up to the top of curbs. That is not the case for newly improved part of Maine Ave. We are satisfied with the results and will be constructing Phase IB and Phase II for the construction of Maine Ave/ Pacific Ave from City Limit to City Limit with similar water quality improvements and add bicycle lanes.

## 8.5 Legal Requirements and Obligations

**Describe any legal requirements or obligations that may arise as a result of constructing the Project and how these requirements will be satisfied:**

The City does not anticipate any legal issues in the development of the project.

## 8.6 Technical Reports

Please upload additional technical reports related to this project not provided above.

Attachments for this Section	
Attachment Name	Description
Barnes Park Full Set 2018.11.21.pdf	Design Plans

## 8.7 Other

Provide any additional information related to the Project as necessary:

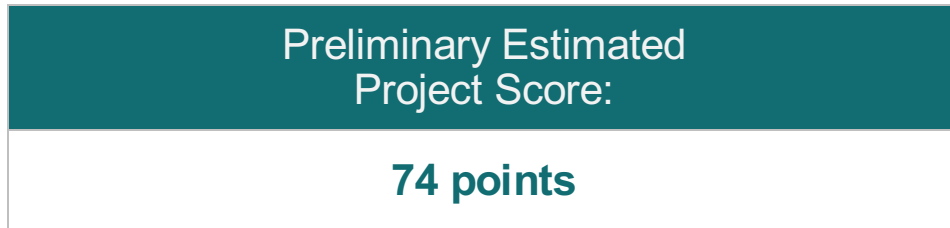
Estimated construction cost \$12,813,644

Attachments for this Section	
Attachment Name	Description
Barnes Park Project Probable Construction Cost.pdf	Barnes Park Cost Estimate
INITIAL STUDY - Multi-Benefit-Barnes Park.pdf	

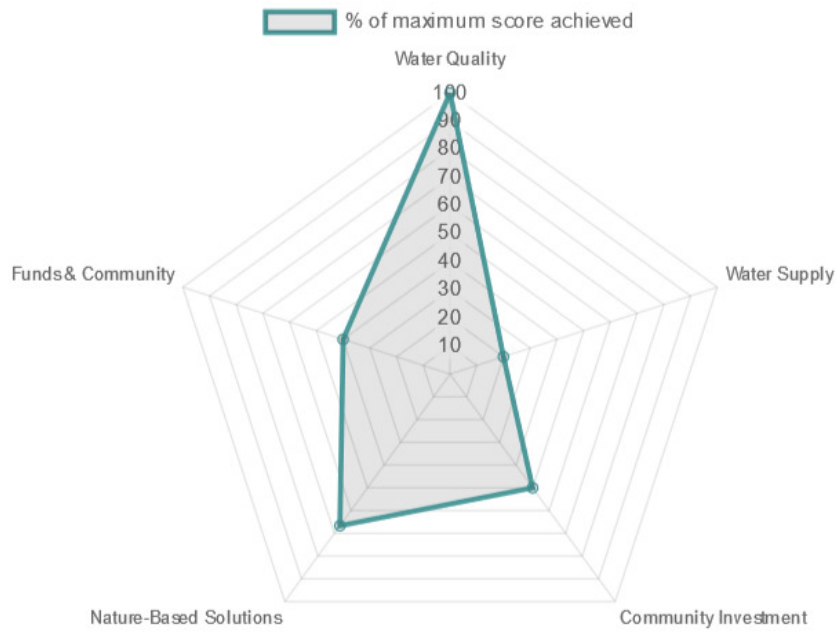
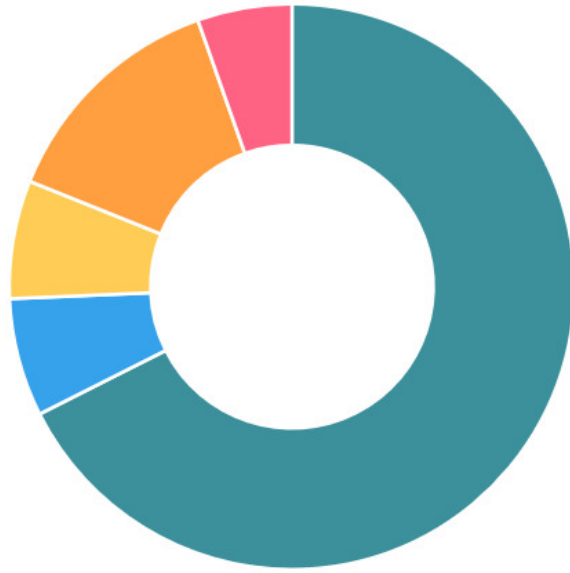
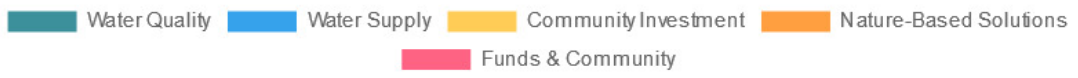
## 9 SCORING

This section summarizes scoring calculations generated by the Module. All Regional Program Projects must meet the Threshold Score of 60 points or more using the following Project Scoring Criteria to be eligible for consideration.

*Note: all scoring estimates are considered preliminary and subject to review and revision by the Scoring Committee.*



The following graphics summarize the project scoring. The first graphic shows the components of the project score, based on the different scoring sections. The second graphic shows the percent of maximum score achieved by the project within each scoring section.



The following table details the scoring calculated for the project, along with the scoring thresholds from the SCW Project Scoring Criteria:

Scoring Section	Project Score	Max Score	Scoring Criteria Thresholds
<b>Water Quality Wet + Dry Weather Part 1</b>	20	20	Cost Effectiveness = (24-hour BMP Capacity) / (Construction Cost in \$Millions) <ul style="list-style-type: none"> <li>• &lt;0.4 = 0 points</li> <li>• 0.4-0.6 = 7 points</li> <li>• 0.6-0.8) = 11 points</li> <li>• 0.8-1.0 = 14 points</li> <li>• &gt;1.0 = 20 points</li> </ul>
<b>Water Quality Wet + Dry Weather Part 2</b>	30	30	Primary Pollutant Reduction: <ul style="list-style-type: none"> <li>• &gt;50% = 15 points</li> <li>• &gt;80% = 20 points</li> </ul> Secondary Pollutant Reduction: <ul style="list-style-type: none"> <li>• &gt;50% = 5 points</li> <li>• &gt;80% = 10 points</li> </ul>
<b>Water Supply Part 1</b>	0	13	<ul style="list-style-type: none"> <li>• &gt;\$2500/ac-ft = 0 points</li> <li>• \$2,000–2,500/ac-ft = 3 points</li> <li>• \$1500-2,000/ac-ft = 6 points</li> <li>• \$1000–1500/ac-ft = 10 points</li> <li>• &lt;\$1000/ac-ft = 13 points</li> </ul>
<b>Water Supply Part 2</b>	5	12	<ul style="list-style-type: none"> <li>• &lt;25 ac-ft/year = 0 points</li> <li>• 25 - 100 ac-ft/year = 2 points</li> <li>• 100 - 200 ac-ft/year = 5 points</li> <li>• 200 - 300 ac-ft/year = 9 points</li> <li>• &gt;300 ac-ft/year = 12 points</li> </ul>
<b>Community Investment</b>	5	10	<ul style="list-style-type: none"> <li>• One Benefit = 2 points</li> <li>• Three Benefits = 5 points</li> <li>• Six Benefits = 10 points</li> </ul>
<b>Nature Based Solutions</b>	10	15	<ul style="list-style-type: none"> <li>• 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</li> <li>• Utilizes natural materials such as soils and vegetation with a preference for native vegetation = 5 points</li> <li>• Removes Impermeable Area from Project (1 point per 20% paved area removed) = 5 points</li> </ul>
<b>Leveraging Funds Part 1</b>	N/A	6	<ul style="list-style-type: none"> <li>• &gt;25% Funding Matched = 3 points</li> <li>• &gt;50% Funding Matched = 6 points</li> </ul>

<b>Leveraging Funds Part 2</b>	4	4	The Project demonstrates strong local, community-based support and/or has been developed as part of a partnership with local NGOs/CBOs.
<b>Total</b>	<b>74</b>	<b>110</b>	

## 10 ATTACHMENTS

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

**Please note** – at a minimum, a feasibility study must attach the following:

- A Location Map
- A Schematic with Proposed Footprint and Key Components
- A Map of the Capture Area (Tributary Map)
- Technical Reports (e.g. soil report, hydrology report, hydraulic study, utility search, survey, PEIR, EIR, monitoring data, etc.)



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## **ATTACHMENTS FOR SECTION 1.1:**

### **OVERVIEW**

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## **ATTACHMENTS FOR SECTION 1.2:**

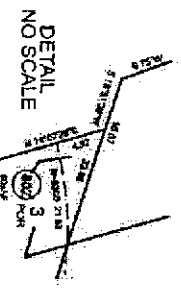
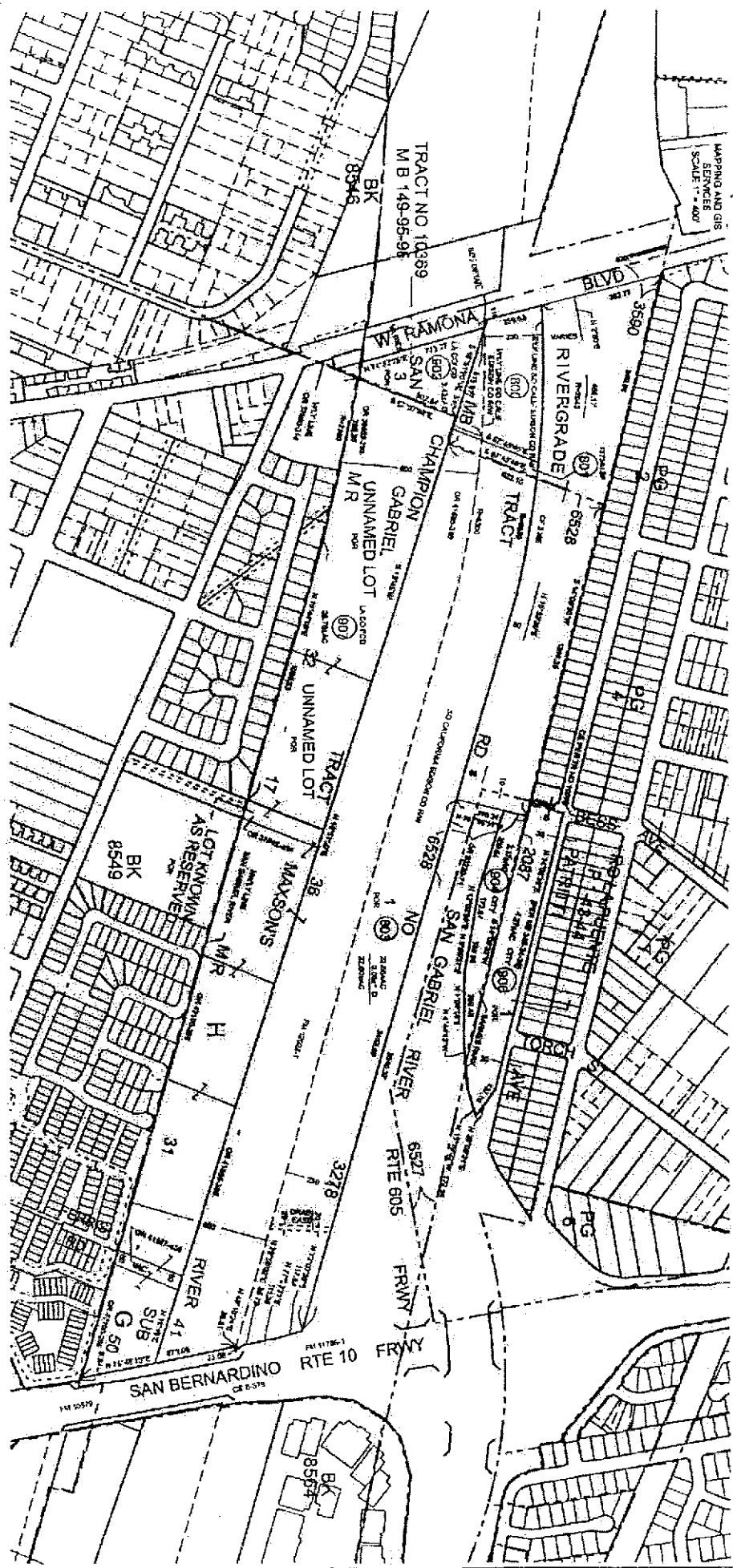
### **PROJECT LOCATION**

---

8550	P. A. 8550.1, 2, 3, 5	TRA. 6527	REVISED	SEARCH NO.	OFFICE OF THE ASSESSOR
SHEET 1		2087 8278	18930322		COUNTY OF LOS ANGELES
		3590	2009023109400001 - 22		COPYRIGHT © 2002

# 2005

MAPPING AND GIS SERVICES  
SCALE: 1" = 400'

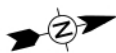


STREET LINES PER M.A.S. 21.6 ARE COMPARED  
THE LOT LINES IN THIS MAP TO THE LINES OF THE  
DIVISIONS OF SOCIAL LOTS ARE DERIVED FROM  
THE CENTERLINES OF THE STREETS.



**LEGEND:**

- LIMITS OF INFILTRATION GALLERY
- SHORING LIMITS FOR INFILTRATION GALLERY
- RIGHT OF WAY / PROPERTY LINE
- (E) SANITARY SEWER
- ACTUATED VALVE



30% DESIGN - 9/7/2018



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 3475 E. FOOTHILL BLVD  
 PASADENA, CA 91107  
 (626) 351-4664

APPROVED  
 BY \_\_\_\_\_ CITY ENGINEER DATE \_\_\_\_\_

NO.	REVISION	REVISED BY	APPROVED BY	DATE

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

**BARNES PARK  
 MULTI-BENEFIT STORMWATER CAPTURE PROJECT  
 SITE PLAN**

DWG G-05 SHEET 5 OF 12

9/7/2018 10:16:52 AM - P:\02272640\2018-08\BARNES PARK (BARNES PARK)G-05 SITE PLAN.DWG - MCCOLLUM\_AUSTIN



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**ATTACHMENTS FOR SECTION 2.1:**

**CONFIGURATION**

---

# Landscape Plant List

## Trees



**Desert Willow**  
(Chilopsis linearis)



**Coast Live Oak**  
(Quercus agrifolia)



**Trident Maple**  
(Acer buergerianum)



**Western Redbud**  
(Cercis occidentalis)

## Shrubs, Perennials and Grasses

**California Wild Rose**  
(Rosa californica)



**Yarrow**  
(Achillea millefolium)



**Dune Manzanita**  
(Arctostaphylos pumila)



**Autumn Sage**  
(Salvia greggii)



**California Goldenrod**  
(Solidago californica)



**Small Cape Rush**  
(Chondropetalum tectorum)



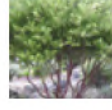
**English Lavender**  
(Lavandula angustifolia)



**Sage**  
(Salvia 'Bees Bliss')



**Manzanita**  
(Arctostaphylos)



**Deer Grass**  
(Muhlenbergia rigens)



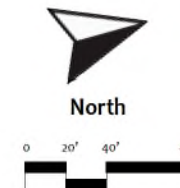
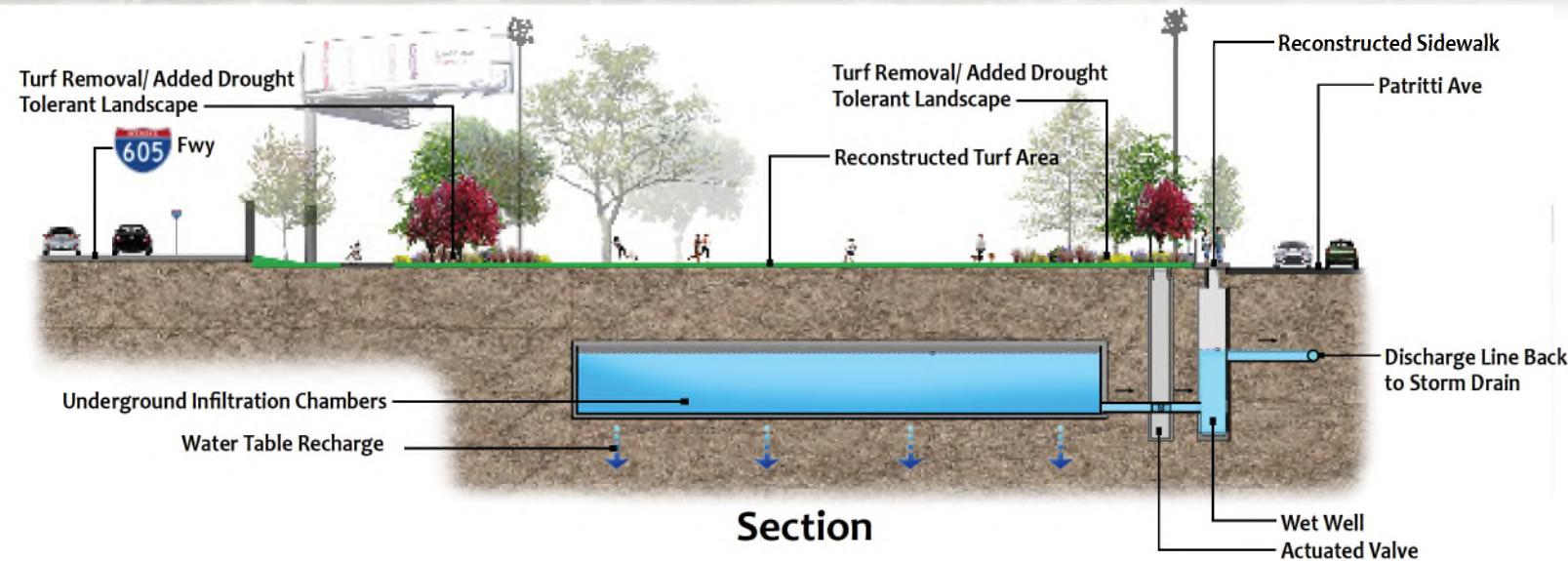
Replace existing turf with drought tolerant landscape



Reconstruct Field to Original Condition



Precast Concrete Underground Infiltration Chambers



## LEGEND

- Manhole Access Location
- ▬ Precast Chamber Limits
- ▬ Excavation Limits
- ▬ Construction Limits
- ▬ Inflow Pipe from Diversion Structure
- ▬ Discharge Pipe to Channel
- ▬ Diversion Structure
- ▬ Existing Storm Drain

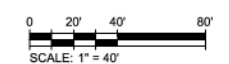


# Barnes Park



**LEGEND:**

- LIMITS OF INFILTRATION GALLERY
- - - SHORING LIMITS FOR INFILTRATION GALLERY
- - - RIGHT OF WAY / PROPERTY LINE
- SS (E) SANITARY SEWER
- ACTUATED VALVE



30% DESIGN - 9/7/2018



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APPROVED  
 BY \_\_\_\_\_ CITY ENGINEER DATE \_\_\_\_\_

NO.	REVISION	REVISED BY	APPROVED BY	DATE

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS  
**BARNES PARK**  
 MULTI-BENEFIT STORMWATER CAPTURE PROJECT  
**SITE PLAN**

PROJECT ENGINEER DATE DWG G-05 SHEET 5 OF 12

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## **ATTACHMENTS FOR SECTION 2.2:**

### **CAPTURE AREA**

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# Landscape Plant List

Trees



**Desert Willow**  
(Chilopsis linearis)



**Coast Live Oak**  
(Quercus agrifolia)



**Trident Maple**  
(Acer buergerianum)



**Western Redbud**  
(Cercis occidentalis)

Shrubs, Perennials and Grasses

**California Wild Rose**  
(Rosa californica)



**Yarrow**  
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(Arctostaphylos pumila)



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(Muhlenbergia rigens)



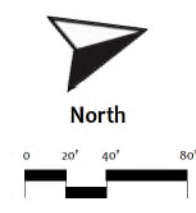
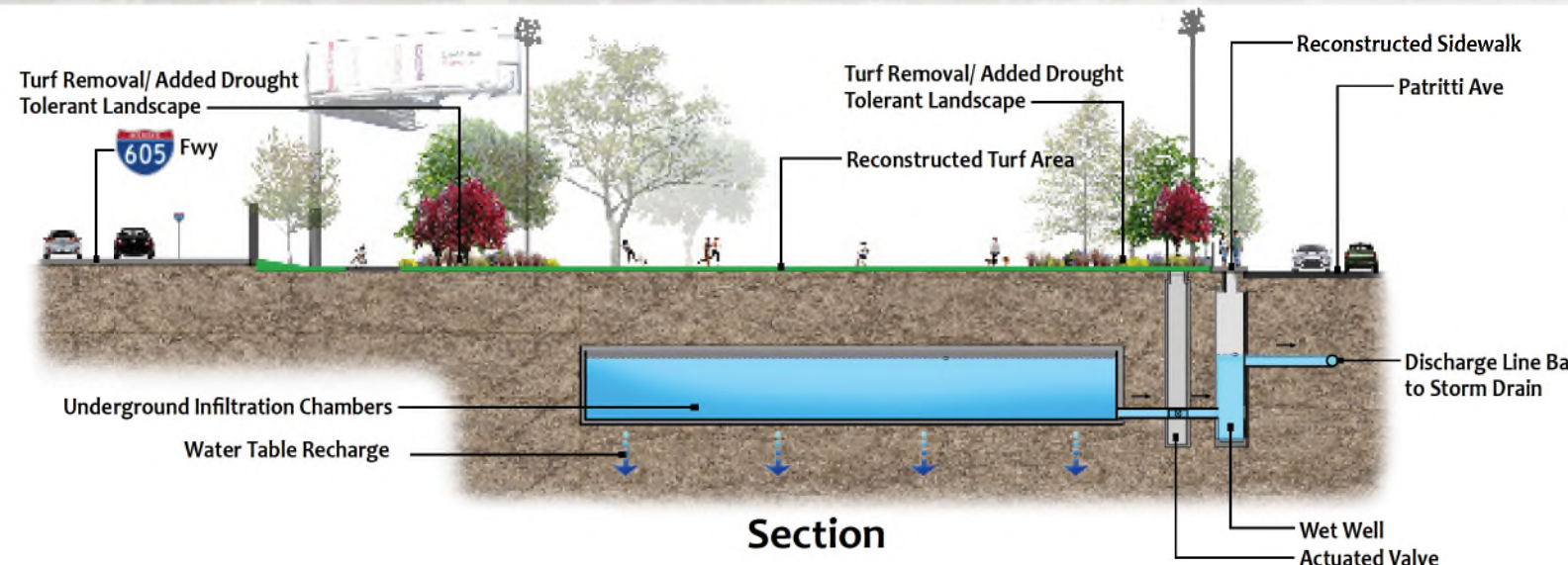
Replace existing turf with drought tolerant landscape



Reconstruct Field to Original Condition



Precast Concrete Underground Infiltration Chambers



- LEGEND**
- Manhole Access Location
  - ▬ Precast Chamber Limits
  - ▬ Excavation Limits
  - ▬ Construction Limits
  - ▬ Inflow Pipe from Diversion Structure
  - ▬ Discharge Pipe to Channel
  - ▬ Diversion Structure
  - ▬ Existing Storm Drain

# Barnes Park

Multi-Benefit Stormwater Capture Project Above Ground Improvements

October 31, 2018





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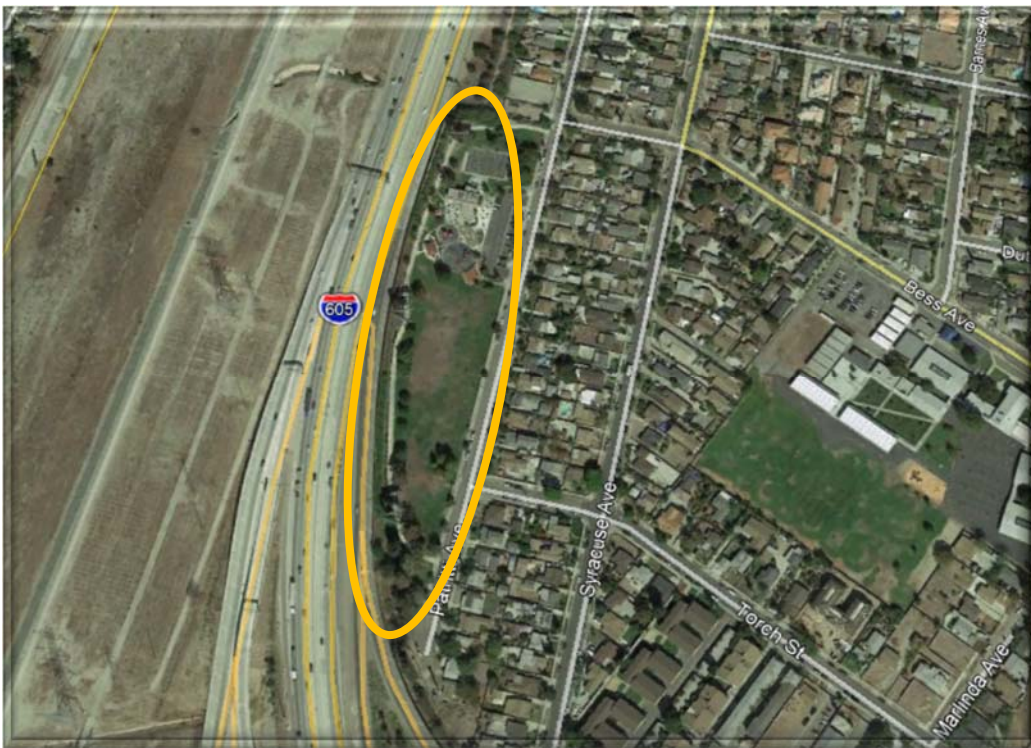
**ATTACHMENTS FOR SECTION 2.4:**

**SITE CONDITIONS & CONSTRAINTS**

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# Preliminary Limited Geotechnical Design Report

## BARNES PARK STORMWATER STORAGE & INFILTRATION FACILITIES 3251 Patritti Avenue Baldwin Park, California



Prepared for:

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March 20, 2018  
Project No. TET 17-136E



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March 20, 2018

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Subject: **PRELIMINARY LIMITED GEOTECHNICAL DESIGN REPORT  
BARNES PARK  
STORMWATER STORAGE & INFILTRATION FACILITIES  
3251 Patritti Avenue  
Baldwin Park, California**

Dear Mr. Philips:

Presented herein is Tetra Tech’s preliminary limited geotechnical design report for the proposed stormwater infiltration/storage facilities at Barnes Park located at 3251 Patritti Avenue in the City of Baldwin Park, California. This report summarizes the results of our geotechnical investigation to characterize the soils at the site and provides geotechnical considerations for the preliminary design of the proposed infiltration facilities. The appendices of the report include logs of borings from the previous and current investigations, results of laboratory and infiltration tests, and liquefaction analyses.

We appreciate the opportunity to provide our professional services on this project. If you have any questions regarding this report or if we can be of further service, please do not hesitate to contact the undersigned.

Respectfully submitted,  
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- Appendix A – Logs of Ninyo and Moore’s Exploratory Boring
- Appendix B – Logs of Tetra Tech’s Exploratory Boring
- Appendix C – Tetra Tech Laboratory Testing
- Appendix D – Field Infiltration Testing Results
- Appendix E – Liquefaction Analyses

## **1. INTRODUCTION**

This report presents the results of Tetra Tech’s preliminary limited geotechnical engineering evaluation for the proposed stormwater capture, infiltration, and conveyance facilities at the Barnes Park (see Figure 1) located at 3251 Patritti Avenue in the City of Baldwin Park, California.

The purpose of this study was to evaluate the subsurface conditions at the site and to provide considerations for the preliminary limited design of the proposed facilities. The area considered in this investigation is located immediately south of the parking lot and the park recreational center facilities shown on Figure 2. This report summarizes the collected data and presents our findings, conclusions, and preliminary geotechnical design considerations.

## 2. SCOPE OF WORK

Tetra Tech's scope of services for this project consisted of the following tasks:

- Review of readily available background data, including in-house geotechnical data from our soil explorations in the vicinity of the proposed facilities.
- Perform a reconnaissance site visit to observe ground conditions and mark boring locations.
- Coordinate with City of Industry personnel, park staff, and Underground Service Alert (USA) for access and clearance of buried utilities prior to drilling.
- Conduct a subsurface investigation within the area where infiltration facilities could be located, including excavating, logging, and geotechnical sampling of 1 soil exploratory boring to a depth of 50.2 feet.
- Install 2 percolation borings in the vicinity of the soil exploratory boring and perform boring percolation tests in general accordance with County of Los Angeles guidelines GS200.2 (2017).
- Perform laboratory testing of selected samples recovered from the borings to evaluate geotechnical engineering properties of the on-site soils.
- Conduct an evaluation of the geotechnical data to develop preliminary limited geotechnical considerations for the design and construction of the proposed structures including the following items:
  - ◆ An evaluation of general subsurface conditions and description of types, distribution, and engineering characteristics of subsurface materials.
  - ◆ An evaluation of the liquefaction potential and dynamic settlement of the on-site materials.
  - ◆ An evaluation of the suitability of on-site soils for infiltration;
  - ◆ Determination of seismic design parameters in accordance with the 2016 California Building Code.
  - ◆ An evaluation of the corrosion potential of the on-site soils to buried concrete.
- Prepare this written report documenting the work performed, physical data acquired, and preliminary geotechnical considerations.

### 3. PROJECT BACKGROUND AND DESCRIPTION

The Upper San Gabriel River Enhanced Watershed Management Group (USGREWMG) was formed on October 24, 2013 and is comprised of the County of Los Angeles, the Los Angeles County Flood Control District (LACFD), and the cities of Baldwin Park, Covina, Glendora, City of Industry, La Puente, and West Covina (the Cities). The group completed the development of an Enhanced Watershed Management Program (EWMP) and obtained approval from the Los Angeles Regional Quality Control Board on April 11, 2016.

The USGREWM Group was formed in response to provisions of National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit Order No. R4-2012-0175 (Permit). The USGREWM Group, through a cooperative and collaborative process, developed an EWMP to demonstrate compliance with water quality standards.

The EWMP identified a suite of watershed control measures and structural Best Management Practices (BMPs), and identified priority projects including the subject Barnes Park. As required by the EWMP, a screening geotechnical investigation was conducted at the site (Ninyo and Moore, 2015). The County, the LACFD and the Cities are now taking the next step in implementing the EWMP by developing this Preliminary Design Report. The City of Industry represents the USGREWMG and is the lead agency for this effort.

Barnes Park was considered a high priority site for a regional stormwater capture project due to its proximity to the San Gabriel River channel, and to an 81-inch diameter reinforced concrete stormdrain pipe running in the east-west direction under Bess Avenue and extending underneath the northern edge of the park area (north of the area being considered for the infiltration BMP) to the San Gabriel River channel. The area included in this investigation encompasses area of the park immediately south of the parking lot and the park recreational center facilities as indicated on Figure 2.

At this moment no specific information regarding the location, depth, and size of the proposed diversion structures, pre-treatment units, and pump station is available. Therefore, the designer should verify with the Geotechnical Engineer the applicability of the considerations contained herein once the design configuration is decided. For the storage and infiltration units several alternatives are being considered including corrugated metal pipes, plastic pipes, precast concrete units, and cast-in-place concrete units. It is estimated that the invert of the infiltration facilities will be located at a depth between 10 and 25 feet.

#### 4. SUBSURFACE EXPLORATIONS

A screening subsurface investigation was conducted at the southernmost area of the site by Ninyo and Moore (2015) at the location indicated on Figure 2. Ninyo and Moore’s exploration consisted in drilling one soil boring to a depth of 101.5 feet. The log of this exploration is included in Appendix A.

For the Preliminary Design subject of this document the subsurface soil and groundwater conditions beneath the site were explored on November 29, 2017 and included the drilling, logging, and sampling of 1 hollow stem auger exploratory boring B-101.

Prior to starting the field exploration program, a field reconnaissance was conducted to observe surface conditions and to mark the locations of the planned boreholes in agreement with the City of Industry and the park staff. A drilling permit was obtained from the Los Angeles County Department of Public Health (LACDPH) for the subsurface explorations. Underground Service Alert and the park staff were also notified of the drilling schedule at least 48 hours prior to drilling.

The hollow stem auger boring was excavated using a CME-75 truck-mounted drill rig equipped with an 8-inch diameter auger at the approximate location indicated on Figure 2 – Site Layout and Boring Location Map. Boring B-101 was advanced to a depth of 50.2 feet. Subsequently, 2 boreholes for percolation testing were drilled in the vicinity of B-101. The percolation testing boreholes were drilled to a depth where coarse-grained materials possibly suitable for infiltration were encountered in B-101, and within the anticipated depth range for the infiltration BMP invert. Borehole percolation tests were then conducted as described in the Section Field Percolation Testing.

The approximate coordinates of the current soil exploration locations, the approximate elevations, and depths are included in Table 1.

**Table 1  
 Borehole Information**

<b>Exploration Number</b>	<b>Northing</b>	<b>Easting</b>	<b>Approximate Depth (ft)</b>	<b>Approximate Top of Borehole Elevation (ft)*</b>
B-101	34.069520	-117.999550	50.2	303
I-102	34.069460	-117.999580	15	303
I-103	34.069740	-117.999450	15	303

\*Estimated from Google Earth

Bulk, driven ring-type, and small bag samples were retrieved at selected depths during drilling of the exploratory boring. Standard Penetration Testing (SPT) was performed using an SPT sampler

driven by an automatic 140-pound hammer with a drop of 30 inches in general accordance with ASTM D1586. The hammer calibration record indicated an energy transfer ratio of 80 percent. Ring-type samples were collected utilizing a California-type sampler driven by the same equipment used for the SPTs. Sampling between the depths of 10 and 25 feet was carried out at 2.5-foot intervals. Otherwise sampling was carried out at 5-foot intervals.

The soil boring was surface-logged by a California Professional Geologist in general accordance with the visual-manual procedure for description and identification of soils, ASTM D2488. The Geologist prepared the recovered samples for subsequent reference and laboratory testing. The soil boring log is presented in Appendix B.

At the completion of drilling, the borings were backfilled with a bentonite cement grout in accordance with LACDPH requirements. The excavated soils from the boreholes were disposed of by park personnel.

## 5. LABORATORY TESTING

Laboratory tests were performed on selected samples recovered from the soil boring to aid in the classification of soils and to evaluate pertinent engineering properties. The following tests were performed:

- Moisture Content of Soil, ASTM D2216;
- Density of Soil Specimens, ASTM D7263;
- Particle Size Analysis of Soils, ASTM D6913 and ASTM D7928;
- Atterberg Limits, ASTM D4318;
- Percent Passing #200 Sieve, ASTM D1140;
- Swell and Collapse Test, ASTM D4546;
- Direct Shear Testing, ASTM D3080;
- Corrosion Testing of Soils:
  - pH, ASTM G51;
  - Resistivity, ASTM G187;
  - Sulfates, ASTM D516;
  - Chlorides, ASTM D512;
  - Redox, ASTM G200;
  - Sulfides, SM-4500-S2;
  - Ammonia, SM 4500-NH<sub>3</sub>; and
  - Nitrate SM 4500-NO<sub>3</sub>.

Results of all laboratory tests are presented in Appendix C. For ease of referral to the soil profile, most of the laboratory results have also been included on the boring logs in Appendix B.

## **6. SUBSURFACE CONDITIONS**

### **6.1. Regional Geology**

The subject site is located within the eastern portions of the greater Los Angeles Basin. The Los Angeles Basin is located within Peninsular Ranges geomorphic province which is characterized as a low-lying plain that rises gently inland to the surrounding mountains and hills including the Santa Monica and San Gabriel Mountains to the north, Puente Hills to the northeast, the Santa Ana Mountains to the Southeast, and the San Joaquin hills and Palos Verdes Peninsula to the south. The Peninsular Range is characterized by northwest-southeast trending structural blocks separated by northwest-southeast trending strike-slip faults. The site is nearby and to the south of the San Gabriel Mountains surrounded by locally characteristic steep mountains, low foothills, and relatively flat valleys. Local mountains are characterized by crystalline plutonic rock of Cretaceous age to Precambrian gneisses. Foothills are locally characterized by Miocene aged units of andesitic volcanic units of the Glendora Volcanics and sandstones of the Topanga Formation (Harden, 2004). Valleys are filled with intermediate and young alluvium formations consisting of locally derived surficial sands and gravels (Dibblee, 2002). Older alluvial gravels outcrop in uplifted remnants, and coarser gravels outcrops are younger and present in active stream channels within the valley floor.

### **6.2. Site Geology**

Based on a review of the geologic maps of El Monte and Baldwin Park quadrangles the subject site is underlain by Quaternary alluvial gravel and sand (Dibblee, 1999). Geologic units encountered during our reconnaissance and subsurface exploration of the project site included relatively thin fill soils that mantle alluvium. The alluvium was encountered to the maximum explored depth of 50.2 feet. Additional descriptions are provided on the boring log in Appendix B. A geologic map of the region is presented on Figure 3. Generalized descriptions of the encountered units are provided in the subsequent sections.

#### **6.2.1. Fill**

Fill materials were encountered in our boring B-101 extending from the ground surface to a depth of approximately 1 foot below existing grade. As observed, the fill materials generally consisted of dark brown, moist, medium dense, silty sand. Scattered roots and grass were encountered in the fill materials.

#### **6.2.2. Native Alluvium**

Native alluvium was encountered in our boring B-101 underlying the fill materials and was observed to extend to the total depth explored of 50.2 feet below existing grade. As observed during our subsurface exploration, the alluvial materials generally consisted of light brownish gray to yellowish brown to olive gray, damp to moist, medium dense to very dense, well graded sands with gravel, poorly graded sands with gravel, poorly graded gravel with sand, and silty sands. Below 39 feet thin interbeds of light olive gray, damp, hard silt were also encountered in the alluvium. Scattered gravel lenses were observed and encountered at various depths indicative of

modern river alluvial sediments. The previous exploration by Ninyo and Moore (2015) encountered fine grained materials from a depth of 15 to 20 feet.

### 6.3. Groundwater

Groundwater was not encountered neither in the Ninyo and Moore’s exploration (2015) to a depth of 101.5 feet nor in the Tetra Tech exploratory boring to a depth of 50.2 feet. According to the State of California Seismic Hazard Zone Report for the El Monte 7.5-minute Quadrangle (CDMG, 1998), the historic high groundwater level near the site has been mapped at a depth of about 10 feet (Figure 4 – Historic High Groundwater Map). However, it is recognized that the CDMG groundwater contours are based on early last century water well logs (Mendenhall, 1905, Conkling, 1927) and also include water measurements from wells from the Central Basin Investigation (State Water Resources Board, 1952), Department of Water Resources (circa 1940’s) which reflect conditions prior to massive infrastructure and urban development that has taken place in the last 50 years which modified the drainage and infiltration patterns and therefore they may not correspond or apply to current conditions and circumstances.

Well data from the Los Angeles County Department of Public Works (LACDPW) database (<http://dpw.lacounty.gov/general/wells/>) and from the database from Geotracker (<http://geotracker.waterboards.ca.gov/map/>) for nearby wells indicate groundwater depths as summarized in Table 4.

**Table 4  
 Groundwater Wells in the Vicinity of the Site**

<b>Well Identification</b>	<b>Monitoring Period</b>	<b>Approximate location relative to the site</b>	<b>Shallowest groundwater depth</b>
LACDPW Well ID 2993W State # 1S11W23K03	March 1968 to October 2010	0.30 miles to the west	19.5 feet on May 1969
LACDPW Well ID 3003B State # 1S11W26B01	August 1968 to October 2015	0.47 miles to the southwest	23.9 feet on May 1969
LACDPW Well ID 3003A State # 1S11W25D01	February 1968 to October 2015	0.4 miles to the southeast	25.9 on June 1969
Geotracker well cluster T0603792879, MW1 through MW6	June 2002 to February 2003	0.45 miles to the southeast	97.3 feet on June 2002
Geotracker well cluster T0603704488, MW6 through MW8	July 2002 to April 2003	0.90 miles to the southwest	84.1 feet on July 2002

Based on the assessment of the local stratigraphy and local topography, it is our opinion that the LACDPW and the Geotracker wells can be utilized for interpretation of the project groundwater conditions. Considering also the current soil exploration, it is our conclusion that the groundwater at the site has been deeper than about 20 feet within the last 50 years. Furthermore, it appears that in the last 30 years the groundwater has been deeper than 84 feet which is also supported by the

Ninyo and Moore exploration (2015) and the current exploration. However, for the design of the infiltration facilities a groundwater depth of 20 feet should be considered.

Based on the research and observed conditions, groundwater is not expected to impact the design or the construction of the proposed development. Fluctuations of the groundwater level, localized zones of perched water, and increased soil moisture content should be anticipated during and following the rainy season. Irrigation of landscaped areas on or adjacent to the site can also cause a fluctuation of local groundwater levels. Evaluation of such factors is beyond the scope of our services.

## 7. FIELD PERCOLATION TESTING

Tetra Tech performed 2 borehole percolation tests denoted I-102 and I-103 located within 20 feet of the geotechnical boring B-101 using the test procedure described in the LACDPW GS200.2 guidelines (2017). Both, I-102 and I-103, were installed to a depth of about 15 feet. The approximate coordinates of the 2 percolation tests, the approximate top of borehole elevations, and borehole depths are included in Table 1. A 3-inch-diameter perforated PVC pipe with 5/8-inch-diameter holes was installed in both borings. The casing was wrapped in a protective cloth sock to limit the migration of soil particles into the pipe. The pipe was surrounded by a free-draining gravel pack with a hydraulic conductivity significantly larger than that of the surrounding soil.

Percolation boreholes were presoaked for at least 2 hours before the test. For the percolation testing an initial constant water level of about 2 feet was maintained above the bottom of the borehole. The readings to determine the water depth were taken every 10 minutes with a well sounder until a stabilized drop rate was obtained (per GS 200.2 a stabilized rate is obtained when the highest and lowest readings are within 10 percent from each other for 3 consecutive readings), however testing was not completed until a 2-hour minimum testing period was completed. Logs of the percolation testing are included in Appendix D. After conclusion of the boring percolation testing, the boreholes were backfilled with a bentonite cement grout in accordance with LACDPH requirements.

The field percolation rate expressed in inches per hour was adjusted as explained below and on the percolation logs. A testing method reduction factor  $RF_t$  of 2 was applied as required by the guidelines to account for the direction of flow during the test and the reliability of the method. To account for effects related to site subsurface variability and the limited number of tests, a reduction factor  $RF_v$  of 2 was used (typical range between 1 and 3) reflecting that although the tests were relatively consistent, some degree of variation in stratigraphy was observed throughout the site. Lastly, to account for long-term siltation, and plugging, a reduction factor  $RF_s$  of 2 was considered (typical range between 1 and 3). The results of the borehole percolation testing and calculation of the adjusted percolation rates are summarized in Table 2.

The percolation results from this exploration indicate that the adjusted percolation rate ranges between 12 and 15.3 inches/hour. A design infiltration rate of about 12 inches/hour is recommended for this site for an invert depth of up to 30 feet. However, it is noted that the Ninyo and Moore (2015) exploration encountered fine-grained materials from a depth of 15 to 20 feet which could possibly preclude the infiltration at the site at depths less than 20 feet. The presence of fine-grained materials encountered by Ninyo and Moore at the southernmost end of the site could be a localized finding that should be further explored with additional site explorations if the invert depth needs to be shallower than 20 feet.

The design infiltration rate is higher than the minimum of 0.3 inches/hour required by the LACDPW guidelines and corresponds to soils with good permeability and good drainage characteristics. Therefore, infiltration of stormwater at the site is considered viable at depths greater than 20 feet. The results of the borehole percolation testing should be validated by large scale percolation testing during the next project phase. Although specific infiltration tests for deep infiltration wells (dry wells) were not performed in this preliminary phase, it is considered that dry

wells could be another suitable alternative for this site. If this alternative is considered, further testing should be carried out to provide parameters for the design.

The soil exploration performed by Ninyo and Moore (2015) in the southernmost area of the park indicated that coarse-grained materials were present from a depth of 20 to the maximum explored depth of 100.5 feet. These findings in conjunction with the findings of the current exploration, would reasonably allow for dry wells to be installed from a depth of about 20 to 30 feet.

**Table 2**  
**Adjusted Percolation Rates**

<b>Boring Percolation Test No.</b>	<b>Borehole Depth (ft)</b>	<b>Adjusted Infiltration Rate (inches/hour)</b>
I-102	15	15.3
I-103	15	12.0

## 8. ESTIMATED SATURATED HYDRAULIC CONDUCTIVITY

In order to further estimate the magnitude of the hydraulic conductivity of the materials below the invert of the proposed infiltration facilities, the following analyses were performed. It should be noted that the estimates given with empirical formulas should be viewed as “order-of magnitude” estimates and field data should always be considered more reliable. An estimate of the saturated soil field permeability of soils within the anticipated invert depth was calculated from the grain size distributions using the approximation based on Massmann (2003) formula:

$$\log_{10}(K_{sat}) = -1.57 + 1.9D_{10} + 0.015D_{60} - 0.013D_{90} - 2.08 f_{fines}$$

where:

- $K_{sat}$ ..... is the saturated hydraulic conductivity in cm/s
- $D_{10}$ ..... is the grain size in mm for which 10% of the sample is finer
- $D_{60}$ ..... is the grain size in mm for which 60% of the sample is finer
- $D_{90}$ ..... is the grain size in mm for which 90% of the sample is finer
- $f_{fines}$ ..... is the ratio or fraction by weight that passes the # 200 sieve

Although hydraulic conductivities are not directly equivalent to infiltration rates, they are usually relatively close for this type of field percolation testing because hydraulic gradients during field testing are relatively close to 1. To compare the hydraulic conductivity with the infiltration rates from the borehole percolation testing described in the previous section, the saturated hydraulic conductivities calculated using the equation above were further adjusted using the same reduction factors as for the calculation of the infiltration rates, i.e., a reduction factor for testing method  $RF_t$  of 2, a site subsurface variability factor  $RF_v$  of 2, and a long-term siltation factor  $RF_s$  of 2. The resulting infiltration-equivalent computed hydraulic conductivities are shown on Table 3.

**Table 3**  
**Computed Hydraulic Conductivities from Grain Size Distributions**

Boring and Sample No.	USCS Classification	Sample Depth (ft)	Applicable Depth Interval (ft)	Infiltration-Equivalent Computed Hydraulic Conductivity (inches/hour)
B-101 SPT-3	GP	10-11.5	0-39	8.7
B-101 SPT-5	SP-SM	15-16.5	0-39	3.3
B-101 R-8	SP	22.5-24	0-39	11.3

The infiltration-equivalent computed hydraulic conductivities using Massman formula match well the adjusted field infiltration rate of 12 inches/hour and thus further validate this recommended design infiltration rate for the applicable depth interval indicated in Table 3.

## 9. ENGINEERING SEISMOLOGY AND GEOLOGIC HAZARDS

### 9.1. General Seismic Setting

The Southern California region is known to be seismically active. Earthquakes occurring within approximately 60 miles of a site are generally capable of generating ground shaking of engineering significance at the site. The project area is located in the general proximity of several active and potentially active faults, as shown on Figure 5 – Regional Faults and Seismicity Map. Active faults are defined as those that have experienced surface displacement within the Holocene period (approximately the last 11,000 years).

Known faults within approximately 12 miles of the project site include:

- the Walnut Creek fault located approximately 3.9 miles southeast of the site;
- the East Montebello fault approximately 4.8 miles southwest of the site;
- the Sierra Madre fault zone located approximately 5.3 miles to the north;
- the Whittier zone approximately 5.4 miles southwest of the site;
- the Raymond fault located approximately 5.8 miles northeast of the site;
- the Indian Hill fault approximately 6.4 miles east of the site;
- the Clamshell-Sawpit fault approximately 7.2 miles northeast of the site;
- the San Jose fault approximately 7.3 miles west of the site; and
- the Eagle Rock fault approximately 8.3 miles northeast of the site.

The San Andreas Fault is located about 26 miles to the northeast of the site.

Table 5 lists selected principal known active faults that may affect the subject site and the maximum moment magnitude ( $M_{max}$ ) as published by Cao et al. (2003) for the California Geological Survey (CGS). The approximate distance to the site were calculated from Jennings (2010).

Superimposed on the area map in Figure 5 are earthquake epicenters recorded by the USGS between 1900 to present day. A large amount of seismic activity and associated events with their epicenters have been recorded surrounding the project site. Notable historic earthquakes in Southern California of significance to the project are listed in Table 6.

**Table 5**  
**Main Active Faults**

<b>Fault Name</b>	<b>Approximate Fault Distance to Site<sup>1</sup> (miles)</b>	<b>Maximum Moment Magnitude<sup>2</sup> (Mmax)</b>
East Montebello	4.8	7.2
Sierra Madre	5.3	7.2
Whittier	5.4	6.8
Raymond	5.8	6.5
San Jose	7.3	6.4
Clamshell-Sawpit	7.8	6.5
Puente Hills Blind Thrust	12.5	7.1
San Gabriel	13.0	7.2
Central Avenue	14.7	6.7
Verdugo	15.3	6.9
Cucamonga	16.5	6.9
Los Alamitos	17.3	6.2
Hollywood	18.8	6.4
Newport-Inglewood	18.9	7.1
Santa Monica	24.4	6.6
San Andreas	26.0	7.8
Palos Verdes	26.5	7.3
Elsinore	28.5	7.4
Malibu Coast	31.0	6.7
San Jacinto	36.3	7.5
Notes: <sup>1</sup> per Jennings, 2010 <sup>2</sup> per Cao, et al., 2003		

**Table 6**  
**Historic Earthquakes in Southern California**

Earthquake Name	Year	Fault and Fault Type	Earthquake Magnitude*	Epicenter	
				Latitude	Longitude
Chino Hills	2008	Whittier fault (left-lateral thrust)	5.5 M <sub>w</sub>	33.95°N	117.76°W
Northridge	1994	Northridge Thrust (blind thrust)	6.7 M <sub>w</sub>	34.21°N	118.54°W
Sierra Madre	1991	Clamshell-Sawpit Canyon fault (reverse)	5.8 M <sub>L</sub>	34.20°N	118.14°W
Upland	1990	San Jose fault (left-lateral strike-slip)	5.4 M <sub>L</sub>	34.13°N	117.70°W
Pasadena	1988	Raymond fault (left-lateral strike-slip)	5.0 M <sub>w</sub>	34.14°N	118.13°W
Whittier Narrows	1987	Puente Hills Fault (blind thrust)	5.9 M <sub>L</sub>	34.06°N	118.08°W
San Fernando	1971	San Fernando fault (thrust)	6.5-6.7 M <sub>w</sub>	34.42°N	118.37°W
Lytle Creek	1970	Lytle Creek fault (right-reverse)	5.2 M <sub>L</sub>	34.27°N	117.54°W
Torrance-Gardena	1941	Palos Verdes fault (right-reverse)	4.8 M <sub>L</sub>	33.82°N	118.22°W
Long Beach	1933	Newport-Inglewood fault (right-lateral strike-slip)	6.4 M <sub>w</sub>	33.63°N	118.00°W
San Jacinto	1923	San Jacinto fault (right-lateral strike-slip)	6.3 M <sub>L</sub>	34.00°N	117.24°W
San Jacinto	1918	San Jacinto fault (right-lateral strike-slip)	6.7 M <sub>w</sub>	33.65°N	117.43°W
Elsinore	1910	Elsinore fault (right-lateral strike-slip)	6 M <sub>L</sub>	33.75°N	117.45°W
Fort Tejon	1857	San Andreas fault (right-lateral strike-slip)	7.9 M <sub>w</sub>	35.43°N	120.19°W
*M <sub>w</sub> refers to Moment Magnitude scale M <sub>L</sub> refers to Local Magnitude scale					

Potential seismic sources of significance to the project include active faults previously described and faults that are not known to break the ground surface but are considered active. This latter group of faults includes buried or “blind” thrust faults. Current tectonic models for the Los Angeles basin include the presence of buried thrust faults, several of which are considered partly responsible for the north-to-south compression of the basin. Although these faults are not currently zoned by the State of California for surface rupture hazards (Earthquake Fault Zones), many are considered capable of generating seismic shaking of significance to structures.

Of these buried active faults the closest to the site is the Puente Hills Trust Fault (PHTF). The PHTF is currently defined as 3 separate but juxtaposed, generally east-west trending and north-dipping, fault surfaces underlying Downtown Los Angeles to Brea. From west to east these include the Los Angeles, Santa Fe Springs, and Coyote Hills segments. Based upon recent studies

by several researchers, including Shaw et al., (2002), Olsen and Cooke (2005), and Leon et al. (2007), the three fault surfaces are interpreted to extend from depths in excess of 9 miles on the north side of the Los Angeles Basin to less than 1.2 miles at the southerly limits of the fault surfaces in the central portion of the basin. Fault surface geometries are interpreted from historical petroleum exploration data, limited geotechnical subsurface exploration data, and limited seismicity (i.e.; the 1987 magnitude 5.9 Whittier Narrows earthquake).

Leon et al. (2007) estimates that upwards of 60 percent of the total Los Angeles Basin compression may be attributed to strain along the PHTF. Although ground rupture has not been officially attributed to the fault, the presence of youthful hills (e.g., Coyote Hills) and shallow folding at depth in the upper portion of the interpreted thrust ramp suggests recent activity. The PHTF is considered capable of generating earthquake magnitudes up to about  $M_w$  7.0.

## 9.2. Surface Fault Rupture

Official Maps of Earthquake Fault Zones were reviewed to evaluate the location of the project site relative to active fault zones. Earthquake Fault Zones (known as Special Studies Zones prior to 1994) have been established in accordance with the Alquist-Priolo Special Studies Zones Act enacted in 1972. The Act directs the State Geologist to delineate the regulatory zones that encompass surface traces of active faults that have a potential for future surface fault rupture. The purpose of the Alquist-Priolo Act is to regulate development near active faults in order to mitigate the hazard of surface fault rupture.

The site is not located within a designated Earthquake Fault Zone for fault surface rupture hazard. Based on a review of State of California Earthquake Fault Zone maps, the closest zoned fault for surface rupture is the East Montebello Fault Zone section located approximately 4.8 miles southwest of the site and is mapped within the El Monte Quadrangle (Revised official Map by CGS, 2014).

No surface traces of any active or potentially active faults are known to pass directly through or project towards the site. Neither our field exploration nor literature review disclosed an active fault trace projecting to the ground surface in the project area. Therefore, the potential for surface rupture due to faulting occurring beneath the site during the design life of the proposed development is considered low.

## 9.3. Seismic Hazard Zones

Maps of seismic hazard zones are issued by the California Geological Survey (CGS, formerly California Department of Conservation, Division of Mines and Geology (CDMG)) in accordance with the Seismic Hazards Mapping Act enacted in April 1997. The intent of the Seismic Hazards Mapping Act is to provide for a statewide seismic hazard mapping and technical advisory program to assist cities and counties in developing compliance requirements to protect the public health and safety from the effects of strong ground shaking, liquefaction, landslides, or other ground failure and other seismic hazards caused by earthquakes.

Based on the review of the El Monte Quadrangle Official Map of Seismic Hazard Zones issued November 6, 2014 (see Figure 6), the proposed development is located within an area identified by the State of California as subject to the hazard of liquefaction. Consequently, presented below is an associated site-specific assessment.

#### **9.4. Liquefaction Potential, Dynamic Settlement, and Cyclic Softening**

Liquefaction of soils can be caused by ground shaking during earthquakes. Research and historical data indicate that loose, relatively clean granular soils and low plasticity silts are susceptible to liquefaction and dynamic settlement, whereas the stability of the majority of clayey silts, silty clays and clays are not typically adversely affected by ground shaking. Liquefaction is generally known to occur in saturated or near-saturated cohesionless soils at depths shallower than about 50 feet. However, cyclic mobility and seismically induced strength softening with effects similar to liquefaction can occur also in fine-grained soils. Since the historic high groundwater level near the site has been mapped at a depth of about 10 feet, a more rigorous liquefaction hazard analysis per 2016 CBC is included in the following sections.

##### **9.4.1. Soil Description**

Evaluation of liquefaction potential for the on-site materials was performed based on soil stratigraphy encountered in the field explorations. The encountered soil materials generally consisted of alluvial deposits made up of layers of medium dense to dense well graded sands.

Materials that are above the groundwater table are not considered susceptible to liquefaction. Thus, the focus of this investigation was aimed at evaluating the liquefaction potential of soils encountered at a depth between 10 and 50 feet. Fine-grained soils can also undergo severe strength loss during ground shaking, and thus an evaluation of their sensitivity was also performed.

##### **9.4.2. Groundwater Level for Liquefaction Analysis**

Groundwater was not encountered during the field explorations. According to the State of California Seismic Hazard Zone Report for the El Monte 7.5-minute Quadrangle (CDMG, 1998), the historic high groundwater level near the site has been mapped at a depth of about 10 feet. Therefore, although not considered as a design groundwater level for the project, for the purposes of liquefaction evaluation and consistent with SPT 117 (CDCDMG, 2008) a groundwater depth of 10 feet was assumed for evaluation of liquefaction potential at the site.

##### **9.4.3. Liquefaction Seismic Demand**

Based on the USGS U.S. Seismic Design Maps website application (<http://earthquake.usgs.gov/designmaps/us/application.php>), for the subject site at coordinates 34.06978° N, -117.99965° W, the mapped geometric mean Peak ground acceleration (PGAM) was estimated to be approximately 0.79g for a site class D (assumed  $v_s = 260$  m/s), for a ground motion corresponding to the Maximum Considered Earthquake (MCE). From the Seismic Hazard Interactive Deaggregation website (<https://earthquake.usgs.gov/hazards/interactive/>) and using the 2008 Dynamic Conterminous U.S. v3.3.1 edition, the ground motion for a return period of

2,475 years (2% in 50 years) corresponds approximately to a modal earthquake magnitude of  $M_w$  6.5 located at a distance of approximately 10 km (6.2 miles). These ground motion parameters provided above were used in the liquefaction analyses.

#### **9.4.4. Evaluation of Liquefaction Potential and Sensitivity Analyses**

The liquefaction potential of cohesionless (sandy) soils was evaluated based on the SPT blowcounts and laboratory test results utilizing procedure published by Boulanger and Idriss (2014) and generally as recommended in the County of Los Angeles Administrative Manual, Liquefaction/Lateral Spreading/GS045.0 dated October 6, 2014. Cohesive soils with a Plasticity Index less than 7 were considered to behave as cohesionless materials and therefore be susceptible to liquefaction.

The analyses based on standard penetration test (SPT) considered the energy ratio correction factor  $C_E$  of 1.3. This ratio is based on a calibrated average hammer efficiency of approximately 80 percent as supplied by the drilling contractor. The blowcounts recorded for soils driven with the 3-inch O.D. California Sampler with brass rings were converted to an equivalent SPT blowcounts using a reduction factor of 0.66. Borehole diameter correction factor  $C_B$  of 1 based on the internal diameter of the hollow stem auger system used for the drilling was utilized in the liquefaction evaluation.

Results of liquefaction analyses of granular soils are summarized in Table 7 in the next section of this report and the analysis details are presented in Appendix E. The analyses based on SPT and Modified California data indicated that the majority of the on-site granular soils are not susceptible to liquefaction.

Seismic sensitivity of fine-grained soils (clays and silts) was further evaluated per County of Los Angeles Administrative Manual GS045.0 with modifications proposed by Idriss and Boulanger (2008) and the fine-grained soils were classified in the following 3 categories:

1. Soils with Plasticity Index  $< 7$  and below groundwater are classified as fine-grained soils susceptible to liquefaction (typically includes silts);
2. Soils with Plasticity Index  $> 18$  and a degree of sensitivity  $S_t > 6$  are classified as fine-grained soils potentially susceptible to significant loss of strength during seismic shaking and require additional evaluation. The sensitivity of the on-site fine-grained soils is evaluated based on the water content, Atterberg limits, and effective vertical stresses using the procedures suggested by Holtz and Kovacs (1981) and Terzaghi, Peck and Mesri (1996).
3. Fine-grained soils falling outside the two categories above are considered to behave like clays, and are not considered susceptible to liquefaction or seismic sensitivity.

The results from the sensitivity analyses indicated that the fine-grained materials at the site below groundwater are not considered susceptible to liquefaction or seismic sensitivity (see Appendix E).

### 9.4.5. Dynamic Settlement

Dynamic settlement can occur in saturated sands due to liquefaction or in dry sands due to densification of the soil matrix. The anticipated dynamic settlement of the saturated soils at the site was estimated using SPT data from the current exploration using procedures outlined by Yoshimine et al (2006). The estimated settlements by Yoshimine et al (2006) were further adjusted by a calibration factor of 0.9 recommended by Cetin (2009) to better match observed settlements. The potential for dry dynamic settlement using SPT data was calculated according to the procedure outlined in Pradel (1998a and 1998b).

Table 7 presents the results of the liquefaction analyses and it includes liquefaction settlement of saturated sands and the seismically-induced settlement of unsaturated materials above the groundwater table. As shown in Table 7, the combined dynamic settlement at the ground surface estimated from the SPT data ranges from about 0.5 to 1.5 inches. It is noted that although the magnitude of the estimated dynamic settlements corresponds to a mean estimated settlement and can vary on the order of +/- 50 percent, the standard of practice uses the mean estimated values in developing guidelines and evaluating potential damage to structures. Differential settlements per GS045.0 are assumed to be about half of the total settlements i.e., about 0.3 to 0.7 inches over a span of 30 feet. Therefore, structural mitigation is acceptable at this site, and the Structural Engineer should account for this differential settlement in the design of the foundation and the structure.

**Table 7**  
**Results of Liquefaction and Dry Dynamic Settlement Analyses**

Boring No.	Assumed Groundwater Depth (feet)	Liquefiable Zone Depth Interval (feet)	FS <sub>liq</sub>	Liquefaction Settlement (inches) <sup>1</sup>	Settlement of Dry Sands (inches) <sup>1</sup>	Combined Dynamic Settlement (inches) <sup>1</sup>
B-101 Tetra Tech	10	25-30	1.1	0.3	0.2	0.5
B-5 Ninyo and Moore		20-30	0.9	1.0	0.5	1.5

<sup>1</sup>Estimated settlements are mean values which can vary within +/-50 percent.

### 9.5. Earthquake-Induced Landslides

The site is not located in an Earthquake-Induced Landslide Hazard Zone on the State of California Seismic Hazard Zones Map (see Figure 6). No evidence of landsliding was observed on or in the immediate vicinity of the site. Therefore an occurrence of an earthquake-induced landslide is not considered to be a hazard to the site.

## 9.6. Subsidence

Land subsidence is the lowering of the ground surface due to extraction or lowering of water levels or other fluids within the subsurface soil pores, or due to seismic activity. The fluid withdrawal causes the alluvial sediments in the basin to compact. Damage caused by subsidence can be visible cracks, fissures, or surface depression.

The site is not located in an area mapped by the USGS ([https://ca.water.usgs.gov/land\\_subsidence/california-subsidence-areas.html](https://ca.water.usgs.gov/land_subsidence/california-subsidence-areas.html)) where either historical or current subsidence has been recorded. Therefore, subsidence is not considered a hazard for this site.

## 10. PRELIMINARY DESIGN CONSIDERATIONS

### 10.1. General

Based on the results of the field exploration and engineering analyses, it is Tetra Tech's opinion that the proposed construction of the infiltration units is feasible from the geotechnical standpoint, provided that the facilities infiltrate at a depth greater than 20 feet. Additional explorations could potentially reduce the depth of infiltration over the site if the findings from the Ninyo and Moore exploration are determined to be localized. Underground infiltration galleries are considered feasible. Dry wells may also be considered, although further infiltration testing will be required. If underground galleries are chosen, large scale percolation testing would be required.

Laboratory tests indicate that the on-site soils are not considered to be susceptible to collapse (less than 1 percent volume change per ASTM D4546 at 2,000 psf) as assessed by Jennings and Knight (1975). Consequently, infiltration is not likely to trigger detrimental collapse or swelling of the underlying soils.

Observations and laboratory tests indicate that the on-site soils have negligible levels of water-soluble sulfates, therefore, the soils are not expected to cause injurious sulfate attack on concrete with a minimum 28-day compressive strength of 2,500 psi.

Once the preferred infiltration system and the final location and depth of the infiltration facilities are selected, then more specific geotechnical recommendations for the project design phase should be developed. The key geotechnical design items that will need to be addressed:

- Site Preparation;
- Excavation and shoring design;
- Foundation design of at-grade and subterranean structures;
- Lateral earth pressures on underground structures;
- Conveyance pipelines;
- Grading recommendations;
- Field percolation/infiltration testing specific to the selected infiltration BMP.

For the preliminary design, presented below are the updated seismic design parameters and assessment of the corrosion of the onsite soils.

### 10.2. Seismic Design Parameters

The seismic design coefficients provided below in Table 8 are based on Chapter 16 of the 2016 CBC and on the information provided by the USGS website (<https://earthquake.usgs.gov/designmaps/us/application.php?>).

**Table 8**  
**Site Categorization and 2016 CBC Site Coefficients**  
Site coordinates N 34.06978°, and W -117.99965°

Parameter	Design Value
Site Class (Table 20.3-1 ASCE 7)	D*
Short Period Spectral Acceleration Parameter $S_s$	2.228**
1-sec. Period Spectral Acceleration Parameter $S_1$	0.775**
Short Period Design Spectral Acceleration Parameter $S_{DS}$	1.485**
1-sec. Period Design Spectral Acceleration Parameter $S_{D1}$	0.775**
* Soil profile based on estimated $v_{s30}$ of 260 m/s	
** Values from USGS Earthquake Hazards Program website based on the ASCE7-10 with March 2013 errata and 2015 International Building Code.	

### 10.3. Soil Corrosion

The corrosion potential of the on-site materials to buried steel and concrete was evaluated based on laboratory testing on a representative soil sample from this investigation and a sample from Ninyo and Moore’s investigation (2015). Table 9 below presents the results of the corrosivity testing.

**Table 9**  
**Corrosivity Test Results**

Boring	Sample ID	Depth (feet)	pH	Minimum Resistivity (ohm-cm)	Chlorides (ppm/%)	Soluble Sulfate Content in Soil (ppm/%)	Nitrate (mg/kg)	Sulfide (mg/kg)	Ammonia (mg/kg)	Redox (mV)
B-101 Tetra Tech	SPT-1	2.5-4	7.7	23,450	12/0.0012	21/0.0021 Category S0 per 2016 CBC	ND	0.15	2.8	223
B-5 Ninyo and Moore	N/A	0-5	7.7	6,000	170/0.017	140/0.0140 Category S0 per 2016 CBC	Not measured			

Per 2016 CBC/ 2015 IBC, Section 1904.1, concrete subject to exposure to sulfates shall comply with the requirements set forth in ACI 318, Section 19.3. Based on the measured water soluble sulfate results the exposure of buried concrete to sulfate attack should be considered “not applicable”, i.e., exposure class S0 per ACI 318, Table 19.3.1.1. Consequently, injurious sulfate attack is not anticipated for concrete with a minimum 28-day compressive strength of 2,500 psi.

Per 2016 CBC, Section 1904.1, concrete shall conform to durability requirements established in ACI 318 Sections 19.3.2 and 26.4 including protection for corrosion and exposure to chlorides. Reinforcement should be protected from corrosion in accordance with ACI 318 Section 20.6.

The evaluation of potential for corrosion of buried metals was based on the minimum resistivity and our experience with similar soils. The on-site soils are anticipated to be “mildly corrosive” to buried metals as defined by the NACE (1984).

A corrosion specialist should be consulted regarding suitable types of piping and necessary protection for underground metal conduits. The corrosion potential of the on-site soils should be verified during construction for each encountered soil type. Imported fill materials should be tested prior to placement to confirm that their corrosion potential is not more severe than the one assumed for the project.

## 11. LIMITATIONS

This report presents preliminary design considerations for the proposed infiltration BMP at Barnes Park. It is not intended to be the geotechnical document suitable for final design of the proposed development as the extent and scope of the performed field and laboratory testing and engineering analyses was not developed for the anticipated relatively complex specific configuration of the proposed development. Consequently, additional field and laboratory investigation and engineering analyses will be required once the scope and configuration of the project are determined.

The recommendations and opinions expressed in this report are based on Tetra Tech's review of background documents and on information obtained from the current geotechnical investigation. It should be noted that this study did not evaluate the possible presence of hazardous materials on any portion of the site.

Due to the limited nature of the field explorations, conditions not observed and described in this report may be present on the site. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface evaluation and laboratory testing can be performed upon request. It should be understood that conditions different from those anticipated in this report may be encountered during grading operations, for example, the extent of unsuitable soil and the associated additional effort required to mitigate them.

Site conditions, including groundwater level, can change with time as a result of natural processes or the activities of man at the subject site or at nearby sites. Changes to the applicable laws, regulations, codes, and standards of practice may occur as a result of government action or the broadening of knowledge. The findings of this document may, therefore, be invalidated over time, in part or in whole, by changes over which Tetra Tech has no control. Therefore, this report should be reviewed and recertified if it were to be used for a project design commencing more than 1 year after the date of issuance of this report.

Tetra Tech's recommendations for this site are dependent upon verification of the actual encountered field conditions, appropriate quality control of grading operations including overexcavation, processing, and replacement of the on-site materials, shoring, and foundation construction. Accordingly, the recommendations are made contingent upon the opportunity for Tetra Tech to observe all aspects of subgrade preparation for the proposed construction. If parties other than Tetra Tech are engaged to provide such services, such parties are assuming complete responsibility as the Geotechnical Engineer of Record for the geotechnical phase of the project and implicitly concur with the recommendations provided in this report or may provide alternative recommendations.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Tetra Tech should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document. Reliance by others on the data presented herein or for purposes other than those stated in the text is authorized only if so permitted

in writing by Tetra Tech. It should be understood that such an authorization may incur additional expenses and charges.

Tetra Tech has endeavored to perform its evaluation using the degree of care and skill ordinarily exercised under similar circumstances by reputable geotechnical professionals with experience in this area in similar soil conditions. No other warranty, either expressed or implied, is made as to the conclusions and recommendations contained in this report.

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## Figures



FIGURE 1



1360 Valley Vista Drive, Diamond Bar, CA 91765  
TEL 909.860.7777 FAX 909.860.8017

BARNES PARK - BALDWIN PARK, CA

SITE LOCATION MAP




JOB NO.  
TET 17-136E

DATE  
DEC 2017

DRAWN BY  
SCM

CHECKED BY  
FC

**EXPLANATION**

- B-101**  Geotechnical Boring Location
- I-102**  Infiltration Testing Locations
- B-5**  Ninyo & Moore Boring Location  
06/2015



**FIGURE 2**



1360 Valley Vista Drive, Diamond Bar, CA 91765  
TEL 909.860.7777 FAX 909.860.8017

BARNES PARK - BALDWIN PARK, CA

**SITE LAYOUT AND BORING  
LOCATION MAP**

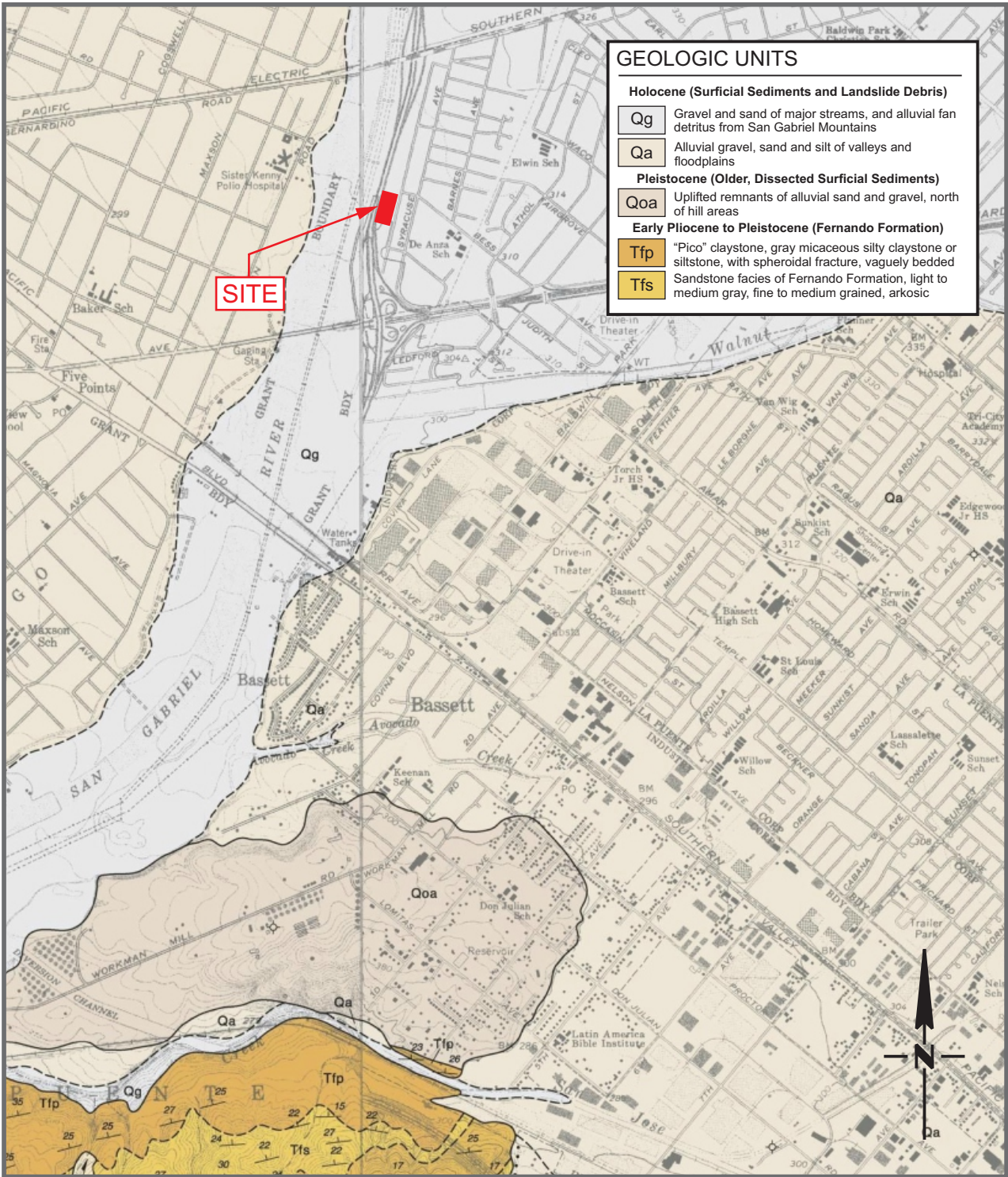
**JOB NO.**  
TET 17-136E

**DATE**  
DEC 2017

**DRAWN BY**  
SCM

**CHECKED BY**  
FC

**PORTION OF THE  
GEOLOGIC MAP OF THE EL MONTE & BALDWIN PARK QUADRANGLES, LOS ANGELES COUNTY, CALIFORNIA  
By THOMAS W. DIBBLEE, JR., 1999**



**GEOLOGIC UNITS**

**Holocene (Surficial Sediments and Landslide Debris)**

- Qg** Gravel and sand of major streams, and alluvial fan detritus from San Gabriel Mountains
- Qa** Alluvial gravel, sand and silt of valleys and floodplains

**Pleistocene (Older, Dissected Surficial Sediments)**

- Qoa** Uplifted remnants of alluvial sand and gravel, north of hill areas

**Early Pliocene to Pleistocene (Fernando Formation)**

- Tfp** "Pico" claystone, gray micaceous silty claystone or siltstone, with spheroidal fracture, vaguely bedded
- Tfs** Sandstone facies of Fernando Formation, light to medium gray, fine to medium grained, arkosic

**FIGURE 3**

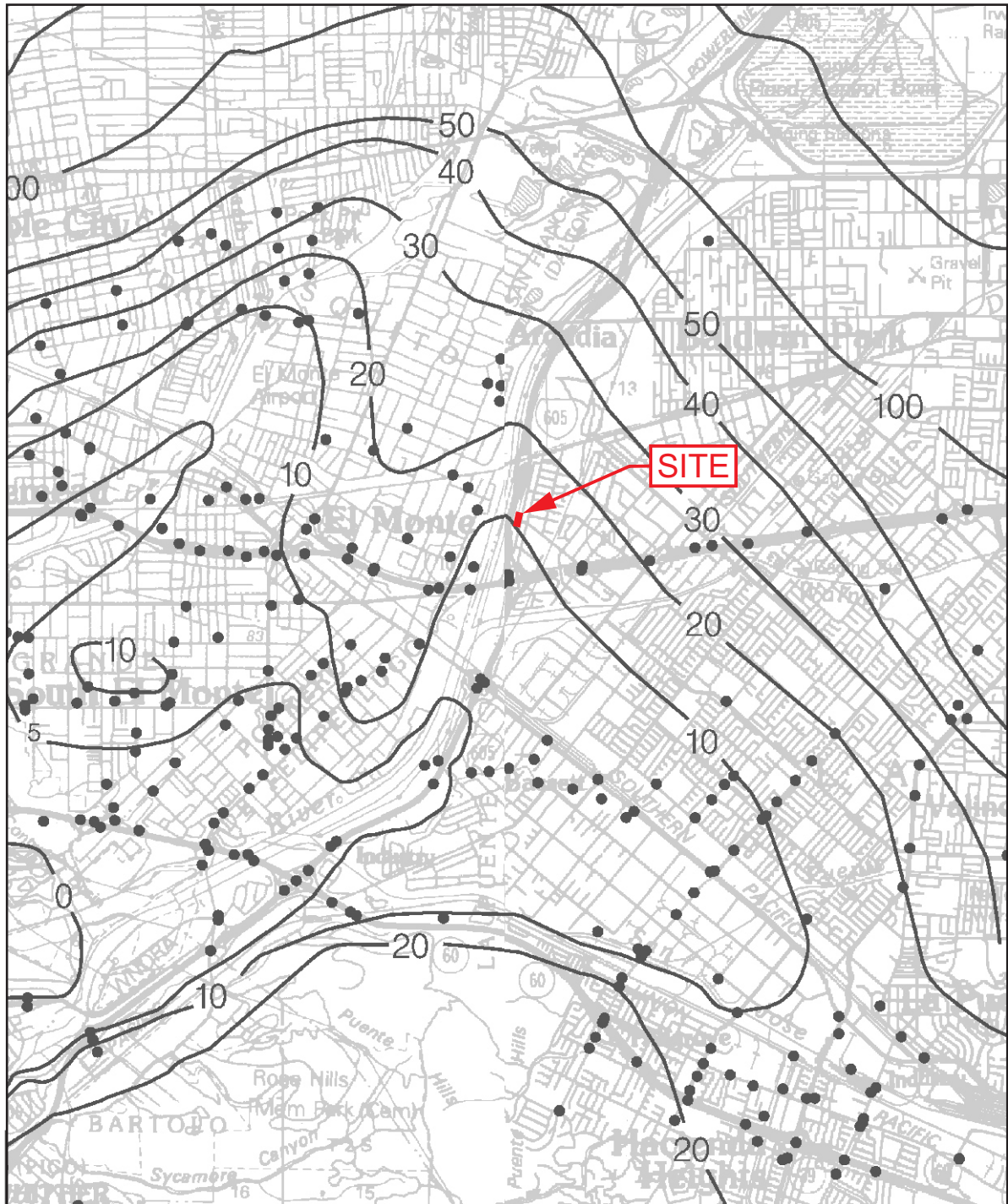
**Tt** **TETRA TECH BAS**  
GEOSCIENCE

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BARNES PARK - BALDWIN PARK, CA

**GEOLOGIC MAP**

<b>JOB NO.</b>	TET 17-136E
<b>DATE</b>	DEC 2017
<b>DRAWN BY</b>	SCM
<b>CHECKED BY</b>	FC



Base map enlarged from U.S.G.S. 30 x 60-m nule series

Plate 1.2 Historically Highest Ground Water Contours and Borehole Log Data Locations, Baldwin Park & El Monte Quadrangles

● Borehole Site      — 30 — Depth to ground water n feet

ONE MILE  
SCALE

FIGURE 4



1360 Valley Vista Drive, Diamond Bar, CA 91765  
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BARNES PARK - BALDWIN PARK, CA

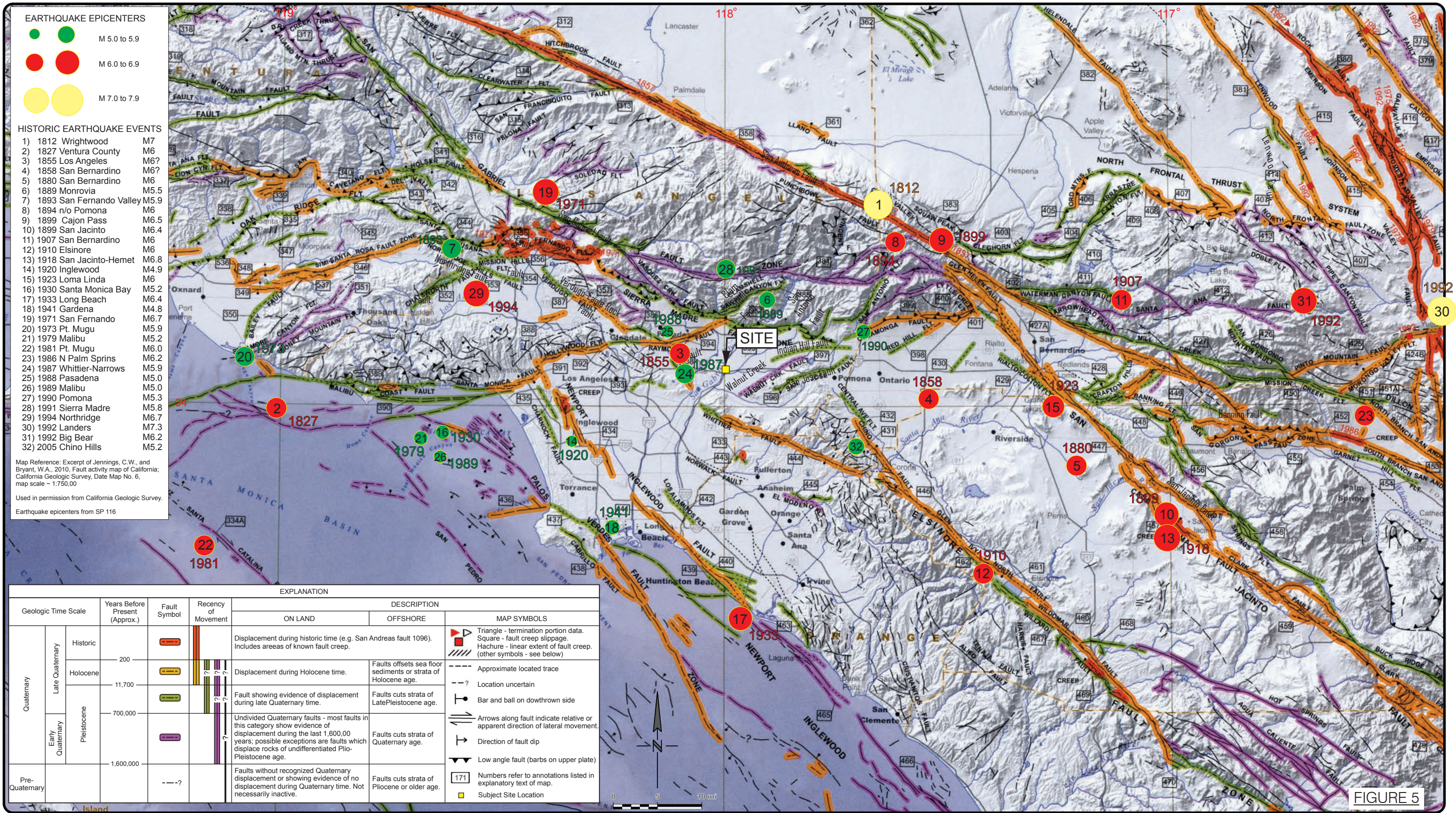
HISTORIC HIGH GROUNDWATER MAP

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TET 17-136E

DATE  
DEC 2017

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SCM

CHECKED BY  
FC



- EARTHQUAKE EPICENTERS**
- M 5.0 to 5.9
  - M 6.0 to 6.9
  - M 7.0 to 7.9

- HISTORIC EARTHQUAKE EVENTS**
- |                             |      |
|-----------------------------|------|
| 1) 1812 Wrightwood          | M7   |
| 2) 1827 Ventura County      | M6   |
| 3) 1855 Los Angeles         | M6?  |
| 4) 1858 San Bernardino      | M6?  |
| 5) 1880 San Bernardino      | M6   |
| 6) 1889 Monrovia            | M5.5 |
| 7) 1893 San Fernando Valley | M5.9 |
| 8) 1894 n/o Pomona          | M6   |
| 9) 1899 Cajon Pass          | M6.5 |
| 10) 1899 San Jacinto        | M6.4 |
| 11) 1907 San Bernardino     | M6   |
| 12) 1910 Elsinore           | M6   |
| 13) 1918 San Jacinto-Hemet  | M6.8 |
| 14) 1920 Inglewood          | M4.9 |
| 15) 1923 Loma Linda         | M6   |
| 16) 1930 Santa Monica Bay   | M5.2 |
| 17) 1933 Long Beach         | M6.4 |
| 18) 1941 Gardena            | M4.8 |
| 19) 1971 San Fernando       | M6.7 |
| 20) 1973 Pt. Mugu           | M5.9 |
| 21) 1979 Malibu             | M5.2 |
| 22) 1981 Pt. Mugu           | M6.0 |
| 23) 1986 N Palm Sprins      | M6.2 |
| 24) 1987 Whittier-Narrows   | M5.9 |
| 25) 1988 Pasadena           | M5.0 |
| 26) 1989 Malibu             | M5.0 |
| 27) 1990 Pomona             | M5.3 |
| 28) 1991 Sierra Madre       | M5.8 |
| 29) 1994 Northridge         | M6.7 |
| 30) 1992 Landers            | M7.3 |
| 31) 1992 Big Bear           | M6.2 |
| 32) 2005 Chino Hills        | M5.2 |

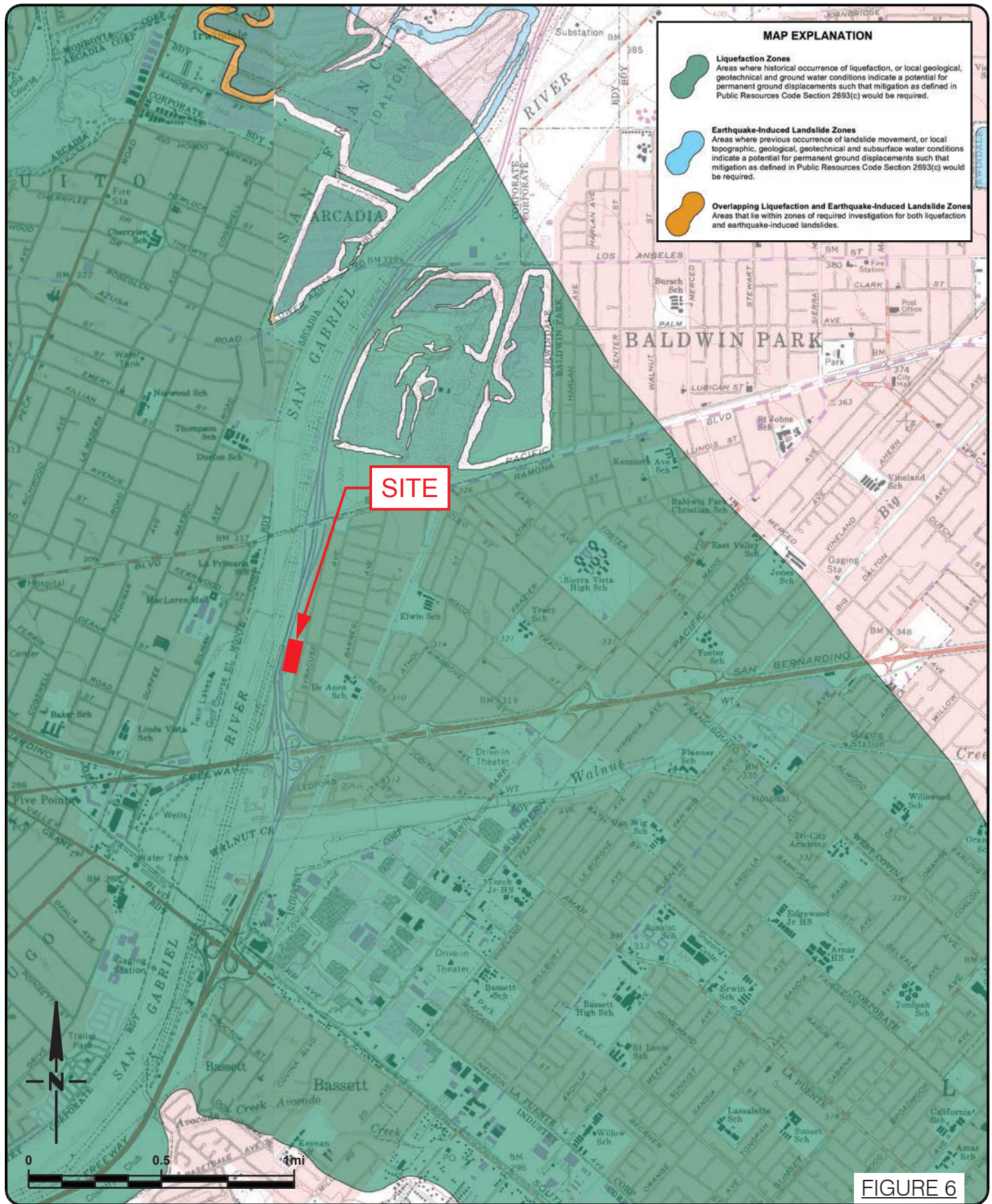
Map Reference: Excerpt of Jennings, C.W., and Bryant, W.A., 2010, Fault activity map of California, California Geologic Survey, Date Map No. 6, map scale ~ 1:750,000


Used in permission from California Geologic Survey.

Earthquake epicenters from SP 116

Geologic Time Scale			Years Before Present (Approx.)	Fault Symbol	Recency of Movement	DESCRIPTION	MAP SYMBOLS
		ON LAND	OFFSHORE				
Quaternary	Late Quaternary	Historic	200			Displacement during historic time (e.g. San Andreas fault 1096). Includes areas of known fault creep.	<ul style="list-style-type: none"> <li> Triangle - termination portion data.</li> <li> Square - fault creep slippage.</li> <li> Hachure - linear extent of fault creep. (other symbols - see below)</li> </ul>
		Holocene	11,700			Displacement during Holocene time. Faults offsets sea floor sediments or strata of Holocene age.	<ul style="list-style-type: none"> <li> Approximate located trace</li> <li> Location uncertain</li> </ul>
	Early Quaternary	Pleistocene	700,000			Fault showing evidence of displacement during late Quaternary time. Faults cuts strata of LatePleistocene age.	<ul style="list-style-type: none"> <li> Bar and ball on downthrown side</li> <li> Arrows along fault indicate relative or apparent direction of lateral movement.</li> <li> Direction of fault dip</li> <li> Low angle fault (barbs on upper plate)</li> </ul>
Pre-Quaternary			1,600,000			Undivided Quaternary faults - most faults in this category show evidence of displacement during the last 1,600,000 years; possible exceptions are faults which displace rocks of undifferentiated Plio-Pleistocene age. Faults cuts strata of Quaternary age.	<ul style="list-style-type: none"> <li> Numbers refer to annotations listed in explanatory text of map.</li> <li> Subject Site Location</li> </ul>
						Faults without recognized Quaternary displacement or showing evidence of no displacement during Quaternary time. Not necessarily inactive. Faults cuts strata of Pliocene or older age.	

FIGURE 5



 <p><b>TETRA TECH BAS GEOSCIENCE</b></p> <p>1360 Valley Vista Drive, Diamond Bar, CA 91765 TEL 909.860.7777 FAX 909.860.8017</p>	BARNES PARK - BALDWIN PARK, CA		JOB NO. TET 17-136E
	<h2>SEISMIC HAZARD ZONES MAP</h2>		DATE DEC 2017
			DRAWN BY SCM
			CHECKED BY FC

## **Appendix A**

### **Logs of Ninyo and Moore’s Exploratory Boring**

# BORING LOG EXPLANATION SHEET

DEPTH (feet)	Bulk Samples Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	
0	■						Bulk sample.
	■						Modified split-barrel drive sampler.
	▲						2-inch inner diameter split-barrel drive sampler.
	X						No recovery with modified split-barrel drive sampler, or 2-inch inner diameter split-barrel drive sampler.
	■						Sample retained by others.
5	▲						Standard Penetration Test (SPT).
	X						No recovery with a SPT.
	X	XX/XX					Shelby tube sample. Distance pushed in inches/length of sample recovered in inches.
	X						No recovery with Shelby tube sampler.
	X						Continuous Push Sample.
10	○		○				Seepage.
	▲						Groundwater encountered during drilling.
	▲						Groundwater measured after drilling.
					■	SM	<u>MAJOR MATERIAL TYPE (SOIL):</u> Solid line denotes unit change.
					- - -	CL	Dashed line denotes material change.
15					/ / /		Attitudes: Strike/Dip b: Bedding c: Contact j: Joint f: Fracture F: Fault cs: Clay Seam s: Shear bss: Basal Slide Surface sf: Shear Fracture sz: Shear Zone sbs: Shear Bedding Surface
20							The total depth line is a solid line that is drawn at the bottom of the boring.



### BORING LOG

Explanation of Boring Log Symbols

PROJECT NO.	DATE	FIGURE
-------------	------	--------

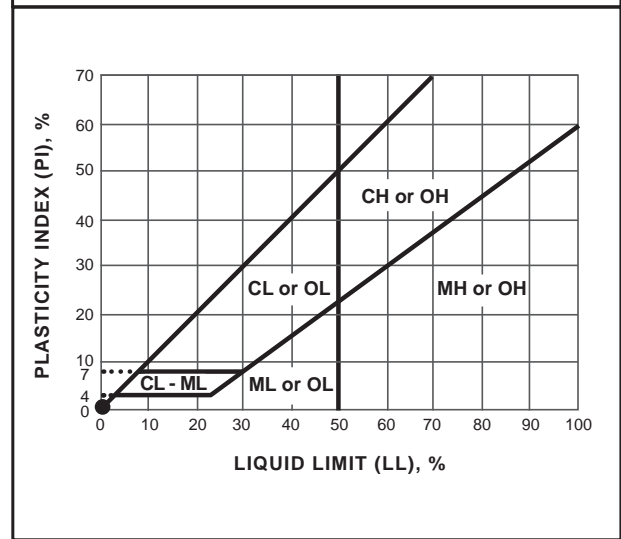
## SOIL CLASSIFICATION CHART PER ASTM D 2488

PRIMARY DIVISIONS		SECONDARY DIVISIONS			
		GROUP SYMBOL	GROUP NAME		
<b>COARSE-GRAINED SOILS</b> more than 50% retained on No. 200 sieve	<b>GRAVEL</b> more than 50% of coarse fraction retained on No. 4 sieve	CLEAN GRAVEL less than 5% fines		GW	well-graded GRAVEL
				GP	poorly graded GRAVEL
		GRAVEL with DUAL CLASSIFICATIONS 5% to 12% fines		GW-GM	well-graded GRAVEL with silt
				GP-GM	poorly graded GRAVEL with silt
				GW-GC	well-graded GRAVEL with clay
				GP-GC	poorly graded GRAVEL with clay
		GRAVEL with FINES more than 12% fines		GM	silty GRAVEL
				GC	clayey GRAVEL
				GC-GM	silty, clayey GRAVEL
	<b>SAND</b> 50% or more of coarse fraction passes No. 4 sieve	CLEAN SAND less than 5% fines		SW	well-graded SAND
				SP	poorly graded SAND
		SAND with DUAL CLASSIFICATIONS 5% to 12% fines		SW-SM	well-graded SAND with silt
				SP-SM	poorly graded SAND with silt
				SW-SC	well-graded SAND with clay
				SP-SC	poorly graded SAND with clay
		SAND with FINES more than 12% fines		SM	silty SAND
				SC	clayey SAND
				SC-SM	silty, clayey SAND
<b>FINE-GRAINED SOILS</b> 50% or more passes No. 200 sieve	<b>SILT and CLAY</b> liquid limit less than 50%	INORGANIC		CL	lean CLAY
				ML	SILT
				CL-ML	silty CLAY
		ORGANIC		OL (PI > 4)	organic CLAY
				OL (PI < 4)	organic SILT
	<b>SILT and CLAY</b> liquid limit 50% or more	INORGANIC		CH	fat CLAY
				MH	elastic SILT
		ORGANIC		OH (plots on or above "A"-line)	organic CLAY
				OH (plots below "A"-line)	organic SILT
		Highly Organic Soils			PT

## GRAIN SIZE

DESCRIPTION	SIEVE SIZE	GRAIN SIZE	APPROXIMATE SIZE
Boulders	> 12"	> 12"	Larger than basketball-sized
Cobbles	3 - 12"	3 - 12"	Fist-sized to basketball-sized
Gravel	Coarse	3/4 - 3"	Thumb-sized to fist-sized
	Fine	#4 - 3/4"	Pea-sized to thumb-sized
Sand	Coarse	#10 - #4	Rock-salt-sized to pea-sized
	Medium	#40 - #10	Sugar-sized to rock-salt-sized
	Fine	#200 - #40	Flour-sized to sugar-sized
Fines	Passing #200	< 0.0029"	Flour-sized and smaller

## PLASTICITY CHART



### APPARENT DENSITY - COARSE-GRAINED SOIL

APPARENT DENSITY	SPOOLING CABLE OR CATHEAD		AUTOMATIC TRIP HAMMER	
	SPT (blows/foot)	MODIFIED SPLIT BARREL (blows/foot)	SPT (blows/foot)	MODIFIED SPLIT BARREL (blows/foot)
Very Loose	≤ 4	≤ 8	≤ 3	≤ 5
Loose	5 - 10	9 - 21	4 - 7	6 - 14
Medium Dense	11 - 30	22 - 63	8 - 20	15 - 42
Dense	31 - 50	64 - 105	21 - 33	43 - 70
Very Dense	> 50	> 105	> 33	> 70

### CONSISTENCY - FINE-GRAINED SOIL

CONSISTENCY	SPOOLING CABLE OR CATHEAD		AUTOMATIC TRIP HAMMER	
	SPT (blows/foot)	MODIFIED SPLIT BARREL (blows/foot)	SPT (blows/foot)	MODIFIED SPLIT BARREL (blows/foot)
Very Soft	< 2	< 3	< 1	< 2
Soft	2 - 4	3 - 5	1 - 3	2 - 3
Firm	5 - 8	6 - 10	4 - 5	4 - 6
Stiff	9 - 15	11 - 20	6 - 10	7 - 13
Very Stiff	16 - 30	21 - 39	11 - 20	14 - 26
Hard	> 30	> 39	> 20	> 26

# Ninyo & Moore

## USCS METHOD OF SOIL CLASSIFICATION

Explanation of USCS Method of Soil Classification

PROJECT NO.

DATE

FIGURE

DEPTH (feet)	Bulk	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>3/18/15</u>	BORING NO. <u>B-5</u>	
	Driven						GROUND ELEVATION <u>300' ± (MSL)</u>	SHEET <u>1</u> OF <u>3</u>	
							METHOD OF DRILLING <u>8" Diameter Hollow-Stem Auger (CME 75) (Geoboden)</u>		
							DRIVE WEIGHT <u>140 lbs. (Auto-Trip Hammer)</u>	DROP <u>30"</u>	
							SAMPLED BY <u>CAT</u>	LOGGED BY <u>CAT</u>	REVIEWED BY <u>GTF</u>
<b>DESCRIPTION/INTERPRETATION</b>									

0					SM	<b>FILL:</b> Dark brown, moist, medium dense, silty fine to medium SAND; scattered grass and roots.
					SW-SM	<b>ALLUVIUM:</b> Light grayish brown, moist, medium dense, well graded SAND with silt; gravel up to 1/2-inch. Gravelly from approximately 4 to 9 feet.  Little cohesion.
	14	4.7				
10	44	2.6	117.9			Gravel up to 1-inch.
					SM	Light grayish brown, moist, loose to medium dense, silty SAND.
	7	16.0			ML	Brown, moist to wet, stiff, fine sandy SILT.
20	22	4.7			SW-SM	Light grayish brown, moist, medium dense, well graded SAND with silt; trace gravel up to 1-inch.
	28	4.2				Graded bedding- grades from silty fine sand to silty fine to coarse sand; fining upward.  @ 28': Gravel extending to 29 feet.
30	50	3.4				
	77/11"	3.8	117.6			Very dense; graded bedding-fining upward.
40						

DEPTH (feet)	SAMPLES	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED	BORING NO.	
							3/18/15	B-5	
							GROUND ELEVATION	SHEET	OF
							300' ± (MSL)	2	3
							METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (CME 75) (Geoboden)		
							DRIVE WEIGHT	DROP	
							140 lbs. (Auto-Trip Hammer)	30"	
							SAMPLED BY	LOGGED BY	REVIEWED BY
							CAT	CAT	GTF
							<b>DESCRIPTION/INTERPRETATION</b>		
40		40	5.7			SM	<b>ALLUVIUM:</b> (Continued) Light grayish brown, moist, very dense, silty fine to coarse SAND; scattered gravel up to 1 inch; graded bedding- fining upward.		
		73	2.5				Massive.		
50		47	2.9				Graded bedding- fining upward; scattered gravel up to 1/2-inch.		
						SP-SM	Light grayish brown, moist, very dense, poorly graded SAND with silt.		
60		62	2.7				Brown and grayish brown; medium dense.  @ 62': Gravel layer; difficult drilling.		
70		73	2.2				Gravel up to 1-inch; trace clay. Yellowish brown.  Gravelly; difficult drilling.		
80									



**BORING LOG**

BARNES PARK - UPPER SAN GABRIEL RIVER EWMP  
LOS ANGELES COUNTY, CALIFORNIA

PROJECT NO.  
107900001

DATE  
6/15

FIGURE  
A-2

DEPTH (feet)	Bulk Driven	SAMPLES	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED	BORING NO.				
								3/18/15	B-5				
								GROUND ELEVATION	300' ± (MSL)	SHEET	3	OF	3
								METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (CME 75) (Geoboden)				
								DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"		
								SAMPLED BY	CAT	LOGGED BY	CAT	REVIEWED BY	GTF
								<b>DESCRIPTION/INTERPRETATION</b>					
80			50/6"	2.8			SM	<u>ALLUVIUM:</u> (Continued) Brown and grayish brown, moist, very dense, silty fine to coarse SAND; scattered gravel up to 1-inch.					
90			72	3.2				Brown; gravel up to 1/2-inch.					
100			50/6"	12.6				Moist to wet; fine sandy SILT; some reddish brown mottling; micaceous. Total Depth = 100.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 3/18/15.					
								<u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.					
								The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.					
110													
120													



**BORING LOG**

BARNES PARK - UPPER SAN GABRIEL RIVER EWMP  
LOS ANGELES COUNTY, CALIFORNIA

PROJECT NO.	DATE	FIGURE
107900001	6/15	A-3

## **Appendix B**

### **Logs of Tetra Tech’s Exploratory Boring**

Project: **Upper San Gabriel EWMP - City of Industry**

Project Location: **Barnes Park, Baldwin Park, CA**

Project Number: **TET 17-136E**

**Log of Boring B-101/I-101 I-102**

**Sheet 1 of 2**

L:\02 - PROJECTS\2017 Projects\TET 17-136E (4552-0136) Upper San Gabriel EWMP - City of Industry\03 Field & Lab\2017-11-29 Barnes Park Drilling & Perc. Testing\Boring\_Log\_Rev\_2018-01-22.bgd\40-45 Well 1, with 2 lab and Percolation Well Log.tpl

Date(s) Drilled	<b>11/29/2017</b>	Logged By	<b>SCM</b>	Checked By	<b>FC</b>
Drilling Method	<b>Hollow stem auger</b>	Drill Bit Size/Type	<b>8-inch</b>	Total Depth of Borehole	<b>50.2 feet</b>
Drill Rig Type	<b>CME-75</b>	Drilling Contractor	<b>2R Drilling, Inc.</b>	Approximate Surface Elevation	<b>303 feet</b>
Groundwater Level and Date Measured	<b>Not Encountered</b>	Sampling Method(s)	<b>SPT, Rings</b>	Hammer Data	<b>CME Auto trip; 140 pounds with 30-inch drop</b>
Borehole Backfill	<b>Cement bentonite grout, tamped soil cuttings</b>		Location <b>Latitude: 34.069520° Longitude: -117.999550°</b>		

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/6 inches	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Percolation Well Log	REMARKS AND OTHER TESTS
303	0				SM	[FILL] Artificial fill (af)					Hand augered to 2.5 feet
	2.5		SPT-1	4-8-8	SW	Silty SAND, medium dense, olive brown (2.5Y 4/3), damp, fine grained					CORR
298	5		R-2	8-12-19		[NATIVE] Modern River Alluvia Sediments (Qw1)					3-inch diameter perforated PVC pipe
						Well-graded SAND with gravel, medium dense, light brownish gray (2.5Y 6/2), damp, medium grained, gravel up to 3" in diameter	1.9	112			Soil Cuttings
					GP	... coarse grained					8-inch diameter borehole
293	10		SPT-3	10-10-17		Poorly-graded GRAVEL with Sand, medium dense, medium grained, gravel up to 3" in diameter					G/S/F = 49/47/4%
			R-4	14-24-22		... dense	2.6	106			Gravel Pack
288	15		SPT-5	15-16-12	SP-SM	Poorly-graded SAND with Silt and Gravel, medium dense, medium grained, gravel up to 3 inches in diameter					DS
			R-6			... dense	18.2	99			I-102 & I-103
											G/S/F = 41/53/6%
283	20		SPT-7	20-43-27	SP	Poorly-graded SAND with Gravel, very dense, medium grained, gravel up to 3 inches in diameter					
			R-8			... 1 inch lean clay lens, olive brown (2.5Y 6/2)	2.7	115			
278	25		SPT-9	9-9-13		... medium dense					
											Swell/Collapse Test
273	30		R-10	12-50/5"		... very dense, 6 inch gravel lense	3.8	121			
											G/S/F =47/51/2%
268	35		SPT-11	20-27-21		... dense					
263	40				ML	SILT, hard, light olive gray (5Y 6/2), damp, micaceous,					

Project: **Upper San Gabriel EWMP - City of Industry**

Project Location: **Barnes Park, Baldwin Park, CA**

Project Number: **TET 17-136E**

Log of Boring B-101/I-101 I-102

Sheet 2 of 2

L:\02 - PROJECTS\2017 Projects\TET 17-136E (4552-0136) Upper San Gabriel EWMP - City of Industry\03 Field & Lab\2017-11-29 Barnes Park Drilling & Perc. Testing\Boring Log Rev 2018-01-22.bgg[40-45 Well 1 with 2 lab and Percolation Well Log.plt]

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/6 inches	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Percolation Well Log	REMARKS AND OTHER TESTS
263	40		R-12	12-15-50	ML SW		SILT, hard, light olive gray (5Y 6/2), damp, micaceous, variegated yellowish brown (10YR 6/4)				
258	45		SPT-13	12-21-24			Well-graded SAND with gravel, dense, light brownish gray (2.5Y 6/2), damp, medium grained, gravel up to 3 inches in diameter				
253	50		R-14	50/3"			... very dense - Bottom of boring at 50.2 feet below ground surface. - No groundwater encountered. - Boring backfilled with 1'-50.2' cement bentonite grout, 0'-1' tamped soil and grass plug.				R-14- refusal on cobble, no recovery
248	55										
243	60										
238	65										
233	70										
228	75										
223	80										
218	85										

Project: **Upper San Gabriel EWMP - City of Industry**

Project Location: **Barnes Park, Baldwin Park, CA**

Project Number: **TET 17-136E**

# Key to Log of Boring

Sheet 1 of 1

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/6 inches	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Percolation Well Log	REMARKS AND OTHER TESTS
1	2	3	4	5	6	7	8	9	10	11	12









### COLUMN DESCRIPTIONS

- 1** Elevation (feet): Elevation (MSL, feet).
- 2** Depth (feet): Depth in feet below the ground surface.
- 3** Sample Type: Type of soil sample collected at the depth interval shown.
- 4** Sample Number: Sample identification number.
- 5** Sampling Resistance, blows/6 inches: Number of blows to advance driven sampler one foot (or distance shown) beyond seating interval using the hammer identified on the boring log.
- 6** Material Type: Type of material encountered.
- 7** Graphic Log: Graphic depiction of the subsurface material encountered.
- 8** MATERIAL DESCRIPTION: Description of material encountered. May include consistency, moisture, color, and other descriptive text.
- 9** Water Content, %: Water content of the soil sample, expressed as percentage of dry weight of sample.
- 10** Dry Unit Weight, pcf: Dry weight per unit volume of soil sample measured in laboratory, in pounds per cubic foot.
- 11** Percolation Well Log: Graphical representation of well installed upon completion of drilling and sampling.
- 12** REMARKS AND OTHER TESTS: Comments and observations regarding drilling or sampling made by driller or field personnel.







### FIELD AND LABORATORY TEST ABBREVIATIONS

- CHEM: Chemical tests to assess corrosivity
- COMP: Compaction test
- CONS: One-dimensional consolidation test
- LL: Liquid Limit, percent
- PI: Plasticity Index, percent
- SA: Sieve analysis (percent passing No. 200 Sieve)
- UC: Unconfined compressive strength test, Qu, in ksf
- WA: Wash sieve (percent passing No. 200 Sieve)






### MATERIAL GRAPHIC SYMBOLS

-  Cuttings
-  Poorly graded GRAVEL (GP)
-  Gravel
-  SILT, SILT w/SAND, SANDY SILT (ML)
-  Silty SAND (SM)
-  Poorly graded SAND (SP)
-  Poorly graded SAND with Silt (SP-SM)
-  Well graded SAND (SW)

### TYPICAL SAMPLER GRAPHIC SYMBOLS

-  Auger sampler
-  Bulk Sample
-  2.5-inch-OD California w/ brass rings
-  CME Sampler
-  Grab Sample
-  3.0-inch-OD Modified California w/ brass liners

### OTHER GRAPHIC SYMBOLS

-  Water level (at time of drilling, ATD)
-  Water level (after waiting)
-  Minor change in material properties within a stratum
-  Inferred/gradational contact between strata
-  Queried contact between strata

### GENERAL NOTES

- 1: Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive, and actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
- 2: Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

L:\02 - PROJECTS\2017 Projects\TET 17-136E (4552-0136) Upper San Gabriel EWMP - City of Industry\03 Field & Lab\2017-11-29 Barnes Park Drilling & Perc. Testing\Boring Log Rev. 2018-01-22.bgd\40-45 Well 1 with 2 lab and Percolation Well Log.tpl

Figure B-1

## **Appendix C**

### **Tetra Tech Laboratory Testing**



# MOISTURE CONTENT AND DENSITY

ASTM D2937

<b>Job Name:</b>	Upper san Gabriel EWMP	<b>Date Sampled:</b>	11/29/2017
<b>Job Number:</b>	197-4552-0136	<b>Date Completed:</b>	12/20/2017
<b>Tested By:</b>	MG	<b>Note:</b>	Page 1 of 3

Boring / Test Pit / Trench		FB-101	FB-101	C-101	C-101	C-101	C-101	C-101	C-102	C-102
Sample Number		R-6	R-8	R-2	R-4	R-8	R-12	R-14	R-2	R-4
Sample Depth	<i>feet</i>	17.5-19	22.5-24	5-6.5	12.5-14	22.5-24	40-41.4	50-51.5	5-6.5	12.5-14
USCS Soil Description		Brown Native (ML)	Greenish Black Native (SP)	Brown Native (SW)	Yellowish Brown Native (SW-SM)	Yellowish Brown Native (SW-SM)	Brown Native (SM)	Brown Native (ML)	Brown Native (SM)	Brown Native (SP)
Number of Rings		6	6	6	5	6	6	6	6	6
Total Weight Rings + Soil	<i>grams</i>	1248.90	1218.70	1026.10	907.40	1132.00	1142.90	1186.70	1077.20	1026.80
* Volume of Rings	<i>ft<sup>3</sup></i>	0.0159	0.0159	0.0159	0.0133	0.0159	0.0159	0.0159	0.0159	0.0159
* Weight of Rings	<i>grams</i>	277.80	277.80	277.80	231.50	277.80	277.80	277.80	277.80	277.80
* Weight of Soil	<i>grams</i>	971.10	940.90	748.30	675.90	854.20	865.10	908.90	799.40	749.00
* Wet Density	<i>pcf</i>	134.27	130.09	103.46	112.15	118.11	119.61	125.67	110.53	103.56
Container ID		PZ1	Z5	P4	VB-4	P88	P#2	Z18	Z9	Z24
Tare	<i>grams</i>	90	4	92.3	148.7	9.3	84	4	4	4
Wet Soil + Tare	<i>grams</i>	400.7	317.3	481.7	739.5	289.7	482.3	301	252.1	270
Dry Soil + Tare	<i>grams</i>	369.8	310.5	446.9	706.2	270.2	431.6	245.5	231.8	251.2
* Weight of Water	<i>grams</i>	30.9	6.8	34.8	33.3	19.5	50.7	55.5	20.3	18.8

<b>* Dry Density</b>	<i>pcf</i>	<b>120.9</b>	<b>127.3</b>	<b>94.2</b>	<b>105.8</b>	<b>109.9</b>	<b>104.4</b>	<b>102.2</b>	<b>101.5</b>	<b>96.2</b>
<b>* Moisture Content</b>	<i>%</i>	<b>11.0</b>	<b>2.2</b>	<b>9.8</b>	<b>6.0</b>	<b>7.5</b>	<b>14.6</b>	<b>23.0</b>	<b>8.9</b>	<b>7.6</b>

## MOISTURE CONTENT AND DENSITY

ASTM D2937

<b>Job Name:</b>	Upper san Gabriel EWMP	<b>Date Sampled:</b>	11/29/2017
<b>Job Number:</b>	197-4552-0136	<b>Date Completed:</b>	12/20/2017
<b>Tested By:</b>	MG	<b>Note:</b>	Page 2 of 3

Boring / Test Pit / Trench		C-102	B-101	B-101	B-101	LP-101	LP-101	LP-101	LPI-102	LPI-102
<b>Sample Number</b>		R-8	R-2	R-8	R-10	R-2	R-06	R-08	G-01	G-02
<b>Sample Depth</b>	<i>feet</i>	22.5-24	5-6.5	22.5-24	30-31.5	5-6.5	20-21.5	30-31.5	1.3	0-0.3
<b>USCS Soil Description</b>		Brown Native (SW)	Black & White Native (SW-SM)	Black & White Native (SW-SM)	Yellowish Brown Native (SW-SM)	Yellowish Brown Native (CL)	Yellowish Brown Native (CL)	Yellowish Brown Native (SC)	Brown Native (SM)	Brown Native (SP)
Number of Rings		6	6	6	6	6	6	6		
Total Weight Rings + Soil	<i>grams</i>	1172.50	1102.10	1135.00	1185.70	1259.00	1185.90	1256.60		
* Volume of Rings	<i>ft<sup>3</sup></i>	0.0159	0.0159	0.0159	0.0159	0.0159	0.0159	0.0159		
* Weight of Rings	<i>grams</i>	277.80	277.80	277.80	277.80	277.80	277.80	277.80		
* Weight of Soil	<i>grams</i>	894.70	824.30	857.20	907.90	981.20	908.10	978.80		
* Wet Density	<i>pcf</i>	123.71	113.97	118.52	125.53	135.67	125.56	135.34		
Container ID		Z31	Z38	Z1	Z7	A2	Z15	Z37	Z39	Z36
Tare	<i>grams</i>	4	4	4	4	147.1	4	4	4	4
Wet Soil + Tare	<i>grams</i>	279.9	273.4	300.1	263.3	554.9	297.4	337.4	298	398.3
Dry Soil + Tare	<i>grams</i>	267.1	268.3	292.2	253.7	496.3	241.7	292.7	261.4	344.7
* Weight of Water	<i>grams</i>	12.8	5.1	7.9	9.6	58.6	55.7	44.7	36.6	53.6

<b>* Dry Density</b>	<i>pcf</i>	<b>118.0</b>	<b>111.8</b>	<b>115.4</b>	<b>120.9</b>	<b>116.2</b>	<b>101.7</b>	<b>117.2</b>		
<b>* Moisture Content</b>	<i>%</i>	<b>4.9</b>	<b>1.9</b>	<b>2.7</b>	<b>3.8</b>	<b>16.8</b>	<b>23.4</b>	<b>15.5</b>	<b>14.2</b>	<b>15.7</b>



# MOISTURE CONTENT AND DENSITY

ASTM D2937

**Job Name:** Upper san Gabriel EWMP  
**Job Number:** 197-4552-0136  
**Tested By:** MG

**Date Sampled:** 11/29/2017  
**Date Completed:** 12/20/2017  
**Note:** Page 3 of 3

Boring / Test Pit / Trench		LPI-102	LPI-102	LPI-103	LPI-103	LPI-103	LPI-103			
Sample Number		G-03	G-04	G-01	G-02	G-03	G-04			
Sample Depth	feet	0.3-0.7	0.7-1.1	1.3	0-0.3	0.3-0.7	0.7-1.1			
USCS Soil Description		Brown Native (SC)	Brown Native (SC)	Olive Brown Native (CL)	Red Gray (CL)	Olive Brown (CL)	Olive Brown (CL)			
Number of Rings										
Total Weight Rings + Soil	grams									
* Volume of Rings	ft <sup>3</sup>									
* Weight of Rings	grams									
* Weight of Soil	grams									
* Wet Density	pcf									
Container ID		Z34	Z16	Z4	Z29	Z19	Z20			
Tare	grams	4	4	4	4	4	4			
Wet Soil + Tare	grams	300.2	282.4	226.1	270.9	290.2	282.2			
Dry Soil + Tare	grams	263.3	247.7	208	230.5	250.7	250.7			
* Weight of Water	grams	36.9	34.7	18.1	40.4	39.5	31.5			

* Dry Density	pcf									
* Moisture Content	%	14.2	14.2	8.9	17.8	16.0	12.8			



## MOISTURE CONTENT AND DRY DENSITY OF RING SAMPLES

### ASTM D2216 & ASTM D2937

**Client:** TETRA TECH  
**Project Name:** Uper San Gabriel EWMP - City of Industry  
**Project No.:** 197-4552-0136

**HAI Project No.:** TRT-17-017  
**Performed by:** KL  
**Checked by:** MJ/MZ  
**Date:** 12/7/2017

No.		1	2	3
<b>Boring No.</b>		<b>FB-101</b>	<b>B-101</b>	<b>LP-101</b>
<b>Sample No.</b>		<b>R-4</b>	<b>R-4</b>	<b>R-04</b>
<b>Depth (ft)</b>		<b>12.5-14</b>	<b>12.5-14</b>	<b>10-11.5</b>
Total wt of rings and soil	gr	403.10	355.75	625.12
Height of sample	in	2.00	2.01	3.00
Diameter of sample	in	2.416	2.416	2.416
Volume of sample	cu.ft	0.0053	0.0053	0.0080
Weight of rings	gr	92.60	93.28	138.90
Weight of soil	lbs.	0.68	0.58	1.07
Wet Density	pcf	129.01	108.62	134.68
Weight of cont.+ wet soil	gr	108.25	124.86	104.99
Weight of cont.+ dry soil	gr	100.40	121.98	88.59
Weight of container	gr	4.98	11.71	4.86
Weight of water	gr	7.85	2.88	16.40
Weight of dry soil	gr	95.42	110.27	83.73
<b>Moisture Content</b>	<b>%</b>	<b>8.2</b>	<b>2.6</b>	<b>19.6</b>
<b>Dry Density</b>	<b>pcf</b>	<b>119.2</b>	<b>105.9</b>	<b>112.6</b>



## PERCENT PASSING # 200 SIEVE

ASTM D1140

**Job Name:** Uper San Gabriel EWMP  
**Job Number:** 197-4552-0136  
**Address:**  
**Date Sampled:** November 29, 2017

**Tested By :** MG  
**Date Completed:** December 24, 2017

Boring Number	Sample Number	Depth (ft)	Weight Before Wash - Dry (grams)	Weight After Wash - Dry (grams)	Percent Passing # 200 Sieve	USCS Classification
C-101	R-6	17.5-19	279.9	183.1	35%	SM
C-101	SPT-9	25-26.5	502.6	169.2	66%	ML
C-101	R-12	40-41.5	374.4	333.6	11%	SP-SM
C-102	SPT-5	15-16.5	346	140.5	59%	CL
C-102	R-10	30-31.5	408.9	184	55%	CL
LP-101	R-02	5-6.5	349.3	117.9	66%	CL
LP-101	SPT-05	15-16.5	314.8	188.8	40%	SM
LP-101	SPT-07	25-26.5	360.2	326.5	9%	SP-SM



## PERCENT PASSING # 200 SIEVE

### ASTM D 1140

**Client:** TETRA TECH  
**Project Name:** Uper San Gabriel EWMP - City of Industry  
**Project No.:** 197-4552-0136

**HAI Project No.:** TRT-17-017  
**Performed by:** GA  
**Checked by:** KL/MJ  
**Date:** 12/7/2017

Boring No.	Sample No.	Depth	Soil Description	USCS	Wt of oven dry soil before wash + Wt of container gr	Wt of oven dry soil retained after #200 wash + Wt of container gr	Wt of Container gr	Wt of soil passing # 200 sieve gr	Initial wt of oven dry soil gr	Soil passing # 200 sieve %
C-101	R-6	17.5-19	Brown, Clayey Sand	SC	296.05	167.82	8.14	128.23	287.91	44.5

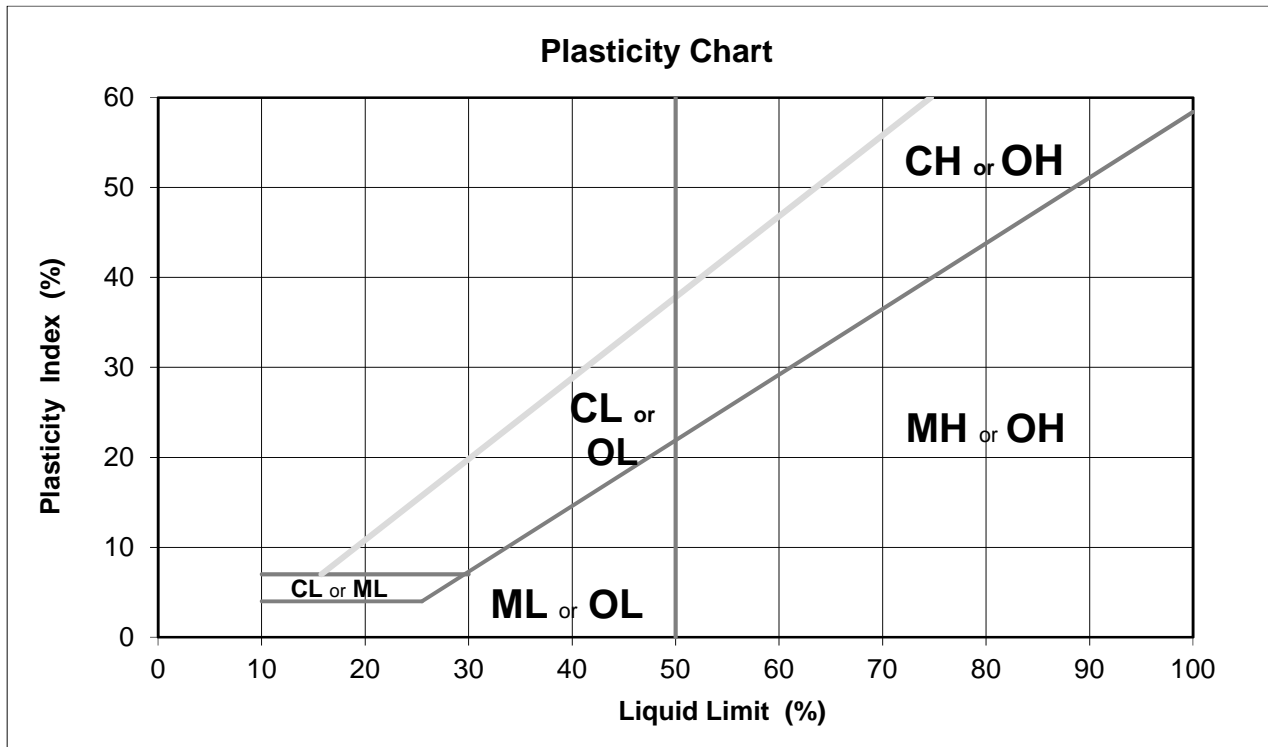
# ATTERBERG LIMITS

ASTM D4318

<b>Job Name:</b>	Uper San Gabriel EWMP	<b>Date Sampled:</b>	11/29/2017
<b>Job Number:</b>	197-4552-0136	<b>Date Completed:</b>	12/24/2017
<b>Tested By:</b>	MG	<b>Sample Identification:</b>	C-101, SPT-9
<b>Note:</b>		<b>Sample Depth:</b>	25-26.5 ft
<b>Sample Description:</b>	Brown Native (ML)		

Test No.		PLASTIC LIMIT	
		1	2
Number of Blows			
Container ID		NP	NP
Wet Weight of Soil + Cont.	grams		
Dry Weight of Soil + Cont.	grams		
Weight of Container	grams		
* Moisture Weight	grams		
* Weight of Dry Soil	grams		
* Moisture Content	%	NP	NP

LIQUID LIMIT			
1	2	3	4
NP	NP	NP	
NP	NP	NP	



**Plastic Limit**      NP

**Liquid Limit**

**Plasticity Index**

**USCS Classification**      ML

# ATTERBERG LIMITS

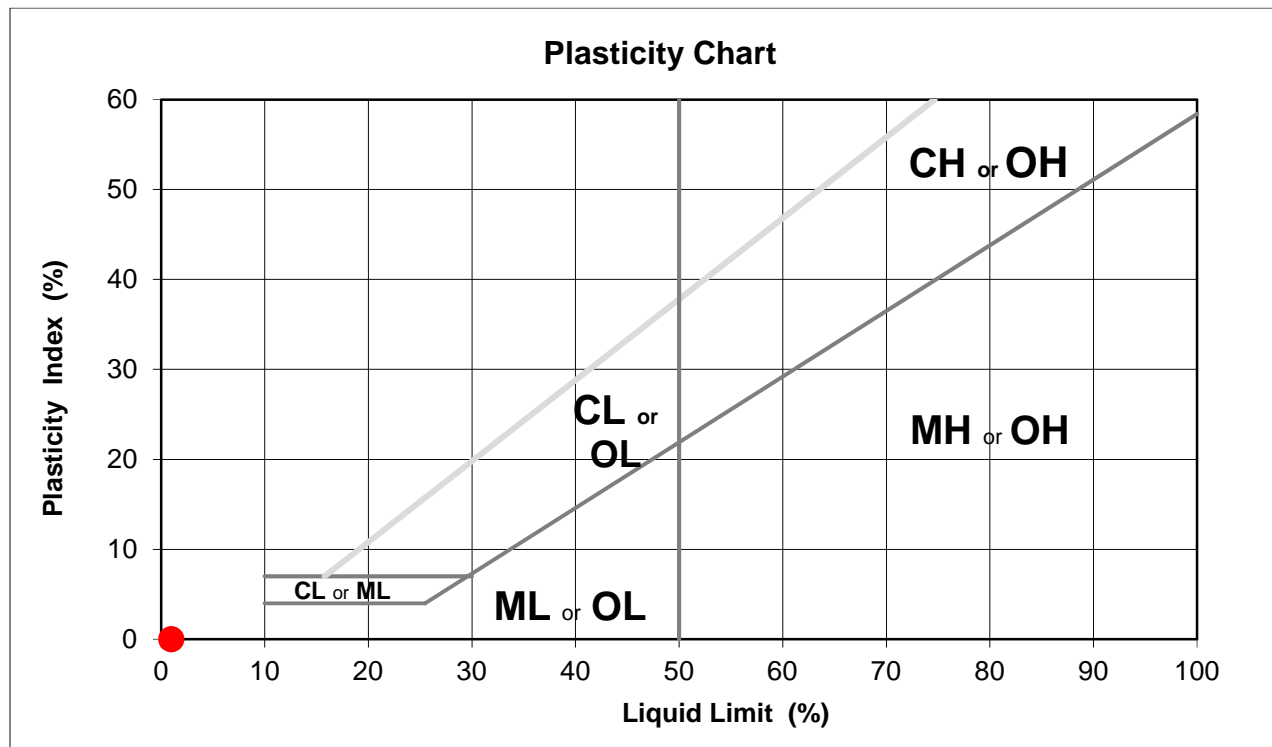
ASTM D4318

**Job Name:** Uper San Gabriel EWMP  
**Job Number:** 197-4552-0136  
**Tested By:** MG  
**Note:**  
**Sample Description:** Brown Native (ML)

**Date Sampled:** 11/29/2017  
**Date Completed:** 12/24/2017  
**Sample Identification:** C-101, SPT-11  
**Sample Depth:** 35-36.5 ft

Test No.		PLASTIC LIMIT	
		1	2
Number of Blows			
Container ID			
Wet Weight of Soil + Cont.	grams	NP	NP
Dry Weight of Soil + Cont.	grams		
Weight of Container	grams		
* Moisture Weight	grams	0.00	0.00
* Weight of Dry Soil	grams	0.00	0.00
* Moisture Content	%	NP	NP

LIQUID LIMIT			
1	2	3	4
NP	NP	NP	
0.00	0.00	0.00	
0.00	0.00	0.00	
NP	NP	NP	



**Plastic Limit** NP  
**Liquid Limit** NP  
**Plasticity Index** NP

**USCS Classification** ML

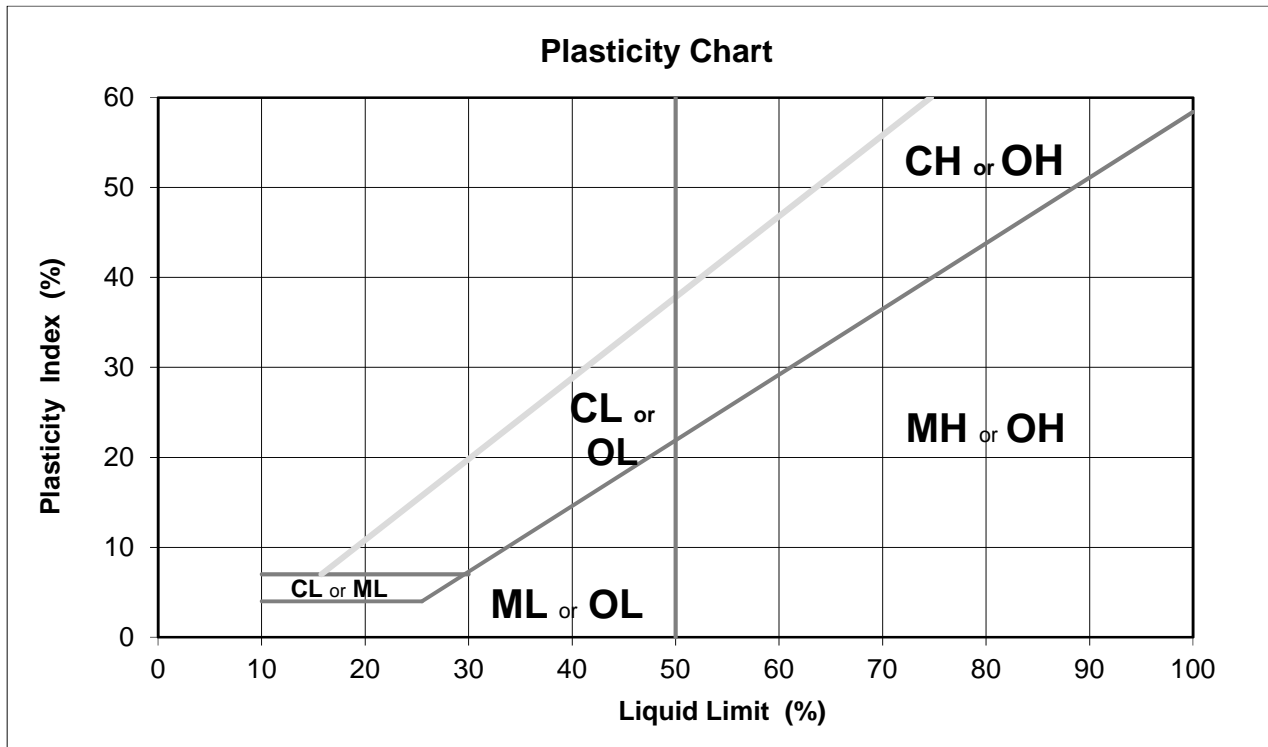
# ATTERBERG LIMITS

ASTM D4318

<b>Job Name:</b>	Uper San Gabriel EWMP	<b>Date Sampled:</b>	11/29/2017
<b>Job Number:</b>	197-4552-0136	<b>Date Completed:</b>	12/24/2017
<b>Tested By:</b>	MG	<b>Sample Identification:</b>	FB-101, R-6
<b>Note:</b>		<b>Sample Depth:</b>	17.5-19 ft
<b>Sample Description:</b>	Brown Native (ML)		

Test No.		PLASTIC LIMIT	
		1	2
Number of Blows			
Container ID		NP	NP
Wet Weight of Soil + Cont.	grams		
Dry Weight of Soil + Cont.	grams		
Weight of Container	grams		
* Moisture Weight	grams		
* Weight of Dry Soil	grams		
* Moisture Content	%	NP	NP

LIQUID LIMIT			
1	2	3	4
NP	NP	NP	
NP	NP	NP	



**Plastic Limit**      NP  
**Liquid Limit**  
**Plasticity Index**

**USCS Classification**      ML

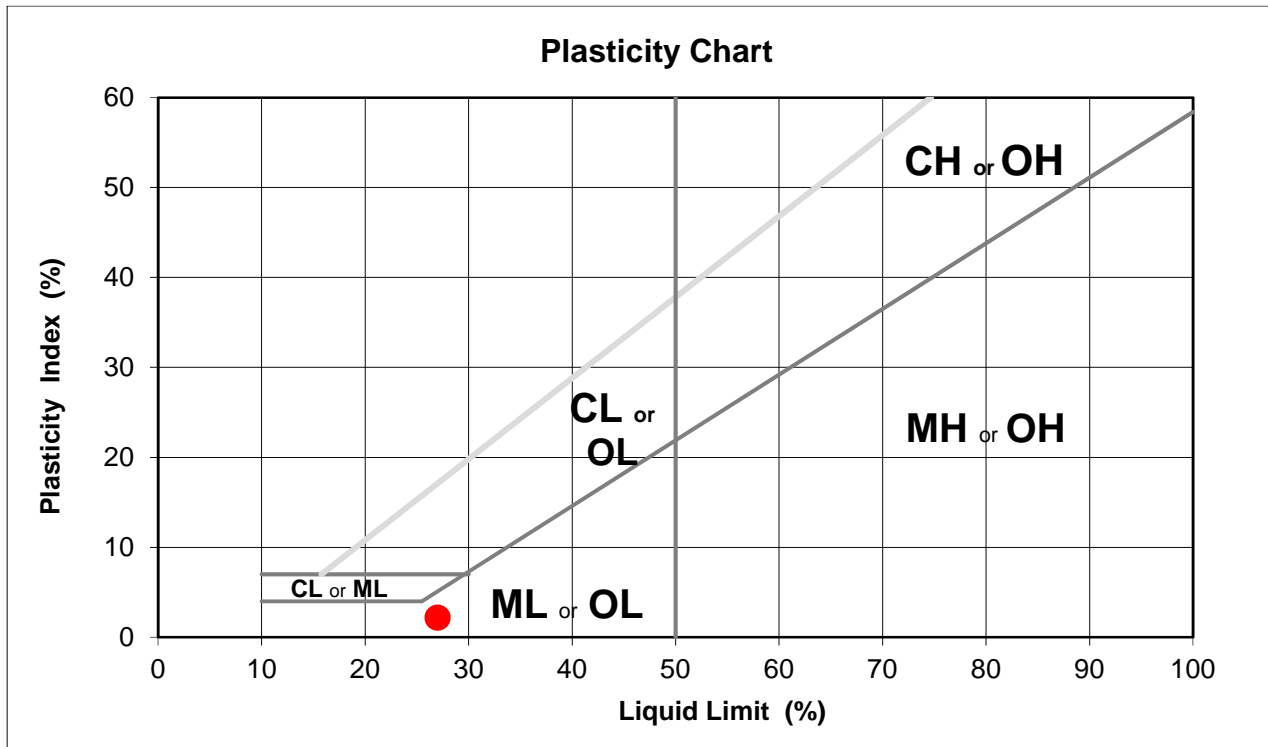
# ATTERBERG LIMITS

ASTM D4318

<b>Job Name:</b>	Uper San Gabriel EWMP	<b>Date Sampled:</b>	11/29/2017
<b>Job Number:</b>	197-4552-0136	<b>Date Completed:</b>	12/24/2017
<b>Tested By:</b>	MG	<b>Sample Identification:</b>	LP-101, R-02
<b>Note:</b>		<b>Sample Depth:</b>	5-6.5 ft
<b>Sample Description:</b>	Yellowish Brown Native (ML)		

Test No.		PLASTIC LIMIT	
		1	2
Number of Blows			
Container ID		P5	P11
Wet Weight of Soil + Cont.	grams	28.00	29.00
Dry Weight of Soil + Cont.	grams	24.90	25.70
Weight of Container	grams	12.40	12.40
* Moisture Weight	grams	3.10	3.30
* Weight of Dry Soil	grams	12.50	13.30
<b>* Moisture Content</b>	<b>%</b>	<b>24.8</b>	<b>24.8</b>

LIQUID LIMIT			
1	2	3	4
36	24	16	
T23	N10	M7	
49.90	49.60	53.90	
45.10	44.50	47.60	
26.00	25.60	26.00	
4.80	5.10	6.30	
19.10	18.90	21.60	
<b>25.1</b>	<b>27.0</b>	<b>29.2</b>	



<b>Plastic Limit</b>	<b>25</b>
<b>Liquid Limit</b>	<b>27</b>
<b>Plasticity Index</b>	<b>2</b>

**USCS Classification** **ML**

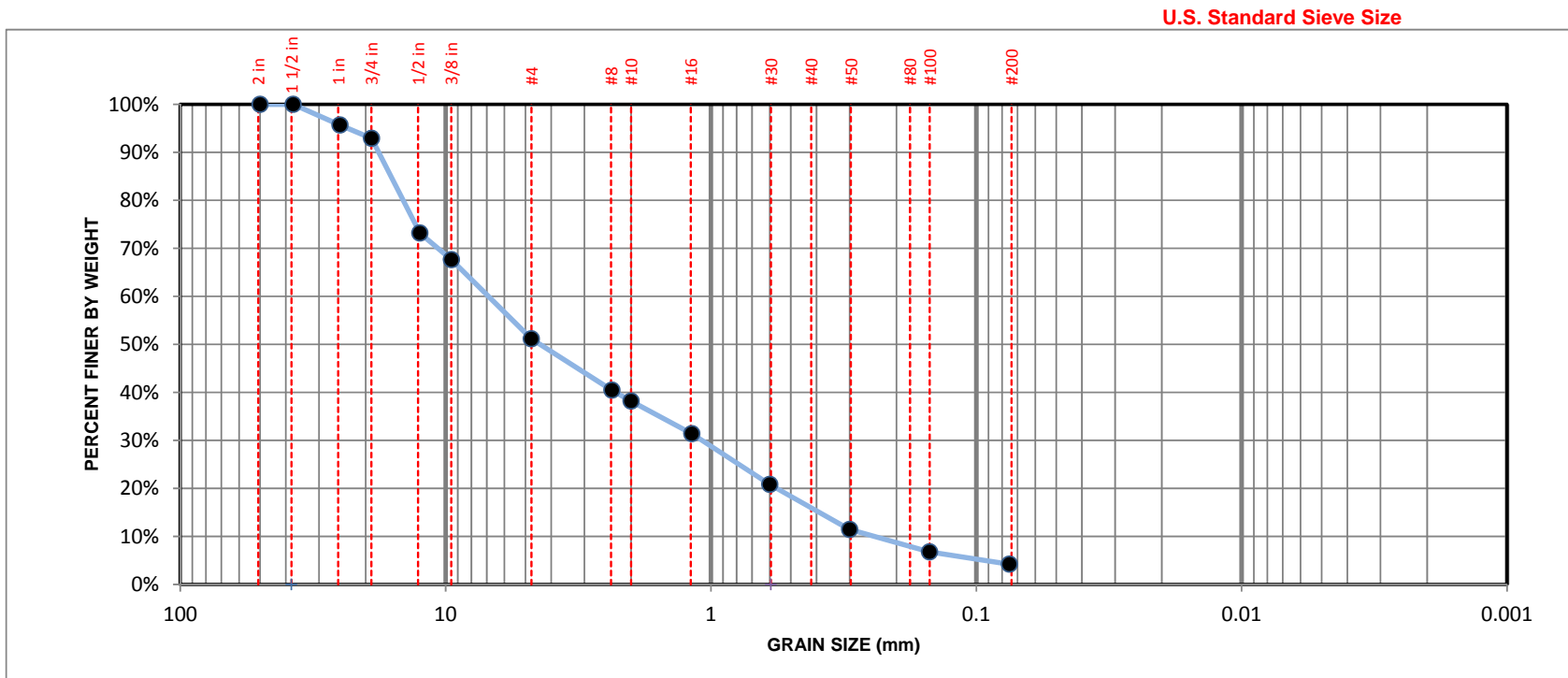


# GRAIN SIZE DISTRIBUTION ANALYSIS

ASTM C136/C117/D422

**Job Name:** Upper San Gabriel EWMP  
**Job Number:** 197-4552-0136  
**Address:**  
**Date Sampled:** November 29, 2017

**Tested By :** MG  
**Date Completed:** December 24, 2017  
**Sample Number:** B-101, SPT-3



Symbol	Boring No.	Sample #	Depth (feet)	LL	PI	USCS	Gravel	Sand	Fines	2 $\mu$
●	B-101	SPT-3	10'-11.5'	-	-	GP	49%	47%	4%	

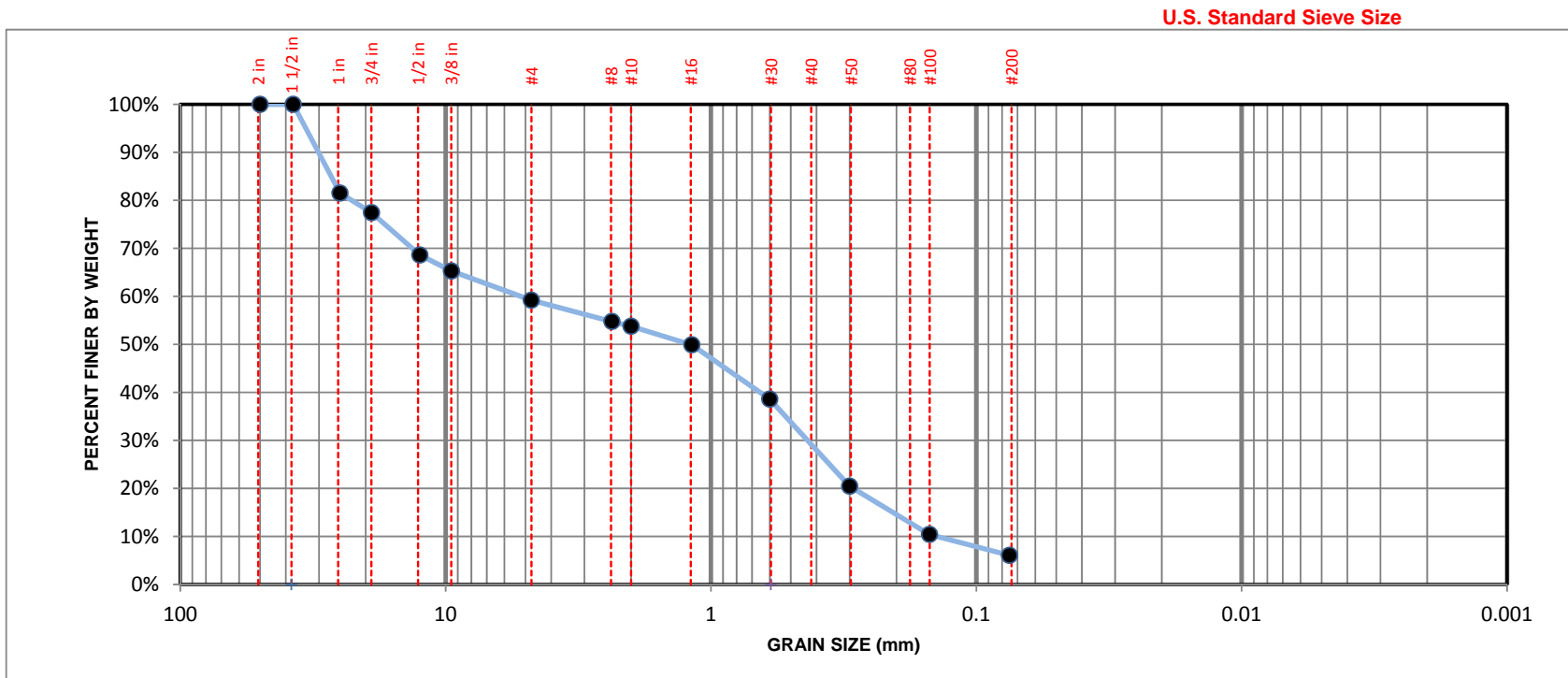


# GRAIN SIZE DISTRIBUTION ANALYSIS

ASTM C136/C117/D422

**Job Name:** Upper San Gabriel EWMP  
**Job Number:** 197-4552-0136  
**Address:**  
**Date Sampled:** November 29, 2017

**Tested By :** MG  
**Date Completed:** December 24, 2017  
**Sample Number:** B-101, SPT-5



Symbol	Boring No.	Sample #	Depth (feet)	LL	PI	USCS	Gravel	Sand	Fines	2 $\mu$
●	B-101	SPT-5	15'-16.5'	-	-	SP-SM	41%	53%	6%	

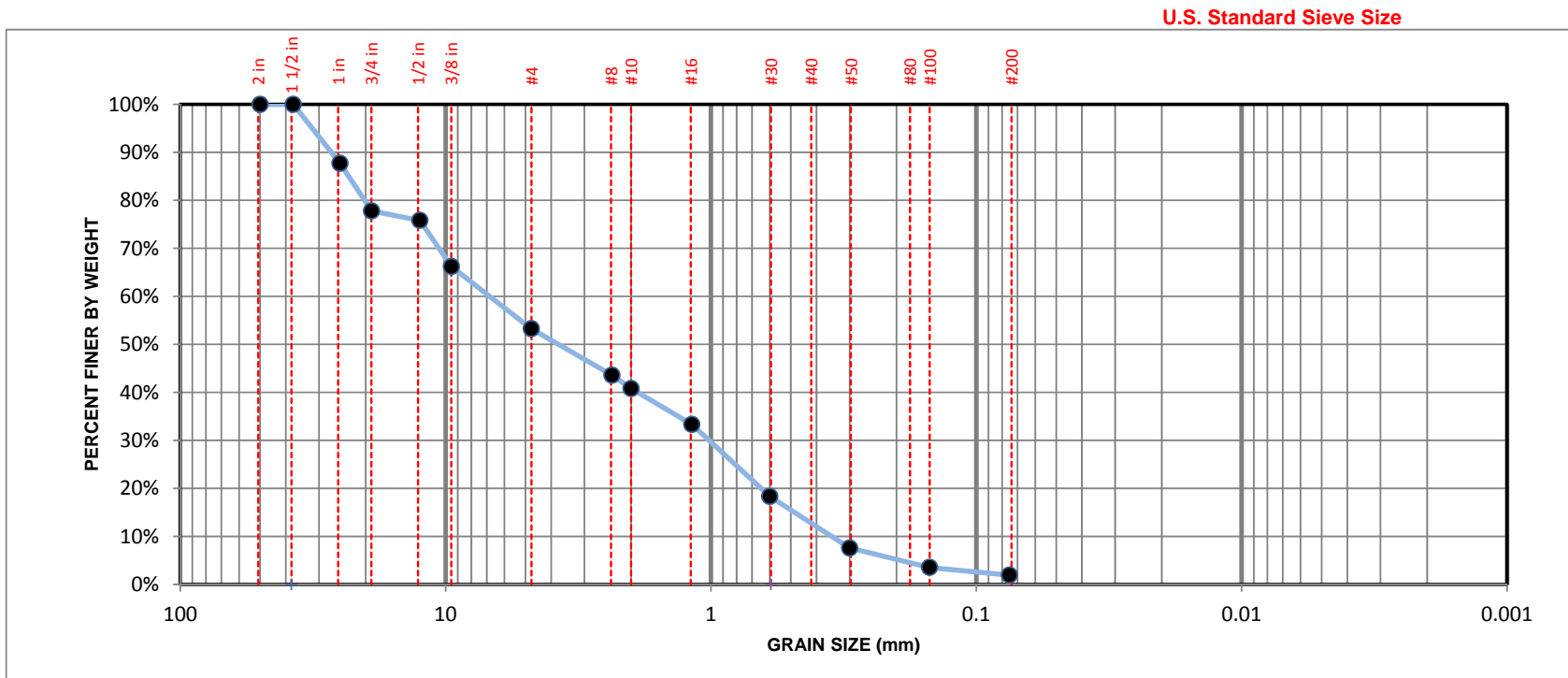


# GRAIN SIZE DISTRIBUTION ANALYSIS

ASTM C136/C117/D422

**Job Name:** Upper San Gabriel EWMP  
**Job Number:** 197-4552-0136  
**Address:**  
**Date Sampled:** November 29, 2017

**Tested By :** MG  
**Date Completed:** December 24, 2017  
**Sample Number:** B-101, R-8



Symbol	Boring No.	Sample #	Depth (feet)	LL	PI	USCS	Gravel	Sand	Fines	2 $\mu$
●	B-101	R-8	22.5'-24'	-	-	SP	47%	51%	2%	

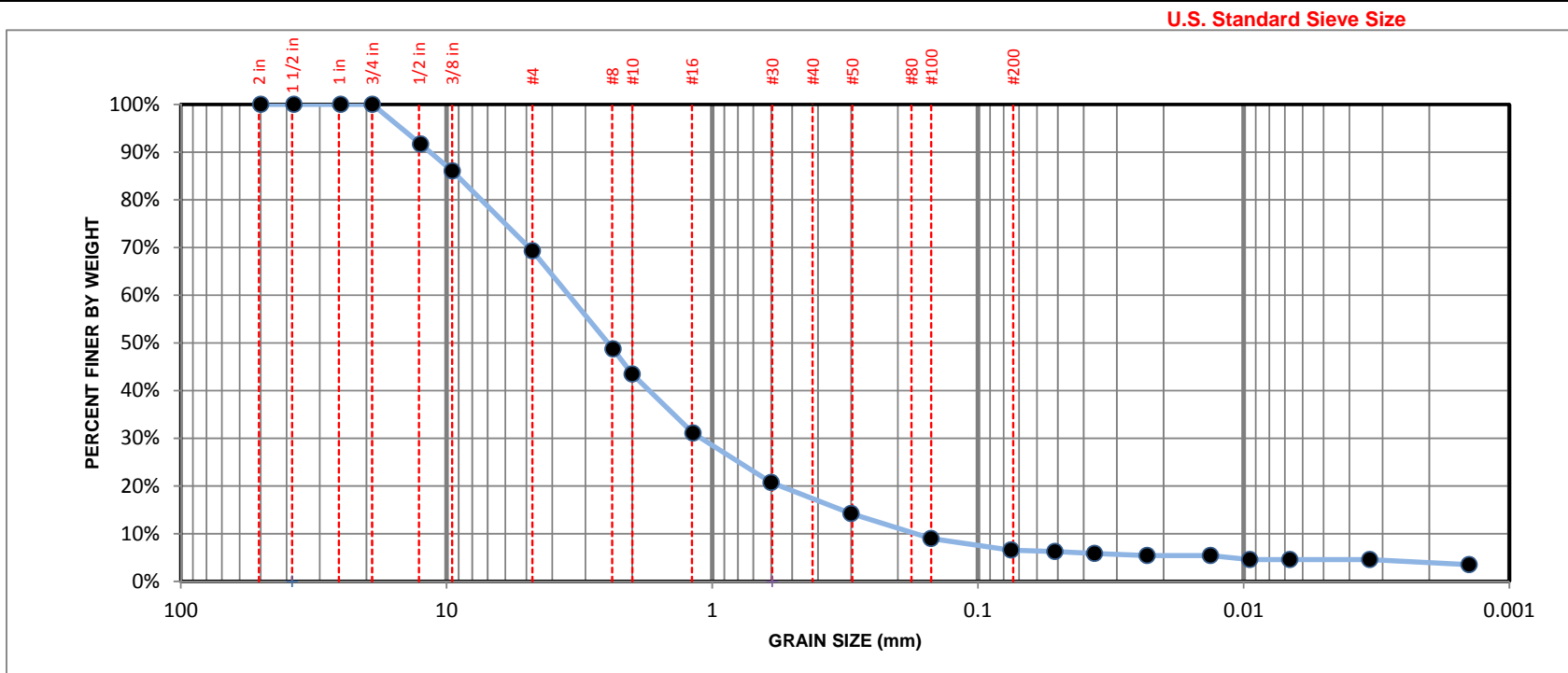


# GRAIN SIZE DISTRIBUTION ANALYSIS

ASTM C136/C117/D422

**Job Name:** Upper San Gabriel EWMP  
**Job Number:** 197-4552-0136  
**Address:**  
**Date Sampled:** November 29, 2017

**Tested By :** MG  
**Date Completed:** December 24, 2017  
**Sample Number:** C-101, R-4



Symbol	Boring No.	Sample #	Depth (feet)	LL	PI	USCS	Gravel	Sand	Fines	2 $\mu$
●	C-101	R-4	12.5'-14'	-	-	SW-SM	31%	63%	7%	4%

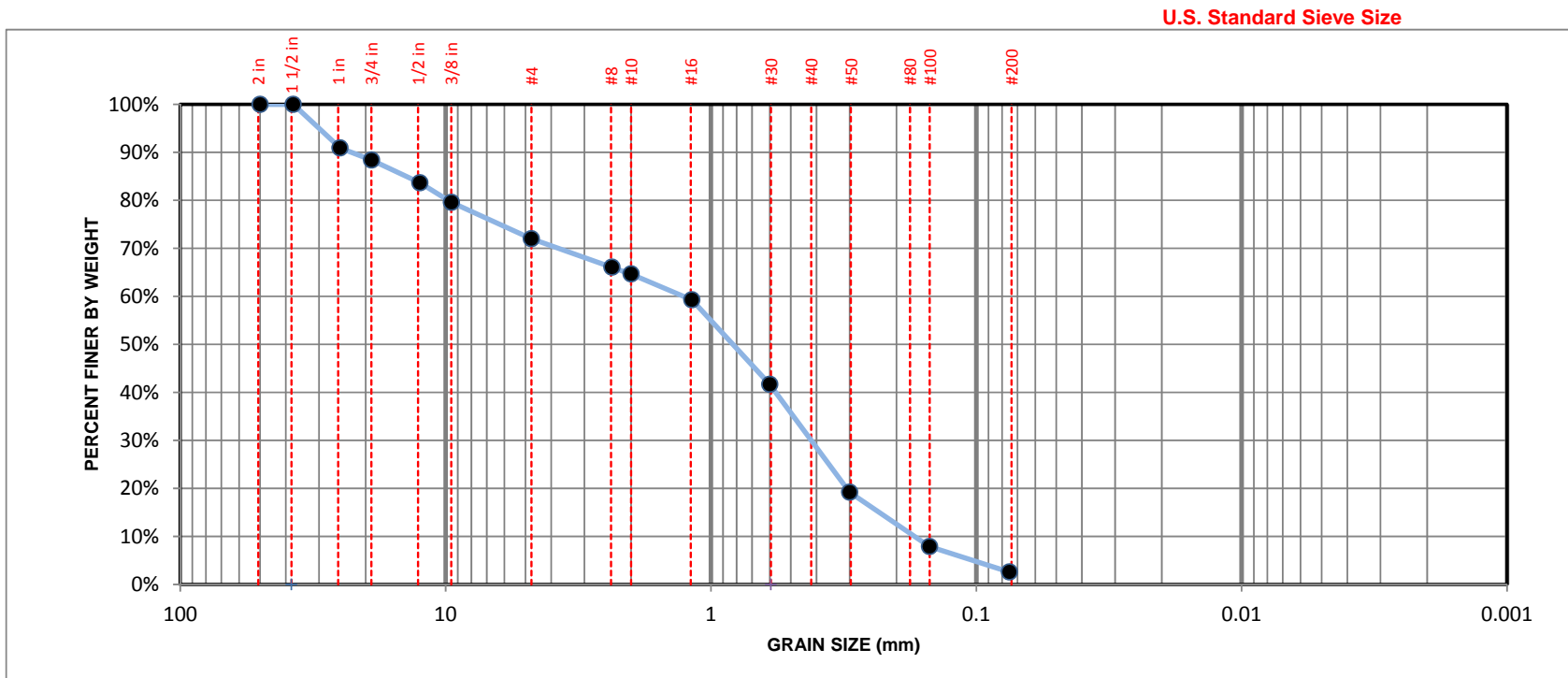


# GRAIN SIZE DISTRIBUTION ANALYSIS

ASTM C136/C117/D422

**Job Name:** Upper San Gabriel EWMP  
**Job Number:** 197-4552-0136  
**Address:**  
**Date Sampled:** November 29, 2017

**Tested By :** MG  
**Date Completed:** December 24, 2017  
**Sample Number:** C-101, SPT-7



Symbol	Boring No.	Sample #	Depth (feet)	LL	PI	USCS	Gravel	Sand	Fines	2 $\mu$
●	C-101	SPT-7	20'-21.5'	-	-	SP	28%	69%	3%	

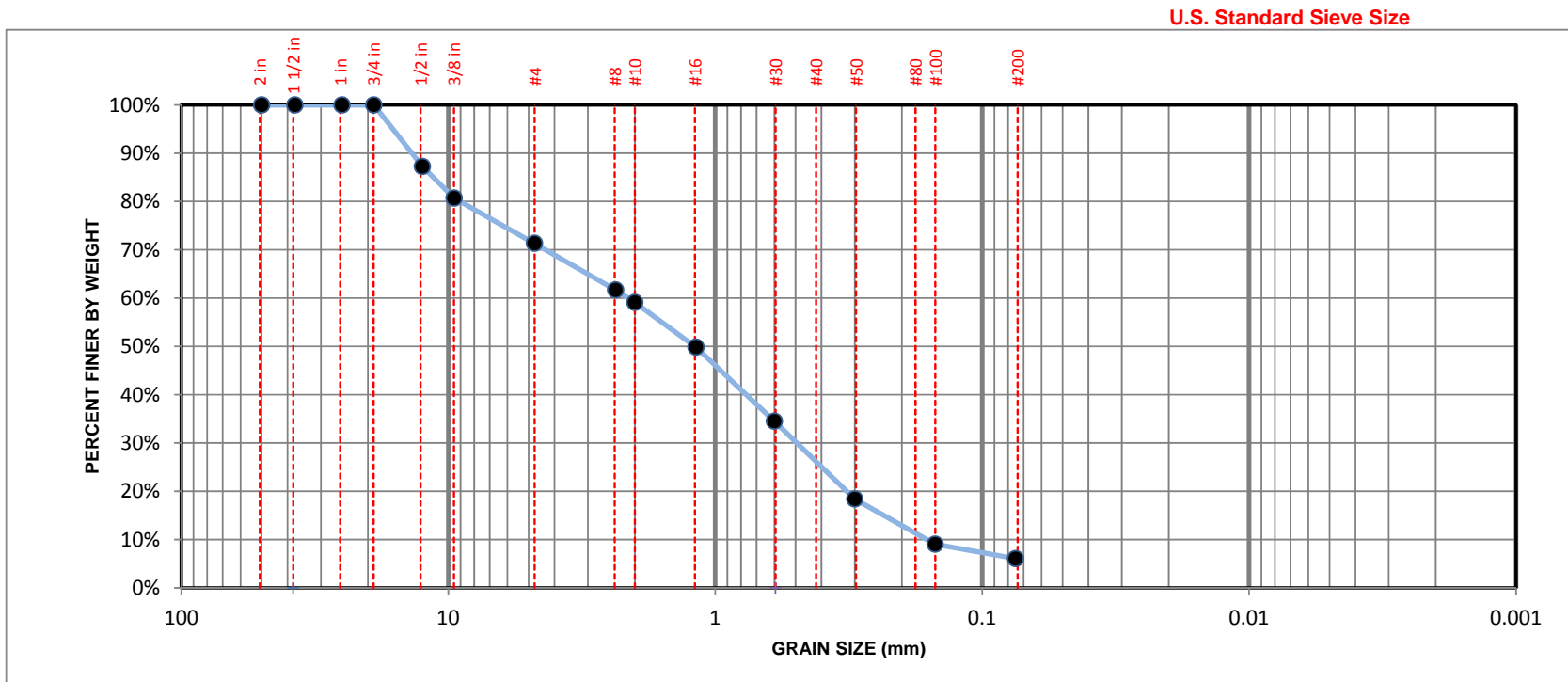


# GRAIN SIZE DISTRIBUTION ANALYSIS

ASTM C136/C117/D422

**Job Name:** Upper San Gabriel EWMP  
**Job Number:** 197-4552-0136  
**Address:**  
**Date Sampled:** November 29, 2017

**Tested By :** MG  
**Date Completed:** December 24, 2017  
**Sample Number:** C-101, R-8



Symbol	Boring No.	Sample #	Depth (feet)	LL	PI	USCS	Gravel	Sand	Fines	2 $\mu$
●	C-101	R-8	22.5'-24'	-	-	SP-SM	29%	65%	6%	

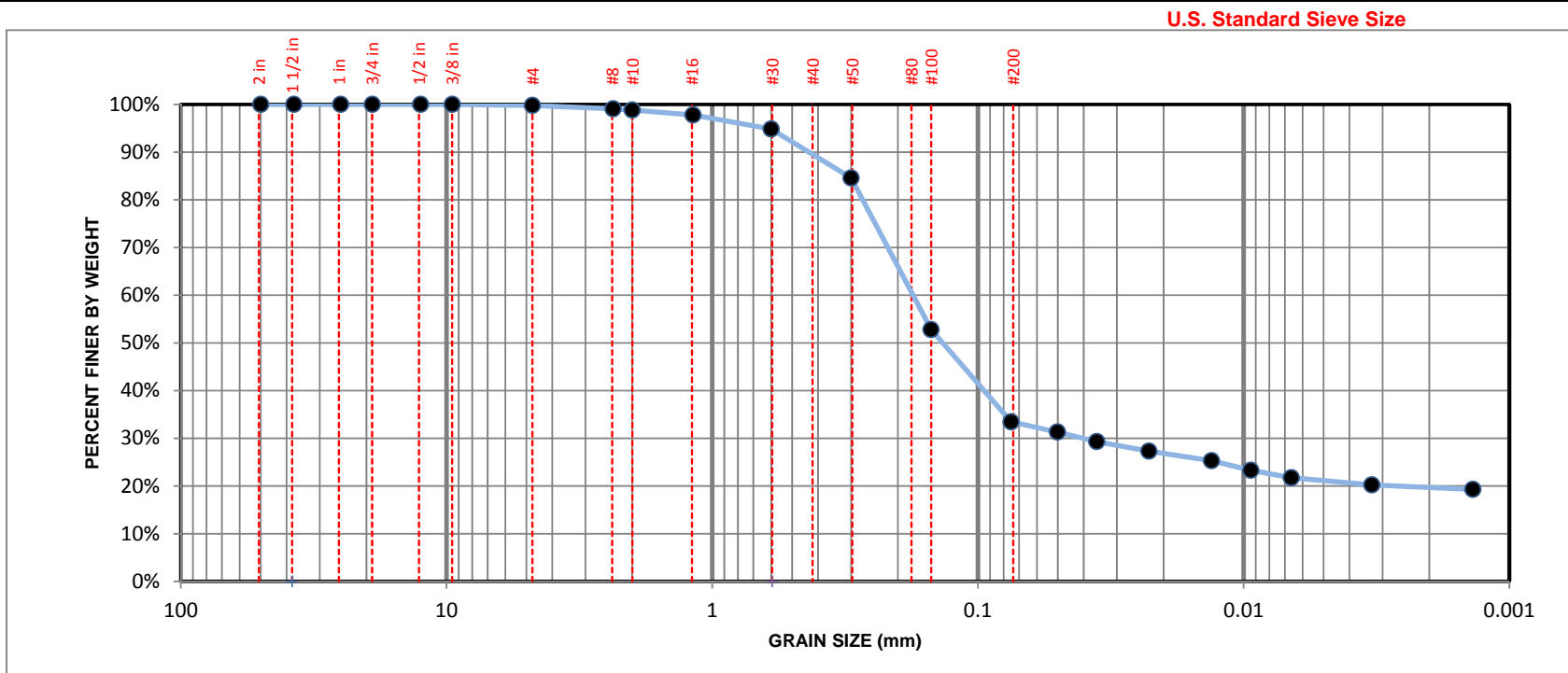


# GRAIN SIZE DISTRIBUTION ANALYSIS

ASTM C136/C117/D422

**Job Name:** Upper San Gabriel EWMP  
**Job Number:** 197-4552-0136  
**Address:**  
**Date Sampled:** November 29, 2017

**Tested By :** MG  
**Date Completed:** December 24, 2017  
**Sample Number:** C-101, R-10



Symbol	Boring No.	Sample #	Depth (feet)	LL	PI	USCS	Gravel	Sand	Fines	2 $\mu$
●	C-101	R-10	30'-31.5'	-	-	SM	0%	66%	33%	19%

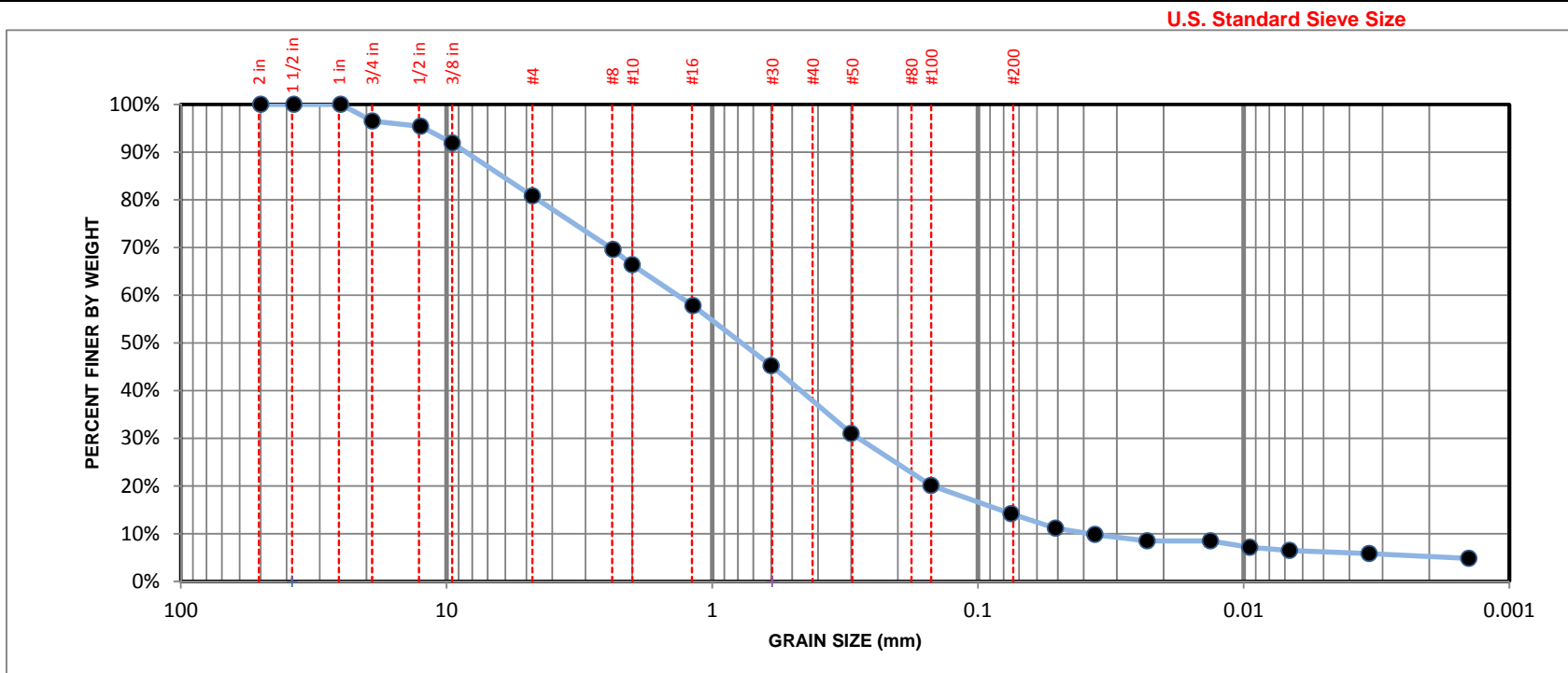


# GRAIN SIZE DISTRIBUTION ANALYSIS

ASTM C136/C117/D422

**Job Name:** Upper San Gabriel EWMP  
**Job Number:** 197-4552-0136  
**Address:**  
**Date Sampled:** November 29, 2017

**Tested By :** MG  
**Date Completed:** December 24, 2017  
**Sample Number:** C-102, SPT-7



Symbol	Boring No.	Sample #	Depth (feet)	LL	PI	USCS	Gravel	Sand	Fines	2 $\mu$
●	C-102	SPT-7	20'-21.5'	-	-	SM	19%	67%	14%	5%

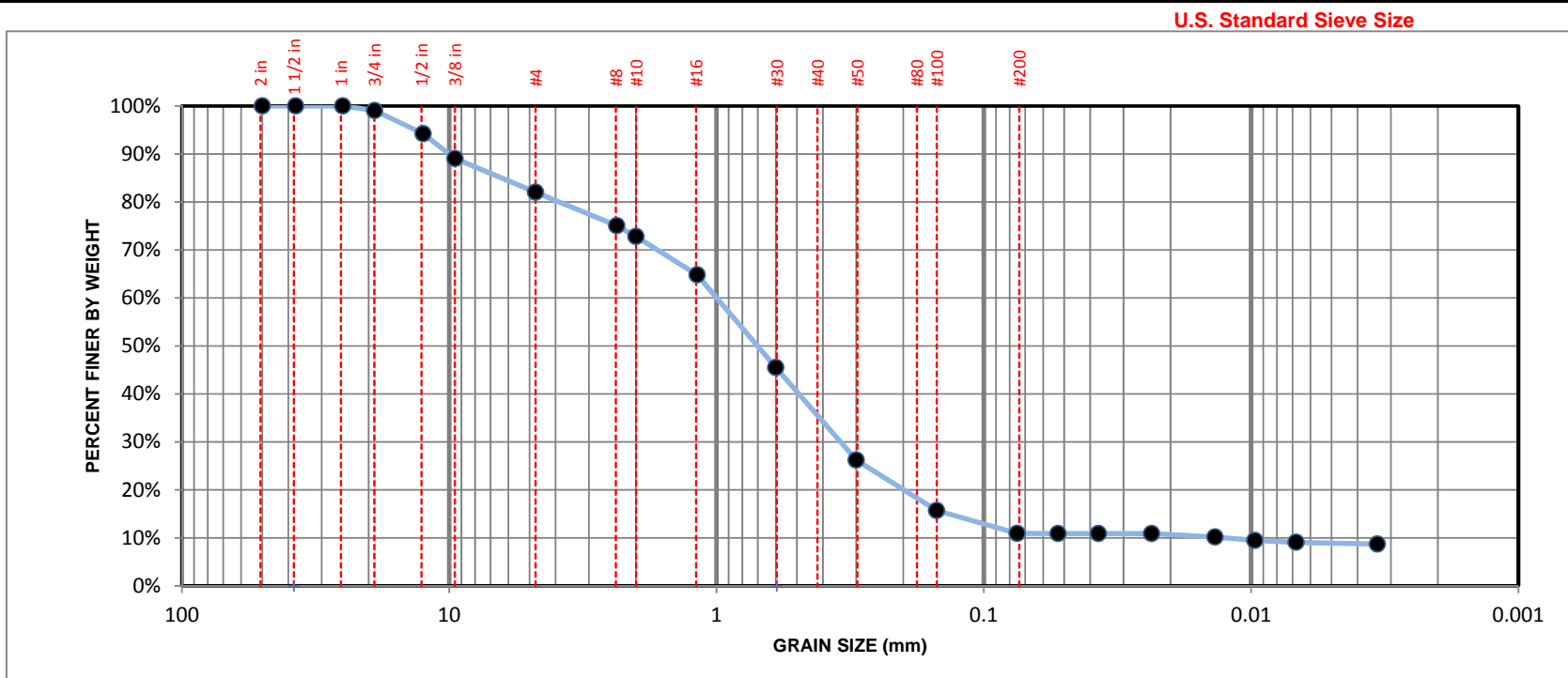


# GRAIN SIZE DISTRIBUTION ANALYSIS

ASTM C136/C117/D422

**Job Name:** Upper San Gabriel EWMP  
**Job Number:** 197-4552-0136  
**Address:**  
**Date Sampled:** November 29, 2017

**Tested By :** MG  
**Date Completed:** December 24, 2017  
**Sample Number:** C-102, SPT-9



Symbol	Boring No.	Sample #	Depth (feet)	LL	PI	USCS	Gravel	Sand	Fines	2 $\mu$
●	C-102	SPT-9	25'-26.5'	-	-	SP-SM	18%	71%	11%	8%

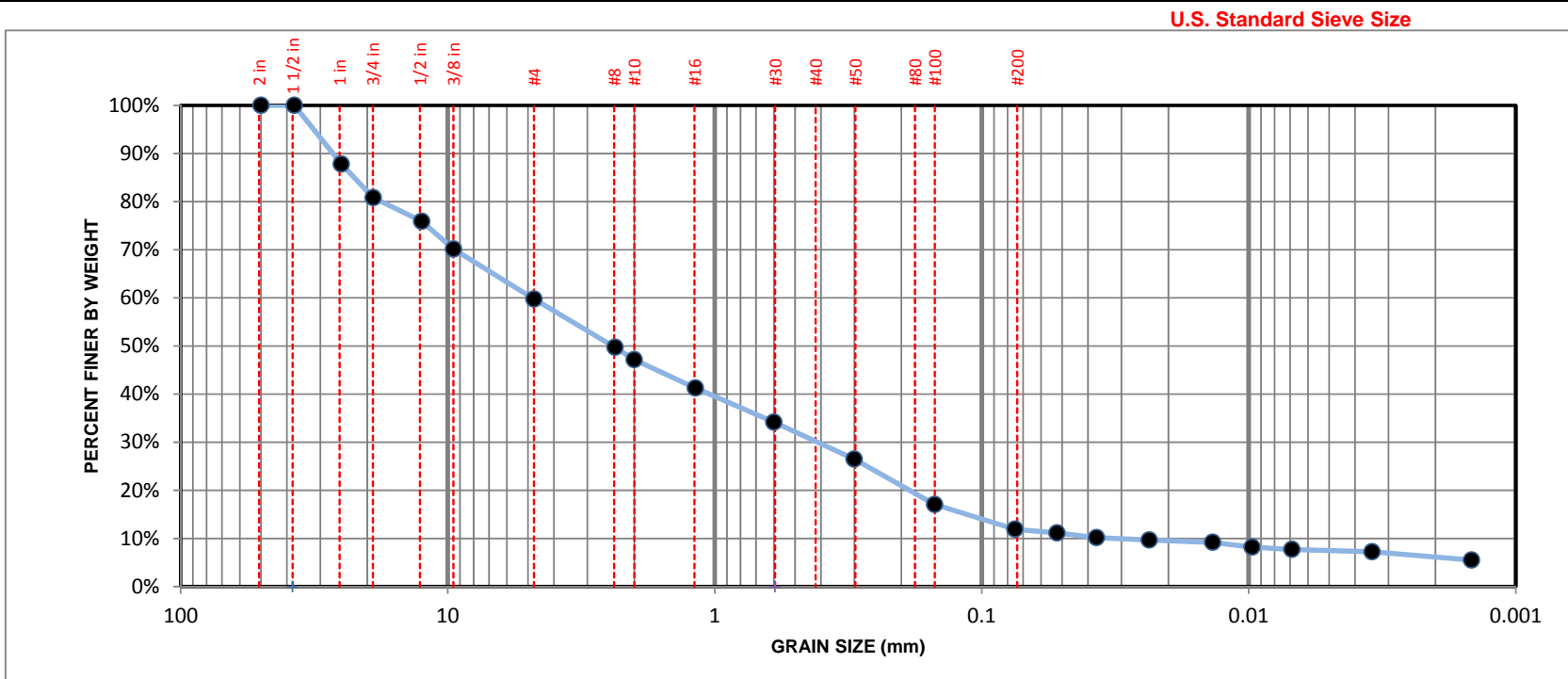


# GRAIN SIZE DISTRIBUTION ANALYSIS

ASTM C136/C117/D422

**Job Name:** Upper San Gabriel EWMP  
**Job Number:** 197-4552-0136  
**Address:**  
**Date Sampled:** November 29, 2017

**Tested By :** MG  
**Date Completed:** December 24, 2017  
**Sample Number:** FB-101, SPT-7



Symbol	Boring No.	Sample #	Depth (feet)	LL	PI	USCS	Gravel	Sand	Fines	2 $\mu$
●	FB-101	SPT-7	20'-21.5'	-	-	SP-SM	40%	48%	12%	6%

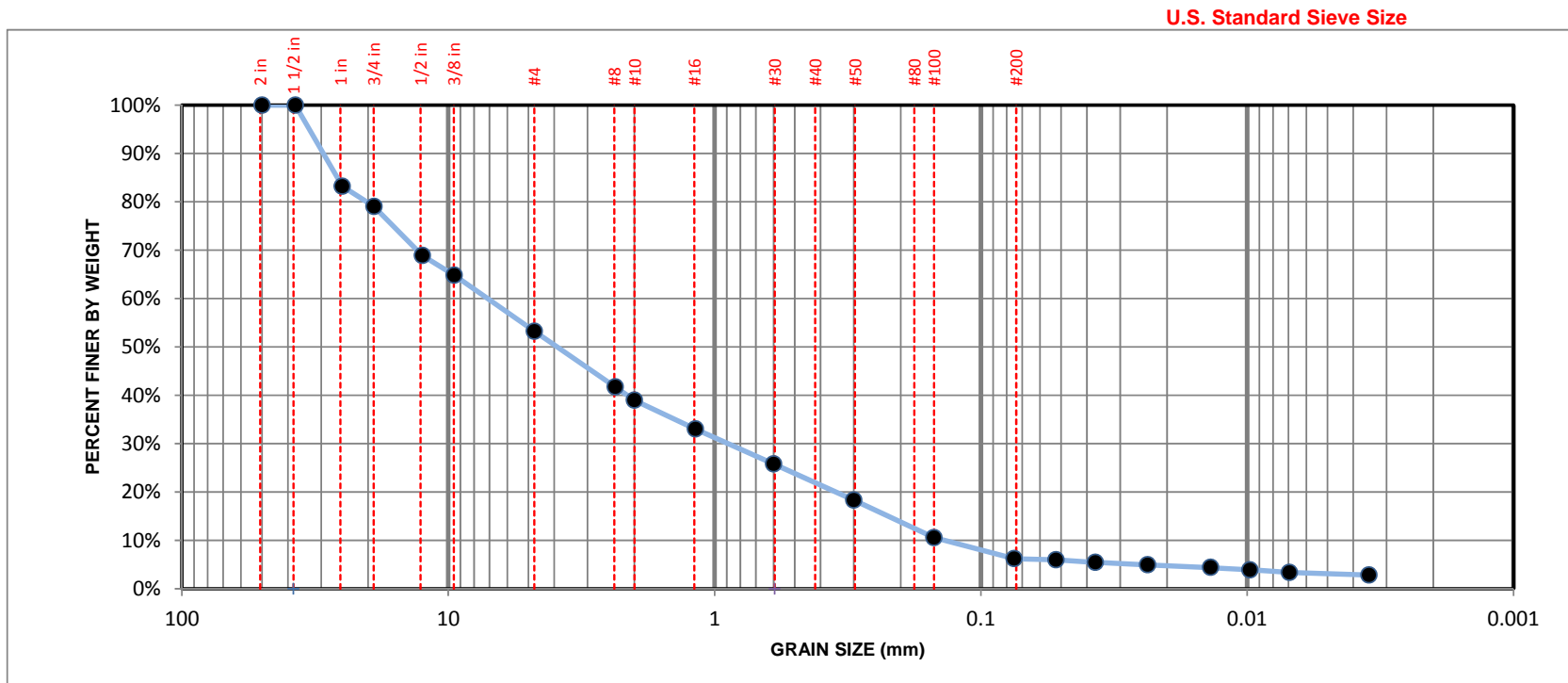


# GRAIN SIZE DISTRIBUTION ANALYSIS

ASTM C136/C117/D422

**Job Name:** Upper San Gabriel EWMP  
**Job Number:** 197-4552-0136  
**Address:**  
**Date Sampled:** November 29, 2017

**Tested By :** MG  
**Date Completed:** December 24, 2017  
**Sample Number:** FB-101, SPT-9



Symbol	Boring No.	Sample #	Depth (feet)	LL	PI	USCS	Gravel	Sand	Fines	2 $\mu$
●	FB-101	SPT-9	25'-26.5'	-	-	SP-SM	47%	47%	6%	2%

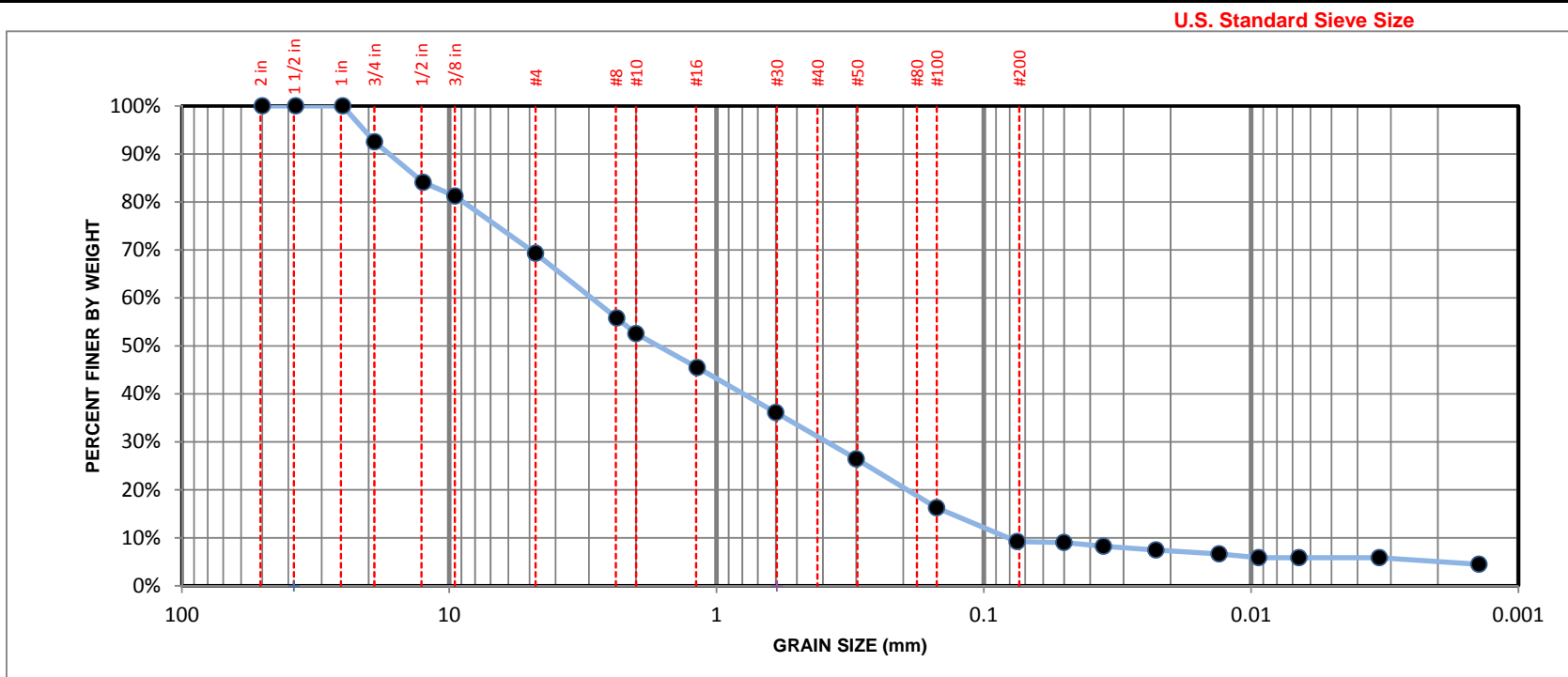


# GRAIN SIZE DISTRIBUTION ANALYSIS

ASTM C136/C117/D422

**Job Name:** Upper San Gabriel EWMP  
**Job Number:** 197-4552-0136  
**Address:**  
**Date Sampled:** November 29, 2017

**Tested By :** MG  
**Date Completed:** December 24, 2017  
**Sample Number:** FB-101, SPT-13



Symbol	Boring No.	Sample #	Depth (feet)	LL	PI	USCS	Gravel	Sand	Fines	2 $\mu$
●	FB-101	SPT-13	45'-46.5'	-	-	SP-SM	31%	60%	9%	5%

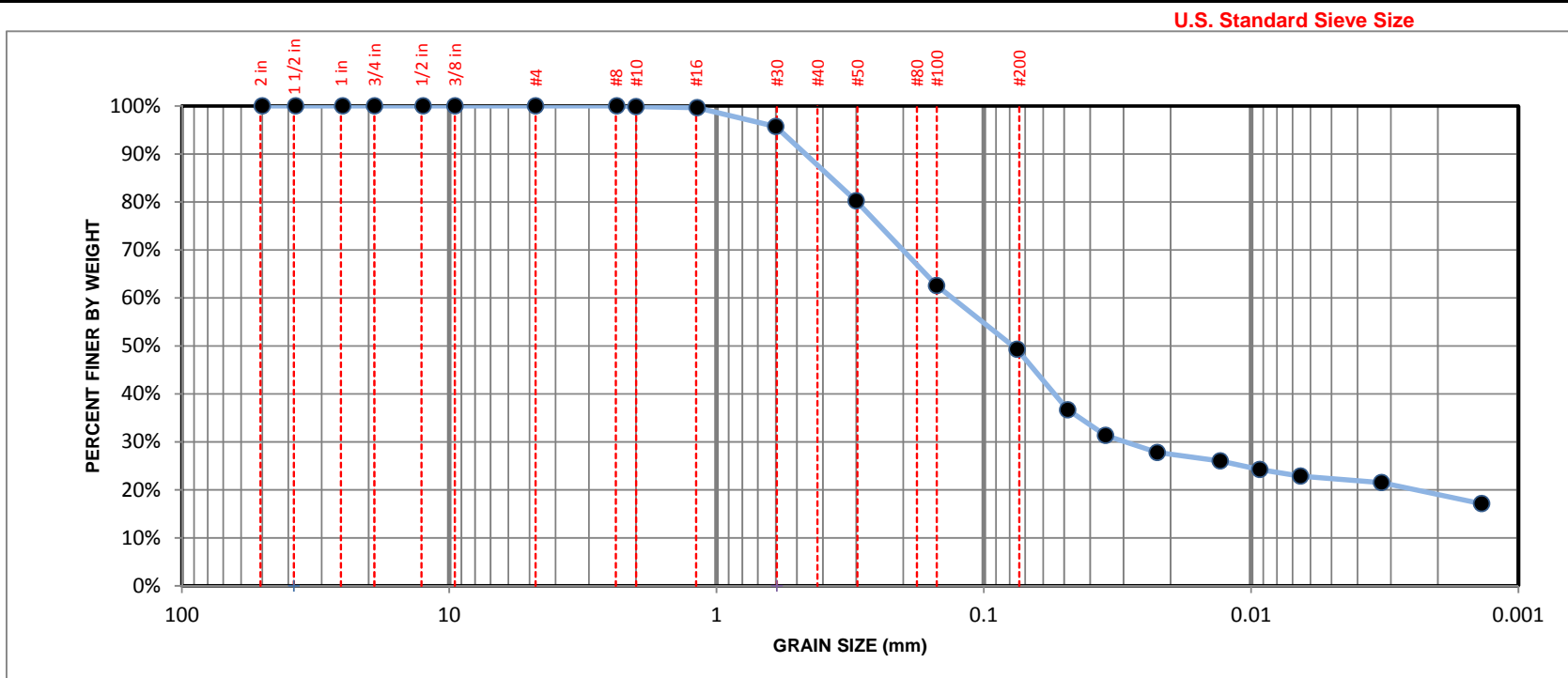


# GRAIN SIZE DISTRIBUTION ANALYSIS

ASTM C136/C117/D422

**Job Name:** Upper San Gabriel EWMP  
**Job Number:** 197-4552-0136  
**Address:**  
**Date Sampled:** November 29, 2017

**Tested By :** MG  
**Date Completed:** December 24, 2017  
**Sample Number:** LP-101, SPT-03



Symbol	Boring No.	Sample #	Depth (feet)	LL	PI	USCS	Gravel	Sand	Fines	2µ
●	LP-101	SPT-3	7.5'-9'	-	-	SC	0%	51%	49%	19%



# DIRECT SHEAR TEST

## ASTM D3080

**HAI Pr No.:** TRT-17-017

**Tested by:** KL

**Checked by:** MJ/MZ

**Date:** 12/7/2017

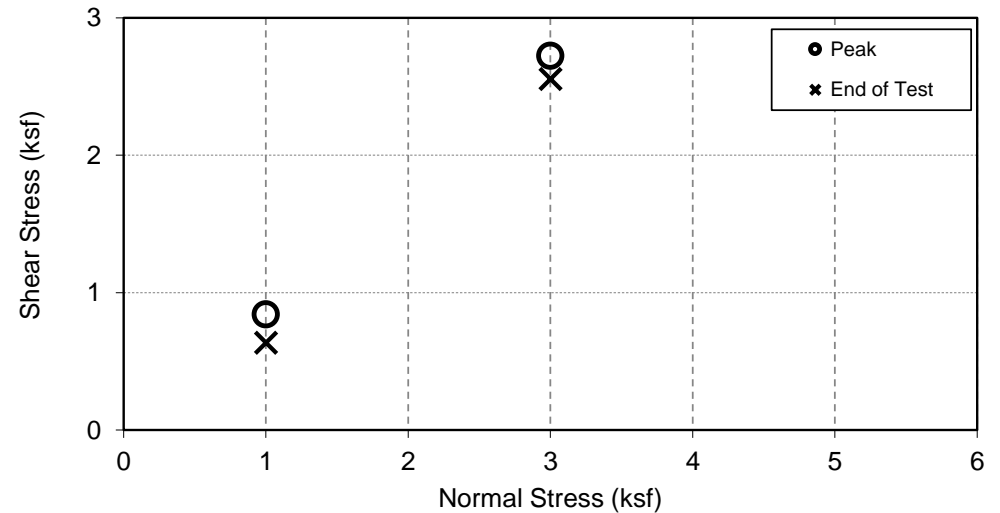
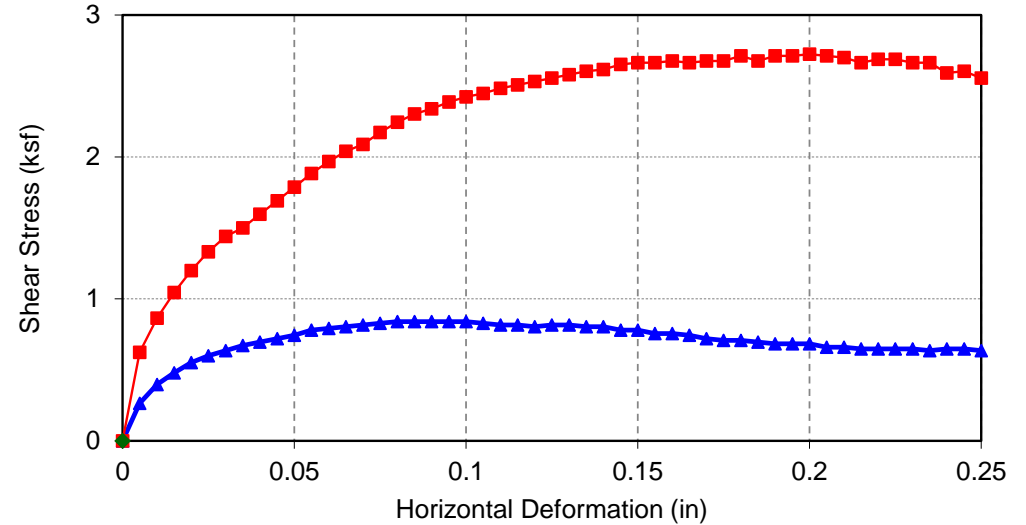
**Client:** TETRA TECH  
**Project Name:** Uper San Gabriel EWMP - City of Industry  
**Project Number:** 197-4552-0136  
**Boring No.:** B-101  
**Sample No.:** R-4  
**Sample type:** Undisturbed Ring  
**Depth (ft):** 12.5-14  
**Soil description:** Gray, Poorly Graded Sand with Gravel (SP)

**Type of test:** Consolidated, Drained

Test No.	1	2	3
Symbol	▲	■	◆
Normal Stress (ksf)	1	3	-
Deformation Rate (in/min)	0.002	0.002	-

Peak Shear Stress (ksf)	O	0.84	2.72	
Shear Stress @ End of Test (ksf)	X	0.64	2.56	

Initial Height of Sample (in)	1.005	1.003	
Height of Sample before Shear (in)	0.9980	0.9806	-
Diameter of Sample (in)	2.416	2.416	
Initial Moisture Content (%)	2.6	2.6	
Final Moisture Content (%)	19.4	17.2	-
Dry Density (pcf)	103.7	107.9	-





# DIRECT SHEAR TEST

## ASTM D3080

HAI Pr No.: TRT-17-017

Tested by: KL

Checked by: KL/MJ

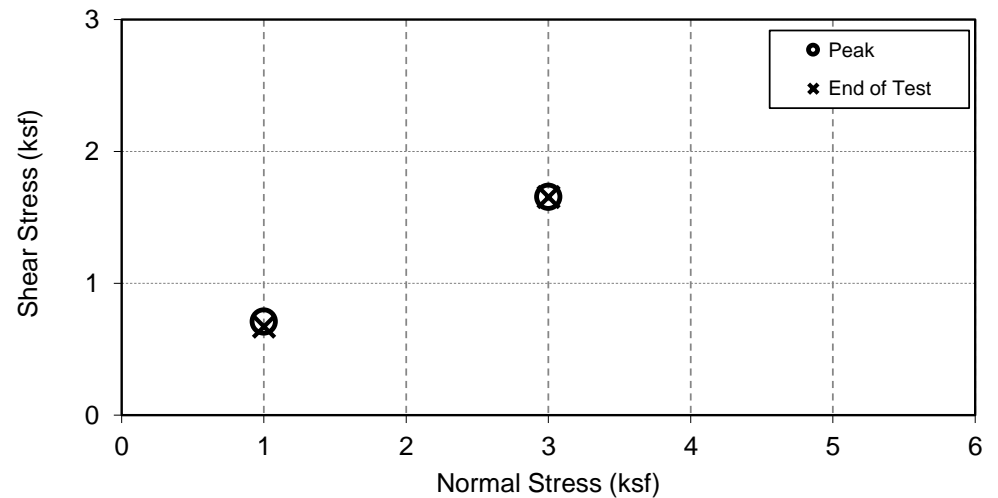
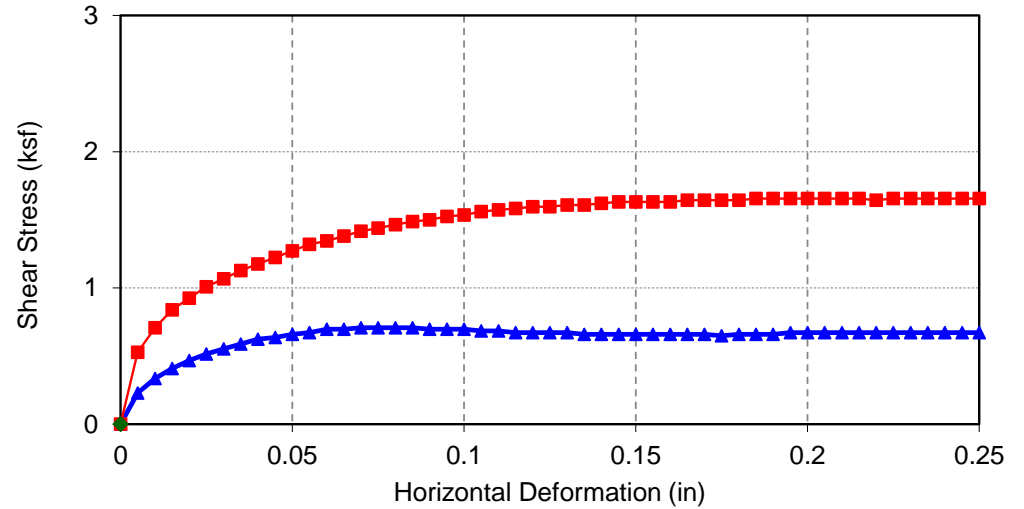
Date: 12/7/2017

**Client:** TETRA TECH  
**Project Name:** Uper San Gabriel EWMP - City of Industry  
**Project Number:** 197-4552-0136  
**Boring No.:** FB-101  
**Sample No.:** R-2  
**Sample type:** Undisturbed Ring  
**Depth (ft):** 5-6.5  
**Soil description:** Brown, Silty Sand with Gravel (SM)  
**Type of test:** Consolidated, Drained

Test No.	1	2	3
Symbol	▲	■	◆
Normal Stress (ksf)	1	3	-
Deformation Rate (in/min)	0.002	0.002	-

Peak Shear Stress (ksf)	O	0.71	1.66	
Shear Stress @ End of Test (ksf)	X	0.67	1.66	

Initial Height of Sample (in)	1.024	1.009	
Height of Sample before Shear (in)	1.0160	0.9842	-
Diameter of Sample (in)	2.416	2.416	
Initial Moisture Content (%)	6.6	6.6	
Final Moisture Content (%)	18.6	17.8	-
Dry Density (pcf)	108.3	109.1	-



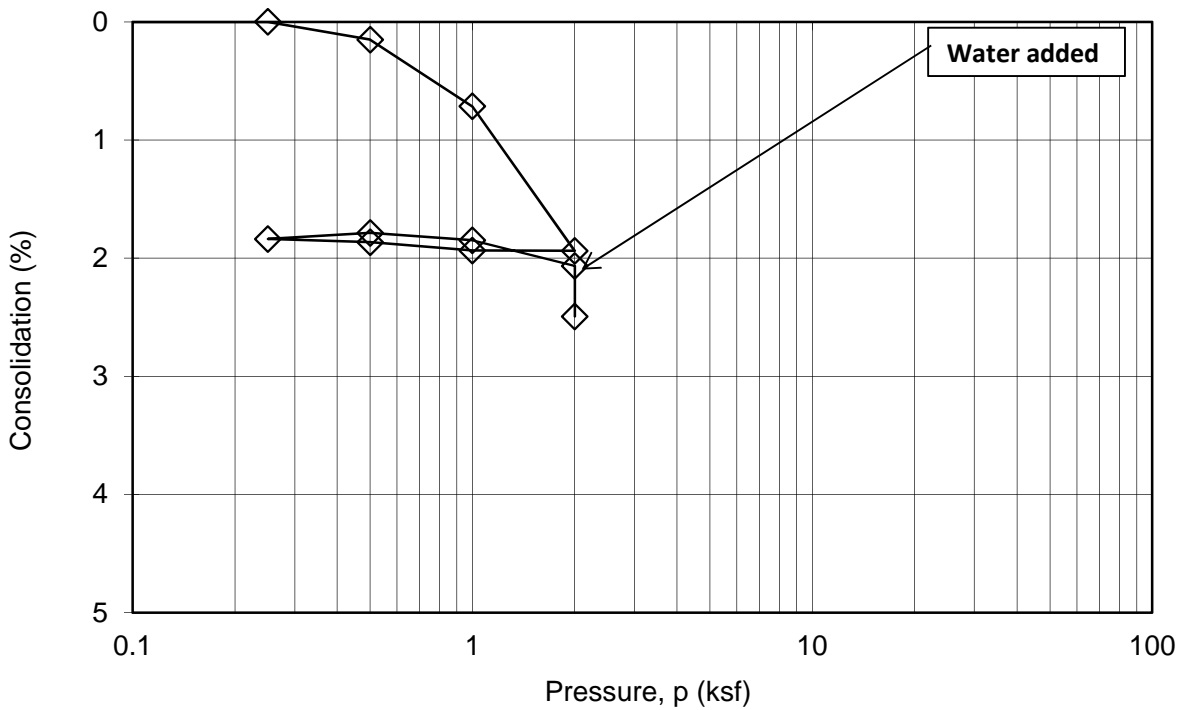




# SWELL / COLLAPSE TEST

## ASTM D4546

<b>Client:</b>	TETRA TECH	<b>HAI Project No.:</b>	TRT-17-017
<b>Project Name:</b>	Uper San Gabriel EWMP - City of Industry	<b>Tested by:</b>	KL
<b>Project No.:</b>	197-4552-0136	<b>Checked by:</b>	KL/MJ
<b>Boring No.:</b>	B-101	<b>Date:</b>	12/07/17
<b>Sample No.:</b>	R-6		
<b>Type of Sample:</b>	Undisturbed Ring		
<b>Depth (ft):</b>	17.5-19		
<b>Soil Description:</b>	Light Brown, Poorly Graded Sand (SP)		

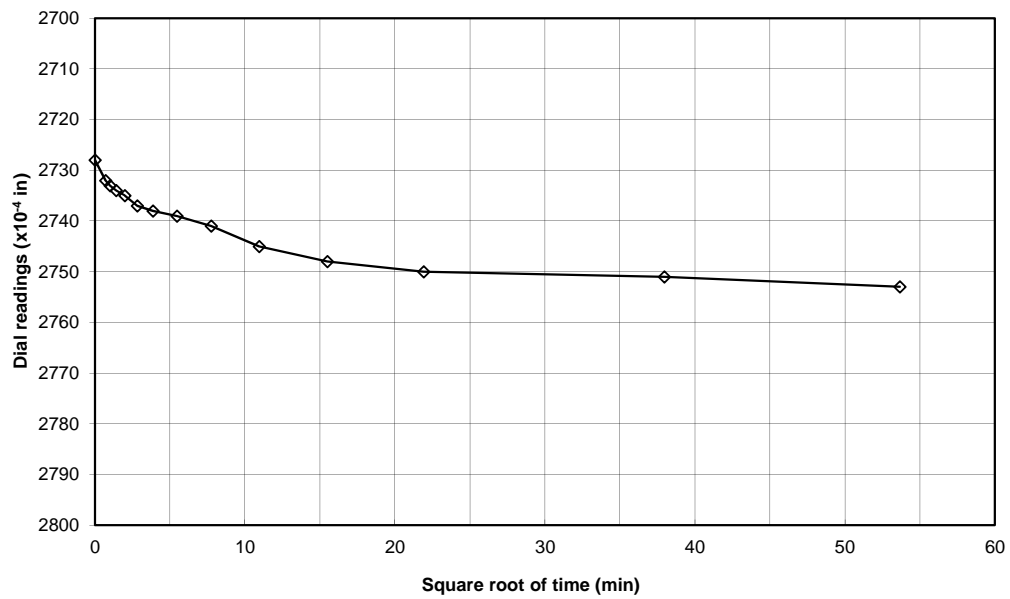
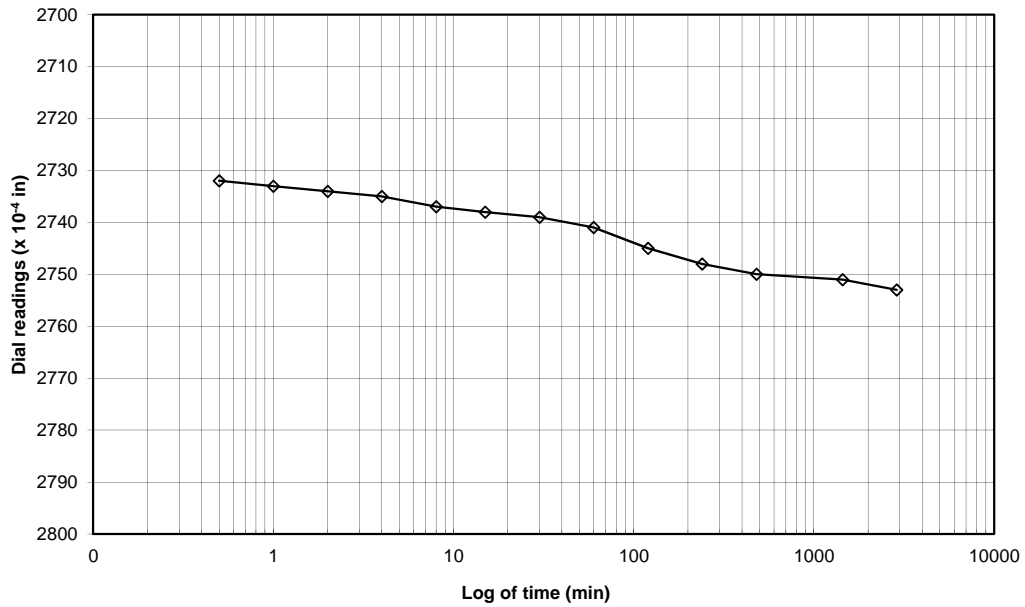




# SWELL / COLLAPSE TEST ASTM D4546

**Client:** TETRA TECH  
**Project Name:** Uper San Gabriel EWMP - City of Industry  
**Project No.:** 197-4552-0136  
**Boring No.:** B-101  
**Sample No.:** R-6  
**Soil Description:** Light Brown, Poorly Graded Sand (SP)  
**Type of Sample:** Undisturbed Ring

**Load:** 2 (ksf)

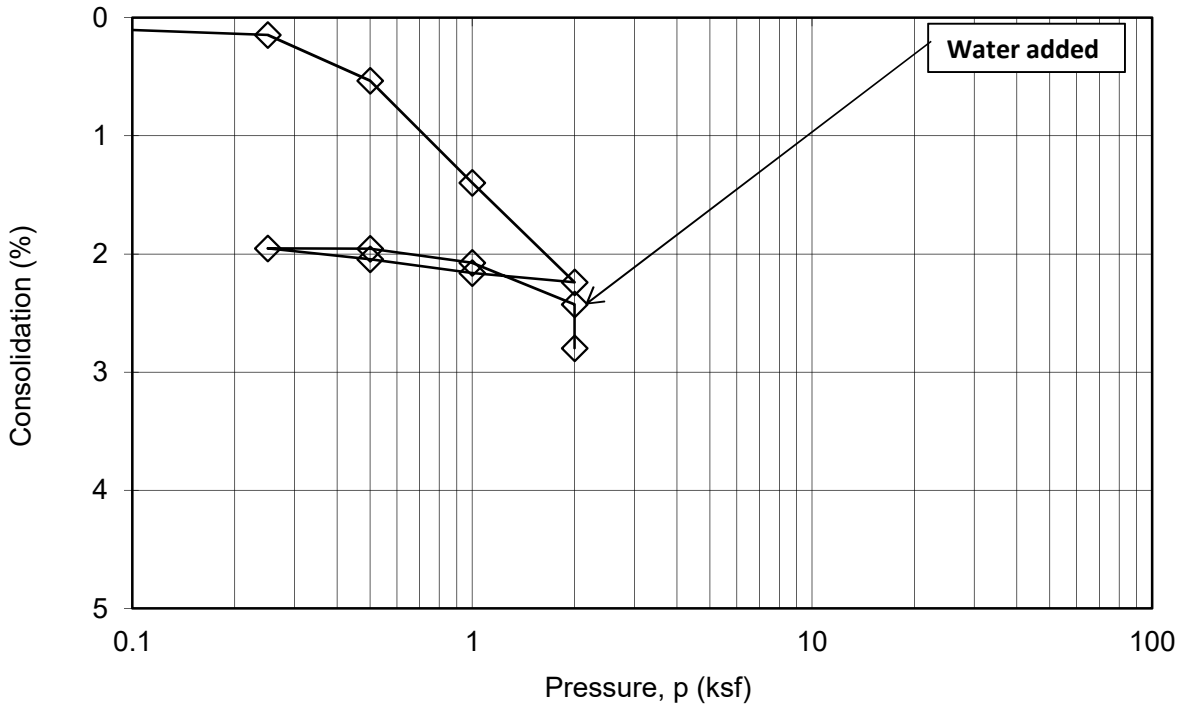






# SWELL / COLLAPSE TEST ASTM D4546

<b>Client:</b>	TETRA TECH	<b>HAI Project No.:</b>	TRT-17-017
<b>Project Name:</b>	Uper San Gabriel EWMP - City of Industry	<b>Tested by:</b>	KL
<b>Project No.:</b>	197-4552-0136	<b>Checked by:</b>	KL/MJ
<b>Boring No.:</b>	C-101	<b>Date:</b>	12/07/17
<b>Sample No.:</b>	R-6		
<b>Type of Sample:</b>	Undisturbed Ring		
<b>Depth (ft):</b>	17.5-19		
<b>Soil Description:</b>	Brown, Clayey Sand (SC)		

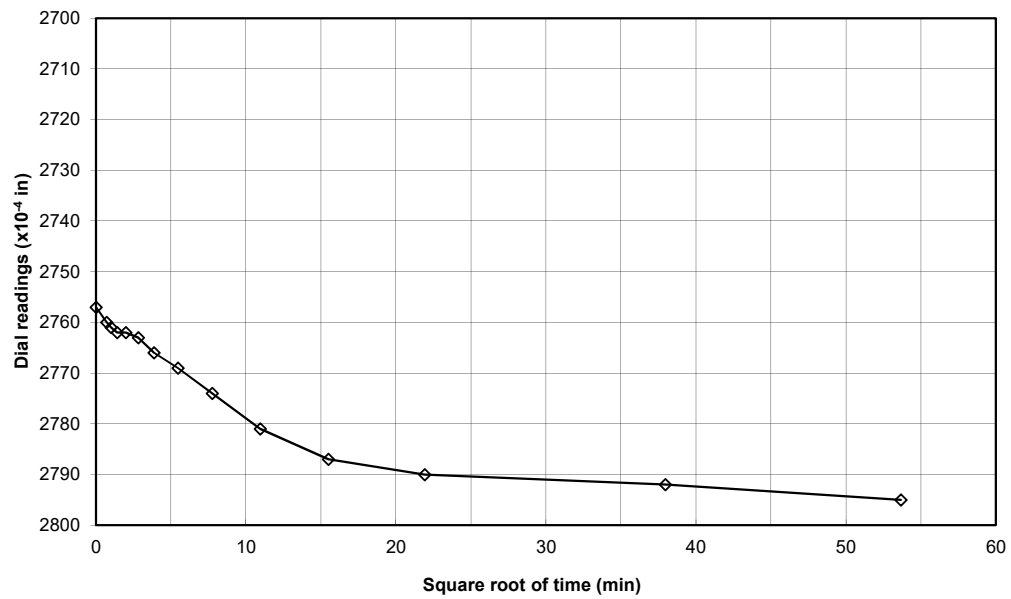
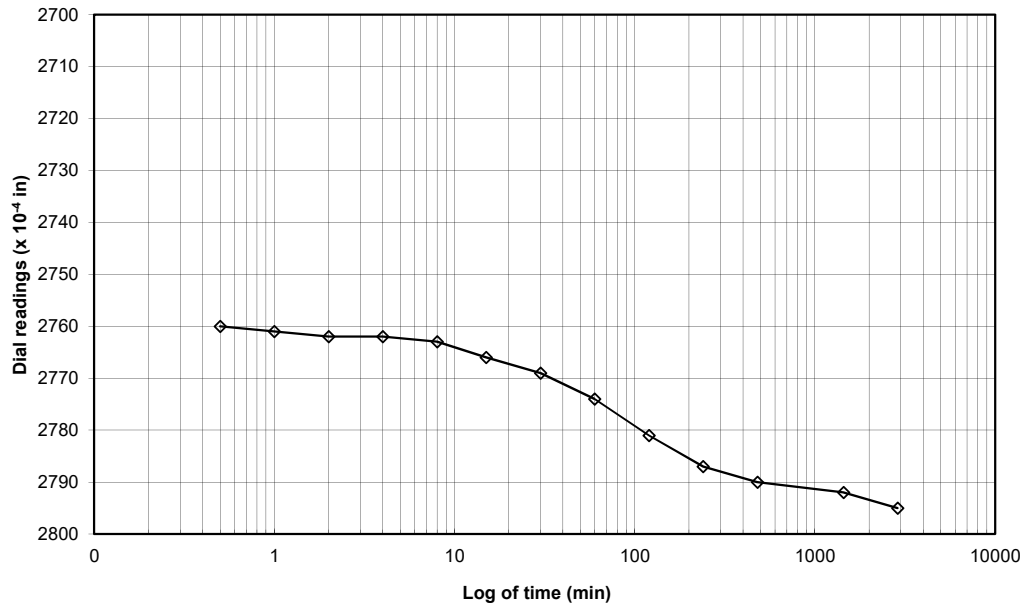




# SWELL / COLLAPSE TEST ASTM D4546

**Client:** TETRA TECH  
**Project Name:** Uper San Gabriel EWMP - City of Industry  
**Project No.:** 197-4552-0136  
**Boring No.:** C-101  
**Sample No.:** R-6  
**Soil Description:** Brown, Clayey Sand (SC)  
**Type of Sample:** Undisturbed Ring

**Load:** 2 (ksf)



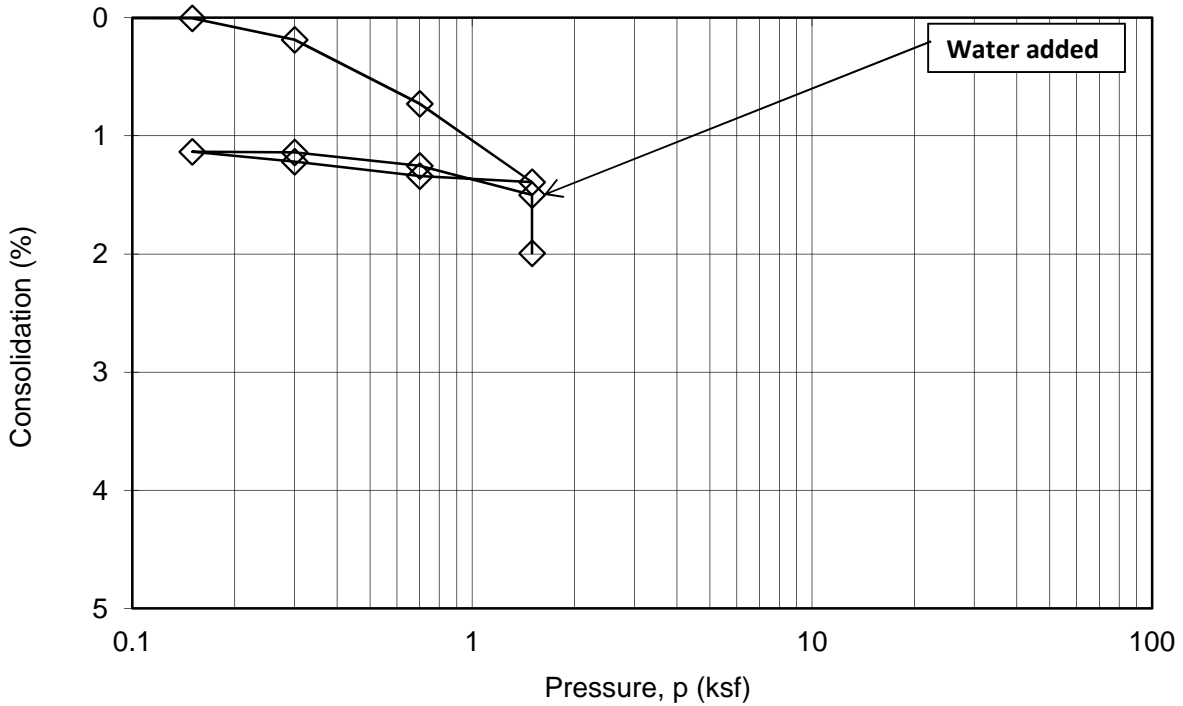




# SWELL / COLLAPSE TEST

## ASTM D4546

<b>Client:</b>	TETRA TECH	<b>HAI Project No.:</b>	TRT-17-017
<b>Project Name:</b>	Uper San Gabriel EWMP - City of Industry	<b>Tested by:</b>	KL
<b>Project No.:</b>	197-4552-0136	<b>Checked by:</b>	KL/MJ
<b>Boring No.:</b>	FB-101	<b>Date:</b>	12/07/17
<b>Sample No.:</b>	R-4		
<b>Type of Sample:</b>	Undisturbed Ring		
<b>Depth (ft):</b>	12.5-14		
<b>Soil Description:</b>	Brown, Silty Sand with Gravel (SM)		

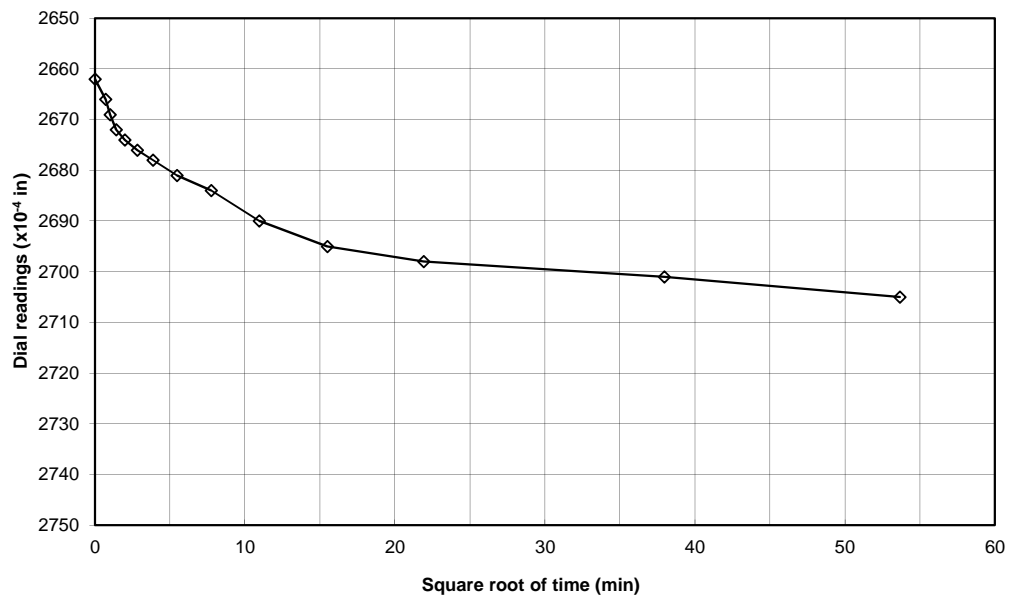
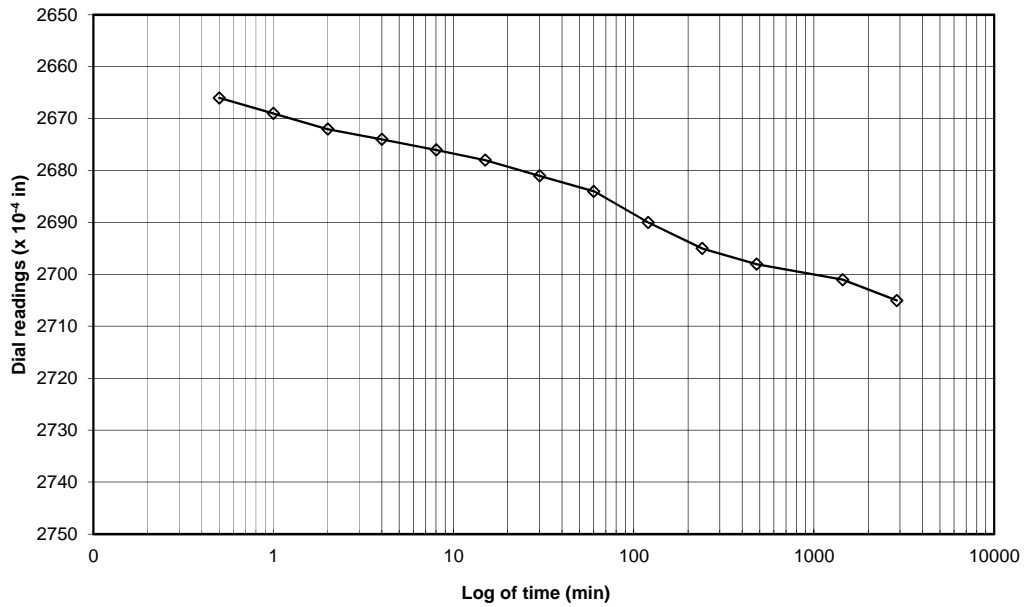




# SWELL / COLLAPSE TEST ASTM D4546

**Client:** TETRA TECH  
**Project Name:** Uper San Gabriel EWMP - City of Industry  
**Project No.:** 197-4552-0136  
**Boring No.:** FB-101  
**Sample No.:** R-4  
**Soil Description:** Brown, Silty Sand with Gravel (SM)  
**Type of Sample:** Undisturbed Ring

**Load: 1.5 (ksf)**



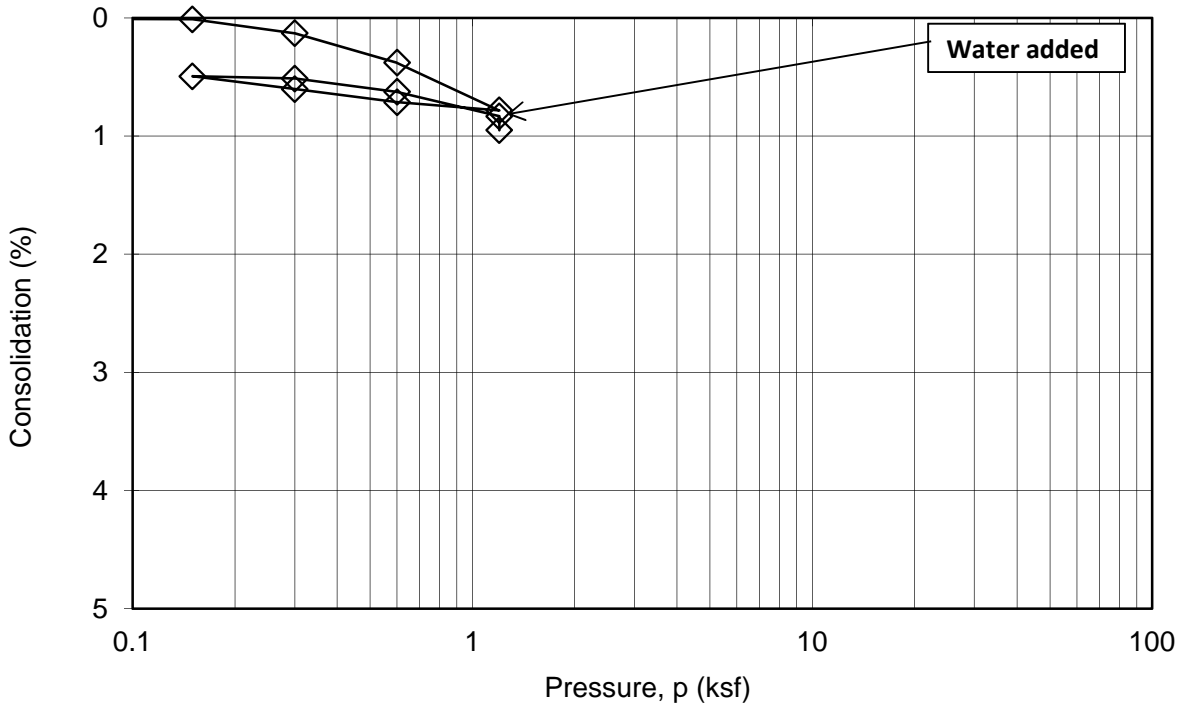




# SWELL / COLLAPSE TEST

## ASTM D4546

<b>Client:</b>	TETRA TECH	<b>HAI Project No.:</b>	TRT-17-017
<b>Project Name:</b>	Uper San Gabriel EWMP - City of Industry	<b>Tested by:</b>	KL
<b>Project No.:</b>	197-4552-0136	<b>Checked by:</b>	KL/MJ
<b>Boring No.:</b>	LP-101	<b>Date:</b>	12/07/17
<b>Sample No.:</b>	R-04		
<b>Type of Sample:</b>	Undisturbed Ring		
<b>Depth (ft):</b>	10-11.5		
<b>Soil Description:</b>	Brown, Clayey Sand (SC)		

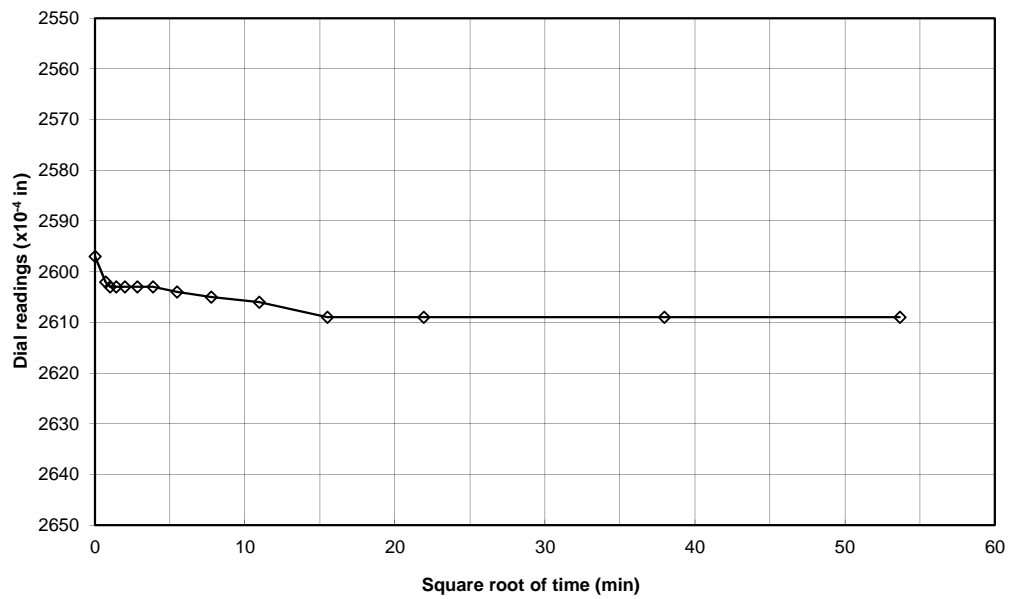
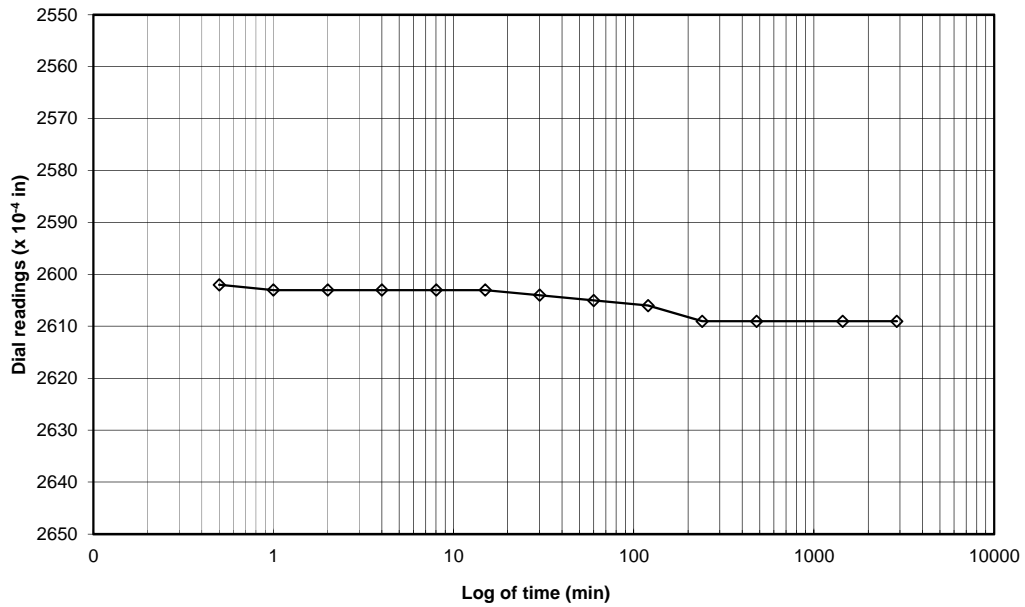




# SWELL / COLLAPSE TEST ASTM D4546

**Client:** TETRA TECH  
**Project Name:** Uper San Gabriel EWMP - City of Industry  
**Project No.:** 197-4552-0136  
**Boring No.:** LP-101  
**Sample No.:** R-04  
**Soil Description:** Brown, Clayey Sand (SC)  
**Type of Sample:** Undisturbed Ring

**Load: 1.2 (ksf)**





## Soil Analysis Lab Results

Client: HAI

Job Name: Upper San Gabriel EWMP - City of Industry

Client Job Number: TRT-17-017 (197-4552-0136)

Project X Job Number: S171211A

December 14, 2017

Bore# / Description	Method	ASTM G187		ASTM D516		ASTM D512B		SM 4500-E	SM 4500-C	SM 4500-D	ASTM G200	ASTM G51
	Depth	Resistivity		Sulfates		Chlorides		Nitrate	Ammonia	Sulfide	Redox	pH
		As Rec'd	Minimum									
	(ft)	(Ohm-cm)	(Ohm-cm)	(mg/kg)	(wt%)	(mg/kg)	(wt%)	(mg/kg)	(mg/kg)	(mg/kg)	(mV)	
FB-101, SPT-1	2.5-4.0	32,160	5,092	18	0.0018	54	0.0054	ND	12.0	0.72	222	7.66
C-101, SPT-1	2.5-4.0	1,407	1,407	150	0.0150	503	0.0503	150	69.0	7.65	207	8.14
B-101, SPT-1	2.5-4.0	274,700	23,450	21	0.0021	12	0.0012	ND	2.8	0.15	223	7.74
LP-101, SPT-01	2.5-4.0	1,876	1,340	90	0.0090	36	0.0036	21	ND	ND	220	7.91

Unk = Unknown

mg/kg = milligrams per kilogram (parts per million) of dry soil weight

mg/L = milligrams per liter of liquid volume

Chemical Analysis performed on 1:3 Soil-To-Water extract

Please call if you have any questions.

Prepared by,

Ernesto Padilla, BSME  
 Field Engineer

Respectfully Submitted,

Eddie Hernandez, M.Sc., P.E.  
 Sr. Corrosion Consultant  
 NACE Corrosion Technologist #16592  
 Professional Engineer  
 California No. M37102  
[ehernandez@projectxcorrosion.com](mailto:ehernandez@projectxcorrosion.com)



## **Appendix D**

### **Field Infiltration Testing Results**



**PERCOLATION DATA SHEET**

Project:	Barnes Park, Baldwin Park		Job No:	TET 17-136E	
Test Hole No:	I-102		Date Excavated:	Wednesday, November 29, 2017	
Test Hole Depth (feet):	15.0	feet	Soil Classification:	Well graded SAND with Gravel (SW), medium dense, light brownish gray (2.5Y 6/1), damp	
Stick up Length (feet):	1.00	foot			
Sandy Soil Criteria Tested By:	Shawn Morrish		Date:	Wednesday, November 29, 2017	Presoak: >1 hour
Actual Percolation Tested By:	Shawn Morrish		Date:	Wednesday, November 29, 2017	
Test Hole Diameter (Inches):	8	inches	Latitude:	34.069460°	Longitude: -117.999580°
Casing Diameter:	3	inches	Elevation:	303 feet	

PERCOLATION TEST (after presoaking for more than 1 hour)							
Time	Time Interval (min) *using stopwatch	Initial Reading (feet below the top of the pipe)	Final Reading (feet below the top of the pipe)	Initial Water Level (feet above bottom of hole)	Final Water Level (feet above bottom of hole)	Δ in Water Level (inches)	Measured Raw Percolation Rate (inches/hour)
1:30 PM	0.36	14.80	15.20	1.2	0.80	4.80	115.0
1:35 PM	0.36	14.80	15.20	1.2	0.80	4.80	113.2
1:40 PM	0.35	14.80	15.20	1.2	0.80	4.80	117.8
1:45 PM	0.34	14.80	15.20	1.2	0.80	4.80	122.8
1:50 PM	0.35	14.80	15.20	1.2	0.80	4.80	119.0
1:55 PM	0.34	14.80	15.20	1.2	0.80	4.80	121.6
2:00 PM	0.33	14.80	15.20	1.2	0.80	4.80	123.2
2:05 PM	0.34	14.80	15.20	1.2	0.80	4.80	122.4
							122.4

Reduction factor for boring percolation

$RF_t = 2.00$

Site variability, number of tests, and thoroughness of subsurface investigation

$RF_v = 2.00$

Long-term siltation, plugging, and maintenance

$RF_s = 2.00$

Percolation Test performed according to the Administrative Manual, County of Los Angeles, Department of Public Works, Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration, GS 200.2 (6/30/17)

Corrected Percolation Rate (Infiltration Rate) =	15.3	in/hour
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**PERCOLATION DATA SHEET**

Project:	Barnes Park, Baldwin Park		Job No:	TET 17-136E	
Test Hole No:	I-103		Date Excavated:	Wednesday, November 29, 2017	
Test Hole Depth (feet):	15.0	feet	Soil Classification:	Well Graded SAND with Gravel (SW), medium dense, light brownish gray (2.5Y 6/1), damp	
Stick up Length (feet):	1.00	foot			
Sandy Soil Criteria Tested By:	Shawn Morrish		Date:	Wednesday, November 29, 2017	Presoak: >1 hour
Actual Percolation Tested By:	Shawn Morrish		Date:	Wednesday, November 29, 2017	
Test Hole Diameter Inches):	8	inches	Latitude:	34.069740°	Longitude: -117.999450°
Casing Diameter:	3	inches	Elevation:	303 feet	

PERCOLATION TEST (after presoaking for more than 1 hour)							
Time	Time Interval (min) *using stopwatch	Initial Reading (feet below the top of the pipe)	Final Reading (feet below the top of the pipe)	Initial Water Level (feet above bottom of hole)	Final Water Level (feet above bottom of hole)	Δ in Water Level (inches)	Measured Raw Percolation Rate (inches/hour)
2:45 PM	0.42	14.80	15.20	1.2	0.80	4.80	98.0
2:50 PM	0.43	14.80	15.20	1.2	0.80	4.80	96.1
2:55 PM	0.43	14.80	15.20	1.2	0.80	4.80	94.9
3:00 PM	0.44	14.80	15.20	1.2	0.80	4.80	94.5
3:05 PM	0.41	14.80	15.20	1.2	0.80	4.80	100.0
3:10 PM	0.42	14.80	15.20	1.2	0.80	4.80	97.5
3:15 PM	0.43	14.80	15.20	1.2	0.80	4.80	95.0
3:20 PM	0.44	14.80	15.20	1.2	0.80	4.80	94.6
							95.7

Reduction factor for boring percolation

$RF_t = 2.00$

Site variability, number of tests, and thoroughness of subsurface investigation

$RF_v = 2.00$

Long-term siltation, plugging, and maintenance

$RF_s = 2.00$

Percolation Test performed according to the Administrative Manual, County of Los Angeles, Department of Public Works, Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration, GS 200.2 (6/30/17)

Corrected Percolation Rate (Infiltration Rate) =	12.0	in/hour
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## **Appendix E**

### **Liquefaction Analyses**

## Summary of Liquefaction and Earthquake-Induced Settlement Analysis

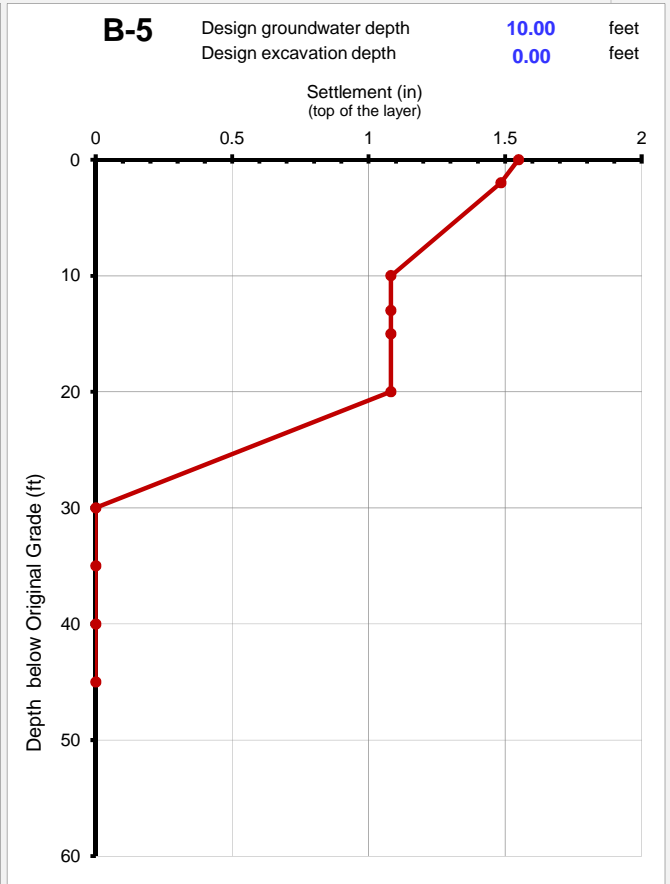
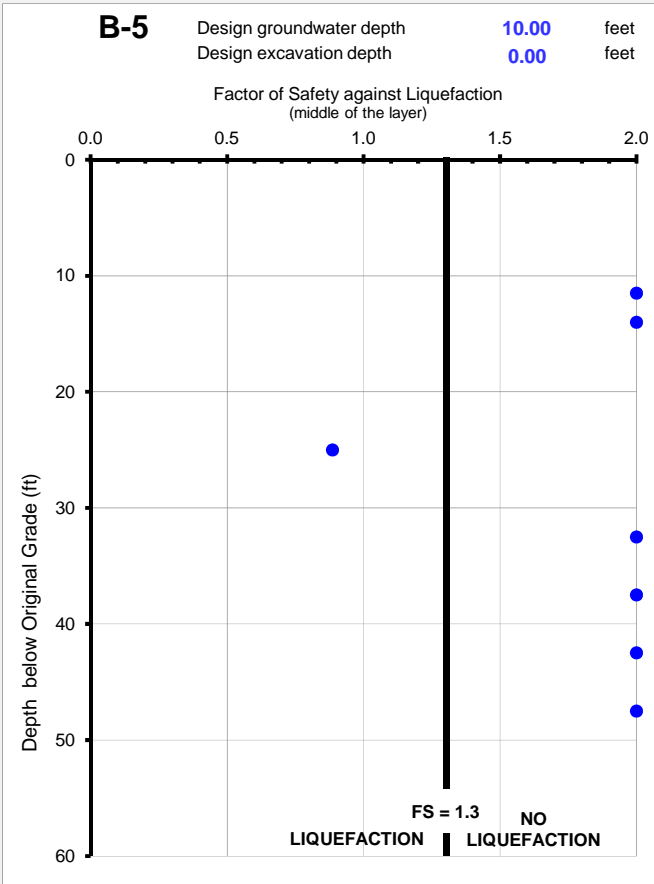
Project:	TET 17-136E Upper San Gabriel EWMP - Barnes Park	Boring:	<b>B-5</b>	Engineer:	FC	Date:	1/19/2018
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Liquefaction Evaluation Method				Liquefaction Analysis Statistics	
Correction for fines content	Idriss & Boulang, 2008, 2014			Total thickness of evaluated profile	50 feet
Correction for overburden $C_N$	Idriss & Boulang, 2014 (N1)60cs			Profile thickness susceptible to liquefaction	10 feet
Cyclic resistance ratio of soil $CRR_{CS}$	Idriss & Boulang, 2004, 2014			Number of evaluated intervals	10
Correction for overburden $K_\sigma$	Idriss & Boulang, 2008, 2014			Number of potentially liquefiable intervals	7
Stress reduction factor $r_D$	Idriss 1999, I&B 2008,2014			<b>Average Factor of Safety of sandy intervals</b>	<b>7.3</b>
Magnitude scaling factor MSF	Idriss & Boulang, 2014			Dry sand settlement	0.47 inches
Liquefaction settlement	Yoshimine et al., 2006 – no adjustment			Liquefaction settlement	1.08 inches
Dry settlement	Pradel, 1998a,b			<b>Total earthquake-induced settlement</b>	<b>1.55 inches</b>
Plasticity Index sand behavior threshold				7	
Calculate settlement only for layers with less than				50 % of fines	

Depth to Layer Top	Layer Thickness	Total Unit Weight		Fines %	Plasticity Index	Considered Blowcounts			Liquefaction Factor of Safety	Liquefaction potential rationale	Layer Settlement	Cumulative Settlement
		In-situ	Design			SPT-N	N1,60	N1,60,cs				
feet	feet	pcf	pcf	%	-	bpf	bpf	bpf	-	-	in	in
0	2	123.546	125.0	30	n/plastic	14.0	27.8	33.2	Not liquefiable	- no groundwater	0.06	1.55
2	8	123.546	125.0	6	n/plastic	14.0	24.8	24.8	Not liquefiable	- no groundwater	0.40	1.48
10	3	121.068	125.0	6	n/plastic	29.0	36.3	36.4	4.53	- too dense – (N1)60,CS > 32	0.00	1.08
13	2	121.068	125.0	28	n/plastic	29.0	34.0	39.3	5.52	- too dense – (N1)60,CS > 32	0.00	1.08
15	5	121.8	125.0	65	15	7.0	10.2	15.8	Not liquefiable	- clay-like behaviour	0.00	1.08
20	10	123.31	125.0	9	n/plastic	22.0	28.3	29.0	0.89	- liquefiable - FS < 1.3	1.08	1.08
30	5	122.012	125.0	9	n/plastic	50.0	71.7	72.4	4.82	- too dense – (N1)60,CS > 32	0.00	0.00
35	5	122.484	125.0	9	n/plastic	77.0	129.1	129.8	4.61	- too dense – (N1)60,CS > 32	0.00	0.00
40	5	124.726	125.0	30	n/plastic	40.0	51.8	57.2	3.92	- too dense – (N1)60,CS > 32	0.00	0.00
45	5	120.95	125.0	30	n/plastic	73.0	125.5	130.8	4.90	- too dense – (N1)60,CS > 32	0.00	0.00
210.00	50.00	1224.51	1250.00	222.00	15.00	355.08	539.59	568.75	29.18		1.55	7.36

Profile			Earthquake loading		Checks	
In-Situ Groundwater depth	no GW	feet	M	6.51	Groundwater depth check	OK
DESIGN Groundwater depth		10.00 feet	PGA	0.791	Design groundwater/excavation depth check	OK
DESIGN Excavation depth		0.00 feet			Fines correction method compatibility	OK
DESIGN Surcharge (fill)		0.00 feet			Idriss & Boulanger, 2004 method for $C_N$	not used
					Cetin 2009 settlement method	not used

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## Summary of Liquefaction and Earthquake-Induced Settlement Analysis

Project: TET 17-136E Upper San Gabriel EWMP - Barnes Park	Boring: <b>B-101</b>	Engineer: FC	Date: 1/19/2018
--	----------------------	--------------	-----------------

Liquefaction Evaluation Method		Liquefaction Analysis Statistics	
Correction for fines content	Idriss & Boulang, 2008, 2014	Total thickness of evaluated profile	50 feet
Correction for overburden $C_N$	Idriss & Boulang, 2014 (N1)60cs	Profile thickness susceptible to liquefaction	5 feet
Cyclic resistance ratio of soil $CRR_{CS}$	Idriss & Boulang, 2004, 2014	Number of evaluated intervals	10
Correction for overburden $K_\sigma$	Idriss & Boulang, 2008, 2014	Number of potentially liquefiable intervals	8
Stress reduction factor $r_D$	Idriss 1999, I&B 2008,2014	<b>Average Factor of Safety of sandy intervals</b>	<b>7.6</b>
Magnitude scaling factor MSF	Idriss & Boulang, 2014	Dry sand settlement	0.18 inches
Liquefaction settlement	Yoshimine et al., 2006 – no adjustment	Liquefaction settlement	0.30 inches
Dry settlement	Pradel, 1998a,b	<b>Total earthquake-induced settlement</b>	<b>0.49 inches</b>
Plasticity Index sand behavior threshold		7	
Calculate settlement only for layers with less than		50 % of fines	

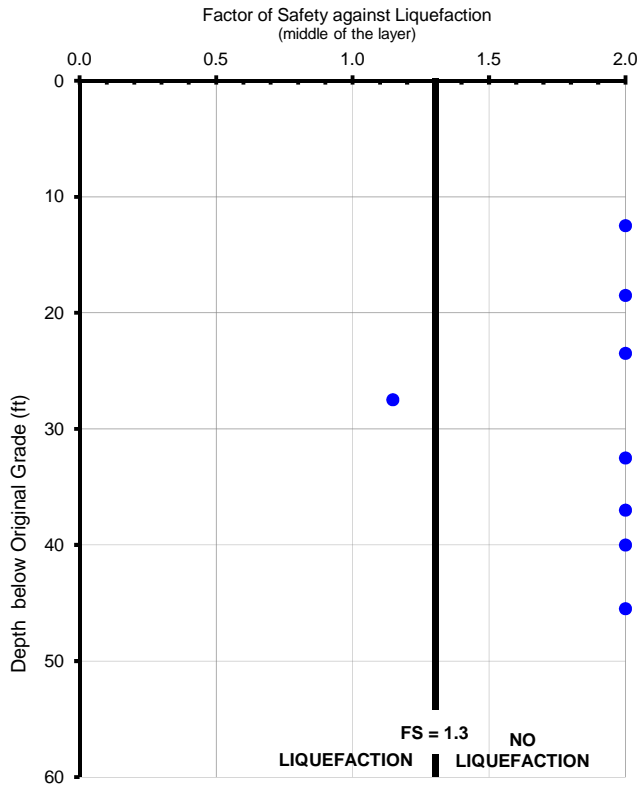
Depth to Layer Top	Layer Thickness	Total Unit Weight		Fines %	Plasticity Index	Considered Blowcounts			Liquefaction Factor of Safety	Liquefaction potential rationale	Layer Settlement	Cumulative Settlement
		In-situ	Design			SPT-N	N1,60	N1,60,cs				
feet	feet	pcf	pcf	%	-	bpf	bpf	bpf	-	-	in	in
0	5	109.18	115.0	4	n/plastic	16.0	34.5	34.5	Not liquefiable	- no groundwater	0.09	0.49
5	5	109.18	115.0	4	n/plastic	20.5	35.3	35.3	Not liquefiable	- no groundwater	0.09	0.40
10	5	109.18	115.0	4	n/plastic	27.0	43.6	43.6	5.79	- too dense – (N1)60,CS > 32	0.00	0.30
15	7	109.18	115.0	6	n/plastic	28.0	45.4	45.4	4.96	- too dense – (N1)60,CS > 32	0.00	0.30
22	3	109.18	115.0	2	n/plastic	70.0	113.1	113.1	4.29	- too dense – (N1)60,CS > 32	0.00	0.30
25	5	109.18	115.0	2	n/plastic	22.0	31.0	31.0	1.15	- liquefiable - FS < 1.3	0.30	0.30
30	5	109.18	115.0	2	n/plastic	66.0	113.6	113.6	4.27	- too dense – (N1)60,CS > 32	0.00	0.00
35	4	109.18	115.0	2	n/plastic	48.0	75.0	75.0	4.51	- too dense – (N1)60,CS > 32	0.00	0.00
39	2	115	115.0	65	n/plastic	42.9	65.6	71.1	4.68	- too dense – (N1)60,CS > 32	0.00	0.00
41	9	109.18	115.0	4	n/plastic	45.0	66.2	66.2	4.77	- too dense – (N1)60,CS > 32	0.00	0.00
222.00	50.00	1097.62	1150.00	95.00	0.00	385.36	623.31	628.93	34.41		0.49	2.11

Profile		Earthquake loading		Checks	
In-Situ Groundwater depth	no GW feet	M	6.51	Groundwater depth check	OK
DESIGN Groundwater depth	10.00 feet	PGA	0.791	Design groundwater/excavation depth check	OK
DESIGN Excavation depth	0.00 feet			Fines correction method compatibility	OK
DESIGN Surcharge (fill)	0.00 feet			Idris & Boulanger, 2004 method for $C_N$	not used
				Cetin 2009 settlement method	not used

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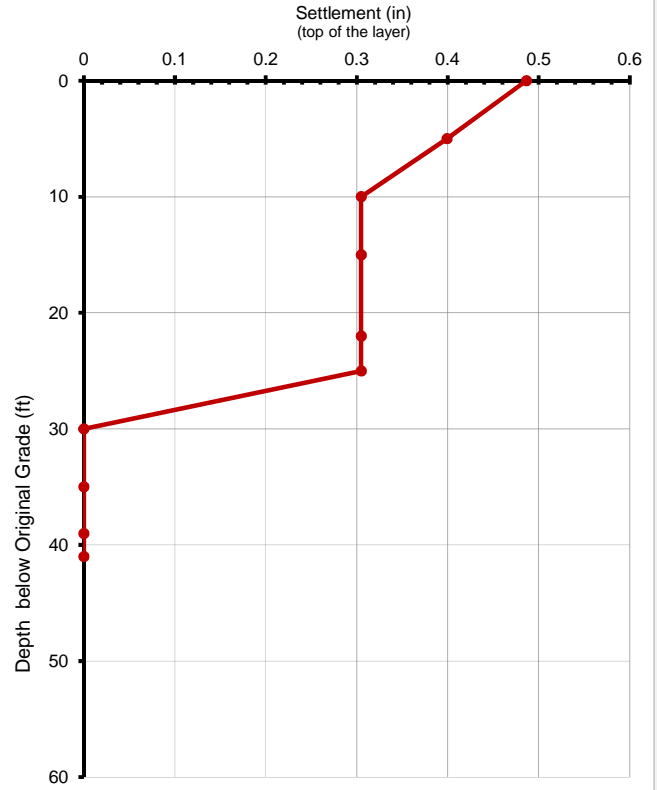
# B-101

Design groundwater depth 10.00 feet  
Design excavation depth 0.00 feet



# B-101

Design groundwater depth 10.00 feet  
Design excavation depth 0.00 feet



# **Appendix A. Barnes Park**

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## 1.0 SITE DESCRIPTION AND EXISTING HYDROLOGY

Barnes Park is a 6.44-acre, multipurpose recreational facility, located in the City of Baldwin Park. It is within a 440-acre watershed (**Figure 1-1**) that drains through the upstream storm drain system directly into the San Gabriel River Tributary, which runs adjacent to the west side of the park (**Figure 1-2**).

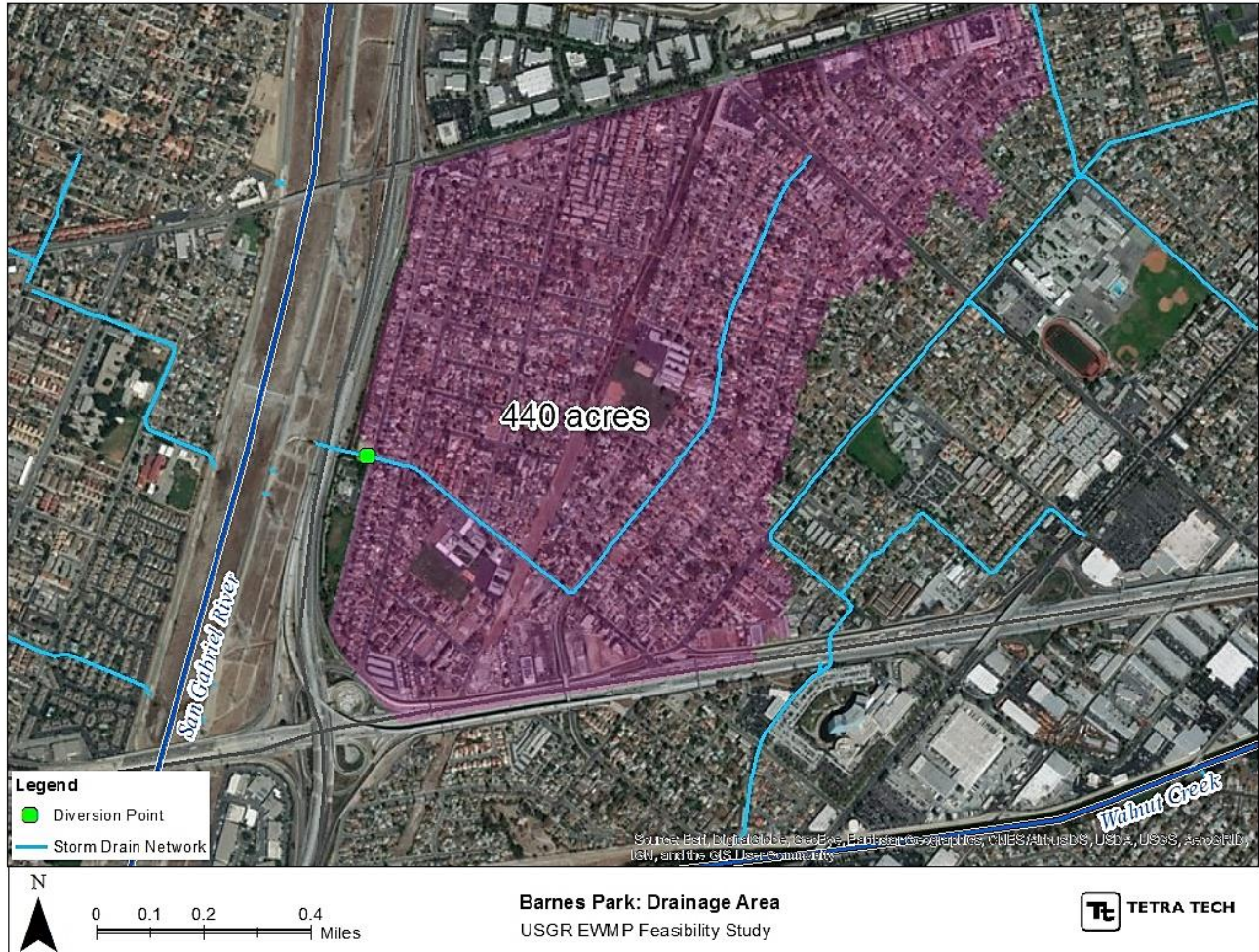


Figure 1-1. Barnes Park Drainage Area and Location



Figure 1-2. Manhole along exist. storm drain running west on Bess Ave, adjacent to the north side of the park

Barnes Park has a large grassy field (**Figure 1-3**) with picnic benches and shade structures on the outer edge, outdoor workout equipment, a playground, recycled water treatment unit, a community building, and basketball courts.



**Figure 1-3.** Grassy field looking north

## 1.1 EXISTING WATER QUALITY

For this study, the Los Angeles County Watershed Management Modeling System (WMMS) was used within the Loading Simulation Program C++ (LSPC) to simulate the contaminant loading, runoff volume, and flow rate associated with a long-term, continuous time series (Water Year 2002 to Water Year 2011) at the proposed regional stormwater facility. The WMMS is accepted by the Los Angeles Water Quality Control Board for performance of compliance analyses in the context of WMP development. This section outlines the known conditions and analyses performed to establish the baseline against which to measure all reductions.

The EWMP Reasonable Assurance Analysis (RAA) details MS4 pollutant loading requirements for subwatershed areas draining to the Upper San Gabriel River Tributary. Barnes Park is located in the area draining directly to the San Gabriel River, and specific compliance requirements for this subwatershed area have been stipulated by the Permit. These are detailed in **Table 1-1**, with a specific target for the reduction of the 90<sup>th</sup> percentile critical storm loading of Zinc, the limiting pollutant in the watershed, as well as capture of runoff from the 90<sup>th</sup> percentile critical storm for *E. coli*. Based on the WMMS pollutant loadings throughout the entire San Gabriel River watershed, the EWMP set a critical storm Zinc reduction target of 64% and full capture of runoff for the critical storm for *E. coli* for areas in the San Gabriel River subwatershed of the Upper San Gabriel Tributary, as summarized in **Table 1-1**.

**Table 1-1.** Required Reduction in San Gabriel River subwatershed during RAA 90<sup>th</sup> Percentile Critical Conditions

Critical Storm Total Zinc (lb)			Critical Storm <i>E. coli</i>		
Current Load	Allowed Load	Required Reduction	Current Load	Allowed Load	Required Reduction
293	105	64%	All runoff retained/captured before discharge		

### 1.1.1 Water Quality and Hydrology Baseline Conditions

To establish the baseline hydrology and water quality to determine the maximum benefit that the project at Barnes Park could have, the drainage area delineation was developed utilizing LA County digital stormwater pipe inventories and high-resolution Light Detection and Ranging (LiDAR) elevation data. The delineation of drainage areas to the diversion point accounts for fine-scale surface drainage patterns and infrastructure pathways to accurately reflect the maximum potential drainage area to be treated by this project.

Long-term baseline hydrology and pollutant loads to the site as well as those for the critical storms for Zinc and *E. coli* are also summarized in **Table 1-2** (long-term) and **Table 1-3** (critical storms). Additionally, peak flows and total runoff associated with the 85<sup>th</sup> percentile storm and the 10-year design storms are also included in **Table 1-3**. The water quality loadings presented in this table represent the maximum possible reductions that could be achieved by control measures at Barnes Park, albeit pragmatic diversion limitations, space constraints, and subsequent treatment mechanisms will ultimately limit how much runoff and pollutant mass can potentially be diverted out of the main channel (as further discussed in section 2).

**Table 1-2.** Long-term baseline hydrology and zinc loading at Barnes Park diversion

Drainage Area	Impervious Cover	Avg. Annual Runoff	Avg. Annual Zn Load
440 acres	59%	282.9 ac-ft	128.9 lbs

**Table 1-3.** Design Storm and Critical Storm baseline hydrology and water quality loading.

85 <sup>th</sup> Percentile Design Storm		10 Year Design Storm		Critical Storm Metals Compliance	Critical Storm Bacteria Compliance
Peak Flow	Runoff Volume	Peak Flow	Runoff Volume	Zinc Load	Runoff Volume
35.2 cfs	13.4 ac-ft	167 cfs	85.3 ac-ft	13.2 lbs	16.1 ac-ft

## 1.3 GEOTECHNICAL INVESTIGATION

The geotechnical investigation was performed by Tetra Tech November 29, 2017. The investigation examined subsurface soil and groundwater conditions of the project area through exploratory soil borings and field percolation borings. The purpose of the investigation was to determine the characteristics of the subsurface materials (including infiltration rates, expansive index, and liquefaction potential) below the invert of the proposed infiltration facilities.

The exploratory boring was performed at a maximum depth of 50.2 feet, and the percolation boring to a depth of 15 feet. Boring locations were selected as near as feasible to the proposed footprint, shown on the Boring Location Map (**Figure 1-4**). Details regarding the full field exploration process, sampling and drilling procedures, laboratory testing, standards and equipment used, and the findings from the evaluation are provided in the Preliminary Geotechnical and Infiltration Investigation Report (Tetra Tech 2017; Attachment 4). This section summarizes the findings from the geotechnical evaluation specifically related to the onsite soil types and historic groundwater levels. General structural design recommendations are covered in detail within the Preliminary Geotechnical and Infiltration Investigation Report.

### 1.3.1 Existing Soil Types

Based on the findings from our subsurface investigation, the soils at the site below the invert of the proposed infiltration facilities were observed to range from graded sands with gravel to silty sands with good drainage characteristics to a depth of about 39 feet. These soils correspond to USCS Classification of GP, SP-SM, and SP. The measured infiltration rate of 12.0 inches/hour is above the minimum required infiltration rate established by the LACDPW guidelines for on-site infiltration systems of 0.3 inches/hour and therefore the soils at the site are preliminarily considered suitable for infiltration use. In order to be more conservative on the infiltration facility's performance rate based on similar projects, it will be modeled as 5.0 in/hr. This project site is mantled by man-made fill soils approximately 1-foot thick. Alluvial soils were encountered below the fill soils and consisted of medium dense to very dense graded sands with gravel, graded gravel with sand and silty sands to a depth of 39 feet. These soils were typically light brownish gray to yellowish brown to olive gray. Underlying these sandy materials, a layer of hard silt was encountered for the remaining 11.2 feet of the exploration to a depth of 50.2 feet.

### 1.3.2 Ground Water

According to the State of California (CDMG, 1998), the historic high groundwater level near this site has been mapped at a depth of about 10 feet. During our subsurface explorations, groundwater was not encountered in the soil boring to a depth of 50.2 feet. A review of the database from the Los Angeles Department of Public Works (LACDPW) for nearby wells (<http://dpw.lacounty.gov/general/wells/>) showed that the shallowest groundwater depth was recorded at 19.5 feet in 1969. The Geotracker database was also used to search for nearby wells, but there were no wells in the nearby area. Based on the assessment of the local stratigraphy and local topography, it is our opinion that the LACDPW wells can be utilized for interpretation of the project groundwater conditions. Therefore, it is our conclusion that the groundwater at the site has been deeper than 20 feet within the last 50 years and 84 feet within the last 30 years. Fluctuations of the groundwater level, localized zones of perched water, and increased soil moisture content should be anticipated during and following the rainy season. Irrigation of landscaped areas on or adjacent to the site can also cause a fluctuation of groundwater levels. Based on the research and observed conditions, groundwater is not expected to impact the design and construction of the proposed BMP.

### 1.3.3 Geotechnical Summary

Based on the results of the field exploration and engineering analyses, it is Tetra Tech's opinion that the proposed construction is feasible from a geotechnical standpoint, provided that the recommendations contained in the Preliminary Geotechnical Investigation Report are incorporated into the design plans and implemented during construction. It should be noted that this study did not evaluate the possible presence of hazardous materials on any portion of the site.



 1360 Valley Vista Drive, Diamond Bar, CA 91765 TEL 909.860.7777 FAX 909.860.8017	BARNES PARK - BALDWIN PARK, CA		JOB NO. TET 17-136E
	SITE LAYOUT AND BORING LOCATION MAP		DATE DEC 2017
			DRAWN BY SCM
			CHECKED BY FC

Figure 1-4. Boring location map at Barnes Park

## 1.4 ENVIRONMENTAL CONDITIONS

---

As part of the site reconnaissance, a Phase 1 Environmental Assessment (ESA) and a Preliminary Initial Study (IS) have been prepared for this site. A summary of the report findings is provided in the subsequent sections. See Attachment 5 for the Phase 1 ESA, and Attachment 6 for the Preliminary IS for additional details.

### 1.4.1 Phase 1 ESA Summary

The Phase 1 ESA included visual observation of the Site, inspection of the surrounding properties from curbside, review of historical property ownership and use, review of regulatory listings, review of Internet resources, and interviews with persons knowledgeable about the Site.

Tetra Tech found no recognized environmental conditions (RECs), no controlled RECs (CRECs), no historical RECs (HRECs), one potential environmental concern (PEC), and one business environmental risk (BER) in connection with the Site. The specific findings are described below:

- Based on review of the old geotechnical investigation by Ninyo & Moore (2015), unknown fill materials were encountered from the ground surface to a depth of approximately 2 feet below ground surface. This fill material of unknown provenance is considered to be a PEC.
- The expected requirement of a Construction Stormwater Permit for redevelopment of the Site is considered to be a BER.

Based on the information gathered during the Phase 1 ESA, no further assessment is recommended except sampling the unknown fill material to be analyzed for chemicals of potential concern (COPCs).

### 1.4.2 Preliminary IS Summary

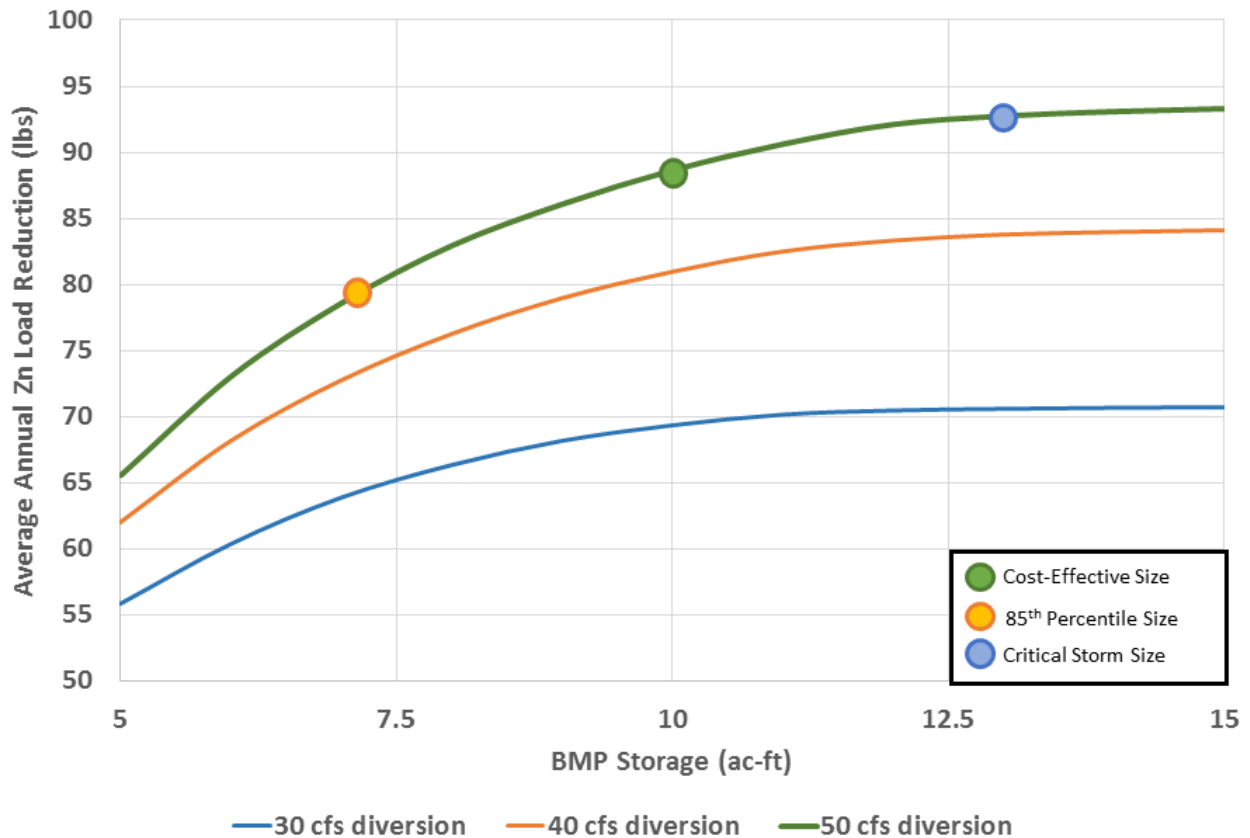
Potential environmental impacts/environmental constraints associated with the proposed project are addressed in the Initial Study (IS) Checklist in Attachment 6. The environmental factors that could be potentially affected by this project and/or require additional study to determine impact are listed below and are discussed further in the checklist.

- Biological resources
- Greenhouse gas emissions
- Transportation/traffic
- Mandatory findings of significance
- Cultural resources
- Hazards & hazardous materials
- Tribal cultural resources
- Air quality
- Hydrology/water quality
- Noise
- Recreation
- Utilities/service systems

## 2.0 BMP DESIGN COMPONENTS

The optimal BMP footprint and diversion rate was determined for the BMP site based on the long-term average annual zinc reduction, simulated using the EPA System for Urban Stormwater Treatment and Analysis Integration (SUSTAIN) model. The runoff treated by the BMP, assumed to have a 10-foot storage depth, was simulated over a ten-year period (WY 2002 - 2011), at comprehensive combinations of feasible storm drain diversion rates and footprint sizes (**Figure 2-1**). **Table 2-1** below shows the resulting optimized BMP configuration and corresponding project pollutant reductions based on the optimization modeling performed within SUSTAIN.

**Barnes Park BMP Storage and Diversion Rate Options**



**Figure 2-1.** BMP performance for varying diversion rates and storage sizes.

**Table 2-1.** Proposed BMP Footprint and Diversion Rate (With Associated Pollutant Reductions)

BMP Footprint (ac)	BMP Capacity (ac-ft)	Diversion Rate (cfs)	Metals Critical Storm Zinc Reduction (lb)	Bacteria Critical Storm Runoff Capture (ac-ft)	Average Annual Runoff Capture (ac-ft)	Average Annual Zinc Load Reduction (lbs)
1.0	10.0	50	12.1 (92%)	13.0 (81%)	139 (49%)	88.6 (69%)

The pollutant reduction exceeds the required target for the critical storm for zinc (64%) but is not quite large enough to fully capture the runoff associated with the Bacteria Critical Storm from the RAA. This is due to the larger drainage area for this project site that generates a peak flow for the critical storm that is difficult to capture while still providing cost effective pretreatment of the associated runoff. Long term average zinc load reductions for this project would occur via capture and treatment of nearly half of all runoff volume flowing to the Barnes Park diversion associated with treatment of 69% of the average annual zinc load for this drainage area. The recommended BMP size is capable of fully capturing the 85<sup>th</sup> percentile storm event, but a larger, less cost-effective would be necessary to fully capture the Bacteria Critical Storm (**Table 2-2**). While this could be built if desired, the more expensive BMP would not result in significant additional water quality benefit as shown in **Figure 2-1**.

**Table 2-2.** BMP storage requirements for different capture benchmarks for Barnes Park

BMP Capture Benchmark Options	85 <sup>th</sup> Percentile Storm Capture	Bacteria Critical Storm Capture	Cost-Effective Size Capture
BMP Storage Required	7.2 ac-ft	12.9 ac-ft	10.0 ac-ft
Rough Magnitude Project Cost Used in Water Quality Modeling <sup>1</sup>	\$8.7 million	\$15.1 million	\$11.7 million

<sup>1</sup>Costs used in water quality modeling are broad and are based on an estimate of the major component costs. For a site-specific cost estimate see Section 4.3 and Attachment 2.

## 2.1 SITE LAYOUT

The regional structural BMP system will divert runoff from the existing 81-inch diameter pipe by a drop inlet, into a 42-inch diameter pipe from the storm drain to a pretreatment device, with flow entering an underground infiltration gallery via gravity (**Figure 2-2**). The site plan is also included in Attachment 1. An above ground landscape concept plan (Attachment 3) was developed to show potential surface improvements that would provide multi-benefits for the park and the community. This concept also provides a cross section of the overall site layout.



Figure 2-2. Barnes Park Site Layout

## 2.2 DIVERSION STRUCTURE ANALYSIS

The storm drain system at the proposed BMP site was represented using the EPA System for Urban Stormwater Treatment Analysis Integration (SUSTAIN) model to determine the optimal diversion rate for the system that corresponded to the most benefit between BMP footprint and pollutant removal. The optimal flow rate of 50 cfs was determined to be feasible with a 10.4-ft by 12.4 ft drop inlet and 42-inch pipe. The proposed diversion structure sections are presented in **Figure 2-3**.

An actuated valve is a valve that can be automatically opened and closed with either an electric actuator or a pneumatic pump. Actuated valves are used to help regulate flow. For this project, when the system is full, a sensor will communicate with the actuator to close the valve, taking the system offline to prevent surcharge. The use of an actuated valve can also eliminate the need for a maintenance worker to physically open and close the valve for either maintenance or emergency purposes. Additionally, actuated valves can be connected to SCADA and real-time controls to control the direction of flow to desired treatment or discharge locations.

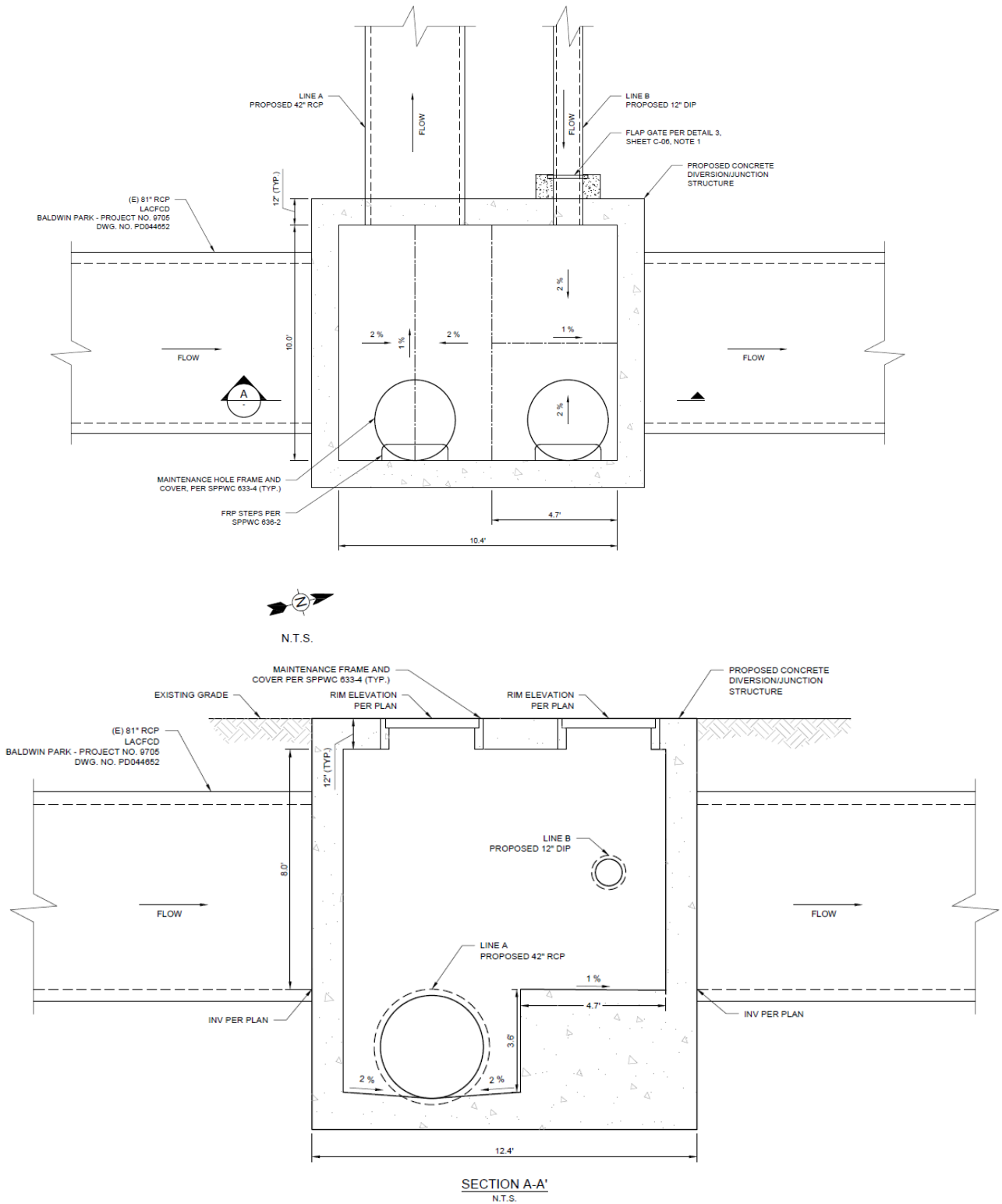
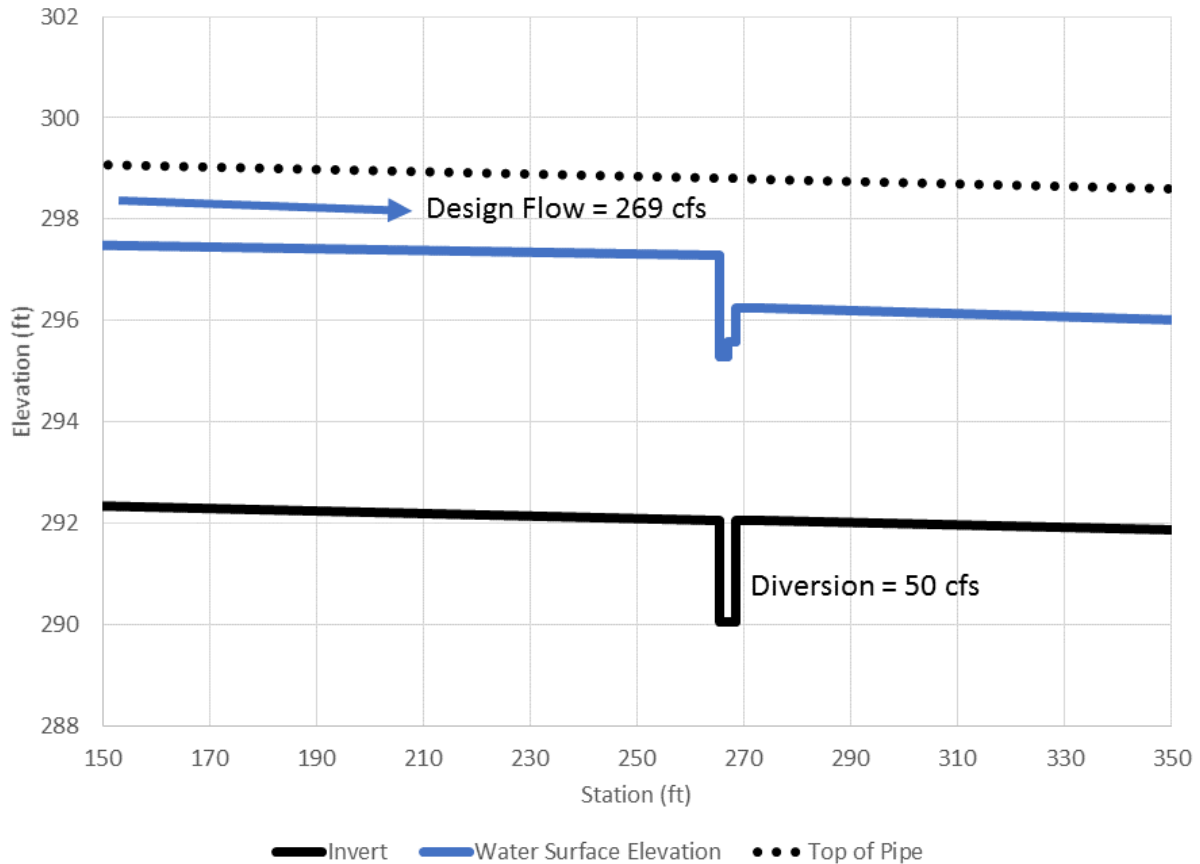


Figure 2-3. Diversion Structure at Proposed Site

Preliminary Water Surface and Pressure Gradient (WSPG) hydraulic calculations were performed based on the design information available on the 30% Design Plans. See **Figure 2-4** plotting the WSPG results. The WSPG modeling will be refined as the design is developed further, and the resulting data can be provided at the final design stage.

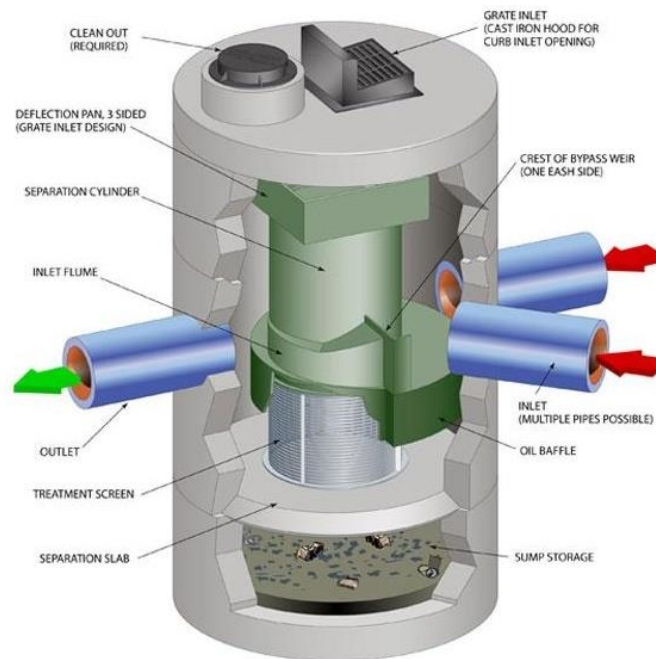


**Figure 2-4.** Preliminary WSPG Plot for Barnes Park

## 2.3 PRETREATMENT

Stormwater runoff transports sediment, trash, and debris that can compromise the performance of stormwater facilities and pollute receiving waters. Pretreatment will be an integral component if the treatment strategies to extend the life of the proposed systems. It will be prescribed in order to reduce the maintenance frequency of the BMP site stormwater facilities, focus maintenance efforts to a concentrated area, and bolster compliance.

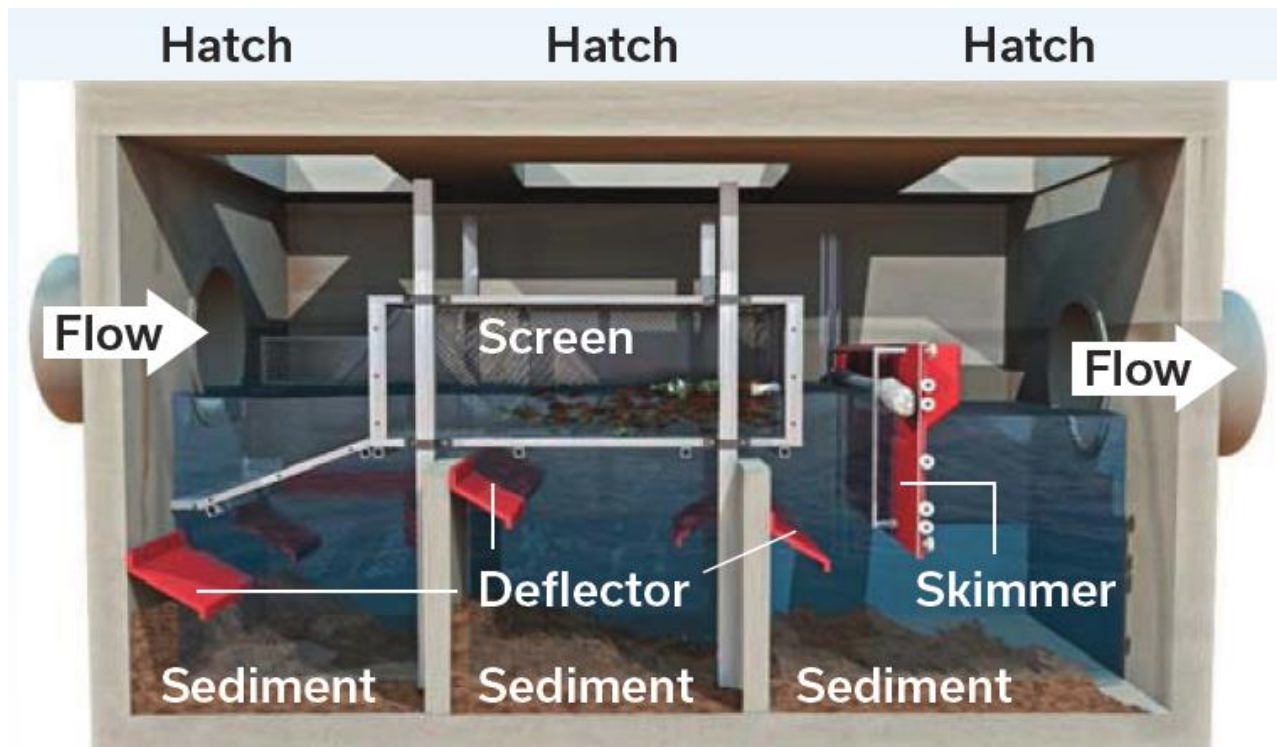
Two types of pretreatment devices are being considered for the project: a hydrodynamic separator and a baffle box. The final selection will be made during the detailed design phase of the project. A typical hydrodynamic separator collects stormwater runoff on one or more sides of the structure, then directs the water into a separation chamber where water begins swirling, forcing particles out of the runoff. One-hundred percent of floatables and neutrally buoyant debris larger than the screen aperture is collected. Hydrodynamic separators typically have an 80 percent removal rate of total suspended solids (TSS). With the chambered system, hydrocarbons float to the top of the water surface and are prevented from being transported downstream. The size of the unit will be selected based on the estimated sediment removal and the routine maintenance required. **Figure 2-5** represents a typical Contech CDS type hydrodynamic separator.



Source: Contech Engineered Solutions

**Figure 2-5.** Typical Hydrodynamic Separator

Hydrodynamic separators, such as the Contech CDS system, are popular pretreatment devices; however, trash and debris are stored for long periods submerged in water, thus potentially leaching nutrients into the treated water. As a consideration for the water quality that will possibly be sent to the irrigation treatment system, a Nutrient Separating Baffle Box (NSBB) by Suntree Technologies, Inc. is also being considered as a pretreatment solution. At a flow rate of 50 cfs, NSBB is available in the NSBB-8-16 with 89% removal of TSS at a treatment level of 150 microns. The NSBB system uses screens that are suspended above the sedimentation chambers that capture and store trash and debris in a dry state, thus reducing potential nutrient leaching and bacteria growth. TSS is removed by routing the flows through a triple chambered system. An oil skimmer with hydrocarbon booms traps and absorbs oil. The NSBB system can remove more than 80 percent of TSS. **Figure 2-6** illustrates the typical operation of a NSBB system.



**Figure 2-6.** Typical NSBB System

Source: Suntime Technologies, Inc.

## 2.4 REGIONAL BMP STRUCTURAL ALTERNATIVES

Underground storage tanks provide initial stormwater detention and allow for implementation where surface space is limited such as around paved streets, parking lots, and buildings. Precast concrete storage systems, such as the StormTrap, Oldcastle, and Jensen StormVault systems, made from durable, reinforced, and high-strength concrete would be the most appropriate modular unit for this project (as opposed to plastic modular units). They can be designed to exceed HS-20 loading, have varying depths of cover, and overcome buoyancy forces. Internal heights can vary to meet the designed storage volume. Cast-in-place structures were not considered a viable solution due to the time required to form, pour, and cure the structure. The additional time would create an additional burden on park operations and could extend the construction schedule.

The StormTrap Double Trap system (*Figure 2-7* and *Figure 2-8*) allows for a maximum headroom of 11'-4", and will provide water storage for more than 10.0 acre-feet of water while allowing for 1 foot of freeboard in the system. The system will be configured to allow for infiltration through the bottom of the system. The modular pieces are constructed offsite and delivered to the project site via truck and lifted into place with a crane. A typical day of installation may allow for 30 to 40 units to be placed in one day. The exact number of modules will depend on the selected vendor.



*Figure 2-7.* StormTrap Installation at Bolivar Park BMP



**Figure 2-8.** Inside StormTrap Unit Installed at Bolivar Park BMP

## 2.5 WATER CONSERVATION POTENTIAL

Because infiltration is feasible at Barnes Park based on the geotechnical investigation, this project has the potential to contribute to local water conservation objectives through groundwater recharge. Capture, treatment, and infiltration of stormwater allows this water to contribute to groundwater recharge and replenishment to local aquifers that are used as sources of water to offset water transported from more distant resources. The recommended BMP configuration captures and treats an annual average of 139 acre-feet of water that contributes to local groundwater replenishment, providing local conservation of stormwater as a potentially usable resource. This provides invaluable water conservation of runoff that otherwise discharges to the San Gabriel River and further drains to the ocean unused.

### 3.0 MONITORING PLAN

There are two goals of the monitoring plan: 1) BMP effectiveness monitoring to document the performance of the BMP and to quantify stormwater volume captured and pollutant removal achieved, and 2) maintenance monitoring to track BMP performance and to predict required maintenance. See **Figure 3-1** below for a conceptual monitoring schematic for Barnes Park. A Monitoring Plan has been provided in Appendix H of the Feasibility Study, which also includes a site-specific conceptual monitoring plan for each site and example chain of custody/field forms.

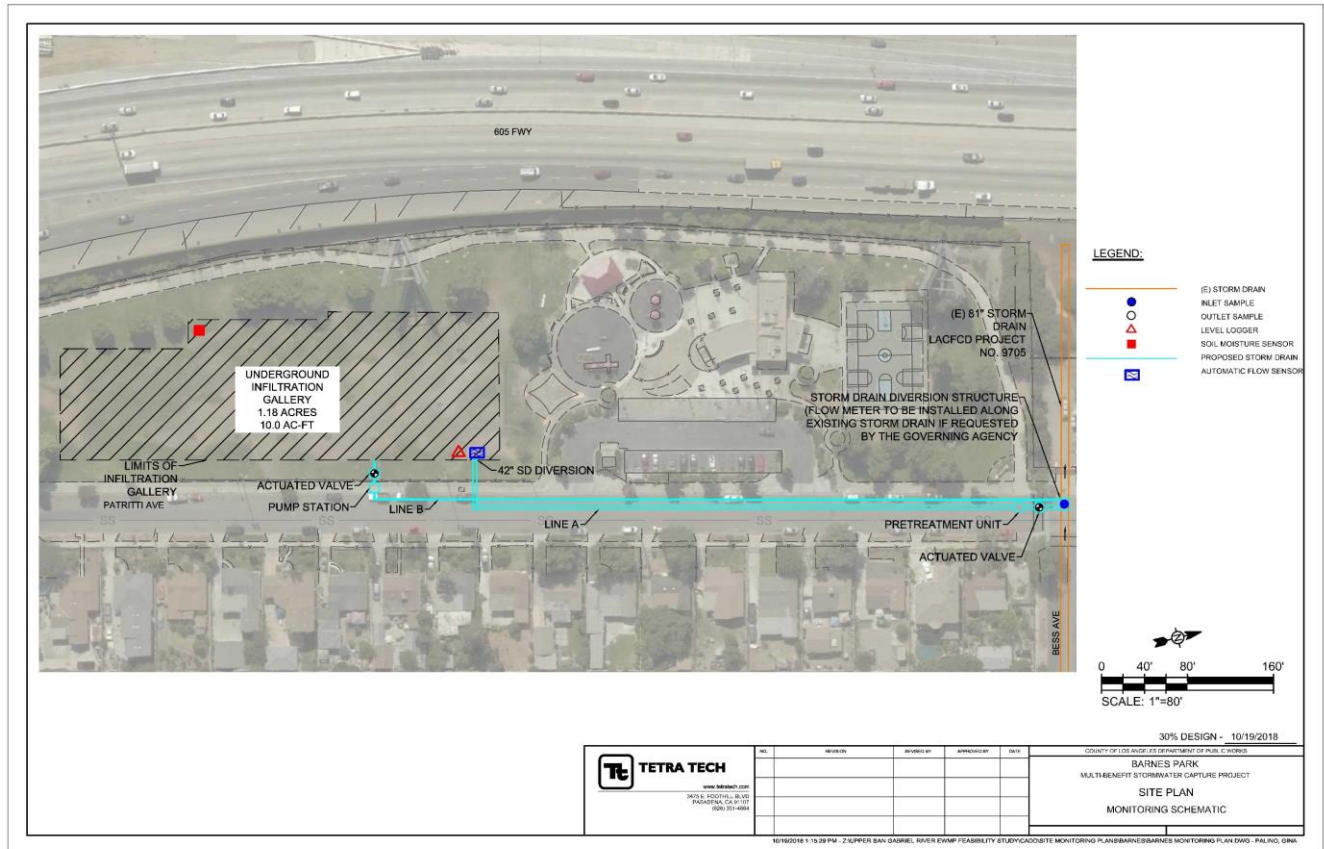


Figure 3-1. Monitoring Schematic for Barnes Park

## 4.0 REGULATORY AND PERMITTING EVALUATION

Consultation with regulatory agencies and acquisition of permits is required before the project components can be constructed. **Table 4-1** summarizes the plan checks, regulatory permits and approvals relevant to this project. Additional discussion on permitting requirements for the Regional Water Quality Control Board, the California Department of Fish and Wildlife, and Los Angeles County Flood Control District, as well as draft permit templates for the are provided in Appendix I of the Feasibility Study.

**Table 4-1.** Listing of Anticipate Required Permits

Agency	Permit/Notification Name	Rationale	Initial Steps
City of Baldwin Park Parks and Recreation	--	City of Baldwin Park Parks and Recreation is the property owner.	Contact Planning and Development Division.
City of Baldwin Park	Grading Permit	Grading in excess of 5,000 cubic yards or grading that will support a structure is designated as engineered grading.	A plan check must first be conducted with the Building and Safety Office.
Los Angeles County Flood Control District	Major Modification Permit	A water diversion structure is considered a drainage facility modification.	Complete and submit application for review.
Los Angeles County Flood Control District	Discharge Permit	Non-storm water (treated water) will be discharged directly into an existing District facility.	Complete and submit application for review.
Los Angeles County Department of Public Works	Encroachment Permit	Project construction will require road closures in the unincorporated areas.	Complete and submit application for review.
Los Angeles County Department of Public Works	Landscape Review/Permit	Installation of parkway, greenway, and/or beautification improvements along Los Angeles County right of way.	Complete and submit application for review.
State Water Resources Control Board	Construction General Permit	One or more acres of soil will be disturbed during construction.	Submit a notice of intent.
Southern California Edison	Design Permit	Installation of a new electrical service plan.	Contact Southern California Edison's Local Planning Department and complete Customer Project Information Sheet and Design Option Letter.
Los Angeles County Department of Public Health	Cross Connection and Water Pollution Control Program	Ensure that there is no hazard to the potable water system.	

Agency	Permit/Notification Name	Rationale	Initial Steps
South Coast Air Quality Management District	Rule 403	Prevent, reduce, or mitigate fugitive dust emissions from construction activities.	Construction in the South Coast Air Basin must incorporate best available control measures included in Table 1 of Rule 403.

## 4.1 ENVIRONMENTAL DOCUMENTATION

Compliance with the California Environmental Quality Act (CEQA) would be required. A governmental agency is required to comply with CEQA procedures when the agency proposes to carry out or approve the activity/project. CEQA considers a “project” to be the whole of an action, which has a potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment. The preparation of an Initial Study (IS) is typically the first step for projects determined to not be exempt from CEQA requirements. Initial Studies allow decision-makers the opportunity to review a proposed project and to make an environmental determination recommending the follow-on CEQA document. Initial Studies consider all phases of project planning, implementation, and operation and utilize the CEQA Guidelines IS Checklist form that covers 17 environmental resources topics. If the IS identifies that there is no substantial evidence that the project may have a significant impact on the environment (with or without mitigation) then a Negative Declaration or Mitigated Negative Declaration may be prepared. In the unlikely event that the IS identifies that the project may have a significant impact on the environment, then an Environmental Impact Report (EIR) is prepared. A description of investigations that may be required are included below.

Compliance with the National Environmental Policy Act (NEPA) would be required if there is a federal nexus (such as federal funding) and would need to comply with the implementing procedures of the applicable federal agency.

A Phase 1 Environmental Assessment and a Preliminary Initial Study Checklist are provided in Attachment 5 and 6 of this Appendix.

### 4.1.1 Historical Resources

The Historical Resources assessment will investigate the occurrence of historically significant areas within the vicinity of a proposed project site, namely sites listed on or eligible for designation by the California Register of Historical Resources (CRHR). A resource should be considered a historical resource if it has previously been identified as significant in a historical resource survey.

If a Lead Agency is unsure about a resource, they should consider hiring a professional historian or archeologist who meets the Secretary of the Interior Standards Professional Qualifications for History, Architectural History, or Archeology. However, CEQA ultimately delegates final authority to the Lead Agency to determine if a resource is historically significant or not (CEQA Case Studies).

### 4.1.2 Archeological Resources

Investigations by institutions such as The Native American Heritage Commission’s search of the Sacred Lands Inventory will likely be required for full compliance. Further assessments for isolated artifacts or stream or topographical formations may also indicate the presence of subsurface prehistoric archeological resources during excavation.

### 4.1.3 Paleontological Resources

Paleontological records may be assessed for records of known vertebrate fossils within the proposed project areas, as well as within older, sedimentary deposits.

### 4.1.4 Burial Sites

An investigation of known burial sites will occur prior to construction. In the event that an unknown burial site or human remains are found during excavation, mitigation should be implemented so that potential impacts remain at a less significant level.

## 4.2 SCHEDULE

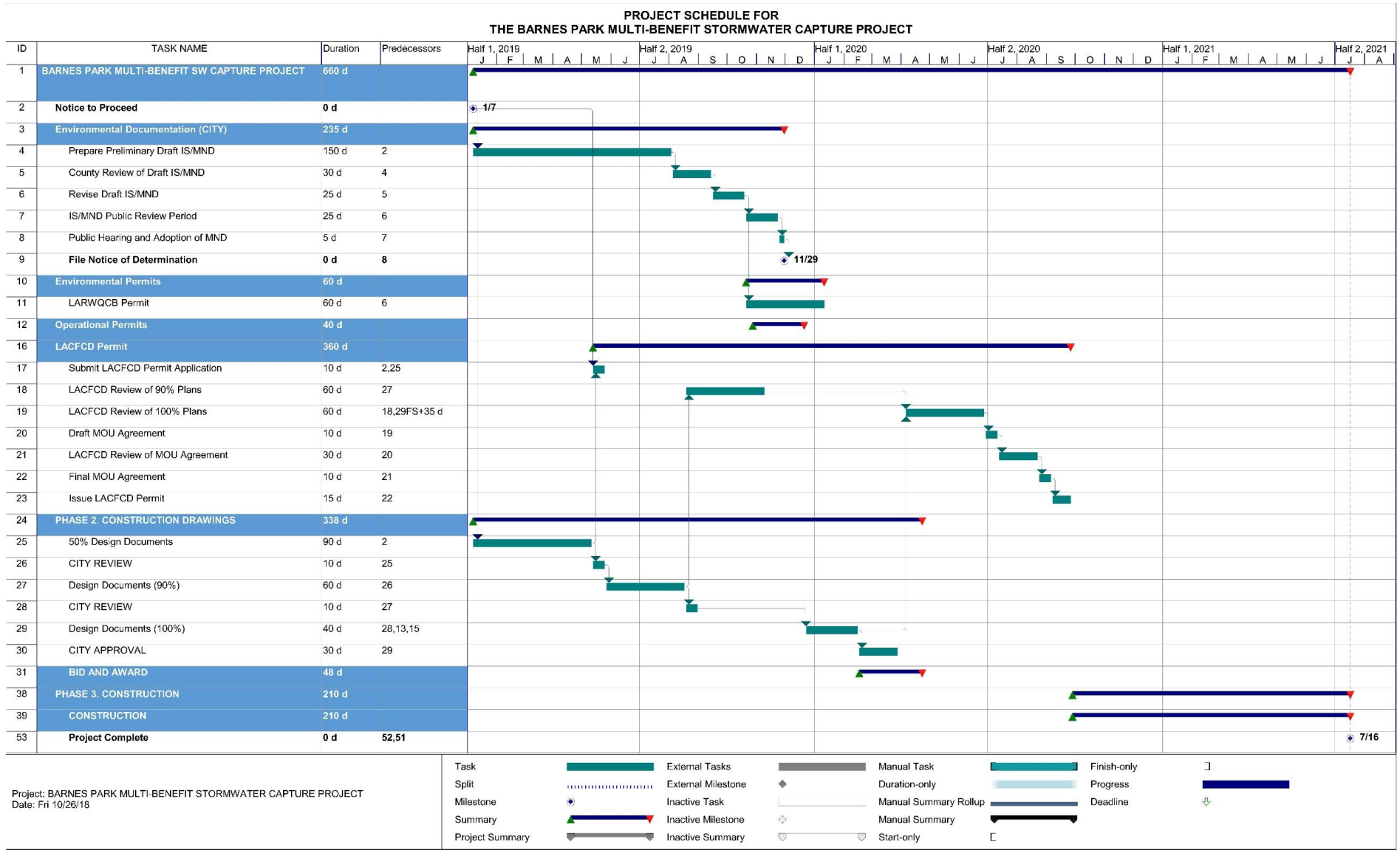


Figure 4-1. Project Implementation Schedule (start date TBD)

## 4.3 COST ANALYSIS

The cost analysis is utilized as a tool to ensure the preliminary design is within the amount of funds available to the project. If the cost analysis indicated that the project is not feasible, then the design will need to be adjusted to bring it within the project budget, while still meeting the project goals. The cost analysis was developed using various sources of information, as well as the Cost Estimator's judgement. See **Table 4-2** for a summary of the total costs.

**Table 4-2.** Total Project Cost

Cost Component	
Construction (includes 20% contingency)	\$12,813,644
Pre-Design, Design, and Construction Support (10%)	\$1,281,364
Environmental Planning and Permitting (5%)	\$640,682
Agency Project Management (5%)	\$640,682
Construction Administration (15% of construction)	\$1,922,047
Construction Surveying	\$20,000
<b>Total Project Cost<sup>1</sup></b>	<b>\$17,318,419</b>

<sup>1</sup>Cost includes 20% contingency on the construction portion.

### 4.3.1 Construction Cost

The construction cost entails the various components of the projects that a Contractor would construct for the City. Construction costs do not include items of work not directly performed by the Contractor, such as a City's construction management during construction. The construction costs were developed using various sources of cost information. The detailed opinion of probable construction cost for the proposed BMP is provided in Attachment 2. See the last page of the cost estimate for a list of assumptions and exclusions.

### 4.3.2 Operations & Maintenance Costs

The operations and maintenance costs were developed on the basis that a service contractor would maintain the various components of the system. Operation of the system during wet and dry weather events will be managed by the City. Operations of the diversion structure will incorporate coordination and notifications to the LACFCD to ensure that there will be no effect on the flood control conveyance system operation. **Table 4-3** estimates annual costs for typical operations and maintenance activities, not including the cost of long-term monitoring.

**Table 4-3.** Annual Estimated Operations & Maintenance Costs

Description	Frequency	# of times/year	Unit Price	Total
<b>Monitoring Controls</b>				<b>\$32,400</b>
<b>Pump Station</b>				<b>\$3,000</b>
Valve Inspection and Cleaning (Vacuum)	Annually	1	\$500	\$500
Pump Inspection and Cleaning (Vacuum)	Annually	1	\$500	\$500
Valve Maintenance	Annually	1	\$1,000	\$1,000

Control Panel Maintenance	Annually	1	\$1,000	\$1,000
<b>Storm Drain Diversion and Pretreatment</b>				<b>\$10,000</b>
Hydro-jetting Pipes being Diverted	Every 3-5 Years	1/5	\$5,000	\$1,000
Drop Inlet System – Inspection and Cleaning	Quarterly	4	\$750	\$3,000
Pretreatment Device – Vacuum	Quarterly	4	\$1,500	\$6,000
<b>Storage</b>				<b>\$25,500</b>
Dry Season Inspection and Cleaning (Vacuum)	Bi-monthly	3	\$4,000	\$12,000
Wet Season Inspection and Cleaning (Vacuum)		3	\$4,000	\$12,000
<b>Total</b>				<b>\$69,400</b>

## ATTACHMENT 1. SITE PLAN

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## ATTACHMENT 2. OPINION OF PROBABLE CONSTRUCTION COSTS

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## ATTACHMENT 3. LANDSCAPE CONCEPT PLAN

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## ATTACHMENT 4. GEOTECHNICAL INVESTIGATION AND INFILTRATION TESTING REPORT

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## ATTACHMENT 5. PHASE 1 ENVIRONMENTAL SITE ASSESSMENT

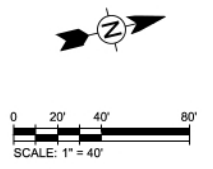
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## ATTACHMENT 6. PRELIMINARY ENVIRONMENTAL INITIAL STUDY

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- LEGEND:**
- LIMITS OF INFILTRATION GALLERY
  - - - SHORING LIMITS FOR INFILTRATION GALLERY
  - RIGHT OF WAY / PROPERTY LINE
  - SS (E) SANITARY SEWER
  - ACTUATED VALVE



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<b>TETRA TECH</b> <small>www.tetrattech.com          3475 E. FOOTHILL BLVD          PASADENA, CA 91107          (626) 351-4664</small>	NO.	REVISION	REVISED BY	APPROVED BY	DATE		COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS <b>BARNES PARK</b> MULTI-BENEFIT STORMWATER CAPTURE PROJECT <b>SITE PLAN</b>
	APPROVED BY _____ CITY ENGINEER _____ DATE _____						PROJECT ENGINEER _____ DATE _____ DWG G-05 SHEET 5 OF 12

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## **ATTACHMENTS FOR SECTION 2.5:**

**COST**

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## **ATTACHMENTS FOR SECTION 2.7:**

### **MONITORING**

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# **Appendix H: Monitoring Plan**

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## ACRONYMS/ABBREVIATIONS

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Acronyms/Abbreviations	Definition
AVB	Area-Velocity Bubbler
BMPs	Best Management Practices
CIMP	Coordinated Integrated Monitoring Program
EWMP	Enhanced Watershed Management Plan
LTA	Long-Term Assessment
NOAA	National Oceanic and Atmospheric Association
MS4	Municipal Separate Storm Sewer System
USGR	Upper San Gabriel River
SCADA	Supervisory Control and Data Acquisition
SGR	San Gabriel River
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
WQOs	Water Quality Objectives

## 1.0 INTRODUCTION

Performance Monitoring of stormwater Best Management Practices (BMPs) is a critical component of a BMP implementation program. Monitoring provides the BMP's designer a mechanism to validate certain design assumptions and to quantify pollutant-removal performance. Specific monitoring objectives should be considered early in the design process to ensure that BMPs are adequately configured for monitoring.

Proper configuration and equipment are critical to collect the data necessary to evaluate BMP effectiveness and predict restorative maintenance. The two main goals of this monitoring program are:

1. BMP effectiveness monitoring to document the performance of the BMP and to quantify stormwater volume captured and pollutant removal achieved, and
2. Maintenance monitoring to track BMP performance and to predict required maintenance.

The Upper San Gabriel River (USGR) EWMP Group is required by the Los Angeles County Municipal Separate Storm Sewer System (MS4) permit to meet water quality limits for the metals (copper, zinc, and lead) Total Maximum Daily Load (TMDL) and the Bacteria TMDL in the San Gabriel River (SGR) Watershed. The objective of this monitoring plan is to demonstrate BMP performance, determine water quality improvements and track performance for accurate predictive maintenance. The components of the plan discussed herein are the monitoring methodology (including weather tracking, monitoring locations, constituents, frequency, and sampling methods), QA/QC protocol, and data analysis.

## 2.0 MONITORING PLAN SUMMARY

This monitoring plan focuses on the TMDL pollutants identified in the USGR EWMP Group Coordinated Integrated Monitoring Program (CIMP). To measure the performance of the regional BMPs, flow-weighted composite samples should be collected at the inlet and outlet of the system (refer to site figures provided in Section 4 which indicate preliminary monitoring points). Autosamplers may be installed at the inlet and outlet of each stormwater BMP depending on funding available. The final monitoring locations will be determined during the design phase of each project. At a minimum, samples should be analyzed for Zinc (total recoverable Zinc) and E. coli, which are identified as the priority TMDLs in the USGR EWMP Group CIMP. Data from a range of storm events are evaluated and compared to determine the performance of the BMP for the priority TMDL pollutants.

Maintenance monitoring of the BMP facility can be achieved by installing equipment that will collect data continuously. This equipment will be connected to a cloud-based data system, which will provide the capability to assess and report performance in real-time and to predict when routine maintenance will be needed or when failure may occur.

## 3.0 MONITORING METHODOLOGY

This section will outline the monitoring methodology from pre- to post-event practices, including the necessary equipment to perform these tasks. The methodology includes:

- weather tracking and mobilization,
- monitoring locations,
- constituents,
- frequency,
- and sampling methods

### 3.1 WEATHER TRACKING AND MOBILIZATION

To determine if and when mobilization will occur, the National Oceanic and Atmospheric Association (NOAA) National Weather Service Forecast Office's point forecast for the desired area will be examined (<https://www.wrh.noaa.gov/forecast/wxtables/>). The NOAA point forecast system allows users to select a specific location on a map and returns a tailored forecast. See **Table 3-1** below for a list of coordinates and web addresses correlating to the forecast for each site. This forecast includes a precipitation depth estimate as well as a percentage chance precipitation will occur. The CIMP identifies the triggering sampling for wet weather conditions is a 70% probable forecast of greater than 0.25 inches of precipitation of rain where the preceding 72 hours of dry weather has less than 0.1 inches of rain.

**Table 3-1.** NOAA Forecast Locations and Web Addresses

Site	Latitude/Longitude	Web Address
Barnes Park	34.0660/-118.0000	<a href="https://www.wrh.noaa.gov/forecast/wxtables/index.php?lat=34.067570000000046&amp;lon=-117.999819999999994">https://www.wrh.noaa.gov/forecast/wxtables/index.php?lat=34.067570000000046&amp;lon=-117.999819999999994</a>
Wingate Park	34.0850/-117.8660	<a href="https://www.wrh.noaa.gov/forecast/wxtables/index.php?lat=34.09280000000007&amp;lon=-117.866909999999996">https://www.wrh.noaa.gov/forecast/wxtables/index.php?lat=34.09280000000007&amp;lon=-117.866909999999996</a>
Finkbiner Park	34.1330/-117.8480	<a href="https://www.wrh.noaa.gov/forecast/wxtables/index.php?lat=34.13780000000003&amp;lon=-117.8628">https://www.wrh.noaa.gov/forecast/wxtables/index.php?lat=34.13780000000003&amp;lon=-117.8628</a>
San Angelo Park	34.0430/-117.9950	<a href="https://www.wrh.noaa.gov/forecast/wxtables/index.php?lat=34.04959000000002&amp;lon=-118.002119999999999">https://www.wrh.noaa.gov/forecast/wxtables/index.php?lat=34.04959000000002&amp;lon=-118.002119999999999</a>
Cortez Park	34.0590/-117.8880	<a href="https://www.wrh.noaa.gov/forecast/wxtables/index.php?lat=34.06460000000004&amp;lon=-117.890189999999996">https://www.wrh.noaa.gov/forecast/wxtables/index.php?lat=34.06460000000004&amp;lon=-117.890189999999996</a>
Allen J Martin Park	34.0470/-117.9690	<a href="https://www.wrh.noaa.gov/forecast/wxtables/index.php?lat=34.03973000000008&amp;lon=-117.962289999999994">https://www.wrh.noaa.gov/forecast/wxtables/index.php?lat=34.03973000000008&amp;lon=-117.962289999999994</a>
La Puente Park	34.0250/-117.9640	<a href="https://www.wrh.noaa.gov/forecast/wxtables/index.php?lat=34.02618000000007&amp;lon=-117.951169999999999">https://www.wrh.noaa.gov/forecast/wxtables/index.php?lat=34.02618000000007&amp;lon=-117.951169999999999</a>

### 3.2 MONITORING LOCATIONS

The regional BMP's for this project are located throughout the USGR watershed, specifically at public parks. These BMP's consist of the following components:

- Storm drain or channel diversion
- Pretreatment device
- Subsurface storage facility (some sites include drywells)
- Pump station and return line for filtration facilities, and optional pump station and return line for infiltration facilities

See **Table 3-2** for a summary of the BMP design features.

Monitoring of the BMPs is required at distinct locations for the different monitoring methods, and are also site-specific, varying based on the type of BMP. BMP effectiveness monitoring consists of both flow monitoring and chemical sampling, which are described in Section 3.5.1. Chemical sampling for all of the BMP's is required at the

diversion structure. If the subsurface structure has a filtration system, chemical sampling should also be done at the discharge point from the subsurface structure. Automatic flow monitoring is also required at the inlet of each BMP. For maintenance monitoring, a water level logger will be located near the inlet of the BMP. Soil moisture sensors should be placed on the surface of the soil within the vaults where infiltration will occur. Storage vaults with filtration systems do not need soil moisture sensors. For drywells, a flowmeter should be placed at the invert of discharge pipe from the pretreatment device.

See Attachments 1 through 7 for a monitoring schematic of each regional BMP site. These monitoring locations are based on the proposed feasibility study concepts and are subject to change in the final design of the BMP. The final monitoring locations will be determined during the project design phase.

**Table 3-2. BMP Summary Table**

Site	Type of BMP	BMP Storage (ac-ft)	Design Infiltration/ Filtration Rate
Barnes Park	Subsurface storage/infiltration vault	10.0	5.0 in/hr
Wingate Park	Subsurface storage/infiltration vault	14.6	1.5 in/hr
Finkbiner Park	Subsurface storage/infiltration vault	19.0	1.9 in/hr
San Angelo Park	Subsurface storage/filtration vault & drywells	5.7	5.76 cfs & 7.1 in/hr
Cortez Park	Subsurface storage/filtration vault	4.0	2.88 cfs
Allen J Martin Park	Subsurface storage/filtration vault & drywells	9.0	5.76 cfs & 7.0 in/hr
La Puente Park	Subsurface storage/filtration vault	1.5	2.88 cfs

### 3.3 CONSTITUENTS

The constituents to be monitored are dictated by the CIMP. The parameters that should be monitored are metals (lead, copper, and zinc), E. coli, flow, pH, hardness, and total suspended solids (TSS). Sampling bottle type, preservatives (if necessary), holding times, and field parameters are required to be included in the SAP during the design phase.

### 3.4 FREQUENCY

Chemical sampling should be done during both wet and dry weather. During the first year of BMP operation, a minimum of three (3) storms at the beginning of the wet season should be sampled. Wet weather as defined by the CIMP is a storm even with a 70% probable forecast of greater than 0.25 inches of precipitation of rain where the preceding 72 hours of dry weather has less than 0.1 inches of rain. Three (3) dry weather samples should also be collected within the first year of BMP operation. After the first year of operation, one (1) wet weather and one (1) dry weather sample should be collected.

### 3.5 SAMPLING METHODS & PROCEDURES

To meet the monitoring plan objectives, BMP effectiveness and maintenance monitoring must be conducted to measure the performance of the regional BMPs and predict maintenance needs. Chemical sampling is also required to calculate pollutant loading. All sampling procedures should be performed in accordance with the

CIMP and local agency requirements. A Sampling and Analysis Plan (SAP) will be required during final design of the BMP, which will provide more project specific information.

### 3.5.1 BMP Effectiveness Monitoring

BMP effectiveness monitoring is required to document the performance of the BMP and to quantify stormwater volume captured and pollutant removal achieved. These goals are achieved through both flow monitoring and chemical sampling, which are explained in detail below.

#### 3.5.1.1 Flow Monitoring

Flow at the BMP inlet location should be measured in real time using an area-velocity bubbler (AVB) flow meter with an AVB sensor. This automatic sensor will transmit real time flow data to a cloud-based system that the BMP operator can easily see the information. Data analysis to determine stormwater volume is described in Section 5.

#### 3.5.1.2 Chemical Sampling

During wet weather, chemical samples should be collected at the diversions structure and outlet pipe location (for filtration systems only) over the duration of the storm event to obtain flow-weighted pollutant concentrations (composite sampling). Samples should be collected at 20-minute intervals over a 3-hour period unless otherwise specified by the CIMP or governing jurisdiction. During dry weather, samples can be collected at any time of the day as composite sampling is not applicable. These samples can be collected as grab samples or by an autosampler that is programmed to collect the samples at the pre-programmed user specified times.

### 3.5.2 Maintenance Monitoring

Maintenance monitoring is essential for tracking long-term BMP performance and predicting maintenance requirements. Additional monitoring equipment is recommended for the subsurface vaults include water level loggers and soil moisture sensors. For sites where drywells are used in conjunction with the subsurface vault, drywell flowmeters are recommended.

#### 3.5.2.1 Level Logger

A water level logger at the surface of the soil within the subsurface vault can collect data on the ponding depth and ultimately determine the infiltration rate at the surface. This data can be used to determine the performance throughout a rain event and demonstrate any decreases in performance from the start of the rain event to the end. An overall reduction in infiltration could indicate an impending maintenance need allowing staff to predict when maintenance will be required rather than reacting to a visual indicator.

#### 3.5.2.2 Soil Moisture Sensor

A soil moisture sensor strategically placed in a BMP would indicate if the system is performing as designed and identify any potential performance limitations. Soil moisture sensors are required at the sites where the subsurface vault is designed to infiltrate. The observed infiltration rate should be compared to the design infiltration rate at each site. This sensor can be connected to a Supervisory Control and Data Acquisition (SCADA) system, which is configured to monitor the BMP system and send data to the staff by communicating through the cellular network. Collecting data in real time allows maintenance staff to evaluate trends that may indicated when routine or restorative maintenance will be required that cannot be observed in the field. The SCADA system conveniently allows staff to make observations from their desktop, reducing the burden on the field staff and minimizing the number of required field inspections.

### 3.5.2.3 Drywell Flowmeter

A flow meter at the drywell inlet, after the drywell pretreatment device, will collect data on the infiltration performance of the drywells. Data should be collected at the beginning of system operation to get a baseline flow rate to compare to throughout the life of the drywell. If data shows that the flow rates subside, this can indicate that the pretreatment device requires maintenance.

### 3.5.3 General Sampling Techniques for Chemical Grab Samples

Monitoring methodology should adhere to the monitoring guidelines as outline in the CIMP. Although the method used to collect water samples varies dependent on the depth, flow, and sampling location, the list below is an overview of sampling techniques that are applicable to all cases.

1. Throughout each sample collection event, the sampler should exercise aseptic techniques to avoid any contamination (i.e., do not touch the inner surfaces or lip edges of the sample bottle or cap).
2. The sampler should use clean, powder-free, nitrile gloves for each site to prevent contamination.
3. When collecting the sample, the sampler should not breathe, sneeze, or cough in the direction of the container.
4. Gloves should be changed if they are soiled, or if the potential for cross-contamination exists from handling sampling materials or samples.
5. While the sample is collected, the bottle lid shall not be placed on the ground.
6. The sampler should not eat or drink during sample collection.
7. The sampler should not smoke during sample collection.
8. Each person on the field crew should wear clean clothing that is free of dirt, grease, or other substances that could contaminate the sampling apparatus or sample bottles.
9. To the extent practical, sampling should not occur near a running vehicle. Vehicles should not be parked within the immediate sample collection area, even non-running vehicles.
10. When the sample is collected, ample air space should be left in the bottle to facilitate mixing by shaking for lab analysis, unless otherwise required by the method.
11. After the sample is collected and the cap is tightly screwed back on the bottle, the time of sampling should be recorded on the field log sheet.
12. Any quality assurance/quality control (QA/QC) samples that are collected should be noted on the field log sheet.
13. Samples should be stored as described in the SAP.
14. Chain of Custody (COC) forms should be filled out as applicable and delivered to the appropriate laboratory as soon as feasible to ensure hold times are met. An example COC is provided in Attachment 8.

To prevent contamination of samples, clean metal sampling techniques using USEPA protocols outlined in USEPA Method 16694 will be used throughout all phases of the water sample collection. The protocol for clean metal sampling, based on USEPA Method 1669, is summarized below:

1. Samples are collected in rigorously pre-cleaned sample bottles with any tubing specially processed to clean sampling standards.
2. At least two persons, wearing clean, powder-free nitrile or latex gloves at all times, are required on a sampling crew.
3. One person, referred to as “dirty hands”, opens only the outer bag of all double-bagged sample bottles.
4. The other person, referred to as “clean hands”, reaches into the outer bag of all double bagged sample bottles.
5. “Clean hands” rinses the bottle at least two times by submerging the bottle, removing the bottle lid, filling the bottle approximately one-third full, replacing the bottle lid, gently shaking, and then emptying the bottle. “Clean hands” then collects the sample by submerging the bottle, removing the lid, filling the bottle, and replacing the bottle cap while the bottle is still submerged. After the sample is collected, the sample bottle is double-bagged in the opposite order from which it was removed from the same double-bagging.

Samplers should put on clean, powder-free gloves whenever something not known to be clean has been touched.

### 3.5.4 Sample Labeling

Samples must be identified with a unique identification code to ensure that results are properly reported and interpreted and allows the site, sampling location, matrix, sampling equipment and sample type to be distinguished by a data reviewer or user. The format for sample identification codes for this BMP modeling is USGR - AAA - XXXX - ### where:

- USGR indicates that the sample was collected as part of the USGR watershed.
- AAA indicates the unique site ID for each site.
- XXXX identifies if this is a dry weather (DW) or wet weather (WW) monitoring event, and which event in the year it is, numbered sequentially from 01 to 05
- ### identifies the sample number unique to a sample bottle collected for a single event. Sample bottles are numbered sequentially 001 to 999 and will not be repeated within a single event.

The sample containers should be pre-labeled before each sampling event to the extent practicable to simplify field activities for the field crew. The sample labels should include the information shown in **Table 3-3**.

**Table 3-3.** Sample Bottle Label Information

Program Name	Date	Analytical Requirements
Station ID	Collection Time	Preservation Requirements
Sample ID	Sampling Personnel	Analytical Laboratory

## 4.0 QA/QC PROTOCOL

Quality assurance and quality control (QA/QC) protocol is necessary for field sampling. The key aspects of quality control associated with field protocols for sample collection and eventual chemical and toxicological analyses, as specified in the CIMP, are as follows:

1. *Field personnel will be thoroughly trained in the proper use of sample collection gear and will be able to distinguish acceptable versus unacceptable water samples in accordance with pre-established criteria.*
2. *Field personnel will be thoroughly trained to recognize and avoid potential sources of sample contamination.*
3. *Sampling gear and utensils which come in direct contact with the sample will be made of non-contaminating materials (e.g. borosilicate glass, high-quality stainless steel and/or Teflon™, according to protocol) and will be thoroughly cleaned between sampling stations according to appropriate cleaning protocol (rinsing thoroughly at minimum).*
4. *Sample containers will be of the recommended type and will be free of contaminants (i.e., pre-cleaned).*
5. *Conditions for sample collection, preservation, and holding times will be followed.*

*Field crews will be comprised of two persons per crew, minimum. For safety reasons sampling will occur during daylight hours, when possible. Sampling on weekends and holidays will also be avoided. Other constraints on sampling events include, but are not limited to, lab closures and toxicity testing organism availability. Sampling events should proceed in the following manner:*

1. *Before leaving the sampling crew base of operations, confirmation number and type of sample containers as well as the complete equipment list.*
2. *Proceed to the first sampling site.*
3. *Fill-out the general information on the field log sheet.*

4. *Collect the environmental and QA/QC samples indicated on the event summary sheet and store samples appropriately. Using the field log sheet, confirm that all appropriate containers were filled.*
5. *Collect field measurements and observations, and record these on the field log sheet.*
6. *Repeat the procedures in steps 3, 4, and 5 for each of the remaining sampling sites.*
7. *Complete the chain-of-command (COC) forms using the information on the field logs.*
8. *After sample collection is completed, deliver and/or ship sample to appropriate laboratory.*

Specific QA/QC sample details and laboratory QA/QC procedures will be provided in the SAP at the design phase of each project.

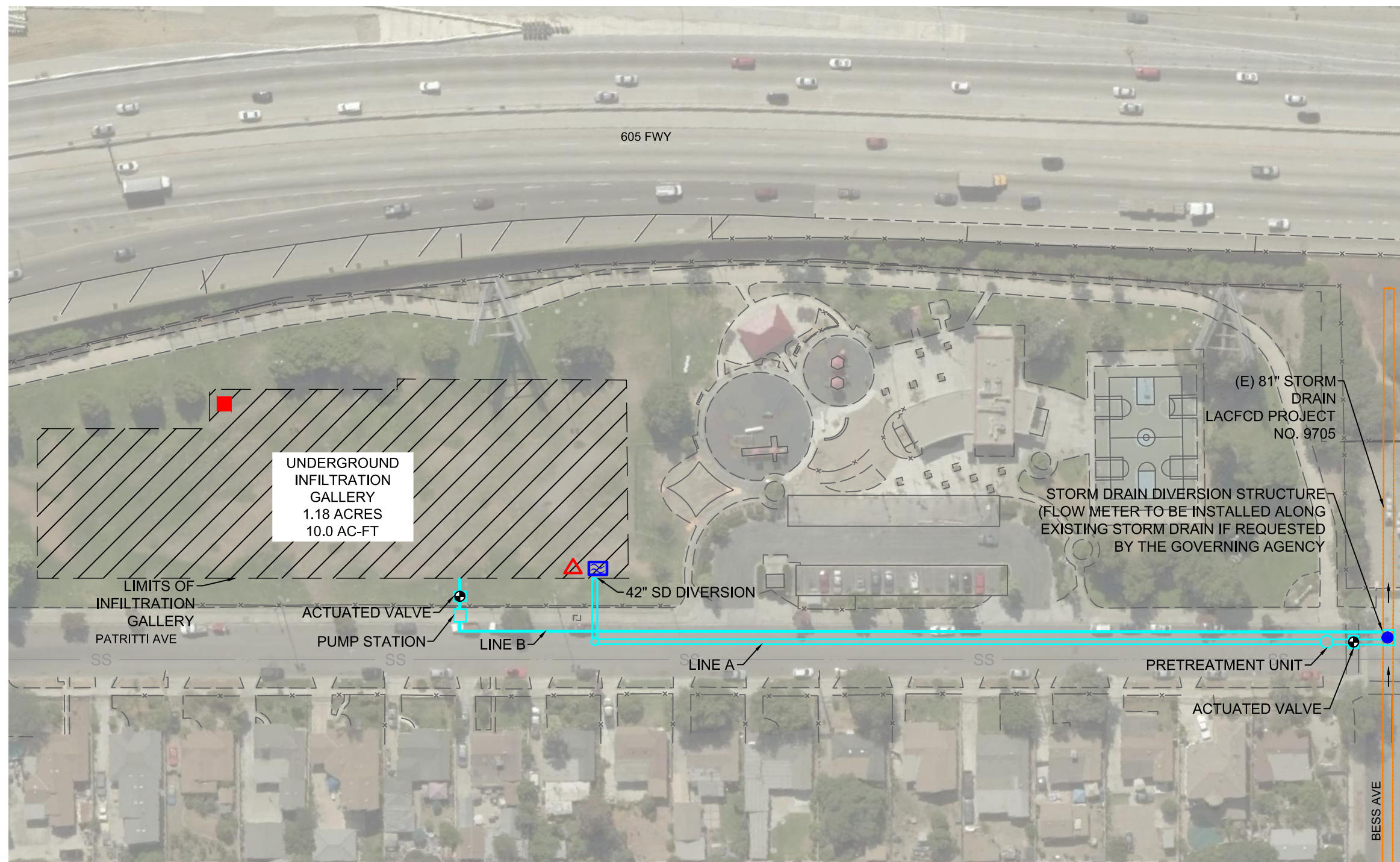
## 5.0 DATA ANALYSIS








The monitoring methods mentioned in Section 3.5 produce data that is useful in determining the BMP effectiveness and maintenance requirements. The flow sensors and water level loggers can be used to determine stormwater volume calculations. The chemical sampling along with continuous flow data will be used to determine pollutant load calculations. There are multiple computational and statistical techniques appropriate for nonpoint source load estimation which include the following:

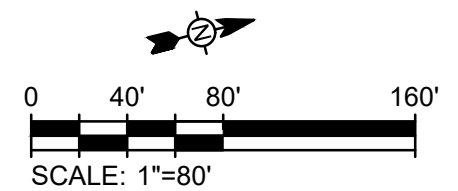
- Numeric integration to compute load as the product of flow and concentration over a sequence of observations;
- Regression to estimate un-sampled concentrations based on flow; and
- Ratio estimators to adjust individual unit loads based on flow conditions at the time of sampling.

Additional data analysis may be required to demonstrate BMP performance and effectiveness. These details will be provided in the final design of the BMP.

# ATTACHMENT 1. BARNES PARK CONCEPTUAL MONITORING SCHEMATIC



- LEGEND:**
-  (E) STORM DRAIN
  -  INLET SAMPLE
  -  OUTLET SAMPLE
  -  LEVEL LOGGER
  -  SOIL MOISTURE SENSOR
  -  PROPOSED STORM DRAIN
  -  AUTOMATIC FLOW SENSOR



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## ATTACHMENT 8. EXAMPLE CHAIN OF CUSTODY AND FIELD FORMS



**GENERAL INFORMATION**

Site ID: \_\_\_\_\_

Sampling Personnel: \_\_\_\_\_

**OBSERVATIONS**

Weather: \_\_\_\_\_

Water Color: \_\_\_\_\_

In-stream Activity: \_\_\_\_\_

Water Characteristics (flow type, odor, turbidity, floatables): \_\_\_\_\_

Other comments (trash, wildlife, recreational uses, homeless activity, etc. Use notes section below if more space is needed): \_\_\_\_\_

***In-situ* WATER QUALITY MEASUREMENTS**

Time	Temp (°C)	pH	DO (mg/L)	DO (% Sat.)	Electric Conductivity (uS/cm)

**COLLECTED WATER QUALITY SAMPLES**

Sample ID	Analysis	Time	Volume	Notes
				Field Blank
				Field Duplicate

**ADDITIONAL WATER QUALITY SAMPLING NOTES:**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



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# CHAIN OF CUSTODY RECORD

14859 East Clark Avenue : Industry : CA 91745  
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WECK WKO# \_\_\_\_\_

CLIENT NAME: <b>Tetra Tech</b>		PROJECT:	
ADDRESS: <b>3475 E Foothill Blvd Pasadena, CA 91107</b>		PHONE: FAX: EMAIL: <a href="mailto:Oliver.Galang@tetrattech.com">Oliver.Galang@tetrattech.com</a>	
PROJECT MANAGER <b>Oliver Galang</b>		SAMPLER	

ANALYSES REQUESTED									
Total Suspended Solids	Copper (Total and Dissolved)	Lead (Total and Dissolved)	Zinc (Total and Dissolved)	Hardness	E. Coli				

<b>SPECIAL HANDLING</b>	
<input type="checkbox"/>	Same Day Rush 150%
<input type="checkbox"/>	24 Hour Rush 100%
<input type="checkbox"/>	48-72 Hour Rush 75%
<input type="checkbox"/>	4 - 5 Day Rush 30%
<input type="checkbox"/>	Rush Extractions 50%
<input checked="" type="checkbox"/>	10 - 15 Business Days
<input type="checkbox"/>	QA/QC Data Package
Charges will apply for weekends/holidays	
Method of Shipment:	
COMMENTS	

ID# (Lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	Cl <sub>2</sub> Y/N	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.
			RW		USGR - AAA - XXXX - ###	
			RW		USGR - AAA - XXXX - ###	

X	X	X	X	X															
									X										

Email copy of COC to project manager.

RELINQUISHED BY	DATE / TIME	RECEIVED BY	DATE / TIME
RELINQUISHED BY	DATE / TIME	RECEIVED BY	DATE / TIME
RELINQUISHED BY	DATE / TIME	RECEIVED BY	DATE / TIME

DATE / TIME		DATE / TIME	
DATE / TIME		DATE / TIME	
DATE / TIME		DATE / TIME	

<b>SAMPLE CONDITION:</b>		<b>SAMPLE TYPE CODE:</b>	
Actual Temperature:		AQ=Aqueous	
Received On Ice		NA= Non Aqueous	
Preserved		SL = Sludge	
Evidence Seals Present		DW = Drinking Water	
Container Attacked		WW = Waste Water	
Preserved at Lab		RW = Rain Water	
	Y / N	GW = Ground Water	
	Y / N	SO = Soil	
	Y / N	SW = Solid Waste	
	Y / N	OL = Oil	
	Y / N	OT = Other Matrix	

PRESCHEMULED RUSH ANALYSES WILL TAKE PRIORITY OVER UNSCHEDULED RUSH REQUESTS  
Client agrees to Terms & Conditions at: [www.wecklabs.com](http://www.wecklabs.com)

SPECIAL REQUIREMENTS / BILLING INFORMATION



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## **ATTACHMENTS FOR SECTION 2.8:**

**O & M**

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# **Appendix H: Monitoring Plan**

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    3.3 Long-Term Performance Monitoring ..... **Error! Bookmark not defined.**

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## ACRONYMS/ABBREVIATIONS

Acronyms/Abbreviations	Definition
AVB	Area-Velocity Bubbler
BMPs	Best Management Practices
CIMP	Coordinated Integrated Monitoring Program
EWMP	Enhanced Watershed Management Plan
LTA	Long-Term Assessment
NOAA	National Oceanic and Atmospheric Association
MS4	Municipal Separate Storm Sewer System
USGR	Upper San Gabriel River
SCADA	Supervisory Control and Data Acquisition
SGR	San Gabriel River
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
WQOs	Water Quality Objectives

## 1.0 INTRODUCTION

Performance Monitoring of stormwater Best Management Practices (BMPs) is a critical component of a BMP implementation program. Monitoring provides the BMP's designer a mechanism to validate certain design assumptions and to quantify pollutant-removal performance. Specific monitoring objectives should be considered early in the design process to ensure that BMPs are adequately configured for monitoring.

Proper configuration and equipment are critical to collect the data necessary to evaluate BMP effectiveness and predict restorative maintenance. The two main goals of this monitoring program are:

1. BMP effectiveness monitoring to document the performance of the BMP and to quantify stormwater volume captured and pollutant removal achieved, and
2. Maintenance monitoring to track BMP performance and to predict required maintenance.

The Upper San Gabriel River (USGR) EWMP Group is required by the Los Angeles County Municipal Separate Storm Sewer System (MS4) permit to meet water quality limits for the metals (copper, zinc, and lead) Total Maximum Daily Load (TMDL) and the Bacteria TMDL in the San Gabriel River (SGR) Watershed. The objective of this monitoring plan is to demonstrate BMP performance, determine water quality improvements and track performance for accurate predictive maintenance. The components of the plan discussed herein are the monitoring methodology (including weather tracking, monitoring locations, constituents, frequency, and sampling methods), QA/QC protocol, and data analysis.

## 2.0 MONITORING PLAN SUMMARY

This monitoring plan focuses on the TMDL pollutants identified in the USGR EWMP Group Coordinated Integrated Monitoring Program (CIMP). To measure the performance of the regional BMPs, flow-weighted composite samples should be collected at the inlet and outlet of the system (refer to site figures provided in Section 4 which indicate preliminary monitoring points). Autosamplers may be installed at the inlet and outlet of each stormwater BMP depending on funding available. The final monitoring locations will be determined during the design phase of each project. At a minimum, samples should be analyzed for Zinc (total recoverable Zinc) and E. coli, which are identified as the priority TMDLs in the USGR EWMP Group CIMP. Data from a range of storm events are evaluated and compared to determine the performance of the BMP for the priority TMDL pollutants.

Maintenance monitoring of the BMP facility can be achieved by installing equipment that will collect data continuously. This equipment will be connected to a cloud-based data system, which will provide the capability to assess and report performance in real-time and to predict when routine maintenance will be needed or when failure may occur.

## 3.0 MONITORING METHODOLOGY

This section will outline the monitoring methodology from pre- to post-event practices, including the necessary equipment to perform these tasks. The methodology includes:

- weather tracking and mobilization,
- monitoring locations,
- constituents,
- frequency,
- and sampling methods

### 3.1 WEATHER TRACKING AND MOBILIZATION

To determine if and when mobilization will occur, the National Oceanic and Atmospheric Association (NOAA) National Weather Service Forecast Office's point forecast for the desired area will be examined (<https://www.wrh.noaa.gov/forecast/wxtables/>). The NOAA point forecast system allows users to select a specific location on a map and returns a tailored forecast. See **Table 3-1** below for a list of coordinates and web addresses correlating to the forecast for each site. This forecast includes a precipitation depth estimate as well as a percentage chance precipitation will occur. The CIMP identifies the triggering sampling for wet weather conditions is a 70% probable forecast of greater than 0.25 inches of precipitation of rain where the preceding 72 hours of dry weather has less than 0.1 inches of rain.

**Table 3-1.** NOAA Forecast Locations and Web Addresses

Site	Latitude/Longitude	Web Address
Barnes Park	34.0660/-118.0000	<a href="https://www.wrh.noaa.gov/forecast/wxtables/index.php?lat=34.067570000000046&amp;lon=-117.999819999999994">https://www.wrh.noaa.gov/forecast/wxtables/index.php?lat=34.067570000000046&amp;lon=-117.999819999999994</a>
Wingate Park	34.0850/-117.8660	<a href="https://www.wrh.noaa.gov/forecast/wxtables/index.php?lat=34.09280000000007&amp;lon=-117.866909999999996">https://www.wrh.noaa.gov/forecast/wxtables/index.php?lat=34.09280000000007&amp;lon=-117.866909999999996</a>
Finkbiner Park	34.1330/-117.8480	<a href="https://www.wrh.noaa.gov/forecast/wxtables/index.php?lat=34.13780000000003&amp;lon=-117.8628">https://www.wrh.noaa.gov/forecast/wxtables/index.php?lat=34.13780000000003&amp;lon=-117.8628</a>
San Angelo Park	34.0430/-117.9950	<a href="https://www.wrh.noaa.gov/forecast/wxtables/index.php?lat=34.04959000000002&amp;lon=-118.002119999999999">https://www.wrh.noaa.gov/forecast/wxtables/index.php?lat=34.04959000000002&amp;lon=-118.002119999999999</a>
Cortez Park	34.0590/-117.8880	<a href="https://www.wrh.noaa.gov/forecast/wxtables/index.php?lat=34.06460000000004&amp;lon=-117.890189999999996">https://www.wrh.noaa.gov/forecast/wxtables/index.php?lat=34.06460000000004&amp;lon=-117.890189999999996</a>
Allen J Martin Park	34.0470/-117.9690	<a href="https://www.wrh.noaa.gov/forecast/wxtables/index.php?lat=34.03973000000008&amp;lon=-117.962289999999994">https://www.wrh.noaa.gov/forecast/wxtables/index.php?lat=34.03973000000008&amp;lon=-117.962289999999994</a>
La Puente Park	34.0250/-117.9640	<a href="https://www.wrh.noaa.gov/forecast/wxtables/index.php?lat=34.02618000000007&amp;lon=-117.951169999999999">https://www.wrh.noaa.gov/forecast/wxtables/index.php?lat=34.02618000000007&amp;lon=-117.951169999999999</a>

### 3.2 MONITORING LOCATIONS

The regional BMP's for this project are located throughout the USGR watershed, specifically at public parks. These BMP's consist of the following components:

- Storm drain or channel diversion
- Pretreatment device
- Subsurface storage facility (some sites include drywells)
- Pump station and return line for filtration facilities, and optional pump station and return line for infiltration facilities

See **Table 3-2** for a summary of the BMP design features.

Monitoring of the BMPs is required at distinct locations for the different monitoring methods, and are also site-specific, varying based on the type of BMP. BMP effectiveness monitoring consists of both flow monitoring and chemical sampling, which are described in Section 3.5.1. Chemical sampling for all of the BMP's is required at the

diversion structure. If the subsurface structure has a filtration system, chemical sampling should also be done at the discharge point from the subsurface structure. Automatic flow monitoring is also required at the inlet of each BMP. For maintenance monitoring, a water level logger will be located near the inlet of the BMP. Soil moisture sensors should be placed on the surface of the soil within the vaults where infiltration will occur. Storage vaults with filtration systems do not need soil moisture sensors. For drywells, a flowmeter should be placed at the invert of discharge pipe from the pretreatment device.

See Attachments 1 through 7 for a monitoring schematic of each regional BMP site. These monitoring locations are based on the proposed feasibility study concepts and are subject to change in the final design of the BMP. The final monitoring locations will be determined during the project design phase.

**Table 3-2. BMP Summary Table**

Site	Type of BMP	BMP Storage (ac-ft)	Design Infiltration/ Filtration Rate
Barnes Park	Subsurface storage/infiltration vault	10.0	5.0 in/hr
Wingate Park	Subsurface storage/infiltration vault	14.6	1.5 in/hr
Finkbiner Park	Subsurface storage/infiltration vault	19.0	1.9 in/hr
San Angelo Park	Subsurface storage/filtration vault & drywells	5.7	5.76 cfs & 7.1 in/hr
Cortez Park	Subsurface storage/filtration vault	4.0	2.88 cfs
Allen J Martin Park	Subsurface storage/filtration vault & drywells	9.0	5.76 cfs & 7.0 in/hr
La Puente Park	Subsurface storage/filtration vault	1.5	2.88 cfs

### 3.3 CONSTITUENTS

The constituents to be monitored are dictated by the CIMP. The parameters that should be monitored are metals (lead, copper, and zinc), E. coli, flow, pH, hardness, and total suspended solids (TSS). Sampling bottle type, preservatives (if necessary), holding times, and field parameters are required to be included in the SAP during the design phase.

### 3.4 FREQUENCY

Chemical sampling should be done during both wet and dry weather. During the first year of BMP operation, a minimum of three (3) storms at the beginning of the wet season should be sampled. Wet weather as defined by the CIMP is a storm even with a 70% probable forecast of greater than 0.25 inches of precipitation of rain where the preceding 72 hours of dry weather has less than 0.1 inches of rain. Three (3) dry weather samples should also be collected within the first year of BMP operation. After the first year of operation, one (1) wet weather and one (1) dry weather sample should be collected.

### 3.5 SAMPLING METHODS & PROCEDURES

To meet the monitoring plan objectives, BMP effectiveness and maintenance monitoring must be conducted to measure the performance of the regional BMPs and predict maintenance needs. Chemical sampling is also required to calculate pollutant loading. All sampling procedures should be performed in accordance with the

CIMP and local agency requirements. A Sampling and Analysis Plan (SAP) will be required during final design of the BMP, which will provide more project specific information.

### 3.5.1 BMP Effectiveness Monitoring

BMP effectiveness monitoring is required to document the performance of the BMP and to quantify stormwater volume captured and pollutant removal achieved. These goals are achieved through both flow monitoring and chemical sampling, which are explained in detail below.

#### 3.5.1.1 Flow Monitoring

Flow at the BMP inlet location should be measured in real time using an area-velocity bubbler (AVB) flow meter with an AVB sensor. This automatic sensor will transmit real time flow data to a cloud-based system that the BMP operator can easily see the information. Data analysis to determine stormwater volume is described in Section 5.

#### 3.5.1.2 Chemical Sampling

During wet weather, chemical samples should be collected at the diversions structure and outlet pipe location (for filtration systems only) over the duration of the storm event to obtain flow-weighted pollutant concentrations (composite sampling). Samples should be collected at 20-minute intervals over a 3-hour period unless otherwise specified by the CIMP or governing jurisdiction. During dry weather, samples can be collected at any time of the day as composite sampling is not applicable. These samples can be collected as grab samples or by an autosampler that is programmed to collect the samples at the pre-programmed user specified times.

### 3.5.2 Maintenance Monitoring

Maintenance monitoring is essential for tracking long-term BMP performance and predicting maintenance requirements. Additional monitoring equipment is recommended for the subsurface vaults include water level loggers and soil moisture sensors. For sites where drywells are used in conjunction with the subsurface vault, drywell flowmeters are recommended.

#### 3.5.2.1 Level Logger

A water level logger at the surface of the soil within the subsurface vault can collect data on the ponding depth and ultimately determine the infiltration rate at the surface. This data can be used to determine the performance throughout a rain event and demonstrate any decreases in performance from the start of the rain event to the end. An overall reduction in infiltration could indicate an impending maintenance need allowing staff to predict when maintenance will be required rather than reacting to a visual indicator.

#### 3.5.2.2 Soil Moisture Sensor

A soil moisture sensor strategically placed in a BMP would indicate if the system is performing as designed and identify any potential performance limitations. Soil moisture sensors are required at the sites where the subsurface vault is designed to infiltrate. The observed infiltration rate should be compared to the design infiltration rate at each site. This sensor can be connected to a Supervisory Control and Data Acquisition (SCADA) system, which is configured to monitor the BMP system and send data to the staff by communicating through the cellular network. Collecting data in real time allows maintenance staff to evaluate trends that may indicated when routine or restorative maintenance will be required that cannot be observed in the field. The SCADA system conveniently allows staff to make observations from their desktop, reducing the burden on the field staff and minimizing the number of required field inspections.

### 3.5.2.3 Drywell Flowmeter

A flow meter at the drywell inlet, after the drywell pretreatment device, will collect data on the infiltration performance of the drywells. Data should be collected at the beginning of system operation to get a baseline flow rate to compare to throughout the life of the drywell. If data shows that the flow rates subside, this can indicate that the pretreatment device requires maintenance.

### 3.5.3 General Sampling Techniques for Chemical Grab Samples

Monitoring methodology should adhere to the monitoring guidelines as outline in the CIMP. Although the method used to collect water samples varies dependent on the depth, flow, and sampling location, the list below is an overview of sampling techniques that are applicable to all cases.

1. Throughout each sample collection event, the sampler should exercise aseptic techniques to avoid any contamination (i.e., do not touch the inner surfaces or lip edges of the sample bottle or cap).
2. The sampler should use clean, powder-free, nitrile gloves for each site to prevent contamination.
3. When collecting the sample, the sampler should not breathe, sneeze, or cough in the direction of the container.
4. Gloves should be changed if they are soiled, or if the potential for cross-contamination exists from handling sampling materials or samples.
5. While the sample is collected, the bottle lid shall not be placed on the ground.
6. The sampler should not eat or drink during sample collection.
7. The sampler should not smoke during sample collection.
8. Each person on the field crew should wear clean clothing that is free of dirt, grease, or other substances that could contaminate the sampling apparatus or sample bottles.
9. To the extent practical, sampling should not occur near a running vehicle. Vehicles should not be parked within the immediate sample collection area, even non-running vehicles.
10. When the sample is collected, ample air space should be left in the bottle to facilitate mixing by shaking for lab analysis, unless otherwise required by the method.
11. After the sample is collected and the cap is tightly screwed back on the bottle, the time of sampling should be recorded on the field log sheet.
12. Any quality assurance/quality control (QA/QC) samples that are collected should be noted on the field log sheet.
13. Samples should be stored as described in the SAP.
14. Chain of Custody (COC) forms should be filled out as applicable and delivered to the appropriate laboratory as soon as feasible to ensure hold times are met. An example COC is provided in Attachment 8.

To prevent contamination of samples, clean metal sampling techniques using USEPA protocols outlined in USEPA Method 16694 will be used throughout all phases of the water sample collection. The protocol for clean metal sampling, based on USEPA Method 1669, is summarized below:

1. Samples are collected in rigorously pre-cleaned sample bottles with any tubing specially processed to clean sampling standards.
2. At least two persons, wearing clean, powder-free nitrile or latex gloves at all times, are required on a sampling crew.
3. One person, referred to as “dirty hands”, opens only the outer bag of all double-bagged sample bottles.
4. The other person, referred to as “clean hands”, reaches into the outer bag of all double bagged sample bottles.
5. “Clean hands” rinses the bottle at least two times by submerging the bottle, removing the bottle lid, filling the bottle approximately one-third full, replacing the bottle lid, gently shaking, and then emptying the bottle. “Clean hands” then collects the sample by submerging the bottle, removing the lid, filling the bottle, and replacing the bottle cap while the bottle is still submerged. After the sample is collected, the sample bottle is double-bagged in the opposite order from which it was removed from the same double-bagging.

Samplers should put on clean, powder-free gloves whenever something not known to be clean has been touched.

### 3.5.4 Sample Labeling

Samples must be identified with a unique identification code to ensure that results are properly reported and interpreted and allows the site, sampling location, matrix, sampling equipment and sample type to be distinguished by a data reviewer or user. The format for sample identification codes for this BMP modeling is USGR - AAA - XXXX - ### where:

- USGR indicates that the sample was collected as part of the USGR watershed.
- AAA indicates the unique site ID for each site.
- XXXX identifies if this is a dry weather (DW) or wet weather (WW) monitoring event, and which event in the year it is, numbered sequentially from 01 to 05
- ### identifies the sample number unique to a sample bottle collected for a single event. Sample bottles are numbered sequentially 001 to 999 and will not be repeated within a single event.

The sample containers should be pre-labeled before each sampling event to the extent practicable to simplify field activities for the field crew. The sample labels should include the information shown in **Table 3-3**.

**Table 3-3.** Sample Bottle Label Information

Program Name	Date	Analytical Requirements
Station ID	Collection Time	Preservation Requirements
Sample ID	Sampling Personnel	Analytical Laboratory

## 4.0 QA/QC PROTOCOL

Quality assurance and quality control (QA/QC) protocol is necessary for field sampling. The key aspects of quality control associated with field protocols for sample collection and eventual chemical and toxicological analyses, as specified in the CIMP, are as follows:

1. *Field personnel will be thoroughly trained in the proper use of sample collection gear and will be able to distinguish acceptable versus unacceptable water samples in accordance with pre-established criteria.*
2. *Field personnel will be thoroughly trained to recognize and avoid potential sources of sample contamination.*
3. *Sampling gear and utensils which come in direct contact with the sample will be made of non-contaminating materials (e.g. borosilicate glass, high-quality stainless steel and/or Teflon™, according to protocol) and will be thoroughly cleaned between sampling stations according to appropriate cleaning protocol (rinsing thoroughly at minimum).*
4. *Sample containers will be of the recommended type and will be free of contaminants (i.e., pre-cleaned).*
5. *Conditions for sample collection, preservation, and holding times will be followed.*

*Field crews will be comprised of two persons per crew, minimum. For safety reasons sampling will occur during daylight hours, when possible. Sampling on weekends and holidays will also be avoided. Other constraints on sampling events include, but are not limited to, lab closures and toxicity testing organism availability. Sampling events should proceed in the following manner:*

1. *Before leaving the sampling crew base of operations, confirmation number and type of sample containers as well as the complete equipment list.*
2. *Proceed to the first sampling site.*
3. *Fill-out the general information on the field log sheet.*

4. *Collect the environmental and QA/QC samples indicated on the event summary sheet and store samples appropriately. Using the field log sheet, confirm that all appropriate containers were filled.*
5. *Collect field measurements and observations, and record these on the field log sheet.*
6. *Repeat the procedures in steps 3, 4, and 5 for each of the remaining sampling sites.*
7. *Complete the chain-of-command (COC) forms using the information on the field logs.*
8. *After sample collection is completed, deliver and/or ship sample to appropriate laboratory.*

Specific QA/QC sample details and laboratory QA/QC procedures will be provided in the SAP at the design phase of each project.

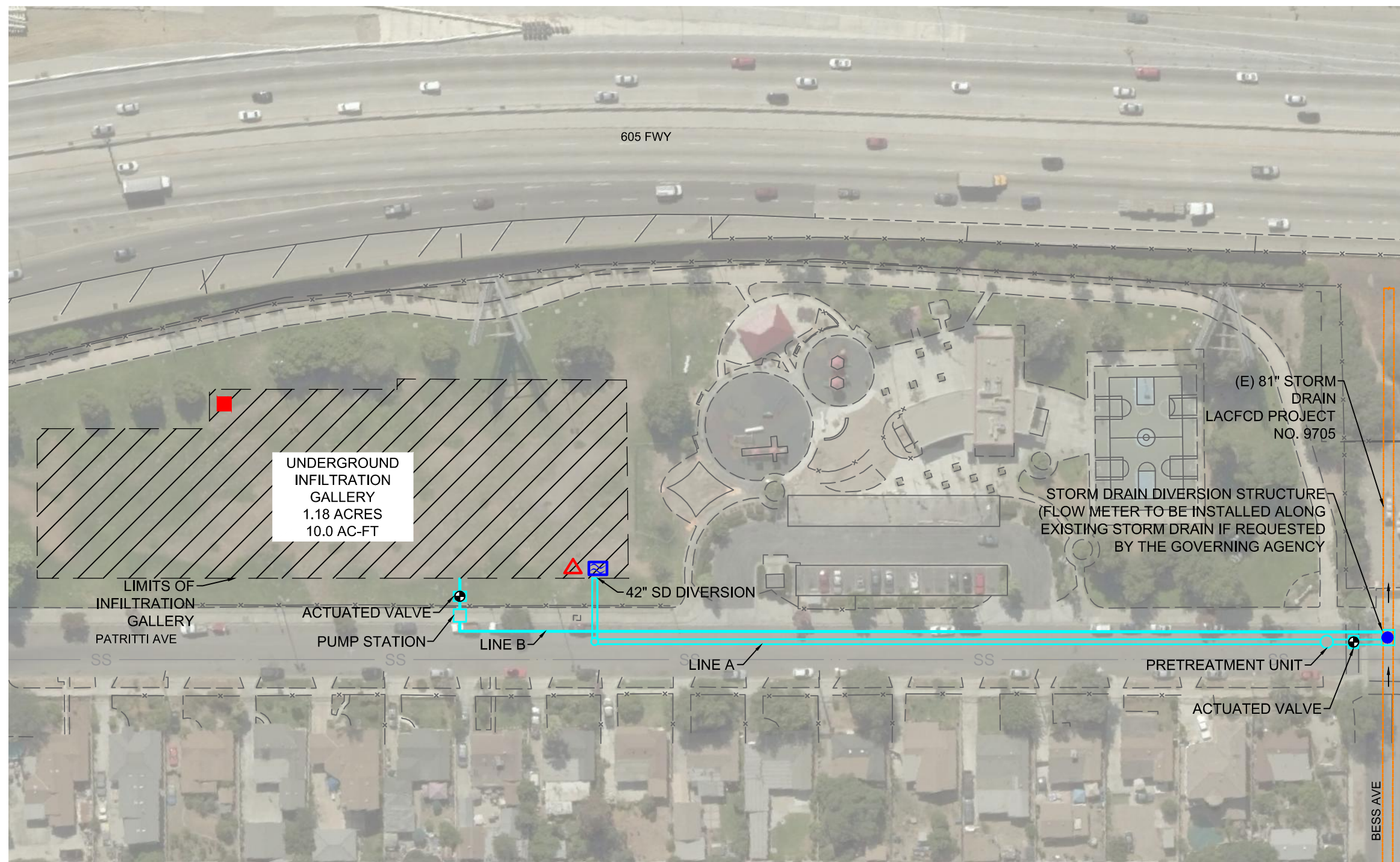
## 5.0 DATA ANALYSIS








The monitoring methods mentioned in Section 3.5 produce data that is useful in determining the BMP effectiveness and maintenance requirements. The flow sensors and water level loggers can be used to determine stormwater volume calculations. The chemical sampling along with continuous flow data will be used to determine pollutant load calculations. There are multiple computational and statistical techniques appropriate for nonpoint source load estimation which include the following:

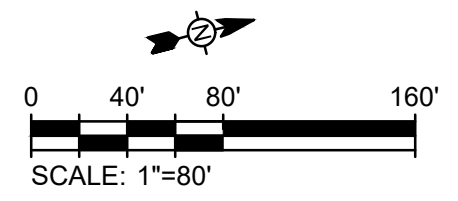
- Numeric integration to compute load as the product of flow and concentration over a sequence of observations;
- Regression to estimate un-sampled concentrations based on flow; and
- Ratio estimators to adjust individual unit loads based on flow conditions at the time of sampling.

Additional data analysis may be required to demonstrate BMP performance and effectiveness. These details will be provided in the final design of the BMP.

**ATTACHMENT 1. BARNES PARK CONCEPTUAL MONITORING SCHEMATIC**



- LEGEND:**
-  (E) STORM DRAIN
  -  INLET SAMPLE
  -  OUTLET SAMPLE
  -  LEVEL LOGGER
  -  SOIL MOISTURE SENSOR
  -  PROPOSED STORM DRAIN
  -  AUTOMATIC FLOW SENSOR



30% DESIGN - 10/19/2018

 <b>TETRA TECH</b> <small>www.tetrattech.com          3475 E. FOOTHILL BLVD          PASADENA, CA 91107          (626) 351-4664</small>	NO.	REVISION	REVISED BY	APPROVED BY	DATE	COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS <b>BARNES PARK</b> MULTI-BENEFIT STORMWATER CAPTURE PROJECT <b>SITE PLAN</b> MONITORING SCHEMATIC

## ATTACHMENT 8. EXAMPLE CHAIN OF CUSTODY AND FIELD FORMS



**GENERAL INFORMATION**

Site ID: \_\_\_\_\_

Sampling Personnel: \_\_\_\_\_

**OBSERVATIONS**

Weather: \_\_\_\_\_

Water Color: \_\_\_\_\_

In-stream Activity: \_\_\_\_\_

Water Characteristics (flow type, odor, turbidity, floatables): \_\_\_\_\_

Other comments (trash, wildlife, recreational uses, homeless activity, etc. Use notes section below if more space is needed): \_\_\_\_\_

***In-situ* WATER QUALITY MEASUREMENTS**

Time	Temp (°C)	pH	DO (mg/L)	DO (% Sat.)	Electric Conductivity (uS/cm)

**COLLECTED WATER QUALITY SAMPLES**

Sample ID	Analysis	Time	Volume	Notes
				Field Blank
				Field Duplicate

**ADDITIONAL WATER QUALITY SAMPLING NOTES:**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



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# CHAIN OF CUSTODY RECORD

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WECK WKO# \_\_\_\_\_

CLIENT NAME: <b>Tetra Tech</b>		PROJECT:		ANALYSES REQUESTED						SPECIAL HANDLING	
ADDRESS: 3475 E Foothill Blvd Pasadena, CA 91107		PHONE: FAX: EMAIL: <a href="mailto:Oliver.Galang@tetrattech.com">Oliver.Galang@tetrattech.com</a>									
PROJECT MANAGER <b>Oliver Galang</b>		SAMPLER		Total Suspended Solids	Copper (Total and Dissolved)	Lead (Total and Dissolved)	Zinc (Total and Dissolved)	Hardness	E. Coli	<input type="checkbox"/> Same Day Rush 150% <input type="checkbox"/> 24 Hour Rush 100% <input type="checkbox"/> 48-72 Hour Rush 75% <input type="checkbox"/> 4 - 5 Day Rush 30% <input type="checkbox"/> Rush Extractions 50% <input checked="" type="checkbox"/> 10 - 15 Business Days <input type="checkbox"/> QA/QC Data Package	
ID# (Lab Use Only)		DATE SAMPLED	TIME SAMPLED							SAMPL TYPE	Cl <sub>2</sub> Y/N

ID# (Lab Use Only)	DATE SAMPLED	TIME SAMPLED	SAMPL TYPE	Cl <sub>2</sub> Y/N	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	Total Suspended Solids	Copper (Total and Dissolved)	Lead (Total and Dissolved)	Zinc (Total and Dissolved)	Hardness	E. Coli	Comments
			RW		USGR - AAA - XXXX - ###		X	X	X	X	X		Email copy of COC to project manager.
			RW		USGR - AAA - XXXX - ###							X	

RELINQUISHED BY	DATE / TIME	RECEIVED BY	DATE / TIME	<b>SAMPLE CONDITION:</b> Actual Temperature:  Received On Ice Y / N Preserved Y / N Evidence Seals Present Y / N Container Attacked Y / N Preserved at Lab Y / N	<b>SAMPLE TYPE CODE:</b> AQ=Aqueous NA= Non Aqueous SL = Sludge DW = Drinking Water WW = Waste Water RW = Rain Water GW = Ground Water SO = Soil SW = Solid Waste OL = Oil OT = Other Matrix
RELINQUISHED BY	DATE / TIME	RECEIVED BY	DATE / TIME		
RELINQUISHED BY	DATE / TIME	RECEIVED BY	DATE / TIME		

PRESCHEMULED RUSH ANALYSES WILL TAKE PRIORITY OVER UNSCHEDULED RUSH REQUESTS  
 Client agrees to Terms & Conditions at: [www.wecklabs.com](http://www.wecklabs.com)

SPECIAL REQUIREMENTS / BILLING INFORMATION



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## **ATTACHMENTS FOR SECTION 3.1:**

### **24-HOUR STORM CAPACITY**

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## **ATTACHMENTS FOR SECTION 3.2:**

### **EVENT-BASED DESIGN DETAILS**

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Barnes Park has a large grassy field (**Figure 1-3**) with picnic benches and shade structures on the outer edge, outdoor workout equipment, a playground, recycled water treatment unit, a community building, and basketball courts.



**Figure 1-3.** Grassy field looking north

## 1.1 EXISTING WATER QUALITY

For this study, the Los Angeles County Watershed Management Modeling System (WMMS) was used within the Loading Simulation Program C++ (LSPC) to simulate the contaminant loading, runoff volume, and flow rate associated with a long-term, continuous time series (Water Year 2002 to Water Year 2011) at the proposed regional stormwater facility. The WMMS is accepted by the Los Angeles Water Quality Control Board for performance of compliance analyses in the context of WMP development. This section outlines the known conditions and analyses performed to establish the baseline against which to measure all reductions.

The EWMP Reasonable Assurance Analysis (RAA) details MS4 pollutant loading requirements for subwatershed areas draining to the Upper San Gabriel River Tributary. Barnes Park is located in the area draining directly to the San Gabriel River, and specific compliance requirements for this subwatershed area have been stipulated by the Permit. These are detailed in **Table 1-1**, with a specific target for the reduction of the 90<sup>th</sup> percentile critical storm loading of Zinc, the limiting pollutant in the watershed, as well as capture of runoff from the 90<sup>th</sup> percentile critical storm for *E. coli*. Based on the WMMS pollutant loadings throughout the entire San Gabriel River watershed, the EWMP set a critical storm Zinc reduction target of 64% and full capture of runoff for the critical storm for *E. coli* for areas in the San Gabriel River subwatershed of the Upper San Gabriel Tributary, as summarized in **Table 1-1**.

**Table 1-1.** Required Reduction in San Gabriel River subwatershed during RAA 90<sup>th</sup> Percentile Critical Conditions

Critical Storm Total Zinc (lb)			Critical Storm <i>E. coli</i>		
Current Load	Allowed Load	Required Reduction	Current Load	Allowed Load	Required Reduction
293	105	64%	All runoff retained/captured before discharge		

### 1.1.1 Water Quality and Hydrology Baseline Conditions

To establish the baseline hydrology and water quality to determine the maximum benefit that the project at Barnes Park could have, the drainage area delineation was developed utilizing LA County digital stormwater pipe inventories and high-resolution Light Detection and Ranging (LiDAR) elevation data. The delineation of drainage areas to the diversion point accounts for fine-scale surface drainage patterns and infrastructure pathways to accurately reflect the maximum potential drainage area to be treated by this project.

Long-term baseline hydrology and pollutant loads to the site as well as those for the critical storms for Zinc and *E. coli* are also summarized in **Table 1-2** (long-term) and **Table 1-3** (critical storms). Additionally, peak flows and total runoff associated with the 85<sup>th</sup> percentile storm and the 10-year design storms are also included in **Table 1-3**. The water quality loadings presented in this table represent the maximum possible reductions that could be achieved by control measures at Barnes Park, albeit pragmatic diversion limitations, space constraints, and subsequent treatment mechanisms will ultimately limit how much runoff and pollutant mass can potentially be diverted out of the main channel (as further discussed in section 2).

**Table 1-2.** Long-term baseline hydrology and zinc loading at Barnes Park diversion

Drainage Area	Impervious Cover	Avg. Annual Runoff	Avg. Annual Zn Load
440 acres	59%	282.9 ac-ft	128.9 lbs

**Table 1-3.** Design Storm and Critical Storm baseline hydrology and water quality loading.

85 <sup>th</sup> Percentile Design Storm		10 Year Design Storm		Critical Storm Metals Compliance	Critical Storm Bacteria Compliance
Peak Flow	Runoff Volume	Peak Flow	Runoff Volume	Zinc Load	Runoff Volume
35.2 cfs	13.4 ac-ft	167 cfs	85.3 ac-ft	13.2 lbs	16.1 ac-ft

## 1.3 GEOTECHNICAL INVESTIGATION

The geotechnical investigation was performed by Tetra Tech November 29, 2017. The investigation examined subsurface soil and groundwater conditions of the project area through exploratory soil borings and field percolation borings. The purpose of the investigation was to determine the characteristics of the subsurface materials (including infiltration rates, expansive index, and liquefaction potential) below the invert of the proposed infiltration facilities.

The exploratory boring was performed at a maximum depth of 50.2 feet, and the percolation boring to a depth of 15 feet. Boring locations were selected as near as feasible to the proposed footprint, shown on the Boring Location Map (**Figure 1-4**). Details regarding the full field exploration process, sampling and drilling procedures, laboratory testing, standards and equipment used, and the findings from the evaluation are provided in the Preliminary Geotechnical and Infiltration Investigation Report (Tetra Tech 2017; Attachment 4). This section summarizes the findings from the geotechnical evaluation specifically related to the onsite soil types and historic groundwater levels. General structural design recommendations are covered in detail within the Preliminary Geotechnical and Infiltration Investigation Report.

### 1.3.1 Existing Soil Types

Based on the findings from our subsurface investigation, the soils at the site below the invert of the proposed infiltration facilities were observed to range from graded sands with gravel to silty sands with good drainage characteristics to a depth of about 39 feet. These soils correspond to USCS Classification of GP, SP-SM, and SP. The measured infiltration rate of 12.0 inches/hour is above the minimum required infiltration rate established by the LACDPW guidelines for on-site infiltration systems of 0.3 inches/hour and therefore the soils at the site are preliminarily considered suitable for infiltration use. In order to be more conservative on the infiltration facility's performance rate based on similar projects, it will be modeled as 5.0 in/hr. This project site is mantled by man-made fill soils approximately 1-foot thick. Alluvial soils were encountered below the fill soils and consisted of medium dense to very dense graded sands with gravel, graded gravel with sand and silty sands to a depth of 39 feet. These soils were typically light brownish gray to yellowish brown to olive gray. Underlying these sandy materials, a layer of hard silt was encountered for the remaining 11.2 feet of the exploration to a depth of 50.2 feet.

### 1.3.2 Ground Water

According to the State of California (CDMG, 1998), the historic high groundwater level near this site has been mapped at a depth of about 10 feet. During our subsurface explorations, groundwater was not encountered in the soil boring to a depth of 50.2 feet. A review of the database from the Los Angeles Department of Public Works (LACDPW) for nearby wells (<http://dpw.lacounty.gov/general/wells/>) showed that the shallowest groundwater depth was recorded at 19.5 feet in 1969. The Geotracker database was also used to search for nearby wells, but there were no wells in the nearby area. Based on the assessment of the local stratigraphy and local topography, it is our opinion that the LACDPW wells can be utilized for interpretation of the project groundwater conditions. Therefore, it is our conclusion that the groundwater at the site has been deeper than 20 feet within the last 50 years and 84 feet within the last 30 years. Fluctuations of the groundwater level, localized zones of perched water, and increased soil moisture content should be anticipated during and following the rainy season. Irrigation of landscaped areas on or adjacent to the site can also cause a fluctuation of groundwater levels. Based on the research and observed conditions, groundwater is not expected to impact the design and construction of the proposed BMP.

### 1.3.3 Geotechnical Summary

Based on the results of the field exploration and engineering analyses, it is Tetra Tech's opinion that the proposed construction is feasible from a geotechnical standpoint, provided that the recommendations contained in the Preliminary Geotechnical Investigation Report are incorporated into the design plans and implemented during construction. It should be noted that this study did not evaluate the possible presence of hazardous materials on any portion of the site.



 <p>1360 Valley Vista Drive, Diamond Bar, CA 91765 TEL 909.860.7777 FAX 909.860.8017</p>	BARNES PARK - BALDWIN PARK, CA		JOB NO. TET 17-136E
	SITE LAYOUT AND BORING LOCATION MAP		DATE DEC 2017
			DRAWN BY SCM
			CHECKED BY FC

Figure 1-4. Boring location map at Barnes Park

## 1.4 ENVIRONMENTAL CONDITIONS

---

As part of the site reconnaissance, a Phase 1 Environmental Assessment (ESA) and a Preliminary Initial Study (IS) have been prepared for this site. A summary of the report findings is provided in the subsequent sections. See Attachment 5 for the Phase 1 ESA, and Attachment 6 for the Preliminary IS for additional details.

### 1.4.1 Phase 1 ESA Summary

The Phase 1 ESA included visual observation of the Site, inspection of the surrounding properties from curbside, review of historical property ownership and use, review of regulatory listings, review of Internet resources, and interviews with persons knowledgeable about the Site.

Tetra Tech found no recognized environmental conditions (RECs), no controlled RECs (CRECs), no historical RECs (HRECs), one potential environmental concern (PEC), and one business environmental risk (BER) in connection with the Site. The specific findings are described below:

- Based on review of the old geotechnical investigation by Ninyo & Moore (2015), unknown fill materials were encountered from the ground surface to a depth of approximately 2 feet below ground surface. This fill material of unknown provenance is considered to be a PEC.
- The expected requirement of a Construction Stormwater Permit for redevelopment of the Site is considered to be a BER.

Based on the information gathered during the Phase 1 ESA, no further assessment is recommended except sampling the unknown fill material to be analyzed for chemicals of potential concern (COPCs).

### 1.4.2 Preliminary IS Summary

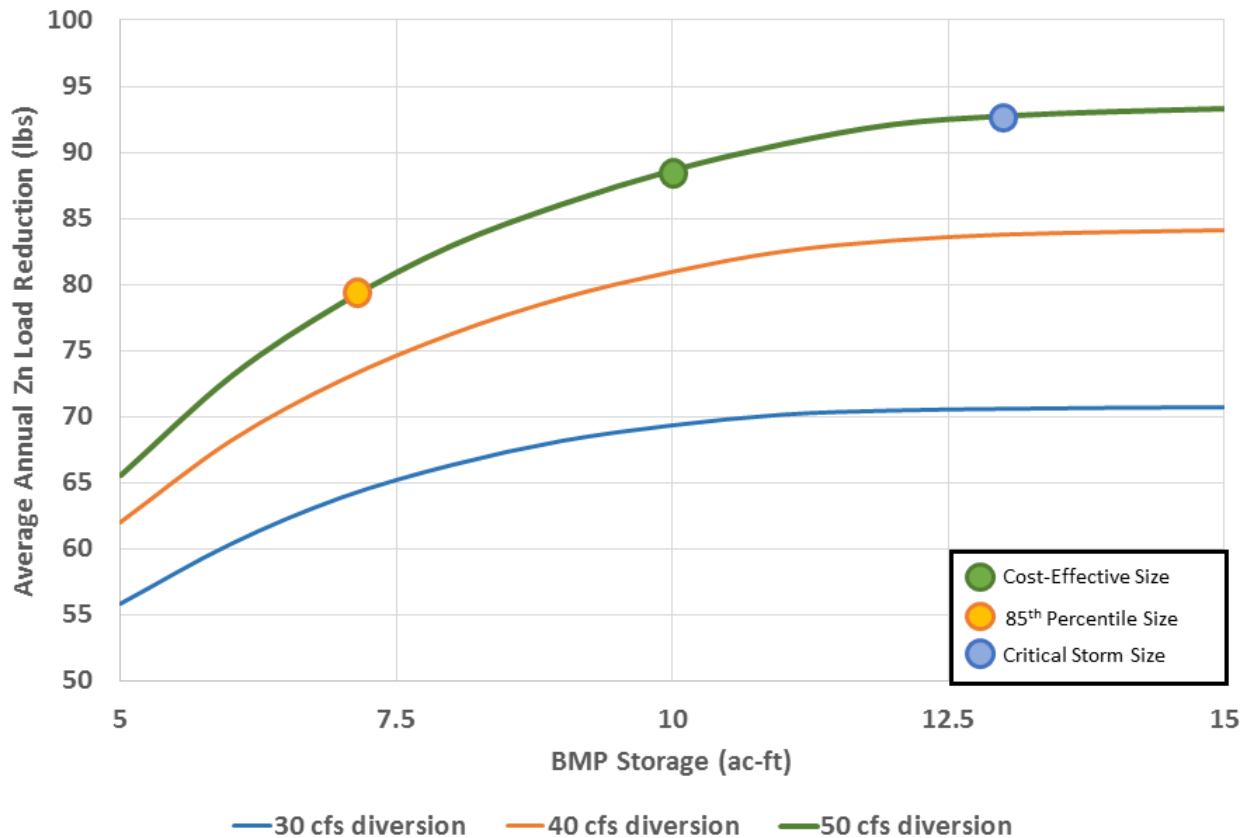
Potential environmental impacts/environmental constraints associated with the proposed project are addressed in the Initial Study (IS) Checklist in Attachment 6. The environmental factors that could be potentially affected by this project and/or require additional study to determine impact are listed below and are discussed further in the checklist.

- Biological resources
- Greenhouse gas emissions
- Transportation/traffic
- Mandatory findings of significance
- Cultural resources
- Hazards & hazardous materials
- Tribal cultural resources
- Air quality
- Hydrology/water quality
- Noise
- Recreation
- Utilities/service systems

## 2.0 BMP DESIGN COMPONENTS

The optimal BMP footprint and diversion rate was determined for the BMP site based on the long-term average annual zinc reduction, simulated using the EPA System for Urban Stormwater Treatment and Analysis Integration (SUSTAIN) model. The runoff treated by the BMP, assumed to have a 10-foot storage depth, was simulated over a ten-year period (WY 2002 - 2011), at comprehensive combinations of feasible storm drain diversion rates and footprint sizes (**Figure 2-1**). **Table 2-1** below shows the resulting optimized BMP configuration and corresponding project pollutant reductions based on the optimization modeling performed within SUSTAIN.

**Barnes Park BMP Storage and Diversion Rate Options**



**Figure 2-1.** BMP performance for varying diversion rates and storage sizes.

**Table 2-1.** Proposed BMP Footprint and Diversion Rate (With Associated Pollutant Reductions)

BMP Footprint (ac)	BMP Capacity (ac-ft)	Diversion Rate (cfs)	Metals Critical Storm Zinc Reduction (lb)	Bacteria Critical Storm Runoff Capture (ac-ft)	Average Annual Runoff Capture (ac-ft)	Average Annual Zinc Load Reduction (lbs)
1.0	10.0	50	12.1 (92%)	13.0 (81%)	139 (49%)	88.6 (69%)

The pollutant reduction exceeds the required target for the critical storm for zinc (64%) but is not quite large enough to fully capture the runoff associated with the Bacteria Critical Storm from the RAA. This is due to the larger drainage area for this project site that generates a peak flow for the critical storm that is difficult to capture while still providing cost effective pretreatment of the associated runoff. Long term average zinc load reductions for this project would occur via capture and treatment of nearly half of all runoff volume flowing to the Barnes Park diversion associated with treatment of 69% of the average annual zinc load for this drainage area. The recommended BMP size is capable of fully capturing the 85<sup>th</sup> percentile storm event, but a larger, less cost-effective would be necessary to fully capture the Bacteria Critical Storm (**Table 2-2**). While this could be built if desired, the more expensive BMP would not result in significant additional water quality benefit as shown in **Figure 2-1**.

**Table 2-2.** BMP storage requirements for different capture benchmarks for Barnes Park

BMP Capture Benchmark Options	85 <sup>th</sup> Percentile Storm Capture	Bacteria Critical Storm Capture	Cost-Effective Size Capture
BMP Storage Required	7.2 ac-ft	12.9 ac-ft	10.0 ac-ft
Rough Magnitude Project Cost Used in Water Quality Modeling <sup>1</sup>	\$8.7 million	\$15.1 million	\$11.7 million

<sup>1</sup>Costs used in water quality modeling are broad and are based on an estimate of the major component costs. For a site-specific cost estimate see Section 4.3 and Attachment 2.

## 2.1 SITE LAYOUT

The regional structural BMP system will divert runoff from the existing 81-inch diameter pipe by a drop inlet, into a 42-inch diameter pipe from the storm drain to a pretreatment device, with flow entering an underground infiltration gallery via gravity (**Figure 2-2**). The site plan is also included in Attachment 1. An above ground landscape concept plan (Attachment 3) was developed to show potential surface improvements that would provide multi-benefits for the park and the community. This concept also provides a cross section of the overall site layout.



Figure 2-2. Barnes Park Site Layout

## 2.2 DIVERSION STRUCTURE ANALYSIS

The storm drain system at the proposed BMP site was represented using the EPA System for Urban Stormwater Treatment Analysis Integration (SUSTAIN) model to determine the optimal diversion rate for the system that corresponded to the most benefit between BMP footprint and pollutant removal. The optimal flow rate of 50 cfs was determined to be feasible with a 10.4-ft by 12.4 ft drop inlet and 42-inch pipe. The proposed diversion structure sections are presented in **Figure 2-3**.

An actuated valve is a valve that can be automatically opened and closed with either an electric actuator or a pneumatic pump. Actuated valves are used to help regulate flow. For this project, when the system is full, a sensor will communicate with the actuator to close the valve, taking the system offline to prevent surcharge. The use of an actuated valve can also eliminate the need for a maintenance worker to physically open and close the valve for either maintenance or emergency purposes. Additionally, actuated valves can be connected to SCADA and real-time controls to control the direction of flow to desired treatment or discharge locations.

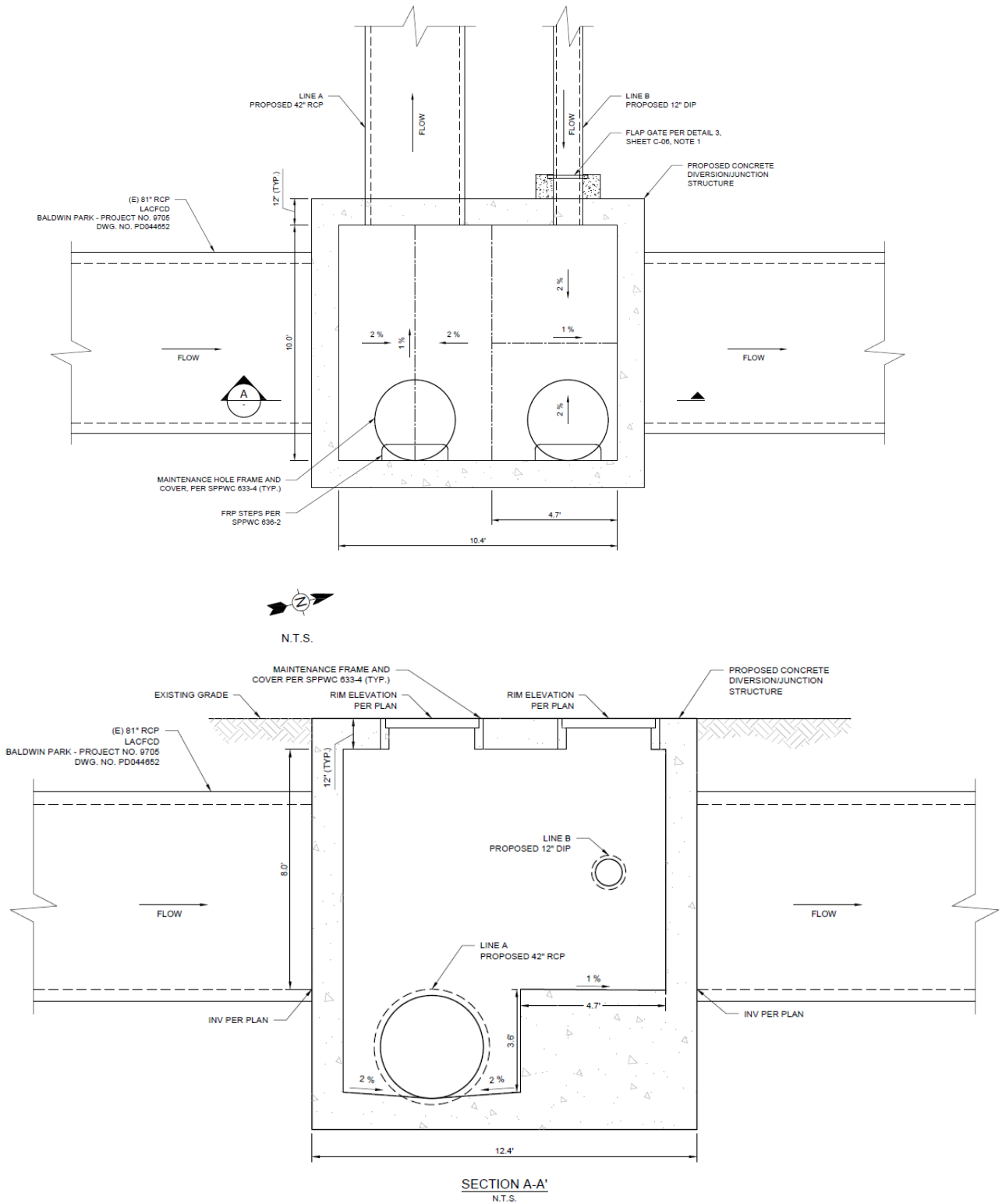
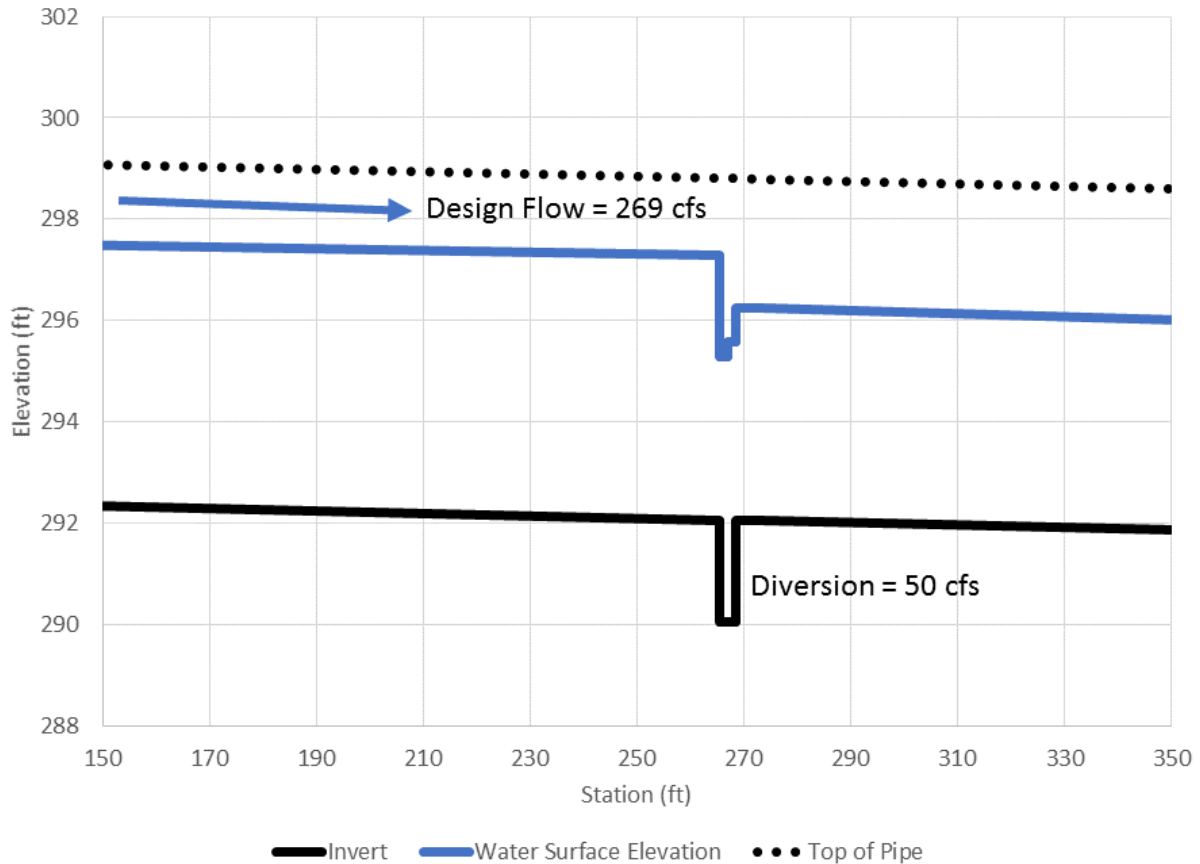


Figure 2-3. Diversion Structure at Proposed Site

Preliminary Water Surface and Pressure Gradient (WSPG) hydraulic calculations were performed based on the design information available on the 30% Design Plans. See **Figure 2-4** plotting the WSPG results. The WSPG modeling will be refined as the design is developed further, and the resulting data can be provided at the final design stage.

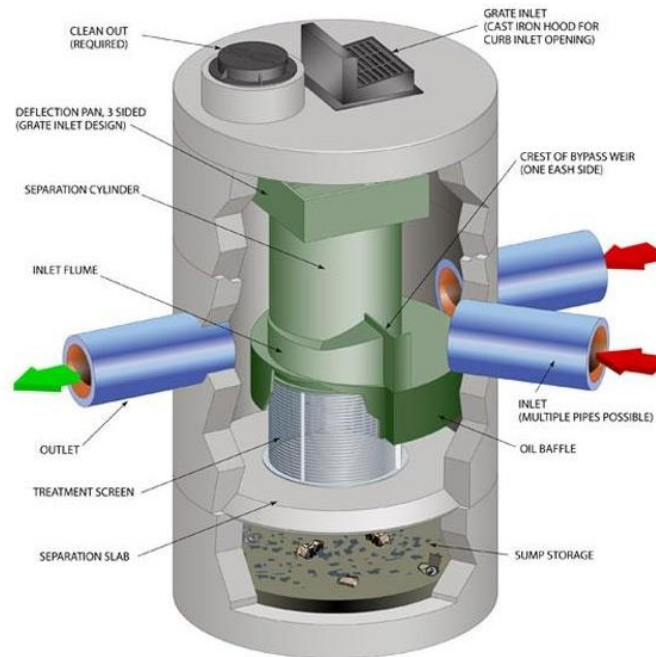


**Figure 2-4.** Preliminary WSPG Plot for Barnes Park

## 2.3 PRETREATMENT

Stormwater runoff transports sediment, trash, and debris that can compromise the performance of stormwater facilities and pollute receiving waters. Pretreatment will be an integral component if the treatment strategies to extend the life of the proposed systems. It will be prescribed in order to reduce the maintenance frequency of the BMP site stormwater facilities, focus maintenance efforts to a concentrated area, and bolster compliance.

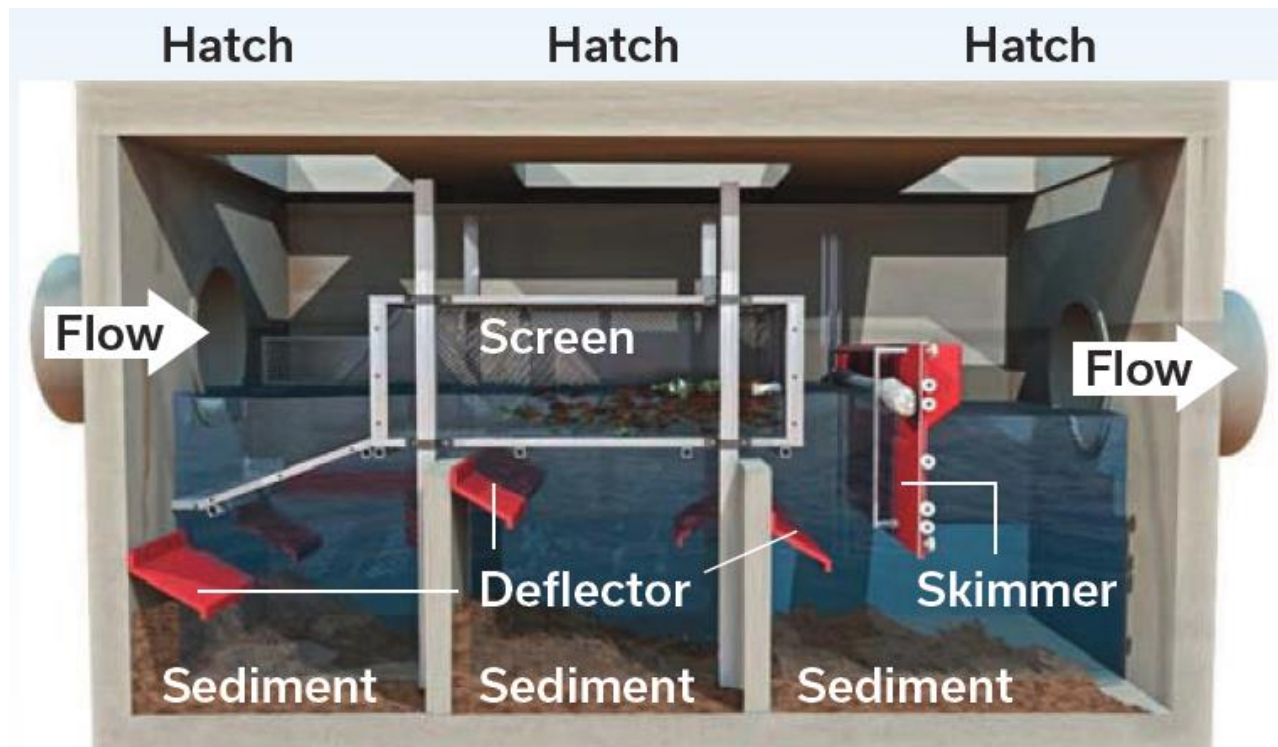
Two types of pretreatment devices are being considered for the project: a hydrodynamic separator and a baffle box. The final selection will be made during the detailed design phase of the project. A typical hydrodynamic separator collects stormwater runoff on one or more sides of the structure, then directs the water into a separation chamber where water begins swirling, forcing particles out of the runoff. One-hundred percent of floatables and neutrally buoyant debris larger than the screen aperture is collected. Hydrodynamic separators typically have an 80 percent removal rate of total suspended solids (TSS). With the chambered system, hydrocarbons float to the top of the water surface and are prevented from being transported downstream. The size of the unit will be selected based on the estimated sediment removal and the routine maintenance required. **Figure 2-5** represents a typical Contech CDS type hydrodynamic separator.



Source: Contech Engineered Solutions

**Figure 2-5.** Typical Hydrodynamic Separator

Hydrodynamic separators, such as the Contech CDS system, are popular pretreatment devices; however, trash and debris are stored for long periods submerged in water, thus potentially leaching nutrients into the treated water. As a consideration for the water quality that will possibly be sent to the irrigation treatment system, a Nutrient Separating Baffle Box (NSBB) by Suntree Technologies, Inc. is also being considered as a pretreatment solution. At a flow rate of 50 cfs, NSBB is available in the NSBB-8-16 with 89% removal of TSS at a treatment level of 150 microns. The NSBB system uses screens that are suspended above the sedimentation chambers that capture and store trash and debris in a dry state, thus reducing potential nutrient leaching and bacteria growth. TSS is removed by routing the flows through a triple chambered system. An oil skimmer with hydrocarbon booms traps and absorbs oil. The NSBB system can remove more than 80 percent of TSS. **Figure 2-6** illustrates the typical operation of a NSBB system.



**Figure 2-6.** Typical NSBB System

Source: Suntime Technologies, Inc.

## 2.4 REGIONAL BMP STRUCTURAL ALTERNATIVES

Underground storage tanks provide initial stormwater detention and allow for implementation where surface space is limited such as around paved streets, parking lots, and buildings. Precast concrete storage systems, such as the StormTrap, Oldcastle, and Jensen StormVault systems, made from durable, reinforced, and high-strength concrete would be the most appropriate modular unit for this project (as opposed to plastic modular units). They can be designed to exceed HS-20 loading, have varying depths of cover, and overcome buoyancy forces. Internal heights can vary to meet the designed storage volume. Cast-in-place structures were not considered a viable solution due to the time required to form, pour, and cure the structure. The additional time would create an additional burden on park operations and could extend the construction schedule.

The StormTrap Double Trap system (*Figure 2-7* and *Figure 2-8*) allows for a maximum headroom of 11'-4", and will provide water storage for more than 10.0 acre-feet of water while allowing for 1 foot of freeboard in the system. The system will be configured to allow for infiltration through the bottom of the system. The modular pieces are constructed offsite and delivered to the project site via truck and lifted into place with a crane. A typical day of installation may allow for 30 to 40 units to be placed in one day. The exact number of modules will depend on the selected vendor.



*Figure 2-7.* StormTrap Installation at Bolivar Park BMP



**Figure 2-8.** Inside StormTrap Unit Installed at Bolivar Park BMP

## 2.5 WATER CONSERVATION POTENTIAL

Because infiltration is feasible at Barnes Park based on the geotechnical investigation, this project has the potential to contribute to local water conservation objectives through groundwater recharge. Capture, treatment, and infiltration of stormwater allows this water to contribute to groundwater recharge and replenishment to local aquifers that are used as sources of water to offset water transported from more distant resources. The recommended BMP configuration captures and treats an annual average of 139 acre-feet of water that contributes to local groundwater replenishment, providing local conservation of stormwater as a potentially usable resource. This provides invaluable water conservation of runoff that otherwise discharges to the San Gabriel River and further drains to the ocean unused.



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## **ATTACHMENTS FOR SECTION 3.3:**

### **LONG-TERM PERFORMANCE**

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## **ATTACHMENTS FOR SECTION 4.1:**

**NEXUS**

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## **ATTACHMENTS FOR SECTION 4.2:**

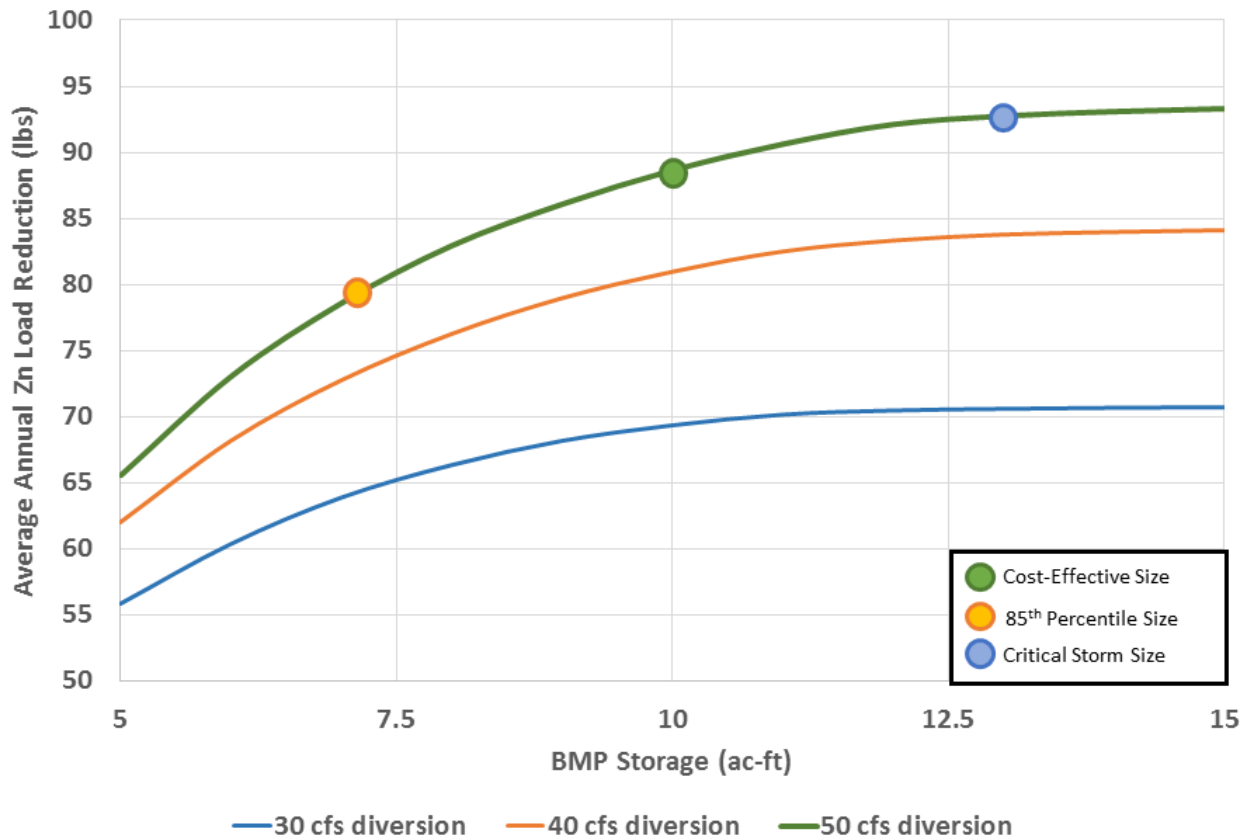
### **BENEFIT MAGNITUDE**

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<sup>1</sup>Costs used in water quality modeling are broad and are based on an estimate of the major component costs. For a site-specific cost estimate see Section 4.3 and Attachment 2.

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The storm drain system at the proposed BMP site was represented using the EPA System for Urban Stormwater Treatment Analysis Integration (SUSTAIN) model to determine the optimal diversion rate for the system that corresponded to the most benefit between BMP footprint and pollutant removal. The optimal flow rate of 50 cfs was determined to be feasible with a 10.4-ft by 12.4 ft drop inlet and 42-inch pipe. The proposed diversion structure sections are presented in **Figure 2-3**.

An actuated valve is a valve that can be automatically opened and closed with either an electric actuator or a pneumatic pump. Actuated valves are used to help regulate flow. For this project, when the system is full, a sensor will communicate with the actuator to close the valve, taking the system offline to prevent surcharge. The use of an actuated valve can also eliminate the need for a maintenance worker to physically open and close the valve for either maintenance or emergency purposes. Additionally, actuated valves can be connected to SCADA and real-time controls to control the direction of flow to desired treatment or discharge locations.

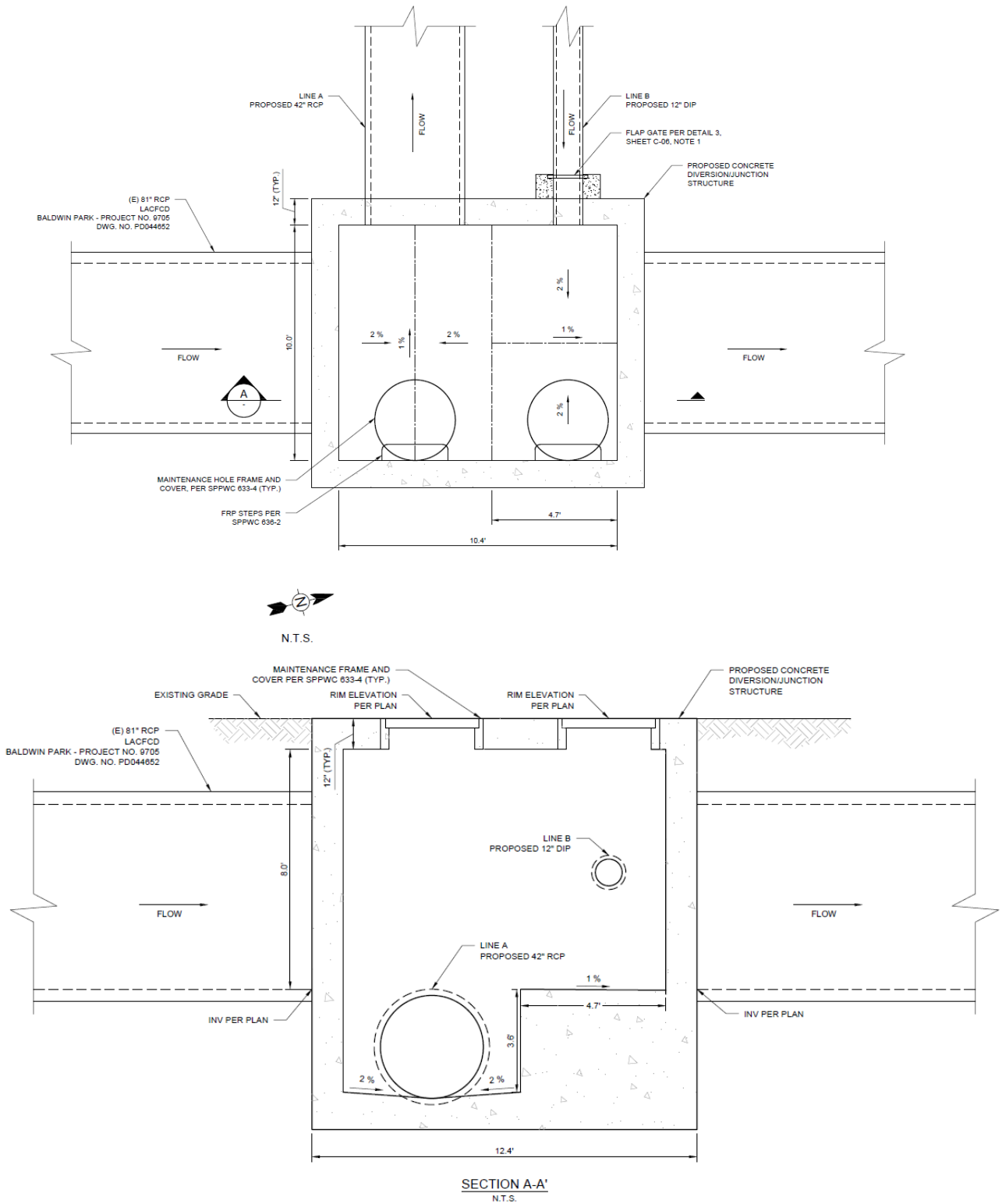
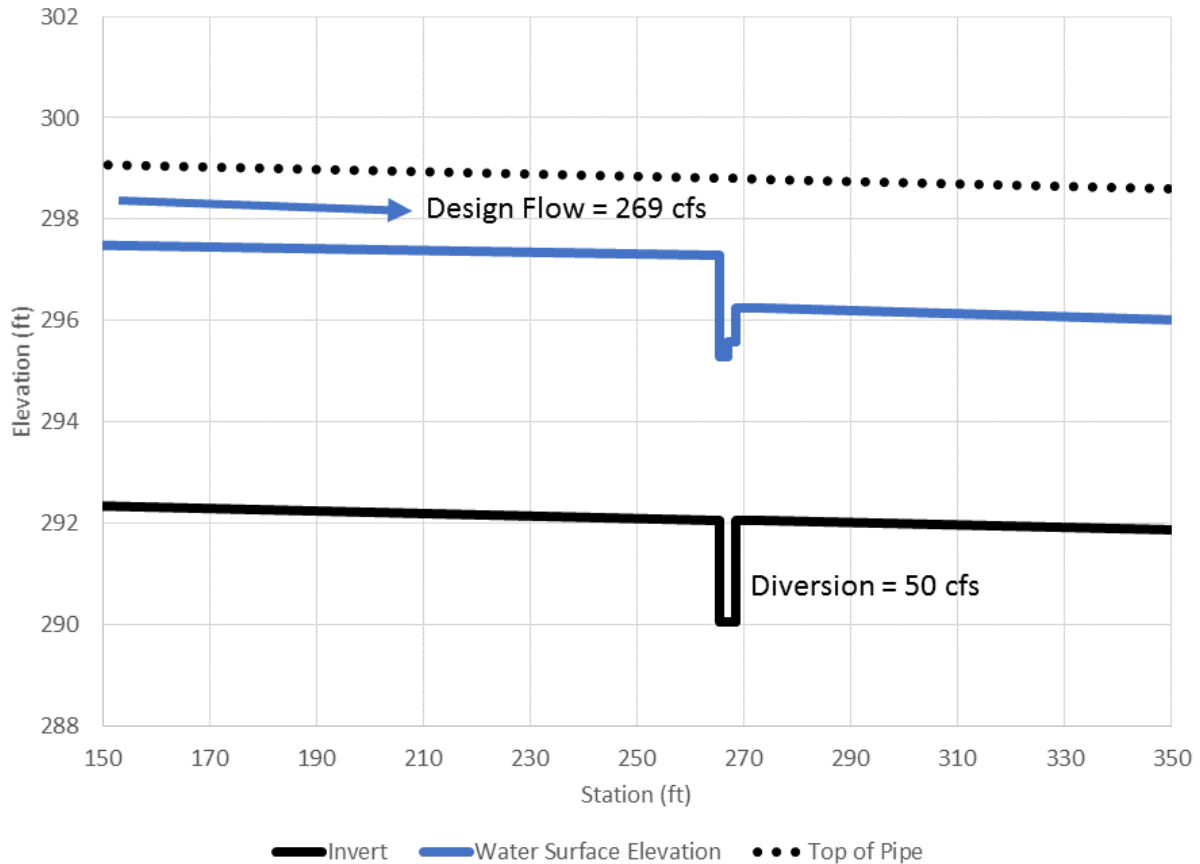


Figure 2-3. Diversion Structure at Proposed Site

Preliminary Water Surface and Pressure Gradient (WSPG) hydraulic calculations were performed based on the design information available on the 30% Design Plans. See **Figure 2-4** plotting the WSPG results. The WSPG modeling will be refined as the design is developed further, and the resulting data can be provided at the final design stage.



**Figure 2-4.** Preliminary WSPG Plot for Barnes Park

### 2.3 PRETREATMENT

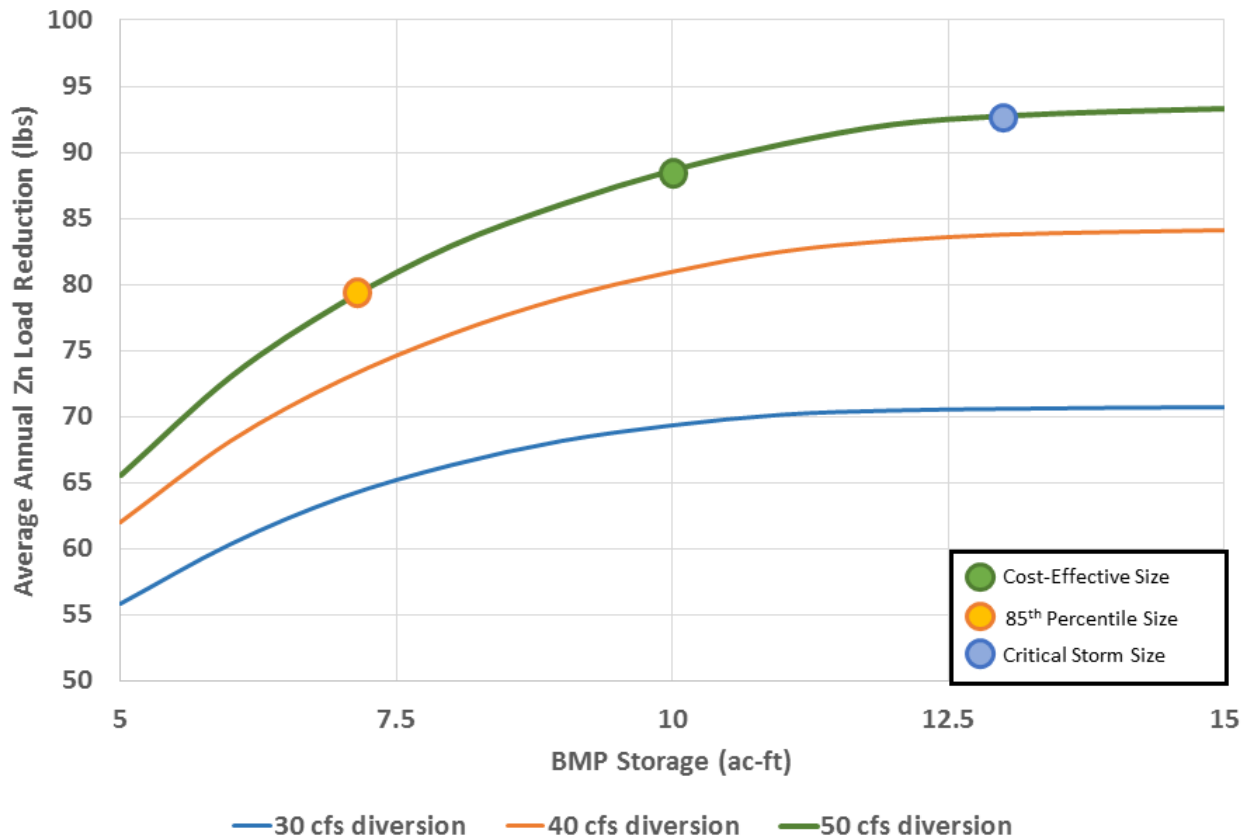
Stormwater runoff transports sediment, trash, and debris that can compromise the performance of stormwater facilities and pollute receiving waters. Pretreatment will be an integral component if the treatment strategies to extend the life of the proposed systems. It will be prescribed in order to reduce the maintenance frequency of the BMP site stormwater facilities, focus maintenance efforts to a concentrated area, and bolster compliance.

Two types of pretreatment devices are being considered for the project: a hydrodynamic separator and a baffle box. The final selection will be made during the detailed design phase of the project. A typical hydrodynamic separator collects stormwater runoff on one or more sides of the structure, then directs the water into a separation chamber where water begins swirling, forcing particles out of the runoff. One-hundred percent of floatables and neutrally buoyant debris larger than the screen aperture is collected. Hydrodynamic separators typically have an 80 percent removal rate of total suspended solids (TSS). With the chambered system, hydrocarbons float to the top of the water surface and are prevented from being transported downstream. The size of the unit will be selected based on the estimated sediment removal and the routine maintenance required. **Figure 2-5** represents a typical Contech CDS type hydrodynamic separator.

## 2.0 BMP DESIGN COMPONENTS

The optimal BMP footprint and diversion rate was determined for the BMP site based on the long-term average annual zinc reduction, simulated using the EPA System for Urban Stormwater Treatment and Analysis Integration (SUSTAIN) model. The runoff treated by the BMP, assumed to have a 10-foot storage depth, was simulated over a ten-year period (WY 2002 - 2011), at comprehensive combinations of feasible storm drain diversion rates and footprint sizes (**Figure 2-1**). **Table 2-1** below shows the resulting optimized BMP configuration and corresponding project pollutant reductions based on the optimization modeling performed within SUSTAIN.

**Barnes Park BMP Storage and Diversion Rate Options**



**Figure 2-1.** BMP performance for varying diversion rates and storage sizes.

**Table 2-1.** Proposed BMP Footprint and Diversion Rate (With Associated Pollutant Reductions)

BMP Footprint (ac)	BMP Capacity (ac-ft)	Diversion Rate (cfs)	Metals Critical Storm Zinc Reduction (lb)	Bacteria Critical Storm Runoff Capture (ac-ft)	Average Annual Runoff Capture (ac-ft)	Average Annual Zinc Load Reduction (lbs)
1.0	10.0	50	12.1 (92%)	13.0 (81%)	139 (49%)	88.6 (69%)

The pollutant reduction exceeds the required target for the critical storm for zinc (64%) but is not quite large enough to fully capture the runoff associated with the Bacteria Critical Storm from the RAA. This is due to the larger drainage area for this project site that generates a peak flow for the critical storm that is difficult to capture while still providing cost effective pretreatment of the associated runoff. Long term average zinc load reductions for this project would occur via capture and treatment of nearly half of all runoff volume flowing to the Barnes Park diversion associated with treatment of 69% of the average annual zinc load for this drainage area. The recommended BMP size is capable of fully capturing the 85<sup>th</sup> percentile storm event, but a larger, less cost-effective would be necessary to fully capture the Bacteria Critical Storm (**Table 2-2**). While this could be built if desired, the more expensive BMP would not result in significant additional water quality benefit as shown in **Figure 2-1**.

**Table 2-2.** BMP storage requirements for different capture benchmarks for Barnes Park

BMP Capture Benchmark Options	85 <sup>th</sup> Percentile Storm Capture	Bacteria Critical Storm Capture	Cost-Effective Size Capture
BMP Storage Required	7.2 ac-ft	12.9 ac-ft	10.0 ac-ft
Rough Magnitude Project Cost Used in Water Quality Modeling <sup>1</sup>	\$8.7 million	\$15.1 million	\$11.7 million

<sup>1</sup>Costs used in water quality modeling are broad and are based on an estimate of the major component costs. For a site-specific cost estimate see Section 4.3 and Attachment 2.

## 2.1 SITE LAYOUT

The regional structural BMP system will divert runoff from the existing 81-inch diameter pipe by a drop inlet, into a 42-inch diameter pipe from the storm drain to a pretreatment device, with flow entering an underground infiltration gallery via gravity (**Figure 2-2**). The site plan is also included in Attachment 1. An above ground landscape concept plan (Attachment 3) was developed to show potential surface improvements that would provide multi-benefits for the park and the community. This concept also provides a cross section of the overall site layout.



Figure 2-2. Barnes Park Site Layout

## 2.2 DIVERSION STRUCTURE ANALYSIS

The storm drain system at the proposed BMP site was represented using the EPA System for Urban Stormwater Treatment Analysis Integration (SUSTAIN) model to determine the optimal diversion rate for the system that corresponded to the most benefit between BMP footprint and pollutant removal. The optimal flow rate of 50 cfs was determined to be feasible with a 10.4-ft by 12.4 ft drop inlet and 42-inch pipe. The proposed diversion structure sections are presented in **Figure 2-3**.

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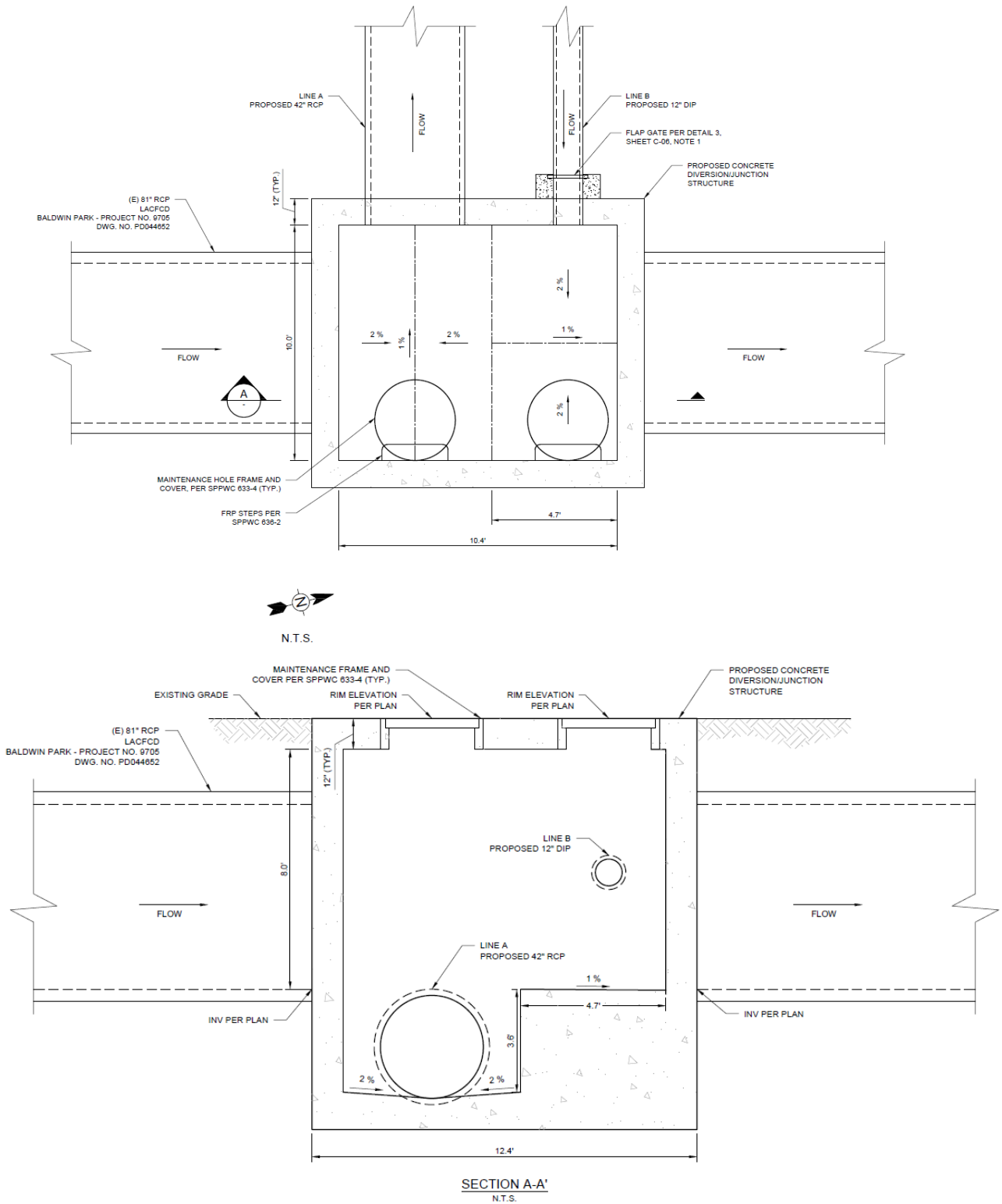
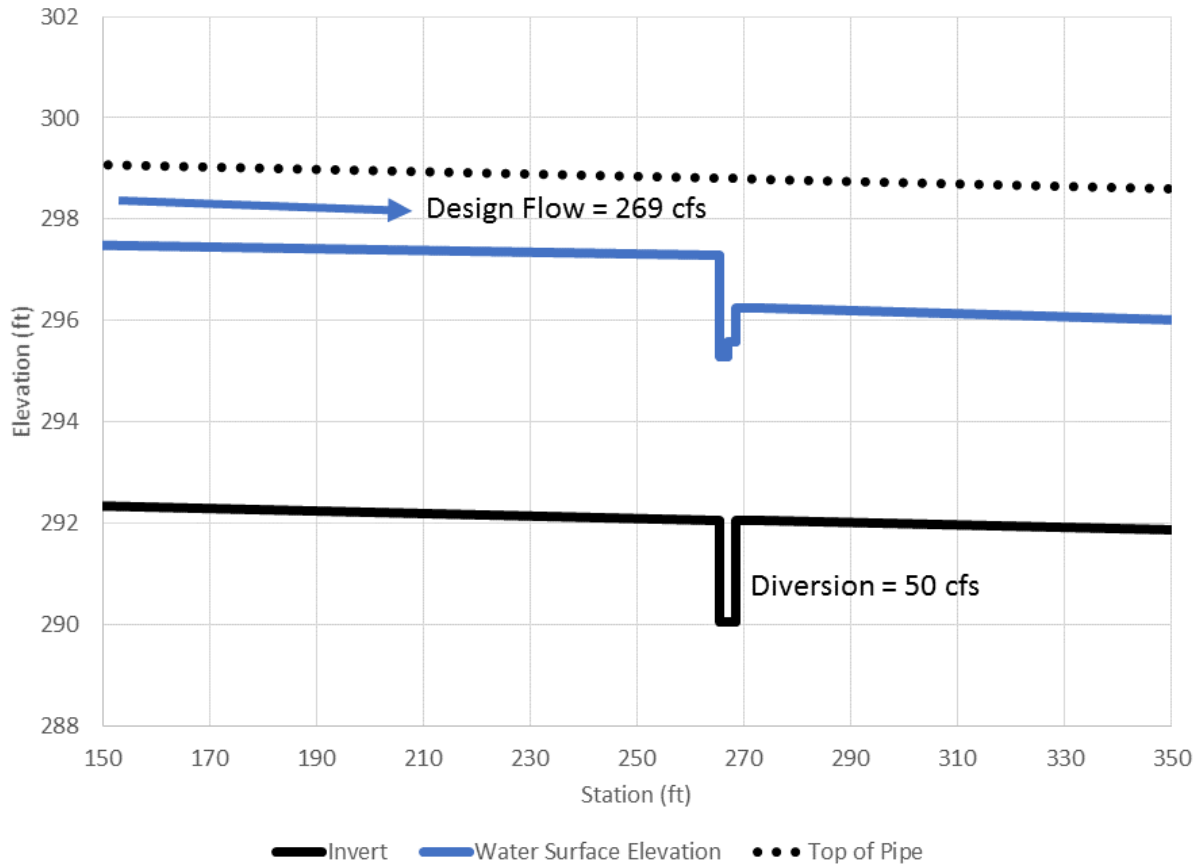


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**Figure 2-4.** Preliminary WSPG Plot for Barnes Park

## 2.3 PRETREATMENT

Stormwater runoff transports sediment, trash, and debris that can compromise the performance of stormwater facilities and pollute receiving waters. Pretreatment will be an integral component if the treatment strategies to extend the life of the proposed systems. It will be prescribed in order to reduce the maintenance frequency of the BMP site stormwater facilities, focus maintenance efforts to a concentrated area, and bolster compliance.

Two types of pretreatment devices are being considered for the project: a hydrodynamic separator and a baffle box. The final selection will be made during the detailed design phase of the project. A typical hydrodynamic separator collects stormwater runoff on one or more sides of the structure, then directs the water into a separation chamber where water begins swirling, forcing particles out of the runoff. One-hundred percent of floatables and neutrally buoyant debris larger than the screen aperture is collected. Hydrodynamic separators typically have an 80 percent removal rate of total suspended solids (TSS). With the chambered system, hydrocarbons float to the top of the water surface and are prevented from being transported downstream. The size of the unit will be selected based on the estimated sediment removal and the routine maintenance required. **Figure 2-5** represents a typical Contech CDS type hydrodynamic separator.



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## **ATTACHMENTS FOR SECTION 4.3:**

### **COST EFFECTIVENESS**

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## **ATTACHMENTS FOR SECTION 5:**

### **COMMUNITY INVESTMENT**











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# Landscape Plant List

Trees

-  Trident Maple  
(*Acer buergerianum*)
-  Coast Live Oak  
(*Quercus agrifolia*)
-  Western Redbud  
(*Cercis occidentalis*)

Shrubs, Perennials and Grasses

-  California Wild Rose  
(*Rosa californica*)
-  Yarrow  
(*Achillea millefolium*)
-  Dune Manzanita  
(*Arctostaphylos pumila*)
-  Autumn Sage  
(*Salvia greggii*)
-  California Goldenrod  
(*Solidago californica*)
-  Small Cape Rush  
(*Chondropetalum tectorum*)
-  English Lavender  
(*Lavandula angustifolia*)
-  Sage  
(*Salvia 'Bees Bliss'*)
-  Manzanita  
(*Arctostaphylos*)
-  Deer Grass  
(*Muhlenbergia rigens*)



Permeable Parking Stall Pavement





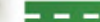
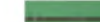




Precast Concrete Underground Storage Chambers

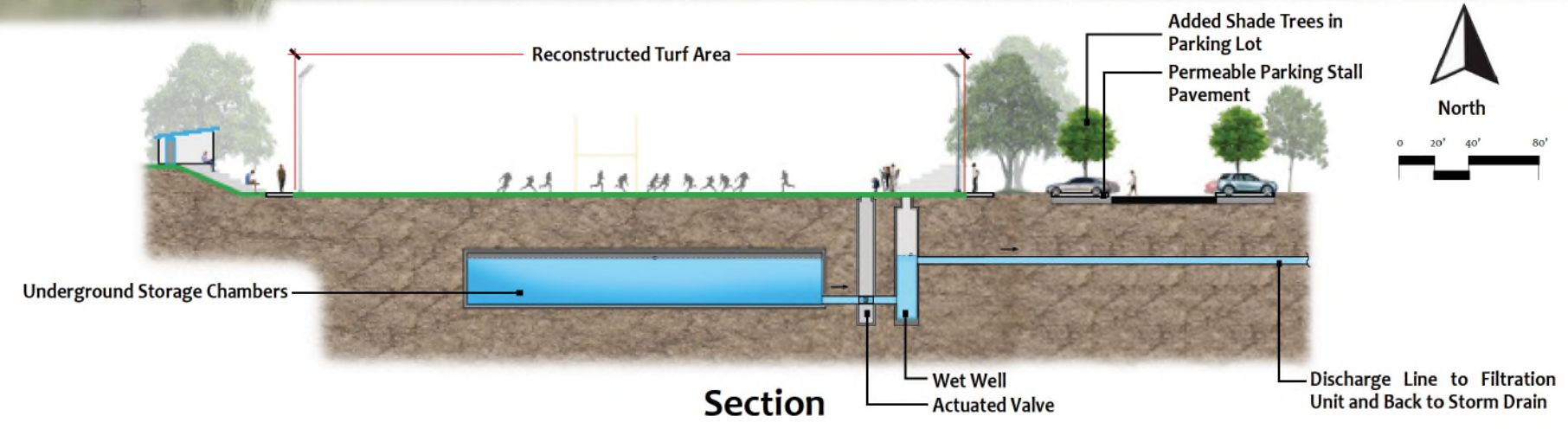


Dry Creek Swale



### LEGEND

-  Manhole Access Location
-  Precast Chamber Limits
-  Excavation Limits
-  Construction Limits
-  Inflow Pipe from Diversion Structure
-  Discharge Pipe to Channel
-  Diversion Structure
-  Existing Storm Drain



# Cortez Park

Multi-Benefit Stormwater Capture Project Above Ground Improvements

October 31, 2018





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## **ATTACHMENTS FOR SECTION 7.1:**

### **COST SHARE**

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## **ATTACHMENTS FOR SECTION 7.2:**

### **LOCAL SUPPORT**

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**ATTACHMENTS FOR SECTION 8.1:**

**ENVIRONMENTAL DOCUMENTS AND  
PERMITS**

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During project construction, park facilities to the north of the field would remain open and available for park users. The area surrounding the field would be secured with construction fencing and would be closed to the public. The parking lot would also be used as a construction ingress/egress area.

**Maintenance Activities**

Ongoing maintenance activities would be required to ensure the unit and pretreatment devices are kept free of debris so that sediment and larger materials do not accumulate. These maintenance activities would typically take a day of work on a monthly ongoing schedule and would involve a vacuum truck on-site at access locations for the unit.

**BMP Components**

<b>Site</b>	<b>Diversion</b>	<b>BMP Storage</b>	<b>Exfiltration</b>	<b>Rate</b>
Barnes	50 cfs	10.0 ac-ft	Infiltration	5.0 in/hr

Additional Details:

- Diversion structure from 81” storm drain
- Pretreatment unit
- Subsurface storage/infiltration facility
- Optional pump station and return line

**1.3 ANTICIPATED PERMITS AND APPROVALS**

Approval or permits from the following agencies are anticipated to be required:

- City of Baldwin Park

## 2.0 INITIAL STUDY CHECKLIST

Potential environmental impacts/environmental constraints associated with the proposed project are addressed in the Initial Study (IS) Checklist and associated discussions as follows. The IS is based on desk top review of the conceptual design and identifies topics where additional study may be required including records searches, field surveys, and technical analysis and studies. In cases where additional actions are required to determine impact, the box for “potential impact” is checked.

### 2.1 ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked could be potentially affected by this project based and/or require additional study to determine impact on a desk top review of the conceptual design and publicly available documents.

- |  |   |   |
|--|---|---|
| <input type="checkbox"/> Aesthetics                                    | <input type="checkbox"/> Agriculture and Forestry Resources       | <input checked="" type="checkbox"/> Air Quality               |
| <input checked="" type="checkbox"/> Biological Resources               | <input checked="" type="checkbox"/> Cultural Resources            | <input type="checkbox"/> Geology/Soils                        |
| <input checked="" type="checkbox"/> Greenhouse Gas Emissions           | <input checked="" type="checkbox"/> Hazards & Hazardous Materials | <input checked="" type="checkbox"/> Hydrology/Water Quality   |
| <input type="checkbox"/> Land Use/Planning                             | <input type="checkbox"/> Mineral Resources                        | <input checked="" type="checkbox"/> Noise                     |
| <input type="checkbox"/> Population/Housing                            | <input type="checkbox"/> Public Services                          | <input checked="" type="checkbox"/> Recreation                |
| <input checked="" type="checkbox"/> Transportation/Traffic             | <input checked="" type="checkbox"/> Tribal Cultural Resources     | <input checked="" type="checkbox"/> Utilities/Service Systems |
| <input checked="" type="checkbox"/> Mandatory Findings of Significance |   |   |

**2.2 ENVIRONMENTAL IMPACT ANALYSIS**

**2.2.1 AESTHETICS**

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

**Discussion:**

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

**Less Than Significant Impact.** A scenic vista generally provides focal views of objects, settings, or features of visual interest; or panoramic views of large geographic areas of scenic quality, primarily from a given vantage point. A scenic vista may include, but is not limited to, designated view corridors and scenic outlooks. Substantial constraints occur if the proposed project would introduce incompatible visual elements within a field of view containing a scenic vista or substantially alters a view of a scenic vista. The proposed project would include primarily subsurface infrastructure improvements except for a small utility building for pumping/filtration infrastructure. Given that the proposed improvements would occur primarily subsurface and park conditions restored after construction, project impact is anticipated to be less than significant.

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

**No Impact.** The project site is not located within the vicinity of a designated or eligible state scenic highway based on a review of the California Scenic Highway Mapping System (Caltrans 2018). Therefore, no project impact would result.

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

**Less Than Significant Impact.** The proposed project includes the construction and operation of a storm water infrastructure improvements within Barnes Park. Infrastructure improvements would be installed underground except for the small utility building for pumping and filtration equipment. Since the infrastructure improvements would primarily occur underground, there would be minimal visual change compared to existing conditions, and the proposed project would not substantially degrade the existing

visual character or quality of the site and its surroundings. Therefore, project impact is anticipated to be less than significant.

**d. Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?**

**Less Than Significant Impact.** The proposed project would not be a substantial source of light or glare. The proposed project includes stormwater infrastructure improvements within Barnes Park. Except for a small utility building for pumping and filtration equipment, all the stormwater infiltration system components would be installed underground. The above ground building would be constructed in accordance with City standards with building materials that would not generate excessive levels of reflective glare. The building may include some low intensity security lighting that would not be intrusive and would not represent a substantial source of new lighting. Therefore, project lighting impact is anticipated to be less than significant.

2.2.2 AGRICULTURE AND FOREST RESOURCES

	Potential Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a.	Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?			X
b.	Conflict with existing zoning for agricultural use or conflict with a Williamson Act contract?			X
c.	Conflict with existing zoning for, or cause rezoning of, forest land (as defined in PRC Section 12220(g)) or timberland (as defined in PRC Section 4526)?			X
d.	Result in the loss of forest land or conversion of forest land to non-forest use?			X
e.	Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?			X

**Discussion:**

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

**No Impact.** The project site is the existing Barnes Park that would continue to be utilized as a public park with implementation of the proposed project. There are no agricultural uses on or adjacent to the project site. Therefore, the proposed project would not convert farmland to non-agricultural uses and no project impact is anticipated.

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

**No Impact.** Based on a review of the City of Baldwin Park Zoning Map the project site is zoned open space. The project site is currently developed and utilized as a public park and would continue to be used as a public park with implementation of the proposed project. No change in land use is proposed. Therefore, the proposed project would not conflict with existing zoning for agricultural use.

The California Land Conservation Act of 1965, commonly referred to as the Williamson Act, enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space use. In return, landowners receive property tax

assessments which are much lower than normal because they are based upon farming and open space uses as opposed to full market value (CDC 2018). The project site is an existing City park and would not conflict with a Williamson Act Contract. Therefore, no project impact is anticipated.

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

**No Impact.** The project site is zoned open space. The project site is currently utilized as a public park within a developed urban environment. There is no forest land on or adjacent to the project. Therefore, no project impact is anticipated.

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

**No Impact.** There is no forest land located on or adjacent to the project site. Therefore, the proposed project would not result in the loss of forest land or conversion of forest land to a non-forest use and no project impact is anticipated.

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

**No Impact.** The proposed project would not involve changes to the existing environment which, due to their location or nature, could result in the conversion of Farmland to non-agricultural use. As identified above, the project site is located with a developed urban environment and there are no agricultural uses on or adjacent to the project site. The project site is currently developed and utilized as a public park and would continue to be used as a public park with implementation of the proposed project. Therefore, no project impact is anticipated.

**2.2.3 AIR QUALITY**

		Potential Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:					
a.	Conflict with or obstruct implementation of the applicable air quality plan?			X	
b.	Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	X			
c.	Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a non-attainment area for an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?	X			
d.	Expose sensitive receptors to substantial pollutant concentrations?	X			
e.	Create objectionable odors affecting a substantial number of people?			X	

**Discussion:**

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

**Less Than Significant Impact.** The proposed project is located within the South Coast Air Basin (SCAB), which is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). The SCAQMD is responsible for administering the Air Quality Management Plan (AQMP) for the Basin, which is a comprehensive air pollution control program for attaining state and federal ambient air quality standards. The City of Baldwin Park has an adopted an Air Quality Element as part of their General Plan. The Air Quality Element contains policies and goals for attaining air quality standards. A significant impact could occur if the proposed project is inconsistent with the AQMP or the applicable plans.

The proposed project would place stormwater infrastructure improvements (primarily subsurface except for a small utility building for pumping and filtration equipment) within the existing Barnes Park. The project site would continue to be used as a public park with no change in land use with implementation of the proposed project and would be consistent with the Park General Plan land use designation. Therefore, the proposed project is not expected to conflict with or obstruct implementation of the applicable air quality plan.

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

**Potential Impact.** The SCAQMD has established thresholds of significance for criteria pollutants generated during construction and operation, and a significant impact would occur if the proposed project would result in construction or operational emissions that exceed the thresholds. Significance thresholds are established to assist lead agencies in determining whether a project may have a significant air quality impact. Projects with emissions below established thresholds will not have a significant impact on air quality. Projects with emissions equal to or exceeding the established significance threshold will have a potentially significant adverse impact on air quality. A summary of the SCAQMD air quality significance thresholds is presented in Table 3.

**Table 3: SCAQMD Air Quality Significance Thresholds**

Pollutant	Construction (lb/day)	Operation(lb/day)
NO <sub>x</sub>	100	55
VOC	75	55
PM <sub>10</sub>	150	150
PM <sub>2.5</sub>	55	55
SO <sub>x</sub>	150	150
CO	550	550
Lead	3	3
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402	

Notes: CO carbon monoxide  
 lb/day pounds per day  
 NO<sub>x</sub> oxides of nitrogen (nitric oxide and nitrogen dioxide)  
 PM<sub>2.5</sub> respirable particulate matter less than 2.5 microns in diameter  
 PM<sub>10</sub> respirable particulate matter less than 10 microns in diameter  
 SCAQMD South Coast Air Quality Management District  
 SO<sub>x</sub> oxides of sulfur  
 VOC volatile organic compounds

Air emissions originate from construction and/or operation of a project. Construction emissions are temporary emissions occurring only while a project is being constructed and end when construction is complete. Operation emissions are long-term and begin once a project starts day-to-day operations.

Construction of the proposed project would require heavy equipment such as loaders, and excavators, and substantial amounts of soil would require export from the site. Consequently, there is a possibility for construction emissions to exceed the SCAQMD significance thresholds, even with mitigation, depending on the construction phasing and schedule. Although such exceedances would not represent a substantial environmental constraint to the proposed project, it may have the effect of increasing the length of time required for individual project approvals by requiring a Mitigated Negative Declaration or Environmental Impact Report for California Environmental Quality Act (CEQA) compliance.

Operational emissions from the proposed project are not expected to differ significantly from current park operations. The proposed project includes the construction of stormwater infrastructure improvements within Barnes Park. Except for the small utility building, all the stormwater improvements would be

installed underground. Once the proposed project is constructed, the park would be restored and its operations would resume to pre-construction conditions. Thereby, project operational emissions are anticipated to be less than significant.

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

**Potential Impact.** Construction of the proposed project could result in emissions that exceed SCAQMD significance thresholds, and pose constraints related to project approval, as discussed above. Construction of the proposed project, in conjunction with construction of other water quality and related improvements, could result in cumulative air quality impacts. The potential for cumulative construction related air quality impacts should be addressed as part of the site-specific environmental compliance for the proposed project.

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

**Potential Impact.** As previously discussed, construction of the proposed project could result in emissions that exceeds SCAQMD significance thresholds. The project site is located within proximity to residences and a school (De Anza Elementary), which are sensitive receptors.

The SCAQMD has established localized significance thresholds (LSTs) to address the impacts that pollutant concentrations could have on nearby receptors. There is a potential for construction to result in emissions in excess of the applicable LSTs, which would have the effect of increasing the length of time required for individual project approvals for CEQA compliance.

The SCAQMD also prescribes toxic air contaminant thresholds (TACs) that, if exceeded, would result in a significant impact to nearby sensitive receptors. TACs would result from construction activities of the proposed project and would be emitted primarily through the combustion of diesel fuel by construction equipment. Exceedances of TACs would also have the potential effect of increasing the length of time required for individual project approvals for CEQA compliance.

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

**Less Than Significant Impact.** Construction of the proposed project would result in some odors associated with diesel emissions from construction equipment. Odors from construction sources would be significant if they were to become a nuisance pursuant to SCAQMD Rule 402. To become a nuisance, odor resulting from the proposed project would need to generate multiple valid odor complaints. Diesel odors are common in urbanized environments, and during project construction, would be temporary and localized, and not expected to result in substantial odor impacts.

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

## 2.2.4 BIOLOGICAL RESOURCES

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

### Discussion:

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

**Potential Impact.** The project site is an existing park located in the City of Baldwin Park and is developed with active and passive recreational uses within an urban environment. A review of the California Natural Diversity Database maintained by the California Department of Fish and Wildlife

should be conducted to identify any previously recorded candidate, sensitive or special status species located on the project site or within the vicinity of the site.

The San Gabriel River that may be used by migrating birds and other sensitive species runs adjacent to the park on the western side, approximately 0.1 mile away. The project site includes landscaped open space areas, which include trees that could be used as nesting sites. Impacts to migratory birds and active nests are prohibited under the Federal Migratory Bird Treaty Act (MBTA), 50 C.F.R. Part 10, and Sections 3500 through 3705 of the California Fish and Game Code protect most migratory bird species and active nests from harm or destruction. Nearly all native North American bird species are on the MBTA list. The nesting season varies according to species, but is generally February 15 through August 15 for most birds and January 31 through September 1 for raptors. If tree and vegetation removal would occur during nesting months, a nesting bird survey at the project site should be performed to prevent disturbance of active nests. Such surveys are standard mitigation applied during site specific environmental documentation. The requirements for nesting bird surveys are not expected to result in substantial environmental constraints, but could result in additional time requirements for CEQA compliance.

Based on the results of the records search and the presence of trees within the project site, a field visit by a qualified biologist may be needed to determine potential impact and to identify mitigation measures (if warranted).

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

**Potential Impact.** No sensitive natural communities are anticipated to be located at the park. Barnes Park is developed with active and passive recreation uses within a developed urban neighborhood. No riparian habitat is located at the park, but it is directly adjacent to the San Gabriel River which is located approximately 0.1 mile to the west of the project. Walnut Creek, which is a soft bottom channel, is located approximately 0.25 mile to the south of the park. No changes to Walnut Creek are proposed as part of the project. A field visit may be needed by a qualified biologist to determine potential impact and to identify mitigation measures (if warranted).

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

**Potential Impact.** Due to the close proximity of the project site to the San Gabriel River, a field visit by a qualified biologist may be needed to determine potential impact and to identify mitigation measures (if warranted). Walnut Creek is found to the south of the project site and no changes to Walnut Creek are proposed as part of the project. Treated stormwater from the residential area northeast of the park would either be filtered to the groundwater for recharge or directed back to the storm drain before entering the creek.

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

**Potential Impact.** The park is located within a highly developed urban region and is not part of a native resident or migratory wildlife corridor. However, the project site is adjacent to the San Gabriel River,

which wildlife may use for migration. No native wildlife nursery site is known to occur in the project site. Trees within the project site may aid migratory wildlife. A field visit by a qualified biologist may be needed to determine potential impact and to identify mitigation measures (if warranted).

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

**Potential Impact.** The Baldwin Park Code of Ordinances Chapter 153.165, addresses tree preservation and protection. Should trees require removal as part of the project, then compliance with City code should be evaluated. Therefore, removal of trees at the park may be a potential environmental constraint.

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

**No Impact.** Based on a preliminary review, there are no known habitat conservation plans applicable to the project site. Therefore, no project impact is anticipated.

2.2.5 CULTURAL RESOURCES

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

Discussion

a. Would the project cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?

**Potential Impact.** A historical resource is defined in Section 15064.5(a)(3) of the CEQA Guidelines as any object, building, structure, site, area, place, record, or manuscript determined to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California. Historical resources are further defined as being associated with significant events, important persons, or distinctive characteristics of a type, period, or method of construction; representing the work of an important creative individual; or possessing high artistic values. Resources listed in or determined eligible for the California Register of Historical Resources, included in a local register, or identified as significant in a historic resource survey are also considered historical resources under CEQA.

A project with an effect that may cause substantial adverse change in the significance of a historical resource is a project that may have a significant impact on the environment. Substantial adverse change is defined as physical demolition, relocation, or alteration of a resource or its immediate surroundings such that the significance of an historical resource would be materially impaired. Direct impacts are those that cause substantial adverse physical change to a historical resource. Indirect impacts are those that cause substantial adverse change to the immediate surroundings of a historical resource such that the significance of a historical resource would be materially impaired.

The project site includes a grassy field area within the existing Barnes Park. The proposed project includes water quality improvements that would be located primarily subsurface except for a small utility building. While there are no structures located on the grassy field area; it is nonetheless recommended that a records search be conducted for the Area of Potential Effect (APE) and a 1-mile radius (study area) at the South Central Coastal Information Center (SCCIC) of the California Historical Resources Information System (CHRIS) at California State University, Fullerton, California. As part of the record search, the SCCIC database of survey reports and overviews, documented cultural resources, cultural landscapes, and ethnic resources would be consulted. Additionally, the search typically includes a review of the following publications and lists: California Office of Historical Preservation (OHP) Historic Properties Directory/National Register of Historic Properties, OHP Archaeological Determinations of

Eligibility, California Inventory of Historical Resources/California Register of Historic Resources, California Points of Historical Interest, California Historical Landmarks, Caltrans Bridge Survey, ethnographic information, historical literature, historical maps, and local historic resource inventories.

**b. Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?**

**Potential Impact.** The project site is located within Barnes Park that is developed for recreational uses. The onsite development is low intensity and there could be undisturbed soils below the site that contain archaeological resources. Based on this, site-specific cultural resource investigation, including a cultural resources records search should be conducted via the SCCIC. Mitigation measures that may be applied in the site-specific environmental document may include monitoring of excavation work by a qualified archaeologist with the authority to halt construction, and the subsequent evaluation and curation of any discovered resources. This potential constraint could have the effect of increasing the length of time required for project approvals and CEQA compliance.

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

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

**d. Would the project disturb any human remains, including those interred outside of formal cemeteries?**

**Less than Significant Impact.** The project site is the existing Barnes Park that is used for recreation. However, it is still possible that human remains could exist within subsurface soils. California Health and Safety Code Section 7050.5 requires that in the event of the discovery of human remains outside of a dedicated cemetery, all ground disturbances must cease and the county coroner must be notified. Section 7052 establishes a felony penalty for mutilating, disinterring, or otherwise disturbing human remains, except by relatives. Sections 5097.94 and 5097.98 of the Public Resources Code specify a protocol to be followed when the Native American Heritage Commission receives notification of a discovery of Native American human remains from a county coroner. Compliance with existing laws regarding the handling of human remains discovered outside of formal cemeteries are expected to address any issues associated with the unanticipated discovery of human remains during project construction, and no environmental constraints are anticipated.

**2.2.6 GEOLOGY AND SOILS**

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

**Discussion:**

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

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

**No Impact.** The park is not on a mapped Alquist Priolo Earthquake Fault zone (California Geological Survey 1999), (Tetra Tech 2018). The closest zoned fault for surface rupture is the is the East Montebello Fault Zone section located approximately 4.25 miles southwest of the project site. No impact would occur.

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

**Less Than Significant Impact.** The Southern California region is known to be seismically active. Earthquakes occurring within approximately 60 miles of the site are generally capable of generating ground shaking of engineering significance to the proposed construction (Tetra Tech 2018). The project area is located in the general proximity of several active and potentially active faults. Active faults are defined as those that have experienced surface displacement within the Holocene period (approximately the last 11,000 years). The East Montebello Fault Zone section located approximately 4.25 southwest of the site. The site is located in an area that has a number of active faults and an earthquake on any fault in the vicinity of the park would subject the park to seismic ground shaking. The proposed project is not a habitable structure so a less than significant impact would occur as a result of strong seismic ground shaking. The 2018 geotechnical study completed at the site concluded that construction of the project is feasible from a geotechnical standpoint provided that the facilities infiltrate at a depth greater than 20 feet (Tetra Tech 2018). Seismic design parameters identified in the geotechnical study are based on Chapter 16 of the 2016 California Building Code and on information provided by the U.S. Geological Survey for seismic design (USGS 2018 b).

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

**Less than Significant Impact.** The park has been mapped in an area subject to ground failure from liquefaction (California Geological Survey 1999). Based on a geotechnical investigation conducted at the site to determine the potential for liquefaction during a seismic event, the majority of the on-site soils are not susceptible to liquefaction. The combined dynamic settlement at the ground surface ranges from about 0.5 to 1.5 inches. It is noted that although the magnitude of the estimated dynamic settlements corresponds to a mean estimated settlement and can vary on the order of +/- 50 percent, the standard of practice uses the mean estimated values in developing guidelines and evaluating potential damage to structures. Differential settlements per County of Los Angeles Administrative Manual, Liquefaction/Lateral Spreading/GS045.0 (GS045.0) are assumed to be about half of the total settlements i.e., about 0.3 to 0.7 inches over a span of 30 feet. Therefore, structural mitigation is acceptable at this site, and the Structural Engineer should account for this differential settlement in the design of the foundation and the structure (Tetra Tech 2018).

**iv.) Landslides?**

**No Impact.** The park has not been mapped in an area subject to ground failure landslides (California Geological Survey 1999; Tetra Tech 2018). No project impact would occur.

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

**Less Than Significant Impact.** The proposed project includes water quality infrastructure improvements. During construction, a Stormwater Pollution Prevention Plan (SWPPP) is required for construction sites over an acre that would identify BMPs to manage soil erosion from wind and stormwater. Upon completion of project construction activities, the site would be restored. Therefore, a less than significant impact is anticipated.

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

**Less Than Significant Impact.** The park is on a geologic unit that is either unstable or likely to become unstable as a result of the project (California Geological Survey 1999). The geotechnical study performed for this site concluded that the site is within an area identified by the State of California as subject to hazard of liquefaction (Tetra Tech 2018). As groundwater was noted within 10 feet of the surface, a liquification hazard analysis was completed at the site. The results of analysis indicated that for the potential for liquefaction during a seismic event, the majority of the on-site soils are not susceptible to liquefaction. The combined dynamic settlement at the ground surface ranges from about 0.5 to 1.5 inches. The 2018 geotechnical report also concluded that the site is not in an Earthquake-Induced Landslide Hazard Zone. No evidence of land sliding was observed on or in the vicinity of the site during the geotechnical sampling completed at the site (Tetra Tech 2018). The 2018 geotechnical report also concluded that the site is not located in an area mapped as subject to historic or current subsidence (US Geological Survey 2018a). Geotechnical sampling of soils yielded results that concluded that soils on site are susceptible to collapse but that structural mitigation in the design of the foundation and structure of the project would off-set the settlement (Tetra Tech 2018).

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

**No Impact.** Based on a geotechnical survey conducted at the park, the subsurface geology was observed to be fill soils characterized as silty sands within the upper 1-foot (Tetra Tech 2018). Native alluvium deposits that consisted of well graded and poorly graded sands with silty sands interbeds (Tetra Tech 2018). Soils at the site are not expansive in nature. As the project site is not located on expansive soils, no impacts would occur to park facilities.

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

**No Impact.** The proposed project would not use septic tanks or alternative wastewater disposal systems and no project impact would result.

2.2.7 GREENHOUSE GAS EMISSIONS

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

**Discussion:**

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

**Potential Impact.** Regulated greenhouse gases (GHGs) include carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>). GHGs are commonly quantified in the equivalent mass of CO<sub>2</sub>, denoted CO<sub>2</sub>eq, which takes into account the global warming potential (GWP) of each individual GHG compound. The most common GHG that results from human activity is CO<sub>2</sub>, followed by CH<sub>4</sub> and N<sub>2</sub>O.

The proposed project would generate GHG emissions during construction that should be evaluated, including CO<sub>2</sub> and equivalents. However, construction emissions are amortized over 30 years and are not likely to result in substantive annual greenhouse gas emissions.

Operation of the proposed project would consist of the pumping of stormwater to the treatment devices, and are not expected to generate substantial levels of greenhouse gasses. Project operational impact is anticipated to be less than significant.

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

**Potential Impact.** GHG emissions would conflict with applicable plans, policy or regulation if the proposed project conflicts with any of the plans, policies or regulations adopted for the purpose of reducing GHG emissions in the City of Baldwin Park. The proposed project would provide new stormwater infrastructure that is not anticipated to generate substantial greenhouse gas emissions. Nonetheless, the proposed project would generate GHG emissions during construction that should be evaluated, including compliance with applicable plans.

2.2.8 HAZARDS AND HAZARDOUS MATERIALS

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

**Discussion:**

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

**Less Than Significant Impact.** A hazardous material is defined as any material that due to its quantity, concentration, physical or chemical characteristics, poses a significant present or potential hazard to human health or to the environment if released. Hazardous materials include, but are not limited to, inorganic and organic chemicals, solvents, mercury, lead, asbestos, paints, cleansers, or pesticides.

Operation activities associated with the proposed water quality infrastructure improvements would not involve the use of acutely hazardous materials or waste, and the limited use of any hazardous materials would be contained, stored, and used in accordance with the manufacturer's instructions. Due to the limited use of small quantities, the project would not create a significant hazard to the public or the environment through reasonably foreseeable use, transport, and disposal. A less than significant impact would occur in this regard.

Construction activities associated with the proposed project are not likely to involve the use of substantial quantities of hazardous materials and the most likely source of hazardous materials would be from vehicles and construction equipment at the site. However, there could be small amounts of hazardous materials, including solvents and lubricants used to maintain construction equipment. Generally, these materials would be used in concentrations that would not pose significant threats during the transport, use and storage of such materials. Furthermore, it is assumed that potentially hazardous materials would be contained, stored, and used in accordance with manufacturers' instructions and handled in compliance with applicable standards and regulations, including California Occupational Safety and Health Administration (OSHA) requirements, and Title 8 and 22 of the Code of California Regulations. Accordingly, risks associated with hazards to the public or environment posed by the transport, use or disposal of hazardous materials during construction are considered less than significant with compliance with required standards and regulations.

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

**Potential Impact.** Operational activities associated with the public park and proposed water quality infrastructure improvements would not involve the use of acutely hazardous materials or waste, and the limited use of any hazardous materials would be contained, stored, and used in accordance with the manufacturer's instructions. Due to the limited use of small quantities, the project would not create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials in to the environment. A less than significant impact is anticipated.

Construction activities would result in the removal of soil at the project site. The Phase I ESA for the project site indicates fill material should be sampled and analyzed for chemicals of potential concern (COPCs) (Tetra Tech 2018). Dust suppression may be necessary during future construction and/or excavation activities at the site. Additionally, near-surface fill material/soils should be sampled and analyzed for hazardous substances prior to being removed from the site for any purpose (Tetra Tech 2018).

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

**Less Than Significant Impact.** The proposed project includes water quality infrastructure improvements that would not utilize processes that could emit hazardous emissions or otherwise release hazardous substances or wastes. Because of this, no environmental constraint associated with the proposed project are expected.

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

**No Impact.** The project site is not identified as a hazardous materials site based on a review of the EnviroStor database (DTSC 2018) and State Water Board's Geotracker Database (SWRCB 2018). Site observations and the information reviewed for the Phase I Environmental Site Assessment did not indicate recognized environmental conditions (RECs), controlled RECs (CRECs), historical RECs (HRECs), PECs, or BERs associated with the site regarding environmental liens, activity use limitations (AULs), aboveground storage tanks (ASTs), underground storage tanks (USTs), current or historical hazardous materials usage, solid waste management, current or historical hazardous waste management, polychlorinated biphenyls (PCBs), mercury, water supply, wastewater, radon, air emissions, dry cleaners, microbial growth and moisture intrusion, or environmental non-compliance issues (Tetra Tech 2018).

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

**No Impact.** Based on review of a Google Earth Image date March 16, 2017, and AirNav.com (AirNav.com 2018), no airports are located within 2 nautical miles of the Site. The closest airport to the Site is the El Monte Airport, which is located approximately 2.25 nautical miles west of the Site.

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

**No Impact.** There are numerous private airports throughout Los Angeles County that include heliports. The proximity of heliports to the proposed project would not result in exposure of people to safety hazards, as the proposed project is water quality infrastructure improvements that are unmanned and would have no effect on air transport activities or their flight paths.

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

**Less Than Significant Impact.** The project site is currently used for recreational activities and the proposed project would add water quality infrastructure improvements within the park. Except for the small utility building, all water quality infrastructure improvements would be installed underground. No changes to the existing roadway network are proposed as part of the project. While it is expected that the majority of construction activities for the project would be confined on-site, short-term construction activities may temporarily affect access on streets during certain periods of the day. Minor traffic control may be necessary during such activities. However, any street work would occur under permit from the City and appropriate notifications would need to be made to local emergency providers so that alternative routes can be planned for in the event of an emergency. As a standard practice, street work would be subject to the requirements of a Traffic Control Plan approved by the local transportation agency, or would comply with applicable work area traffic control requirements. In addition, contractors typically would have steel plating available in the event excavations need to be quickly spanned. Aside from any needed temporary street work, no other disruptions to the local transportation system would occur, and substantial interruptions to emergency access are not anticipated.

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

**No Impact.** The project site is an existing park located within an urbanized area. The areas immediately surrounding the project site are urbanized, and no increased wildland fire hazard is expected as a result of the water quality improvements.

## 2.2.9 HYDROLOGY AND WATER QUALITY

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

**Discussion:**

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

**Potential Impact.** The proposed project would install and operate water quality improvement facilities within the San Gabriel River Watershed, which would divert, treat, and infiltrate stormwater. The proposed project would generally result in beneficial impacts to downstream receiving water quality as part of long-term operations.

During construction, the proposed project would require site work and grading. Construction activity could result in soil erosion and loss of topsoil, which could then affect water quality. Since the project is anticipated to disturb greater than one acre of land (including laydown and stockpile areas), the project must comply with the State Water Resources Control Board Order No. 2009-0009-DWQ, *National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities* (Construction General Permit). The Construction General Permit requires development of an SWPPP, implementation of erosion and sediment best management practices, monitoring, and reporting. Pursuant to the Construction General Permit, prior to terminating permit coverage the project site must be stabilized and not pose any additional sediment discharge risk than it did prior to the commencement of construction activity.

During operation of the BMP, pretreatment of runoff would be performed prior to its infiltration; however, it's unlikely pretreatment units would be able to treat all types and concentrations of contaminants in the runoff. Therefore, further analysis is needed to determine the underlying soil type, the depth to groundwater, and the proximity of the BMP to production wells.

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

**Less than Significant Impact.** The proposed project would feature an underground stormwater vault that would capture and infiltrate runoff from an 81-inch storm drain that collects stormwater from the residential area northeast of the park. Runoff from this wash would be diverted to a pretreatment system and then to an underground infiltration vault. Treated water would infiltrate to the groundwater for recharge, or be directed back to the storm drain if the vault is full. As such, there would be a net increase in recharge rate at the site. Therefore, project impact is anticipated to be less than significant.

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

**Less Than Significant Impact.** Barnes Park is located in the City of Baldwin Park, within a 384-acre watershed that drains through the upstream storm drain system directly into the San Gabriel River Tributary, which runs adjacent to the west side of the park. The proposed project would feature an underground stormwater vault that would capture and infiltrate runoff from an 81-inch storm drain that collects stormwater from the residential area northeast of the park. Runoff from this wash would be diverted to a pretreatment system and then to an underground infiltration vault. Treated water would infiltrate to the groundwater for recharge, or be directed back to the storm drain if the vault is full.

Therefore, the proposed project is not anticipated to substantially alter the drainage pattern of the project site or vicinity, or to result in substantial erosion or siltation.

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

**Less Than Significant Impact.** The proposed project would be located within the existing Barnes Park. The project site would be restored following construction. Infiltration would occur subsurface and would not result in erosion. The proposed project would feature an underground stormwater vault that would capture and infiltrate runoff from an 81-inch storm drain that collects stormwater from the residential area northeast of the park. Runoff from this wash would be diverted to a pretreatment system and then to an underground infiltration vault. Treated water would infiltrate to the groundwater for recharge, or be directed back to the storm drain if the vault is full. While a negligible amount of impervious surfaces would be created, it would not substantially increase the rate or amount of surface runoff in a manner that would result in flooding on-site or off-site. Therefore, project impact is anticipated to be less than significant.

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

**Less Than Significant Impact.** The proposed project consists of redeveloping a portion of Barnes Park with a stormwater BMP to improve water quality. The proposed project would feature an underground stormwater vault that would capture and infiltrate runoff from an 81-inch storm drain that collects stormwater from the residential area northeast of the park. Runoff from this wash would be diverted to a pretreatment system and then to an underground infiltration vault. Treated water would infiltrate to the groundwater for recharge, or be directed back to the storm drain if the vault is full. Thereby, the diversion rate would be much larger than the discharge rate and a less than significant impact is anticipated.

**f. Would the project otherwise substantially degrade water quality?**

**Less Than Significant Impact.** No adverse impacts/constraints regarding water quality are anticipated beyond those discussed under Checklist Item 2.2.9 a.

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

**No Impact.** No housing is located on the site and no housing is proposed as part of the project. Therefore, no project impact would result.

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

**No Impact.** The project site is located within Zone X, areas determined to be outside the 0.2% annual chance floodplain according to Flood Insurance Rate Map (FIRM)06037C1700F. Therefore, the proposed project would not place buildings or structures within a 100-year floodplain. No project impact would result.

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

**Less Than Significant Impact.** Dam inundation is flooding that occurs due to structural failure of a dam. Failure of a dam may be caused by seismic activity, severe flooding that causes water to exceed the capacity of the dam, or landslides that flow into a reservoir displacing water. The proposed project are infrastructure improvements that would not house people or otherwise increase the risk of exposure to risks related to potential flooding. Therefore, project impact is anticipated to be less than significant.

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

**Less Than Significant.** The proposed project is located inland and is not within a tsunami hazard zone or near inland water bodies that could be subject to a seiche. In addition, the project site is relatively flat and are not subject to mudflows. Therefore, project impact is anticipated to be less than significant.

2.2.10 LAND USE AND PLANNING

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

**Discussion:**

**a. Would the project physically divide an established community?**

**No Impact.** The proposed project would not physically divide an established community. The project site is currently used as a public park and would continue to do so with implementation of the proposed project. Implementation of the proposed project would result in primarily subsurface improvements to the City’s stormwater system and would not make any changes to existing city streets. Therefore, no project impact is anticipated.

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

**No Impact.** The proposed project would place stormwater infrastructure improvements primarily subsurface except for a small utility building within the existing Barnes Park. The project site would continue to be used as a public park with no change in land use with implementation of the proposed project and would be consistent with the general plan land use designation that identifies the site as Park.

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

**No Impact.** Based on a preliminary review, there are no known habitat conservation plans applicable to the project site. Therefore, no project impact is anticipated.

**2.2.11 MINERAL RESOURCES**

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

**Discussion:**

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

**No Impact.** The proposed project would be located within an existing park developed with recreational uses and the land would continue to be used as a public park with implementation of the proposed project. The project site is located within an urban environment and is adjacent to residential land uses that contain sensitive receptors (residences) which are generally not compatible land uses with mineral extraction. Therefore, no impacts on minerals are anticipated.

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

**No Impact.** The proposed project would be located within an existing park developed with recreational uses and the land would continue to be used as a public park with implementation of the proposed project. No impacts on minerals are anticipated.

2.2.12 NOISE

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

**Discussion:**

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

**Potential Impact.** Noise is defined as unwanted sound; however, not all unwanted sound rises to the level of a potentially significant noise impact. To differentiate unwanted sound from potentially significant noise impacts, the City has established noise regulations that take into account noise-sensitive land uses. The proposed project would be located primarily subsurface expect for a small utility building and the surface restored such that existing activities could resume following completion of construction. Operation of the water quality improvements would be automated and pump systems required to convey stormwater to the buried facilities would either be subsurface or placed in a small utility structure. Noise from operations is not expected to be noticeable and is not anticipated to result in substantial elevations in ambient noise levels at the project site or vicinity. The water quality improvements would require periodic maintenance; however, maintenance activities would not result in substantial elevation in ambient noise.

Construction of the water quality improvement facilities would result in short-term temporary noise impacts associated with construction equipment and haul trip activities. Noise is regulated by Chapter 153.140.070, Noise of the Baldwin Park Code of Ordinances. Given the extent of construction, construction duration, and the surrounding noise receptors, there may be temporary elevations in noise

levels from construction activities that should be evaluated for compliance with City noise requirements and mitigation measures identified as warranted.

**b. Would the project result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?**

**Potential Impact.** Operation of the pumps being installed as part of the proposed project would not generate vibration; however, construction of the underground storage facilities and site grading would require the use of equipment that could generate vibration. According to the Federal Transit Administration (FTA) guidelines, a vibration level of 65 VdB is the threshold of perceptibility for humans (FTA 2006). For a significant impact to occur, vibration levels must exceed 80 VdB during infrequent events (FTA 2006).

Possible sources of construction vibration from the proposed project may include bulldozers, dump trucks, backhoes, rollers, and other construction equipment that produces vibration. The vibration generated by project construction should be evaluated for potential impact since project construction activities would occur within proximity to existing residences within the surrounding neighborhood.

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

**Less Than Significant Impact.** Operation of the proposed project is not expected to result in a permanent increase in ambient noise levels. The pump station would be underground or housed in a small utility structure; therefore, there is not anticipated to be a substantial source of new noise.

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

**Potential Impact.** Operation of the proposed project is not expected to result in a permanent increase in ambient noise levels since the pump station would be located underground or housed in a small utility structure that would not be a substantial source of new noise. Construction activities would require a variety of equipment. Typical construction equipment would not be expected to generate noise levels above 90 dBA at 50 feet, and most equipment types would typically generate noise levels of less than 85 dBA at 50 feet. The highest noise levels during construction are normally generated during the use of earth moving equipment or pavement removal. Given the extent of construction, construction duration, and the surrounding noise receptors, there may be temporary elevations to the ambient noise levels from construction activities that should be evaluated and mitigation measures identified as warranted.

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

**No Impact.** Based on review of a Google Earth Image date March 16, 2017, and AirNav.com (AirNav.com 2018), no airports are located within 2 nautical miles of the Site. The closest airport to the Site is the El Monte Airport, which is located approximately 2.25 nautical miles west of the Site.

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

**Less Than Significant Impact.** There are numerous private airports throughout Los Angeles County, which include heliports. The proximity of the heliports to the proposed project would not result in exposure of people to excessive noise levels, since the proposed project is water quality infrastructure improvements that would have no effect on air transport activities or their flight paths, and would not cause people to move closer to a private airport.

2.2.13 POPULATION AND HOUSING

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

**Discussion:**

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

**Less than Significant Impact.** The proposed project would make improvements to the stormwater system. The project site is an existing public park and would continue operating as a public park with implementation of the proposed project. The construction of the proposed project would require construction workers. However, due to the relatively small size of the project and short duration of project construction activities, the proposed project is not anticipated to induce employees to move to the project vicinity and induce population growth or the need for housing. During long-term project operations, workers would be needed for routine maintenance activities. However, the proposed project is not anticipated to generate a substantial number of new jobs. Therefore, project impact is anticipated to be less than significant.

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

**No Impact.** The project site is an existing public park that does not contain any housing units. Since no existing housing would be removed, there would be no need for the construction of replacement housing elsewhere. Therefore, no project impact is anticipated.

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

**No Impact.** The project site is an existing public park that contains no housing units. No people would be displaced as a result of the proposed project since no housing units are onsite. Therefore, no project impact is anticipated.

2.2.14 PUBLIC SERVICES

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

**Discussion:**

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

**i.) Fire Protection**

**Less Than Significant Impact.** Except for the small utility building, the storm water infrastructure improvements would be installed underground. Since these infrastructure improvements would primarily be underground and the proposed project would not result in an increase use of park facilities, project impact on fire protection services is anticipated to be less than significant.

**ii.) Police Protection**

**Less Than Significant Impact.** The project is a water quality improvement project that would not increase housing or induce population growth that could in turn increase the need for new police protection services. Therefore, project impact is anticipated to be less than significant.

**iii.) Schools**

**Less Than Significant Impact.** Demand for educational services is typically linked to an increase in population growth in the area through the development of new housing units or the generation of new jobs. The proposed project includes water quality improvement facilities that are infrastructure improvements that would not increase housing or induce population growth through the generation of a substantial number of new jobs that could, in turn, increase the need for schools. Therefore, project impact is anticipated to be less than significant.

**iv.) Parks**

**Less Than Significant Impact.** Demand for park and recreational services is typically linked to an increase in population growth in the area through the development of new housing units or the generation of new jobs. The water quality improvement facilities are infrastructure improvements that do not increase housing stock and do not result in the movement or relocation of people. Therefore, project impact is anticipated to be less than significant.

**v.) Other Public Facilities**

**Less Than Significant Impact.** Demand for public services is typically linked to an increase in population growth in the area through the development of new housing units or the generation of new jobs. The proposed project includes water quality improvement facilities that are infrastructure improvements that would not increase housing or induce population growth through the generation of substantial number of new jobs that could in turn increase the need for new public facilities. Therefore, project impact is anticipated to be less than significant.

2.2.15 RECREATION

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

**Discussion:**

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

**Potential Impact.** Demand for park and recreational services is typically linked to an increase in population growth in the area through the development of new housing units or the generation of new jobs. The water quality improvement facilities are infrastructure improvements that do not increase housing stock and do not result in the movement or relocation of people. Therefore, project long-term operational impact is anticipated to be less than significant.

During construction, some park users may elect to use other parks during the approximately 18-month construction period. During project construction, park facilities to the north of the field would remain open and available for park users. The area surrounding the field would be secured with construction fencing and would be closed to the public. The parking lot would also be used as a construction ingress/egress area. The temporary closure of the recreational uses on part of the park is likely to require close coordination between the City, local residents, and community stakeholders to develop suitable mitigation options for addressing the temporary loss of recreational uses. This represents an environmental constraint that could have the effect of increasing the length of time required for project approval and CEQA compliance.

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

**Less Than Significant Impact.** The proposed project is located within the existing Barnes Park and would remove and replace the grassy field area. No expansion of recreational facilities is proposed as part of the proposed project. Therefore, project impact is anticipated to be less than significant.

2.2.16 TRANSPORTATION/TRAFFIC

		Potential Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:					
a.	Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, including mass transit and non-motorized travel and relevant components of the circulation system, including, but not limited to, intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	X			
b.	Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?			X	
c.	Result in a change in air traffic patterns including either an increase in traffic levels or a change in location that results in substantial safety risks?				X
d.	Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?			X	
e.	Result in inadequate emergency access?			X	
f.	Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?				X

**Discussion:**

**a. Would the project conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, including mass transit and non-motorized travel and relevant components of the circulation system, including, but not limited to, intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?**

**Potential Impact.** The proposed project would not make substantive changes to the circulation system or street capacities. The proposed project would involve water quality infrastructure improvements at the existing Barnes Park that would not result in the generation of a substantial number of new vehicle trips as part of long-term operations. During construction, there would be a short-term and temporary increase in vehicle trips associated with construction workers and equipment. Once operational, vehicle trips to the existing park would be similar to existing conditions. Therefore, it is recommended that an evaluation of construction vehicle trips be conducted and a recommended haul route identified in addition to any mitigation measures (if needed) to reduce any short-term, temporary construction impacts.

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

**Less Than Significant.** The proposed project would not make substantive changes to the circulation system or street capacities. The proposed project includes infrastructure improvements and would not be a significant traffic generator as part of long-term operations. Therefore, project impact is anticipated to be less than significant.

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

**No Impact.** Construction of water quality infrastructure improvements on the project site would not affect air traffic levels or change the location of the flight paths at an airport. Therefore, no project impact would result.

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

**Less than Significant Impact.** The proposed project would add water quality infrastructure improvements at Barnes Park that would be located primarily subsurface except for a small utility building. The project site is currently used for recreational activities and would continue to do so with implementation of the proposed project. No changes to the existing street system are proposed as part of the project. Therefore, project impact is anticipated to be less than significant.

**e. Would the project result in inadequate emergency access?**

**Less Than Significant Impact.** The project site is currently used for recreational activities and the water quality infrastructure improvements would primarily be located underground. No changes to the existing street system are proposed as part of the project. While it is expected that the majority of construction activities for the project would be confined on-site, short-term construction activities may temporarily affect access on streets during certain periods of the day. Minor traffic control may be necessary during such activities. However, any street work would occur under permit from the City and appropriate notifications would need to be made to local emergency providers so that alternative routes can be planned for in the event of an emergency. As a standard practice, street work would be subject to the requirements of a Traffic Control Plan approved by the local transportation agency, or would comply with applicable work area traffic control requirements. In addition, contractors typically would have steel plating available in the event excavations need to be quickly spanned. Aside from any needed temporary street work, no other disruptions to the local transportation system would occur, and substantial interruptions to emergency access are not anticipated. Therefore, project impact is anticipated to be less than significant.

**f. Would the project conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?**

**No Impact.** The proposed project would be located primarily subsurface, except for a small utility building, and would not result in permanent changes to the street systems that could affect alternative transportation routes, such as bike lanes or bike paths. Therefore, no project impacts are anticipated.

**2.2.17 TRIBAL AND CULTURAL RESOURCES**

	Potential Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a.	Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:			
	i.) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or	X		
	ii.) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	X		

**Discussion:**

**a. Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:**

**i.) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or**

**Potential Impact.** The project site is the existing Barnes Park that is currently developed with recreational uses. It is recommended that a Native American Heritage Commission (NAHC) sacred lands search and outreach letters to NAHC listed tribes be conducted to identify any known tribal historical resources that could be located within or adjacent to the project APE.

ii.) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

**Potential Impact.** The project site is the existing Barnes Park and subsurface construction activities may encounter native soils. A records search via SCCIC and NAHC sacred lands search should be conducted to identify any significant tribal cultural resources within or adjacent to the project area of potential effect (APE). Assembly Bill (AB) 52 requires a lead agency to evaluate a project's potential to impact to "tribal cultural resources" and requires the lead agency to consult with any California Native American tribe(s) that has previously requested that the lead agency provide the tribe with notice of such projects and consultation, and is traditionally and culturally affiliated with the geographic area of a proposed project. Consultations must include discussing the type of environmental review necessary, the significance of tribal cultural resources, and the significance of the project's impacts on the tribal cultural resources (as applicable), and alternatives and mitigation measures recommended by the tribe.

## 2.2.18 UTILITIES AND SERVICE SYSTEMS

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

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

**No Impact.** The proposed project would not generate wastewater that would require treatment by the local wastewater treatment plant. Therefore, no project impact is anticipated.

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

**No Impact.** The proposed project is a water quality improvement project that would not consume or require potable water and therefore, would not generate wastewater. Therefore, no project impacts on water supply or wastewater treatment services are anticipated as a result of this project.

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

**Potential Impact.** The proposed project is a stormwater infrastructure improvement project designed to improve water quality. The project as a whole will require additional evaluation to determine whether implementation of the project could result in any individual or cumulative impacts from construction or operation that may require mitigation to reduce impact and/or that could result in a significant impact.

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

**No Impact.** The proposed project is a stormwater improvement project that would not consume or require water service. Therefore, no impacts on water supply are anticipated.

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

**Less Than Significant Impact.** During project construction, a negligible amount of wastewater would be generated by construction workers. It is anticipated that portable toilets would be provided by a private company and the waste disposed off-site. Wastewater generation from construction activities is not anticipated to cause a measurable increase in wastewater flows at a point where, and at a time when, a sewer's capacity is already constrained or that would cause a sewer's capacity to become constrained. The proposed project would not generate wastewater upon operation of the project. Therefore, project impact is anticipated to be less than significant.

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

**Less than Significant Impact.** The proposed project is a stormwater infrastructure project that would not generate substantial amounts of solid waste. Project construction waste would be recycled to the extent feasible. Once operational, waste generation from the proposed project would primarily be from routine maintenance activities that would not be a significant source of new waste. Although some solid wastes would be generated by the proposed project, the amounts would be minimal and are not anticipated to adversely affect landfill capacity. Therefore, project impact is anticipated to be less than significant.

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

**Less Than Significant Impact.** The proposed project would not generate a substantial amount of solid waste and would comply with applicable federal, state, and local statutes and regulations related to solid waste. Project construction waste would be recycled to the extent feasible. Once operational, waste generation from the proposed project would primarily be from routine maintenance activities that would not be a significant source of new waste. Therefore, project impact is anticipated to be less than significant.

2.2.19 MANDATORY FINDINGS OF SIGNIFICANCE

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

**Discussion:**

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

**Potential Impact.** Construction of the proposed project would remove vegetation from the project site that could affect biological resources and may require additional study and site specific mitigation measures. Construction activities may also have the potential to encounter archaeological and paleontological resources, which could require site-specific mitigation. These potential constraints have been identified above, and would need to be addressed during site-specific CEQA compliance once additional technical analysis has been completed.

**b. Does the project have impacts that are individually limited, but cumulatively considerable? (“Cumulatively considerable” means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)**

**Potential Impact.** Construction of the proposed project could contribute to short-term temporary construction related cumulative air quality, noise, and traffic impacts that could require site-specific

mitigation. These potential impacts would need to be addressed in future site-specific CEQA documentation once additional technical analysis has been completed and include mitigation measures as warranted.

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

**Potential Impact.** The proposed project could result in impacts on human beings related to air quality, hazardous materials, and noise from construction activities, as previously discussed. These potential impacts would need to be addressed in a future site-specific CEQA documentation once additional technical analysis has been completed and include mitigation measures as warranted.

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**ATTACHMENTS FOR SECTION 8.2:**

**VECTOR MINIMIZATION**

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## **Barnes Park Vector Minimization Plan**

Although, the City does not have a complete Vector Plan Minimization Plan, for this project, currently in place. The City and its team will develop and complete a Vector Plan that effectively responds to the California Department of Public Health's Checklist and guidelines for Minimizing Vector Production in Stormwater Management Structures. The Vector Minimization Plan will be incorporated into the Project's design, operations, and maintenance plan.



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**ATTACHMENTS FOR SECTION 8.6:**

**TECHNICAL REPORTS**

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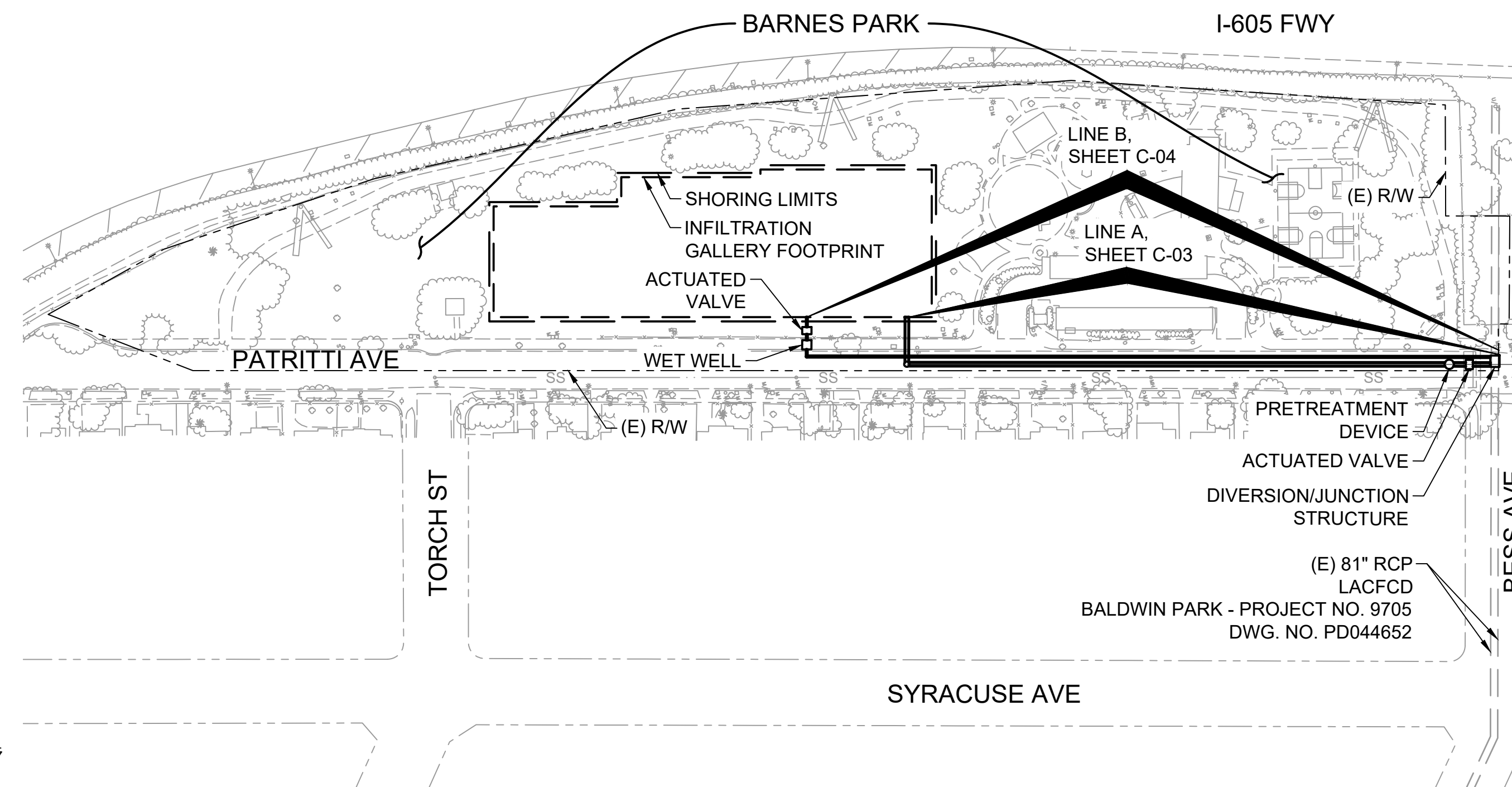
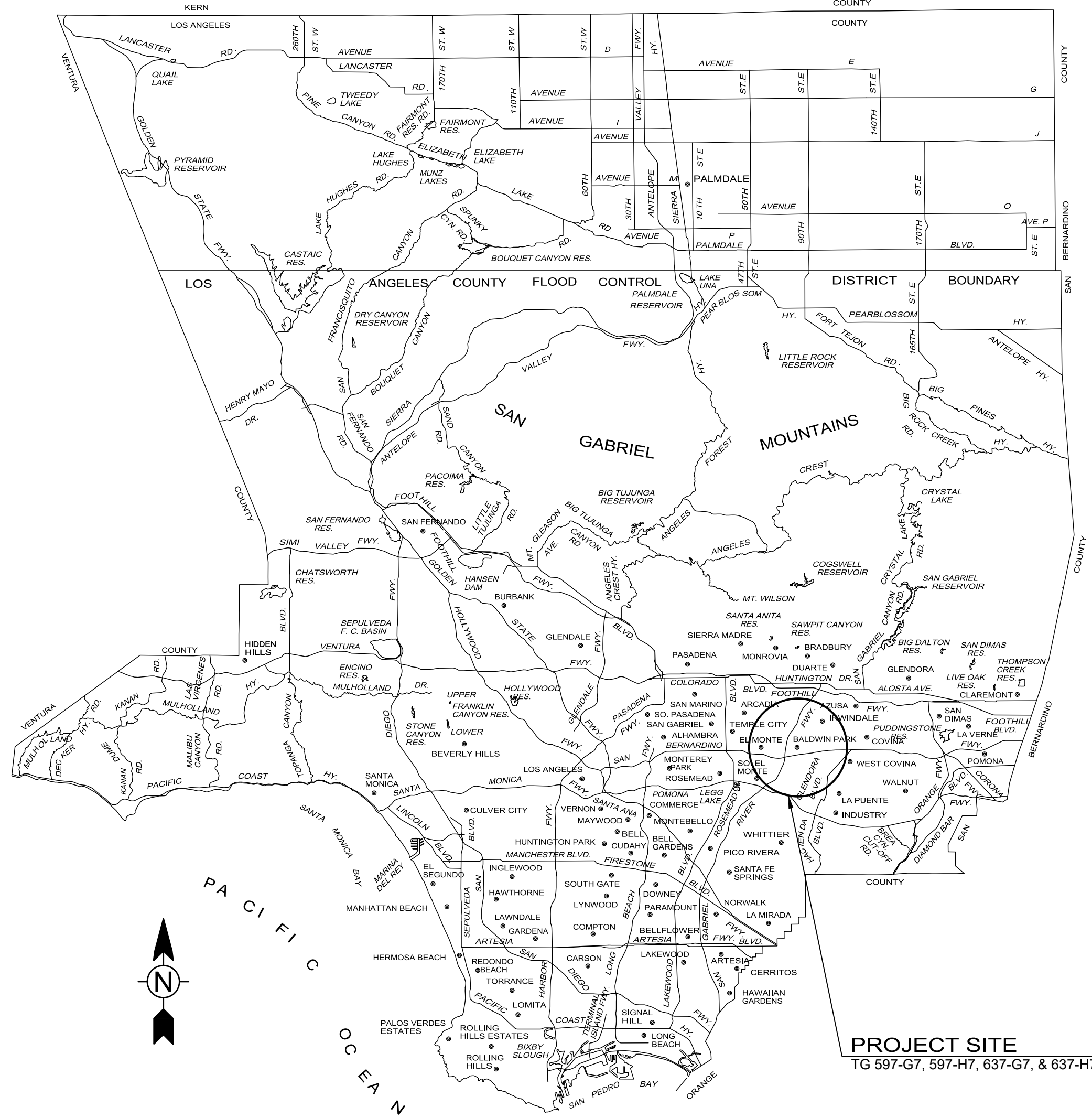
# COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

## BARNES PARK, BALDWIN PARK, CA

### MULTI-BENEFIT STORMWATER CAPTURE PROJECT

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UTILITY PURVEYORS		
UTILITY	CONTACT NAME	CONTACT NUMBER
ATT TRANSMISSIONS	JOSEPH FORKERT	(714) 963-7964
AT&T DISTRIBUTION	CONSTRUCTION & ENGINEERING	(510) 645-2929
LA COUNTY DEPT PUBLIC WORKS	JEFFREY BOUSE	(626) 300-3373
METROPOLITAN WATER	SUBSTRUCTURES TEAM	(213) 217-6679
SOUTHERN CALIFORNIA EDISON	ELSE ACEVEDO	(909) 274-3190
SO CAL GAS	GEARY AMBERS	(909) 335-7955
SUNESYS, LLC	TRENT HORVATH	(951) 278-0400
FRONTIER	RAY ROUNDTREE	(714) 375-6760
SAN GABRIEL VALLEY WATER CO	LUIS MONTENEGRO	(626) 448-6183
CHARTER COMM	GEORGE ALVAREZ	(626) 430-3335
UNITED CATV (TIME WARNER)	JEFF FLACO	(626) 855-3349
WILSHIRE CONNECTION LLC	NOC	(213) 542-0100
CONSOLIDATED SEWER MAINTENANCE DISTRICT	LA COUNTY DPW	(626) 300-3399

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APPROVED  
BY \_\_\_\_\_ CITY ENGINEER DATE \_\_\_\_\_

NO.	REVISION	REVISED BY	APPROVED BY	DATE

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

**BARNES PARK**  
MULTI-BENEFIT STORMWATER CAPTURE PROJECT

**TITLE SHEET**

**3251 PATRITTI AVE, BALDWIN PARK, CA 91706**

DWG G-01 SHEET 1 OF 12

# NOTICE TO CONTRACTOR

## GENERAL NOTES

- ALL WORK SHALL CONFORM TO THE PROJECT TECHNICAL SPECIFICATIONS. WORK NOT COVERED BY THE PROJECT SPECIFICATIONS SHALL CONFORM TO THE STANDARD PLANS OF LOS ANGELES COUNTY, THE CITY OF BALDWIN PARK, AMERICAN PUBLIC WORKS ASSOCIATION AND CALTRANS STANDARD PLANS AND SPECIFICATIONS. (ALL LATEST EDITIONS).
- NOTIFICATION: AT LEAST TEN (10) DAYS BEFORE THE START OF CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY, IN WRITING, ALL HOMES LOCATED WITHIN 500 FEET OF THE PARK, OF THE PROPOSED CONSTRUCTION START DATE. A COPY OF SAID WRITTEN NOTIFICATION SHALL BE PROVIDED TO THE INSPECTOR FOR WRITTEN APPROVAL BEFORE THEY ARE DISTRIBUTED TO THE OCCUPANTS OF THE ABUTTING PROPERTY.
- THE CONTRACTOR SHALL NOTIFY THE CITY ENGINEER TWO (2) WORKING DAYS IN ADVANCE FOR INSPECTION PRIOR TO STARTING WORK AT (626) 813-5255.
- THE CONTRACTOR SHALL NOTIFY THE UTILITY COMPANIES 48 HOURS IN ADVANCE PRIOR TO WORKING AROUND THEIR FACILITIES.
- THE CONTRACTOR SHALL CALL UNDERGROUND SERVICE ALERT AT 811 48 HOURS PRIOR TO ANY EXCAVATION.
- THE CONTRACTOR SHALL PROVIDE AND MAINTAIN AT ALL TIMES DURING CONSTRUCTION AMPLE MEANS AND DEVICES WITH WHICH TO PROMPTLY REMOVE AND PROPERLY DISPOSE OF ALL WATER FROM ANY SOURCE ENTERING THE EXCAVATION OR OTHER PARTS OF THE WORK.
- ALL EXISTING IMPROVEMENTS, INCLUDING STRIPING, LANDSCAPING, MONUMENTS, BENCHES, GRILLES, REMOVED OR DAMAGED SHALL BE REPLACED "IN KIND", TO THE SATISFACTION OF THE CITY ENGINEER.
- ANY IMPROVEMENTS DAMAGED DURING THE CONSTRUCTION SHALL BE REMOVED AND RECONSTRUCTED PER CITY OF BALDWIN PARK STANDARD PLAN, STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION, AND TO THE SATISFACTION OF THE CITY ENGINEER.
- THE EDGES OF ALL A.C. PATCH SHALL BE SEALED WITH ASPHALT EMULSION.
- THE TRAFFIC CONTROL PLAN SHALL BE PREPARED BY THE GENERAL CONTRACTOR. THE TRAFFIC CONTROL AND CONSTRUCTION SIGNING SHALL BE PER WATCH HANDBOOK, OR THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) ALONG WITH THE CALIFORNIA SUPPLEMENT (ALL LATEST EDITIONS).
- CONTRACTOR SHALL HAVE SUFFICIENT MATERIALS ON HAND AT ALL TIMES TO EXPEDITE ANY EMERGENCY REPAIRS.
- WORKING HOURS SHALL BE BETWEEN 8AM AND 5PM MONDAY - FRIDAY ON ARTERIALS UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.
- A CONSTRUCTION PERMIT ISSUED BY THE CITY OF BALDWIN PARK IS REQUIRED FOR ANY WORK TO BE DONE IN THE PUBLIC RIGHT-OF-WAY.
- ALL COSTS FOR PERMITS AND MISCELLANEOUS FEES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. SEE SECTION 01010 FOR LIST OF PERMITS.
- A CONSTRUCTION BOND IS REQUIRED BY THE CITY OF BALDWIN PARK FOR ALL WORK TO BE DONE WITHIN THE PUBLIC RIGHT-OF-WAY.
- CONTRACTOR SHALL PROVIDE PROOF OF WORKER'S COMPENSATION AND LIABILITY INSURANCE.
- ALL SURVEY MONUMENTS DESTROYED AS A RESULT OF THE CONTRACTOR'S WORK SHALL BE RESET "IN KIND" AT THE CONTRACTORS EXPENSE BY A LICENSED SURVEYOR OR REGISTERED CIVIL ENGINEER. COPIES OF ALL TIES TO RESET MONUMENTS SHALL BE SUPPLIED TO THE CITY PRIOR TO RELEASE OF ANY SURETIES.
- PARKING LOT AND AREAS ADJACENT TO PARKING LOT SHALL BE PROTECTED FROM HEAVY EQUIPMENT TO AVOID CRACKING AND/OR DAMAGING THE AREA. THE CONTRACTOR IS RESPONSIBLE FOR THE REPAIR OF ANY DAMAGES TO THIS AREA. REFER TO THE OVERALL CONSTRUCTION WORK PLAN ON SHEET G-XX FOR ADDITIONAL INFORMATION. AT MINIMUM THE CONTRACTOR SHALL GRIND AND OVERLAY, AND RE-STRIPE ANY PARKING LOT AREAS USED DURING CONSTRUCTION.
- THE CONTRACTOR SHALL VISIT THE SITE AND BE KNOWLEDGEABLE OF CONDITIONS THEREON. THE CONTRACTOR SHALL INVESTIGATE, VERIFY AND BE RESPONSIBLE FOR ALL CONDITIONS OF THE PROJECT. THE CONTRACTOR SHALL NOTIFY THE CITY OF ANY CONDITIONS REQUIRING CORRECTION OR MODIFICATION PRIOR TO PROCEEDING WITH THE WORK.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE ACCURATE PLACEMENT OF ALL WORK ON THE SITE.
- EXISTING ELEVATIONS AND LOCATIONS TO BE JOINED BY THE WORK SHALL BE VERIFIED BY THE CONTRACTOR BEFORE COMMENCING THE WORK. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES ON THE DRAWINGS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR THE COORDINATION OF ALL DRAWINGS WITH ITS SUBCONTRACTORS. ALL SUBCONTRACTORS SHALL BE FURNISHED WITH COMPLETE SETS OF PLANS AND SPECIFICATIONS BY THE CONTRACTOR.
- ALL DIMENSIONS SHALL HAVE PREFERENCE OVER SCALE. DIMENSIONS SHALL BE VERIFIED IN THE FIELD PRIOR TO PROCEEDING WITH THE WORK. THE CITY SHALL BE NOTIFIED OF ANY CORRECTIONS REQUIRED.
- NOTES AND TYPICAL DETAILS APPLY TO ALL DRAWINGS UNLESS NOTED OTHERWISE.
- TRADE NAMES AND MANUFACTURERS REFERRED TO ARE FOR QUALITY STANDARDS ONLY. EQUALS WILL BE PERMITTED ONLY AS APPROVED BY THE CITY. SUBMITTALS AND/OR SHOP DRAWING ARE REQUIRED FOR ALL PRODUCTS OR ITEMS TO BE INSTALLED. SEE SPECIFICATIONS.
- THE GENERAL CONTRACTOR AND ITS SUBCONTRACTORS SHALL FURNISH ALL LABOR, EQUIPMENT, AND MATERIALS; AND PERFORM ALL WORK NECESSARY, INDICATED, REASONABLY INFERRED OR REQUIRED BY ANY CODE WITH JURISDICTION. ALL CONTRACTORS SHALL COMPLETE THEIR SCOPE OF WORK FOR A COMPLETE AND PROPERLY FINISHED JOB.
- THE GENERAL CONTRACTOR AND ALL SUBCONTRACTORS SHALL AT ALL TIMES KEEP THE PREMISES FREE FROM ACCUMULATION OF WASTE MATERIALS OR RUBBISH CAUSED BY THEIR WORK, AND AT THE COMPLETION OF THE WORK, SHALL REMOVE ALL RUBBISH FROM AND ABOUT THE JOB SITE, AND ALL THEIR TOOLS, SCAFFOLDING, AND SURPLUS MATERIALS, AND SHALL LEAVE THE JOB BROOM CLEAN.
- THE CONTRACTOR SHALL PROVIDE PROPER ANCHORAGE OF ALL EQUIPMENT AND ASSEMBLIES SHOWN HEREIN IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS, TRADE AND INDUSTRY STANDARDS, AND ALL GOVERNING CODES AND ORDINANCES.
- WHERE SPECIFIC DIMENSIONS, DETAILS, OR DESIGN INTENT CANNOT BE DETERMINED, CONSULT THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
- THE CONTRACTOR SHALL LOCATE ALL EXISTING UTILITIES AND PROTECT THEM FROM DAMAGE AS REQUIRED. ALL EXISTING UTILITY CROSSINGS SHALL BE POTHOLED AND FIELD LOCATED. IN ANY INSTANCES WHERE THE CLEARANCE BETWEEN THE TOP OF THE EXISTING PIPE AND THE BOTTOM OF THE CROSSING PIPE OR

CONDUIT IS LESS THAN 18", CONTRACTOR SHALL INSTALL BLANKET PROTECTION IN ACCORDANCE WITH THE STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION NO. 224-2.

- ALL DISSIMILAR METALS SHALL BE SUFFICIENTLY ISOLATED FROM EACH OTHER TO PREVENT GALVANIC ACTION.
- TRENCH COMPACTION AND SUBGRADE COMPACTION TESTS SHALL BE PERFORMED BY A LABORATORY DESIGNATED BY THE CITY, UTILIZING CALIFORNIA TEST METHOD NO. 216 AND 231. THE CITY WILL FURNISH FIRST TESTS, WHEN REQUESTED, AT NO COST TO THE CONTRACTOR. ANY RE-TESTING REQUIRED DUE TO FIRST TEST FAILURES SHALL BE MADE AT LOCATIONS ORDERED BY THE ENGINEER, AND SHALL BE AT THE CONTRACTOR'S EXPENSE - COST OF WHICH WILL BE DEDUCTED FROM THE CONTRACTOR'S FINAL PAYMENT.
- ALL EXISTING IMPROVEMENTS, INCLUDING CURB AND GUTTERS, SIDEWALKS, ASPHALT CONCRETE OR P.C.C. PAVING WHICH ARE BEING JOINED OR MATCHED IN CONNECTION WITH THE PROJECT, SHALL BE JOINED, OR MATCHED IN A MANNER SATISFACTORY TO THE CITY ENGINEER, INCLUDING NECESSARY SAWCUTTING, REMOVAL, REPLACEMENT OR CAPPING. SAW CUTTING OF CONCRETE WALKS, CURBS, GUTTERS, AND PCC PAVEMENT SHALL OCCUR AT THE NEAREST JOINT UNLESS NOTED IN THE PLANS.
- THE CONTRACTOR SHALL CONDUCT CONSTRUCTION OPERATIONS IN SUCH A MANNER THAT STORM, SEWER, IRRIGATION, OR OTHER WATERS MAY PROCEED UNINTERRUPTED ALONG THE STREET OR THEIR CONYENCE COURSES.
- ALL BURIED VALVES SHALL BE PROVIDED WITH RISERS, VALVE BOXES AND COVERS. NUTS AND BOLTS SHALL BE 316 STAINLESS STEEL.

## DEMOLITION

- THE DEMOLITION PLANS ARE INTENDED TO BE SCHEMATIC ONLY AND DO NOT ITEMIZE ALL SPECIFIC DEMOLISHED ITEMS. THE DEMOLITION INDICATED ON THE PLANS ARE INTENDED AS A GENERAL GUIDE ONLY. THE CONTRACTOR IS RESPONSIBLE TO DETERMINE AND PROVIDE ALL DEMOLITION NECESSARY TO PROPERLY INSTALL ALL THE IMPROVEMENTS. THE CONTRACTOR SHALL PERFORM AN INVESTIGATION OF THE AS-BUILTS, EXISTING CONDITIONS, AND SHALL INCLUDE ALL DEMOLITION NECESSARY IN THE BID. THE CONTRACTOR RESPONSIBLE FOR DEMOLITION SHALL BE FAMILIAR WITH ALL NEW IMPROVEMENT PLANS IN ORDER TO ALLOW FOR THE PROPER DETERMINATION OF THE DEMOLITION EXTENTS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DEMOLITION REQUIRED FOR PROPER INSTALLATION OF IMPROVEMENTS SHOWN IN THE PLANS AND SPECIFICATIONS. SEE CIVIL, ARCHITECTURAL, STRUCTURAL, ELECTRICAL, AND MECHANICAL DRAWINGS FOR ADDITIONAL DEMOLITION NOTES.
- EXISTING ITEMS TO REMAIN THAT ARE DAMAGED DURING THE COURSE OF CONSTRUCTION SHALL BE RESTORED TO THEIR ORIGINAL CONDITION BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE CITY.
- SEE ADDITIONAL DEMOLITION NOTES THROUGHOUT THE PLANS.
- PRIOR TO ANY CONCRETE REMOVAL, THE CONTRACTOR SHALL FIELD LOCATE AND STAKE OR MARK OUT DIVERSION STRUCTURE LOCATION FOR LOS ANGELES COUNTY FLOOD CONTROL DISTRICT APPROVAL.

## PATCHING NOTE

THE CONTRACTOR SHALL BE RESPONSIBLE FOR PATCHING ALL AREAS AT OR ADJACENT TO DEMOLISHED ITEMS SPECIFIED ELSEWHERE IN THESE PLANS. THE INTENT OF PATCHING IS TO RESTORE DEMOLISHED AREAS TO ORIGINAL CONDITION AS CLOSE AS REASONABLY POSSIBLE. PATCHING OR RESTORATION SHALL ALSO TAKE PLACE AT ALL AREAS TO REMAIN THAT RECEIVE DAMAGE DURING THE COURSE OF CONSTRUCTION UNDER THIS CONTRACT. THE CITY SHALL BE THE SOLE DETERMINANT AS TO THE REQUIREMENTS OR ACCEPTABILITY OF PATCHING OR RESTORATION WORK. ALL PATCHING MATERIALS, FINISHES, OR COLORS SHALL MATCH ADJACENT SURFACES AS CLOSELY AS POSSIBLE. SEE SPECIFICATIONS AND CITY OF BALDWIN PARK STANDARD PLANS.

## EXISTING FACILITY NOTE

THESE PLANS HAVE BEEN PREPARED FROM FIELD SURVEYS PERFORMED BY TETRA TECH, AERIAL SURVEYS DATED MARCH 28, 2017 PERFORMED BY ARROWHEAD MAPPING CORPORATION AND RECORD DOCUMENTS FURNISHED BY THE CITY OF BALDWIN PARK. ALL EXISTING INFORMATION SHOWN ON THE PLANS PREPARED BY TETRA TECH HAS BEEN TRANSFERRED FROM DOCUMENTS PROVIDED BY THE CITY OF BALDWIN PARK. TETRA TECH HAS PROVIDED DRAFTING SERVICES ONLY WITH REGARD TO DEPICTING EXISTING IMPROVEMENTS AND CONDITIONS. TETRA TECH CANNOT GUARANTEE THE ACCURACY OR COMPLETENESS OF EXISTING INFORMATION SHOWN. IF CONTRACTOR NOTICES ANY DISCREPANCIES BETWEEN EXISTING INFORMATION SHOWN ON THESE PLANS AND ACTUAL CONDITIONS, THE CONTRACTOR SHALL GIVE NOTICE OF SUCH FACT TO THE CITY OR ITS REPRESENTATIVE WITHOUT DELAY.

## JOB SITE RESPONSIBILITY

CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; AND THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.

## SECURITY DURING CONSTRUCTION

THE CONTRACTOR SHALL COORDINATE WITH THE CITY AND PROVIDE CONTINUOUS SECURITY FOR THE CONSTRUCTION AREAS OF THIS FACILITY DURING THE CONSTRUCTION OF THE IMPROVEMENTS. THIS SECURITY MUST BE IN PLACE 24 HOURS EACH WORK DAY, HOLIDAY, AND WEEKEND DAY AS REQUIRED TO MEET THE SATISFACTION OF THE CITY. THE CONTRACTOR SHALL BE RESPONSIBLE TO THE CITY FOR ANY LOSS OF PROPERTY OR DAMAGE TO PROPERTY CAUSED BY THE CONTRACTOR'S FAILURE TO PROVIDE ADEQUATE SECURITY.

## CORRELATION WITH SPECIFICATIONS


THE GENERAL NOTES ON THIS SHEET AND SHOWN ELSEWHERE ON THE PLANS ARE INTENDED TO BE COMPLEMENTARY WITH THE SPECIFICATIONS AND THE PROJECT MANUAL. SEE SPECIFICATIONS FOR PRECEDENCE OF DOCUMENTS. CONTRACTOR SHALL CAREFULLY REVIEW AND BECOME FAMILIAR WITH THE CONTENT OF ALL CONTRACT DOCUMENTS.

## GRADING NOTES

- THE LOCATION AND PROTECTION OF ALL UTILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR.
- THE LOCATION OF THE EXISTING UTILITIES AND SUBSTRUCTURES SHOWN HEREON HAVE BEEN TAKEN FROM RECORDS. THE ENGINEER DOES NOT WARRANT THE COMPLETENESS OR CORRECTNESS OF THE LOCATIONS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REVIEW PLANS, AS-BUILTS, AND LOCATE ALL UNDERGROUND FACILITIES, BEFORE COMMENCING WORK, AND PROTECT THEM FROM DAMAGE. SHOULD UTILITIES BE ENCOUNTERED THAT ARE NOT INDICATED, NOTIFY THE ENGINEER IMMEDIATELY. MARK HIGH VOLTAGE ELECTRICAL SERVICES WITH PROPER WARNING SIGNS AND BARRICADES.
- ALL EXPORT OF MATERIALS FROM THE SITE MUST GO TO A PERMITTED SITE APPROVED BY THE BUILDING OFFICIAL OR A LEGAL DUMPSITE. RECEIPTS FOR ACCEPTANCE OF EXCESS MATERIAL BY A DUMPSITE ARE REQUIRED AND MUST BE PROVIDED TO THE BUILDING OFFICIAL UPON REQUEST.
- A COPY OF THE GRADING PERMIT AND APPROVED GRADING PLANS MUST BE IN THE POSSESSION OF THE CONTRACTOR AND AVAILABLE AT THE SITE AT ALL TIMES.
- SITE BOUNDARIES, EASEMENTS, DRAINAGE DEVICES, RESTRICTED USE AREAS SHALL BE LOCATED PER CONSTRUCTION STAKING BY FIELD ENGINEER OR LICENSED SURVEYOR. PRIOR TO GRADING, AS REQUESTED BY THE BUILDING OFFICIAL, ALL PROPERTY LINES, EASEMENTS, AND RESTRICTED USE AREAS SHALL BE STAKED.
- IF GRADING AUTHORIZED BY THIS PLAN IS TO EXTEND THROUGH THE RAINY SEASON, NOVEMBER 1 THROUGH APRIL 15 OF THE FOLLOWING YEAR, SEPARATE UPDATED PLANS FOR EROSION CONTROL MUST BE SUBMITTED PRIOR TO OCTOBER 1 PER SECTIONS J110.8.3 AND J111.3 OF THE LOS ANGELES COUNTY BUILDING CODE (LACBC).
- TRANSFER OF RESPONSIBILITY: IF THE CIVIL ENGINEER, THE SOIL ENGINEER, OR THE ENGINEERING GEOLOGIST OF RECORD IS CHANGED DURING GRADING, THE WORK SHALL BE STOPPED UNTIL THE REPLACEMENT AGREED IN WRITING TO ACCEPT THEIR RESPONSIBILITY WITHIN THE AREA OF TECHNICAL COMPETENCE FOR ARRIVAL UPON COMPLETION OF THE WORK. IT SHALL BE THE DUTY OF THE PERMITTEE TO NOTIFY THE BUILDING OFFICIAL IN WRITING OF SUCH CHANGE PRIOR TO THE RECOMMENCEMENT OF SUCH GRADING.
- CONTRACTOR TO DESIGN AND PROVIDE ALL NECESSARY SHORING AND BRACING FOR REMOVAL ITEMS OR CONSTRUCTION OF IMPROVEMENTS. SHORING SHALL COMPLY WITH THE CALIFORNIA ADMINISTRATIVE CODE, TITLE 8; CONSTRUCTION SAFETY ORDERS, "INJURY AND ILLNESS PREVENTION - SAFETY MEASURES" OF THE GENERAL CONDITIONS AND "EXCAVATION SHORING, FORMS, & FALSE WORK" OF THE GENERAL REQUIREMENTS. SHORING PLANS SHALL BE SUBMITTED TO THE PROJECT ENGINEER FOR REVIEW AND APPROVAL. SHORING PLANS SHALL BE DESIGNED IN ACCORDANCE WITH RECOMMENDATIONS OF THE PROJECT GEOTECHNICAL ENGINEERING REPORT.
- FOR TRENCHES OR EXCAVATIONS 5 FEET OR MORE IN DEPTH INTO WHICH A PERSON IS REQUIRED TO DESCEND, THE CONTRACTOR SHALL OBTAIN NECESSARY PERMITS FROM THE STATE OF CALIFORNIA DIVISION OF INDUSTRIAL SAFETY PRIOR TO THE ISSUANCE OF A BUILDING OR GRADING PERMIT.
- A GEOTECHNICAL EVALUATION FOR BARNES PARK MULTI-BENEFIT STORMWATER CAPTURE PROJECT PREPARED BY TETRA TECH BAS GEOSCIENCE (PROJECT NO. TET 17-136E, REPORT DATE MARCH 20, 2018) HAS BEEN INCORPORATED INTO THE PROJECT PLANS & SPECIFICATIONS AS A GEOTECHNICAL DATA REPORT. THE CONTRACTOR SHALL COMPLY WITH THE RECOMMENDATIONS PRESENTED IN THE REPORT.

ADDITIONAL NOTES TO CONTRACTOR ARE ON SHEET G-03.

30% DESIGN - 9/7/2018

 <b>TETRA TECH</b> <small>www.tetrattech.com 3475 E. FOOTHILL BLVD PASADENA, CA 91107 (626) 351-4664</small>		NO.	REVISION	REVISED BY	APPROVED BY	DATE	COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS <b>BARNES PARK</b> MULTI-BENEFIT STORMWATER CAPTURE PROJECT <b>GENERAL NOTES</b>	
		APPROVED						
BY _____							PROJECT ENGINEER	DATE
CITY ENGINEER							DWG	G-02
							SHEET 2 OF 12	

# NOTICE TO CONTRACTOR (CONT.)

## LOS ANGELES COUNTY FLOOD CONTROL DISTRICT GENERAL NOTES

- A PERMIT SHALL BE OBTAINED FOR ALL WORK WITHIN THE COUNTY RIGHT OF WAY AND A DEPOSIT PAID TO THE DEPARTMENT OF PUBLIC WORKS AT THE PERMIT COUNTER, 900 SOUTH FREMONT AVENUE 8TH FLOOR, ALHAMBRA AT LEAST 72 HOURS PRIOR TO STARTING WORK UNDER THIS CONTRACT. COPIES OF ALL OTHER REQUIRED PERMITS, SUCH AS FLOOD CONTROL DISTRICT AND ROAD EXCAVATION, MUST BE FILED WITH THE PERMIT APPLICATION.
- WHEN WORK IS WITHIN A CONTRACT CITY, THE CONTRACTOR MUST CONTACT THE DIRECTOR OF PUBLIC WORKS OF THAT CITY TO DETERMINE THE LOCATION TO PAY THE INSPECTION DEPOSIT.
- THE CONTRACTOR SHALL CONTACT THE DISTRICT OFFICE LISTED ON THE "APPLICATION FOR STORM DRAIN CONSTRUCTION INSPECTION FORM I" TO ARRANGE FOR AN ACCEPTABLE CONSTRUCTION START DATE.
- APPROVAL OF THIS PLAN BY THE COUNTY OF LOS ANGELES DOES NOT CONSTITUTE A REPRESENTATION AS TO THE ACCURACY OF THE LOCATION, OR THE EXISTENCE OR NONEXISTENCE OF ANY UNDERGROUND UTILITY, PIPE OR STRUCTURE WITHIN THE LIMITS OF THIS PROJECT. THIS NOTE APPLIES TO ALL SHEETS.
- ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST ADOPTED EDITION OF THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION", INCLUDING SUPPLEMENTS AND SHALL BE PROSECUTED ONLY IN THE PRESENCE OF THE DIRECTOR OF PUBLIC WORKS.
- THE CONTRACTOR'S ATTENTION IS DIRECTED IN SECTION 7-10.4.1 OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION IN REGARD TO SAFETY ORDERS AND SHALL CONFORM TO THE "MINIMUM PUBLIC SAFETY REQUIREMENTS" AS SHOWN ON LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS STANDARD PLAN 6008-1.
- ELEVATIONS ARE IN FEET ABOVE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88), UNLESS OTHERWISE INDICATED.
- NO CONCRETE SHALL BE PLACED UNTIL THE FORMS AND REINFORCING STEEL HAVE BEEN PLACED, INSPECTED AND APPROVED.
- ALL STRUCTURAL CONCRETE SHALL BE PORTLAND CEMENT CONCRETE WITH AN ULTIMATE 28 DAY COMPRESSIVE STRENGTH OF 4500 P.S.I UNLESS OTHERWISE NOTED.
- TRANSVERSE REINFORCEMENT AND TRANSVERSE JOINTS SHALL BE PLACED AT RIGHT ANGLES (OR RADIAL) TO THE CONDUIT CENTER LINE EXCEPT AS OTHERWISE SHOWN ON THE DRAWINGS.
- ALL STEEL ADJACENT TO FACE OF CONCRETE SHALL HAVE 2-1/2 INCH CLEARANCE UNLESS OTHERWISE SPECIFIED.
- REINFORCEMENT SHALL BE DEFORMED BARS OF INTERMEDIATE GRADE STEEL PER A.S.T.M. A-615-GRADE 60.
- ALL BAR BENDS AND HOOKS SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE "MANUAL OF STANDARD PRACTICE".
- DIMENSIONS FROM FACE OF CONCRETE TO STEEL ARE TO CENTER LINE OF STEEL UNLESS OTHERWISE NOTED.
- ALL STEEL THAT IS TO BE CONTINUOUS SHALL HAVE A MINIMUM LAP OF 30 BAR DIAMETERS OR 18" WHICHEVER IS GREATER.
- ALL CONSTRUCTION JOINTS IN THE FOOTING OR SLABS AND WALLS SHALL BE IN THE SAME PLANE. NO STAGGERING OF JOINTS WILL BE PERMITTED.
- ALL EXPOSED EDGES SHALL BE FINISHED WITH A 3/4" CHAMFER.
- UNLESS OTHERWISE SHOWN, CONCRETE DIMENSIONS SHALL BE MEASURED VERTICALLY OR HORIZONTALLY AND PARALLEL OR AT RIGHT ANGLES (OR RADIAL) TO THE CENTER LINE OF CONSTRUCTION.
- CONCRETE BACKFILL SHALL BE PROVIDED FOR PIPE 21 INCHES IN DIAMETER OR LESS WHERE THE COVER IS EQUAL TO OR LESS THAN 2'-0", FOR PIPE GREATER THAN 21 INCHES IN DIAMETER BUT LESS THAN 39 INCHES WHERE THE COVER IS LESS THAN 1'-3", AND FOR PIPE 39 INCHES OR GREATER WHERE THE COVER IS LESS THAN 1'-0". THE CONCRETE BACKFILL SHALL BE AS SPECIFIED ON LACDPW STANDARD PLAN 3080, NOTE 7.
- ALL PIPES SHALL BE PLACED IN A TRENCH IN NATURAL GROUND AND/OR COMPACTED FILL. THE GROUND LEVEL BEFORE THE TRENCHING SHALL BE AT LEAST 3 FEET ABOVE THE TOP OF THE PIPE ELEVATION, OR AT FINISH SURFACE ELEVATION, WHICHEVER IS LESS.
- ALL BACKFILL AND FILLS OUTSIDE OF STREET RIGHT OF WAY SHALL BE COMPACTED TO A MINIMUM RELATIVE COMPACTION OF 90% OF MAXIMUM DRY DENSITY AS DETERMINED BY ASTM SOIL COMPACTION TEST D 1557-91 METHOD "D" UNLESS OTHERWISE SPECIFIED. THIS SHALL BE CERTIFIED BY A SOILS ENGINEER. THIS CERTIFICATION SHALL BE SUBMITTED TO THE DIRECTOR OF PUBLIC WORKS AND THE CITY ENGINEER PRIOR TO ACCEPTANCE OF THE WORK BY THE COUNTY AND THE CITY.
- ALL BACKFILL AND FILLS WITHIN STREET RIGHT OF WAY SHALL BE COMPACTED IN ACCORDANCE WITH SECTION 306-1.3.4 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED AND INSPECTED BY THE DEPARTMENT. CONTRACTOR SHALL NOTIFY THE INSPECTOR AT LEAST 24 HOURS IN ADVANCE FOR SOIL TESTING AS REQUIRED BY THE INSPECTOR.
- PIPE BEDDING SHALL BE ACCORDING TO LOS ANGELES COUNTY STANDARD DRAWING NO.3080; CASE III, EXCEPT BELL AND SPIGOT PIPE WHICH SHALL BE CASE II BEDDING, UNLESS OTHERWISE SHOWN. "W" VALUES SHALL BE AS SPECIFIED ON STANDARD DRAWING NO. 3080 FOR CASE III BEDDING, NOTE 3 (A), 3 (B), AND 3 (C). IF THE "W" VALUE AT THE TOP OF THE PIPE IS EXCEEDED, THE BEDDING SHALL BE MODIFIED, AND/OR PIPE OF ADDITIONAL STRENGTH SHALL BE PROVIDED. THE PROPOSED MODIFICATION SHALL BE APPROVED BY THE DEPARTMENT.
- PIPE SHALL BE EMBEDDED 5 INCHES INTO ALL STRUCTURES INCLUDING INLET AND OUTLET HEADWALLS, UNLESS OTHERWISE SPECIFIED.
- "UNLESS OTHERWISE SPECIFIED IN THE PROFILE ON THESE PLANS, THE PIPE SHALL BE MANUFACTURED WITH A MINIMUM CONCRETE COVER OVER THE STEEL IN THE INVERT OF 0.75 INCHES FOR RCP UP TO 96 INCHES IN DIAMETER AND 1.25 INCHES FOR PIPE GREATER THAN 96 INCHES IN DIAMETER".
- THE CONTRACTOR SHALL PROVIDE TO THE SATISFACTION OF THE DIRECTOR OF PUBLIC WORKS A SYSTEM FOR CONTRIBUTORY DRAINAGE TO BE OPERABLE AT ALL TIMES UNTIL THIS STORM DRAIN SYSTEM IS ACCEPTED FOR MAINTENANCE. THIS MAY HAVE TO BE DESIGNED BY A CIVIL ENGINEER.
- ALL REFERENCES ON THIS PLAN TO THE COUNTY ENGINEER, ROAD DEPARTMENT, OR FLOOD CONTROL DISTRICT SHALL APPLY TO THE APPROPRIATE ELEMENTS OF THE DEPARTMENT OF PUBLIC WORKS.
- EXISTING UTILITIES SHALL BE MAINTAINED IN PLACE BY THE CONTRACTOR, UNLESS OTHERWISE NOTED.

- WHERE THE UTILITIES ARE INDICATED ON THE DRAWINGS TO BE SUPPORTED, SAID SUPPORTS SHALL BE IN ACCORDANCE WITH STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION NO. 224, UNLESS OTHERWISE INDICATED.
- ALL OPENINGS RESULTING FROM THE CUTTING OR PARTIAL REMOVAL OF EXISTING CHANNELS, PIPES OR SIMILAR STRUCTURES SHALL BE SEALED WITH 8 INCHES OF BRICK AND MORTAR OR 6 INCHES OF CONCRETE, UNLESS OTHERWISE SHOWN.
- MANHOLES SHALL USE THE SPPWC STANDARD PLAN FOR PUBLIC WORKS CONSTRUCTION 630-4 FOR THE "FRAME AND COVER" AND 635-3 OR 636-2 FOR THE "STANDARD DROP STEP". STORM DRAIN MANHOLE COVERS SHALL BE CAST WITH THE LETTERS, "L.A.C.F.C.D.". THE LETTER SIZE SHALL BE 1-INCH HIGH AND PLACED BELOW THE LETTER "D" IN THE CENTER OF THE COVER.
- STORM DRAINS INVOLVED IN THE IMPROVEMENTS WILL NOT BE ACCEPTED FOR MAINTENANCE UNTIL THE STREETS HAVE BEEN PAVED, MANHOLES BROUGHT TO GRADE AND THE SYSTEM CLEANED TO SATISFACTION OF THE DIRECTOR OF PUBLIC WORKS.
- THE LATEST REVISED STANDARD PLAN OR DRAWING SHALL BE USED UNLESS OTHERWISE SPECIFICALLY NOTED.
- AN NPDES PERMIT FROM THE REGIONAL WATER QUALITY CONTROL BOARD IS REQUIRED BEFORE ANY DISCHARGE OF NON-STORM WATER INTO THE STORM DRAIN IS ALLOWED.
- STATIONS SHOWN ON THE PLANS ARE ALONG THE CENTER LINE OF CONDUIT OR ON A LINE NORMAL TO CENTER LINE OF CONDUIT.
- STATION AND INVERT ELEVATIONS OF PIPE INLETS SHOWN ON THE PROFILES ARE AT THE INSIDE FACE OF THE CONDUIT, UNLESS OTHERWISE SHOWN.
- PIPE CONNECTIONS TO STORM DRAIN SHALL CONFORM TO THE CURRENT REVISION OF SPPWC STANDARD PLAN 332 OR 334, UNLESS OTHERWISE SHOWN.
- ALL EXISTING UTILITIES SHOWN ON THE PLANS ARE THE PROPERTY OF THE OWNERS LISTED ON SHEET 1, UNLESS OTHERWISE NOTES.
- EXISTING UTILITIES SHALL BE MAINTAINED IN PLACE BY THE CONTRACTOR, UNLESS OTHERWISE NOTED, AND ALL UTILITIES CROSSING THE TRENCH SHALL BE TEMPORARILY SUPPORTED TO SATISFACTION OF THE OWNER.
- EXISTING TREES NOT INTERFERING WITH CONSTRUCTION SHALL BE PROTECTED IN PLACE.
- ALL MONUMENTS AND BENCHMARK MARKERS WITHIN THE PROJECT LIMITS WHICH ARE DISTURBED SHALL BE REPLACED AT THEIR PRE-CONSTRUCTION LOCATION AND ELEVATION PER COUNTY OF LOS ANGELES.
- THE WORK SHOWN ON THESE PLANS REQUIRES THE PRIME CONTRACTOR TO HAVE A VALID CLASS A OR C42 LICENSE ISSUED BY THE STATE OF CALIFORNIA.

## INSPECTION NOTES

- THE PERMITTEE SHALL CALL FOR AN INSPECTION BY THE BUILDING OFFICIAL AT THE FOLLOWING VARIOUS STAGES OF WORK AND SHALL OBTAIN THE APPROVAL OF THE BUILDING OFFICIAL PRIOR TO PROCEEDING TO THE NEXT STAGE OF WORK:
  - PRE-GRADE. BEFORE ANY CONSTRUCTION OR GRADING ACTIVITIES OCCUR AT THE SITE. PERMITTEE SHALL SCHEDULE A PRE-GRADE INSPECTION WITH THE BUILDING OFFICIAL. THE PERMITTEE SHALL ENSURE THAT ALL PROJECT CONSULTANTS ARE PRESENT AT THE PRE-GRADE INSPECTION.
  - INITIAL GRADE. WHEN THE SITE HAS BEEN CLEARED OF VEGETATION AND UNAPPROVED FILL AND HAS BEEN SCARIFIED, BENCHED, OR OTHERWISE PREPARED FOR FILL. NO FILL SHALL HAVE BEEN PLACED PRIOR TO THIS INSPECTION.NOTE: PRIOR TO ANY CONSTRUCTION ACTIVITIES, INCLUDING GRADING, ALL STORM WATER POLLUTION PREVENTION MEASURES INCLUDING EROSION CONTROL DEVICES WHICH CONTAIN SEDIMENTS MUST BE INSTALLED.
  - ROUGH GRADE. WHEN APPROXIMATE FINAL ELEVATIONS HAVE BEEN ESTABLISHED, DRAINAGE TERRACES, SWALES, AND OTHER DRAINAGE DEVICES NECESSARY FOR THE PROTECTION OF THE BUILDING SITES FROM FLOODING HAVE BEEN INSTALLED, BERMS HAVE BEEN INSTALLED AT THE TOP OF THE SLOPES, AND THE STATEMENTS REQUIRED BY SECTION J105.12 OF THE LACBC HAVE BEEN RECEIVED.
  - FINAL GRADE. WHEN GRADING HAS BEEN COMPLETED, ALL DRAINAGE DEVICES NECESSARY TO DRAIN THE BUILDING PAD HAVE BEEN INSTALLED. SLOPE PLANTING HAS BEEN ESTABLISHED, IRRIGATION SYSTEMS HAVE BEEN INSTALLED, AND THE AS-BUILT PLANS AND REQUIRED STATEMENTS AND REPORTS HAVE BEEN SUBMITTED.
- IN ADDITION TO THE INSPECTION REQUIRED OF THE BUILDING OFFICIAL FOR REGULAR GRADING, REPORTS AND STATEMENTS SHALL BE SUBMITTED TO THE BUILDING OFFICIAL IN ACCORDANCE WITH SECTION J105 OF THE LACBC.
- THE GRADING CONTRACTOR SHALL SUBMIT THE STATEMENT OF THE GRADING INSPECTOR AS REQUIRED BY SECTION J105.12 OF THE LACBC AT THE COMPLETION OF ROUGH GRADING.
- FINAL GRADING MUST BE APPROVED BEFORE OCCUPANCY OF BUILDINGS WILL BE ALLOWED PER SECTION J105 OF THE LACBC.

## CONCRETE REMOVAL NOTES

WHERE REINFORCEMENT IS REQUIRED TO EXTEND THROUGH THE NEW JOINT, CONCRETE SHALL BE REMOVED IN THE FOLLOWING SEQUENCE.

- A SAWCUT SHALL BE MADE ONE AND ONE-HALF INCHES DEEP AT THE REMOVAL LIMITS. CARE SHALL BE EXERCISED IN SAWING AT THE REMOVAL LIMITS SO AS NOT TO CUT THE REINFORCING STEEL IN THE REMAINING SLAB. THE EXISTING REINFORCING STEEL SHALL BE RETAINED AND EXTENDED INTO THE NEW CONSTRUCTION AS INDICATED ON THE PLANS.

- USING HANDHELD EQUIPMENT, THE CONCRETE SHALL BE CAREFULLY REMOVED FOR THE FULL DEPTH OF THE WALL OR SLAB AND FOR A MINIMUM DISTANCE FROM THE SAWCUT EQUAL TO THE LONGEST EXTENSION OF THE EXISTING BARS TO BE EXTENDED INTO THE NEW CONSTRUCTION. THIS EXTENSION SHALL BE 30 BAR DIAMETERS, UNLESS OTHERWISE SHOWN.
- EXISTING REINFORCEMENT SHALL BE CUT TO THE REQUIRED BAR EXTENSION.
- THE REMAINING CONCRETE MAY BE REMOVED BY ANY SUITABLE METHOD UPON APPROVAL OF THE ENGINEER, WHO SHALL BE THE SOLE JUDGE OF THE USE OF ANY CONCRETE REMOVAL EQUIPMENT. EXPLOSIVES, WRECKING BALL, OR OTHER SIMILAR DEVICES, WHICH ARE LIKELY TO DAMAGE THE CONCRETE TO BE LEFT IN PLACE, SHALL NOT BE USED.

## SHORING


SEE SPECIFICATION 02260 EXCAVATION SUPPORT AND PROTECTION.

## WORK AREA RESTRICTION NOTES

- ONCE AUTHORIZED BY THE CITY TO COMMENCE WORK WITHIN THE LACFCD STORM DRAIN, THE CONTRACTOR SHALL NOTIFY THE FLOOD MAINTENANCE DIVISION (IMPERIAL YARD) AT TELEPHONE (562) 861-0316 (8:00am TO 4:00pm) AND WATER RESOURCES DIVISION (OPERATIONS SECTION) AT TELEPHONE (626) 458-6177 AND PROVIDE THEM WITH A SCHEDULE OF ACTIVITIES A MINIMUM OF 120 HOURS (5 WORKING DAYS) BEFORE STARTING ANY WORK UNDER THE PERMIT.
- CONTRACTOR SHOULD BE AWARE THAT IMPROVEMENTS WITHIN THE LACFCD STORM DRAIN MAY OCCUR WHEN LARGE FLOWS ARE PRESENT WITHIN THE LACFCD STORM DRAIN. RAIN GAUGES THROUGHOUT THE WATERSHED SHOULD BE MONITORED DURING ALL WORK WITHIN THE LACFCD STORM DRAIN. CONTRACTOR IS RESPONSIBLE FOR SAFELY DIVERTING AND CONVEYING FLOW WITHIN THE WORK AREA THROUGHOUT THE DURATION OF CONSTRUCTION.
- PRIOR TO ANY WORK WITHIN THE LACFCD STORM DRAIN, THE CONTRACTOR SHALL SUBMIT A WATER DIVERSION PLAN TO THE CITY AND THE LOS ANGELES COUNTY FLOOD CONTROL DISTRICT (LACFCD) TO PROVIDE BYPASS CAPACITY AS FOLLOWS:
  - APRIL 16 TO MAY 31: 88.77 CFS (33%)
  - JUNE 1 TO AUGUST 31: 13.45 CFS (5%)
  - SEPTEMBER 1 TO OCTOBER 14: 88.77 CFS (33%)
  - NO WORK WILL BE ALLOWED IN THE LACFCD STORM DRAIN DURING THE PERIOD OF OCTOBER 15 - APRIL 15
- PLEASE SEE PERMIT POLICY DURING THE STORM SEASON (<http://www.ladpw.org/ladd/lib/fp/permits/permit%20policy%20during%20the%20storm%20season.pdf>) FOR MORE DETAILS.
- THE CONTRACTOR SHALL SUBMIT THE WATER DIVERSION PLAN A MINIMUM OF 60-DAYS PRIOR TO THE ANTICIPATED START DATE OF THE WORK TO OCCUR WITHIN THE STORM DRAIN. THE WATER DIVERSION PLAN IS REQUIRED TO BE REVIEWED AND APPROVED BY THE CITY AND LACFCD.
- CONTRACTOR SHOULD BE AWARE THAT IMPROVEMENTS WITHIN THE LACFCD STORM DRAIN MAY OCCUR WHEN LARGE FLOWS ARE PRESENT WITHIN THE LACFCD STORM DRAIN. RAIN GAUGES THROUGHOUT THE WATERSHED SHOULD BE MONITORED DURING ALL WORK WITHIN THE LACFCD STORM DRAIN. CONTRACTOR IS RESPONSIBLE FOR SAFELY DIVERTING AND CONVEYING FLOW WITHIN THE WORK AREA THROUGHOUT THE DURATION OF CONSTRUCTION.

ADDITIONAL NOTES TO CONTRACTOR ARE ON SHEET G-04.

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 <b>TETRA TECH</b> <small>www.tetrattech.com 3475 E. FOOTHILL BLVD PASADENA, CA 91107 (626) 351-4664</small>	NO.	REVISION	REVISED BY	APPROVED BY	DATE	COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS <b>BARNES PARK</b> MULTI-BENEFIT STORMWATER CAPTURE PROJECT <b>GENERAL NOTES</b>
	APPROVED					
BY _____ CITY ENGINEER						PROJECT ENGINEER _____ DATE _____
						DWG G-03
						SHEET 3 OF 12

# NOTICE TO CONTRACTOR (CONT.)

## NEW IMPROVEMENTS/EXISTING IMPROVEMENTS

ALL IMPROVEMENTS SHOWN ON THE PLANS SHALL BE CONSIDERED NEW UNLESS SPECIFICALLY LABELED "EXISTING" OR OTHERWISE CLEARLY INDICATED TO BE EXISTING.

## NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM NOTES

- IN THE CASE OF EMERGENCY, CALL SAM GUTIERREZ, CITY OF BALDWIN PARK DIRECTOR OF PUBLIC WORKS AT (626) 960-4011.
- SEDIMENT FROM AREAS DISTURBED BY CONSTRUCTION SHALL BE RETAINED ON SITE USING STRUCTURAL CONTROLS TO THE MAXIMUM EXTENT PRACTICABLE.
- STOCKPILES OF SOIL SHALL BE PROPERLY CONTAINED TO MINIMIZE SEDIMENT TRANSPORT FROM THE SITE TO STREETS, DRAINAGE FACILITIES OR ADJACENT PROPERTIES VIA RUNOFF, VEHICLE TRACKING OR WIND.
- APPROPRIATE BMP'S FOR CONSTRUCTION-RELATED MATERIALS, WASTES, SPILLS SHALL BE IMPLEMENTED TO MINIMIZE TRANSPORT FROM THE SITE TO STREETS, DRAINAGE FACILITIES, OR ADJOINING PROPERTIES BY WIND OR RUNOFF.
- RUNOFF FROM EQUIPMENT AND VEHICLE WASHING SHALL BE CONTAINED AT CONSTRUCTION SITES UNLESS TREATED TO REDUCE OR REMOVE SEDIMENT AND OTHER POLLUTANTS.
- ALL CONSTRUCTION CONTRACTOR OR SUBCONTRACTOR PERSONNEL ARE TO BE MADE AWARE OF THE REQUIRED BEST MANAGEMENT PRACTICES AND GOOD HOUSEKEEPING MEASURES FOR THE PROJECT SITE AND ANY ASSOCIATED CONSTRUCTION STAGING AREAS.
- AT THE END OF EACH DAY OF CONSTRUCTION ACTIVITY ALL CONSTRUCTION DEBRIS AND WASTE MATERIALS SHALL BE COLLECTED AND PROPERLY DISPOSED IN TRASH OR RECYCLE BINS.
- CONSTRUCTION SITES SHALL BE MAINTAINED IN SUCH A CONDITION THAT AN ANTICIPATED STORM DOES NOT CARRY WASTES OR POLLUTANTS OFF THE SITE. DISCHARGES OF MATERIAL OTHER THAN STORM WATER ONLY WHEN NECESSARY FOR PERFORMANCE AND COMPLETION OF CONSTRUCTION PRACTICES AND WHERE THEY DO NOT: CAUSE OR CONTRIBUTE TO A VIOLATION OF ANY WATER QUALITY STANDARD; CAUSE OR THREATEN TO CAUSE POLLUTION, CONTAMINATION, OR NUISANCE; OR CONTAIN A HAZARDOUS SUBSTANCE IN A QUANTITY REPORTABLE UNDER FEDERAL REGULATIONS 40 CFR PARTS 117 AND 302.
- POTENTIAL POLLUTANTS INCLUDE BUT ARE NOT LIMITED TO: SOLID OR LIQUID CHEMICAL SPILLS; WASTES FROM PAINTS, STAINS, SEALANTS, GLUES, LIMES, PESTICIDES, HERBICIDES, WOOD PRESERVATIVES AND SOLVENTS; ASBESTOS FIBERS, PAINT FLAKES OR STUCCO FRAGMENTS; FUELS, OILS, LUBRICANTS, AND HYDRAULIC, RADIATOR OR BATTERY FLUIDS; FERTILIZERS, VEHICLE/EQUIPMENT WASH WATER AND CONCRETE WASH WATER; CONCRETE, DETERGENT OR FLOATABLE WASTES; WASTES FROM ANY ENGINE/EQUIPMENT STEAM CLEANING OR CHEMICAL DEGREASING AND SUPERCHLORINATED POTABLE WATER LINE FLUSHING.
- DURING CONSTRUCTION, PERMITEE SHALL DISPOSE OF SUCH MATERIALS IN A SPECIFIED AND CONTROLLED TEMPORARY AREA ON-SITE, PHYSICALLY SEPARATED FROM POTENTIAL STORMWATER RUNOFF, WITH ULTIMATE DISPOSAL IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REQUIREMENTS.
- DEWATERING OF CONTAMINATED GROUNDWATER, OR DISCHARGING CONTAMINATED SOILS VIA SURFACE EROSION IS PROHIBITED. DEWATERING OF NON-CONTAMINATED GROUNDWATER REQUIRES A NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT FROM THE RESPECTIVE STATE REGIONAL WATER QUALITY CONTROL BOARD.
- GRADED AREAS ON THE PERMITTED AREA PERIMETER MUST DRAIN AWAY FROM THE FACE OF SLOPES AT THE CONCLUSION OF EACH WORKING DAY. DRAINAGE IS TO BE DIRECTED TOWARD DESILTING FACILITIES.
- THE PERMITEE AND CONTRACTOR SHALL BE RESPONSIBLE AND SHALL TAKE NECESSARY PRECAUTIONS TO PREVENT PUBLIC TRESPASS ONTO AREAS WHERE IMPOUNDED WATER CREATES A HAZARDOUS CONDITION.
- THE PERMITEE AND CONTRACTOR SHALL INSPECT THE EROSION CONTROL WORK AND INSURE THAT THE WORK IS IN ACCORDANCE WITH THE APPROVED PLANS.
- THE PERMITEE SHALL NOTIFY ALL GENERAL CONTRACTORS, SUBCONTRACTORS, MATERIAL SUPPLIERS, LESSEES, AND PROPERTY OWNERS THAT DUMPING OF CHEMICALS INTO THE STORM DRAIN SYSTEM OR THE WATERSHED IS PROHIBITED.
- EQUIPMENT AND WORKERS FOR EMERGENCY WORK SHALL BE MADE AVAILABLE AT ALL TIMES DURING THE RAINY SEASON. NECESSARY MATERIALS SHALL BE AVAILABLE ON SITE AND STOCKPILED AT CONVENIENT LOCATIONS TO FACILITATE RAPID CONSTRUCTION OF TEMPORARY DEVICES WHEN RAIN IS IMMINENT.
- ALL REMOVABLE EROSION PROTECTIVE DEVICES SHALL BE IN PLACE AT THE END OF EACH WORKING DAY WHEN THE 5-DAY RAIN PROBABILITY FORECAST EXCEEDS 40%.
- SEDIMENTS FROM AREAS DISTURBED BY CONSTRUCTION SHALL BE RETAINED ON SITE USING AN EFFECTIVE COMBINATION OF EROSION AND SEDIMENT CONTROLS TO THE MAXIMUM EXTENT PRACTICABLE, AND STOCKPILES OF SOIL SHALL BE PROPERLY CONTAINED TO MINIMIZE SEDIMENT TRANSPORT FROM THE SITE TO STREETS, DRAINAGE FACILITIES OF ADJACENT PROPERTIES VIA RUNOFF, VEHICLE TRACKING, OR WIND.
- APPROPRIATE BMPS FOR CONSTRUCTION-RELATED MATERIALS, WASTES, SPILLS OR RESIDUES SHALL BE IMPLEMENTED AND RETAINED ON SITE TO MINIMIZE TRANSPORT FROM THE SITE TO STREETS, DRAINAGE FACILITIES, OR ADJOINING PROPERTY BY WIND OR RUNOFF.
- ALL WORK SHALL BE IN ACCORDANCE WITH THE PROJECT APPROVED STORM WATER POLLUTION PREVENTION PLAN (SWPPP).
- THE CONTRACTOR IS REQUIRED TO PREPARE AND SUBMIT THE SWPPP FOR APPROVAL BY THE CITY.

## INDEX TO STANDARD PLAN

STD PLAN	SPPWC TITLE
110-2	DRIVEWAY APPROACHES
112-2	CURB AND SIDEWALK JOINTS
113-2	SIDEWALK AND DRIVEWAY REPLACEMENT
120-2	CURB AND GUTTER - BARRIER
122-2	CROSS AND LONGITUDINAL GUTTERS
133-3	ASPHALT CONCRETE PAVEMENT REPLACEMENT
224-2	SUPPORT FOR CONDUITS ACROSS TRENCHES
225-2	BLANKET PROTECTION FOR PIPES
300-3	CURB OPENING CATCH BASIN
320-2	MANHOLE - PIPE TO PIPE MAIN LINE ID = 36" (900mm) OR LARGER
324-2	MANHOLE SHAFT - WITH ECCENTRIC REDUCER
331-3	JUNCTION STRUCTURE - PIPE TO PIPE INLET ID ≥ OR OD > 1/2 MAIN LINE ID
332-2	JUNCTION STRUCTURE - PIPE TO PIPE INLET ID ≤ 24" (600mm)
333-2	JUNCTION STRUCTURE - PIPE TO RCB
334-2	JUNCTION STRUCTURE - PIPE TO PIPE INLET ID < 30" (750mm)
630-4	24" (610mm) MANHOLE FRAME AND COVER
633-4	36" (914mm) MANHOLE FRAME AND COVER
635-3	STEEL STEP
636-2	POLYPROPYLENE - PLASTIC STEP

STD PLAN	LACDPW TITLE
2027-1	ALLOWABLE TRENCH WIDTHS
3080-2	PIPE BEDDING IN TRENCHES
3090-1	CRITERIA FOR THE DESIGN OF SHORING FOR EXCAVATIONS
3091-1	SAMPLE SHEET FOR USE AS A GUIDE IN PREPARING CALCULATIONS FOR SHORING EXCAVATIONS
3093-1	UNIFIED SOIL CLASSIFICATION SYSTEM
6002-1	PORTABLE SECURITY FENCE FOR OPEN TRENCHES
W-46	PIPE TRENCH

## ABBREVIATIONS

ABBREVIATION	WORD OR WORDS	ABBREVIATION	WORD OR WORDS
AC	ASPHALT CONCRETE	LACDPW	LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
AVE	AVENUE	LACFCD	LOS ANGELES COUNTY FLOOD CONTROL DISTRICT
BLVD	BOULEVARD	MH	MANHOLE
BM	BENCH MARK	PT	POINT
CLF	CHAIN LINK FENCE	RCB	REINFORCED CONCRETE BOX
CMP	CORRUGATED METAL PIPE	RCP	REINFORCED CONCRETE PIPE
CONST	CONSTRUCTION	R/W	RIGHT OF WAY
DIA	DIAMETER	S	SLOPE
DIP	DUCTILE IRON PIPE	SD	STORM DRAIN
DWG	DRAWING	SF	SQUARE FOOT
EC	END OF CURVE	SPEC	SPECIFICATIONS
EL	ELEVATION	SPPWC	STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION
(E)	EXISTING	SS	SANITARY SEWER
FL	FLOW LINE	ST	STREET
FRP	FIBER REINFORCED PLASTIC	STA	STATION
FT	FOOT	STD	STANDARD
GC	GRADE CHANGE	W	WIDTH
HORIZ	HORIZONTAL		
ID	INNER DIAMETER		
INV	INVERT		
L	LENGTH		
MIN	MINIMUM		
MAX	MAXIMUM		

## BASIS OF BEARINGS

THE COORDINATES AND BEARINGS SHOWN HEREON ARE BASED UPON THE CALIFORNIA COORDINATE SYSTEM OF 1983 (CCS83), ZONE 5 NAD83, EPOCH 2010.00 IN ACCORDANCE WITH THE CALIFORNIA PUBLIC RESOURCES CODE SECTIONS 8801-8819; SAID COORDINATES AND BEARINGS ARE BASED LOCALLY UPON FIELD-OBSERVED TIES TO UNAVCO STATIONS "WNRA" AND "LPHS". THE GRID BEARING BETWEEN STATIONS BEING S79°06'34"E AS DERIVED FROM PUBLISHED UNAVCO GEODETIC VALUES.


## BENCHMARK

LOS ANGELES DEPARTMENT OF PUBLIC WORKS BENCHMARK NO. 4G4078

LEAD & TACK IN WEST CURB OF SYRACUSE AVENUE 2' SOUTH OF BEGINNING OF CURVE RETURN 20' WEST OF CENTERLINE AND 46' SOUTH OF CENTERLINE OF BESS AVENUE

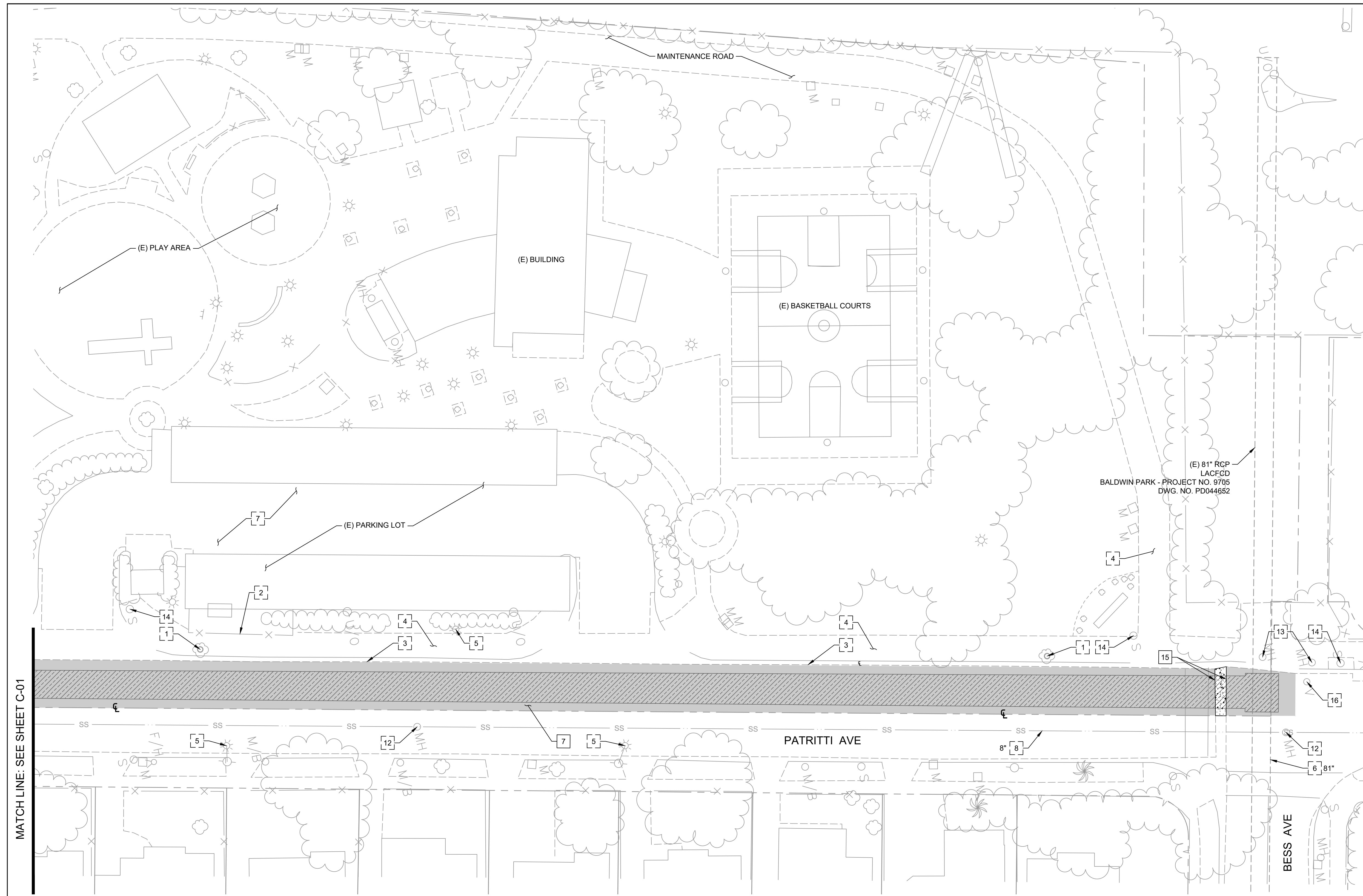
ELEVATION (FT) = 304.673

30% DESIGN - 9/7/2018

 <b>TETRA TECH</b> <small>www.tetrattech.com 3475 E. FOOTHILL BLVD PASADENA, CA 91107 (626) 351-4664</small>	NO.	REVISION	REVISED BY	APPROVED BY	DATE	COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS <b>BARNES PARK</b> MULTI-BENEFIT STORMWATER CAPTURE PROJECT <b>GENERAL NOTES, SURVEY NOTES</b> <b>&amp; ABBREVIATIONS</b>
	APPROVED					
BY _____ CITY ENGINEER						PROJECT ENGINEER _____ DATE _____
						DWG G-04 SHEET 4 OF 12







**LEGEND:**

- REMOVE EXISTING AC PAVEMENT AND BASE MATERIAL
- REMOVE EXISTING CONCRETE (SEE NOTE 7)
- TRENCH AND BACKFILL (SEE NOTE 9)
- RIGHT OF WAY (RAW) / PROPERTY LINE

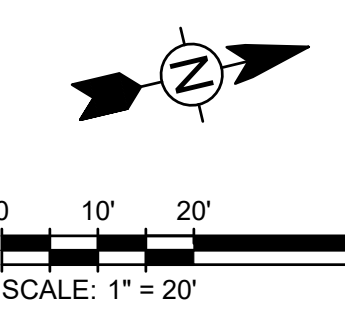
**CONSTRUCTION NOTES:**

- REMOVE
  - REMOVE, SALVAGE, AND REINSTALL
  - EXISTING-PROTECT IN PLACE
1. TREE
  2. FENCE
  3. CONCRETE CURB AND GUTTER
  4. CONCRETE SIDEWALK (SEE NOTE 7)
  5. LIGHT (SEE NOTE 6)
  6. STORM DRAIN LINE
  7. AC PAVEMENT
  8. SANITARY SEWER LINE
  12. SANITARY SEWER MANHOLE
  13. STORM DRAIN MANHOLE
  14. STREET SIGN
  15. CROSS AND LONGITUDINAL GUTTER
  16. VALVE

**DEMOLITION NOTES:**

1. LOCATION OF EXISTING UTILITIES IS APPROXIMATE AND BASED ON RECORD DRAWINGS. ACTUAL CONDITIONS MAY VARY. CONTRACTOR SHALL FIELD VERIFY.
2. EXISTING UNDERGROUND UTILITIES MUST BE PROTECTED IN PLACE UNLESS OTHERWISE SPECIFIED PER PLAN.
3. REFER TO PROJECT SPECIFICATIONS FOR DEMOLITION REQUIREMENTS.
4. TREES TO BE REMOVED SHALL BE TAGGED BY CONTRACTOR PRIOR TO DEMOLITION. CONTRACTOR SHALL REMOVE TREES AFTER APPROVAL FROM THE CITY OF BALDWIN PARK.
5. CONTRACTOR SHALL FIELD LOCATE ALL POINTS OF CONNECTION TO IRRIGATION MAINLINE AND CAP AT MAINLINE PRIOR TO EXCAVATION. CONTRACTOR SHALL MAINTAIN IRRIGATION SERVICES TO THE REMAINDER/UNDISTURBED PORTIONS OF THE PARK.
6. ANY LIGHT THAT WILL BE PROTECTED IN PLACE SHALL HAVE A MIN 3.5' RADIUS PROTECTED BUFFER AROUND THE PERIMETER OF THE LIGHT FOUNDATION.
7. REMOVE SIDEWALK AT NEAREST JOINT AND SAWCUT AT RIGHT ANGLES.
8. CONTRACTOR TO FIELD VERIFY ALL UTILITY LINES PRIOR TO EXCAVATION.
9. CONTRACTOR SHALL PROVIDE AND CONSTRUCT TEMPORARY SHORING FOR TRENCHING AND EXCAVATION. THE CONTRACTOR SHALL PROVIDE SHOP DRAWINGS FOR THE CONSTRUCTION OF THE SHORING, PREPARED, STAMPED, AND SIGNED BY A REGISTERED CIVIL OR STRUCTURAL ENGINEER IN THE STATE OF CALIFORNIA.

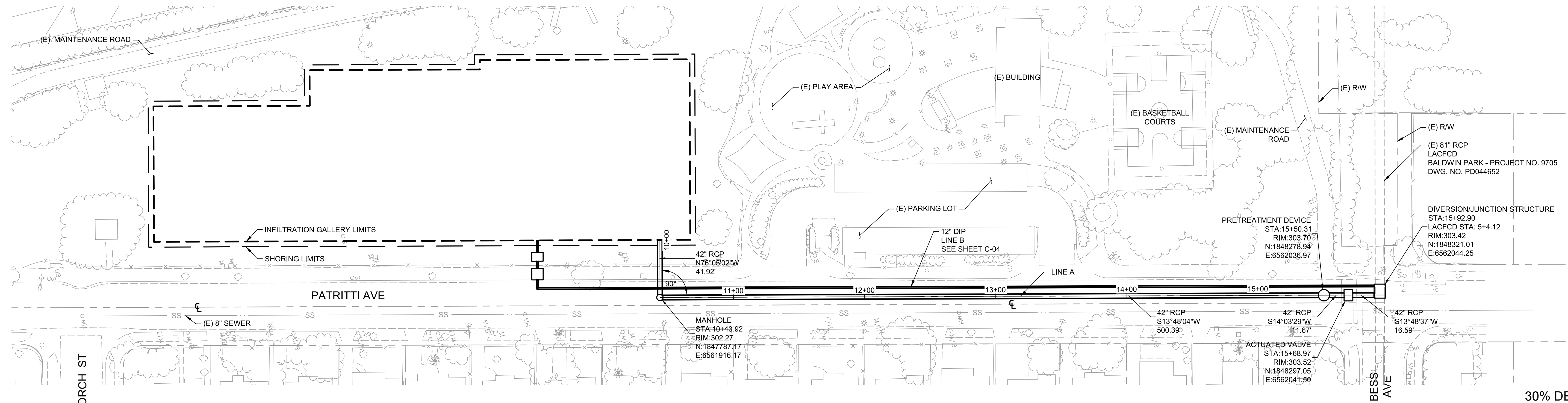
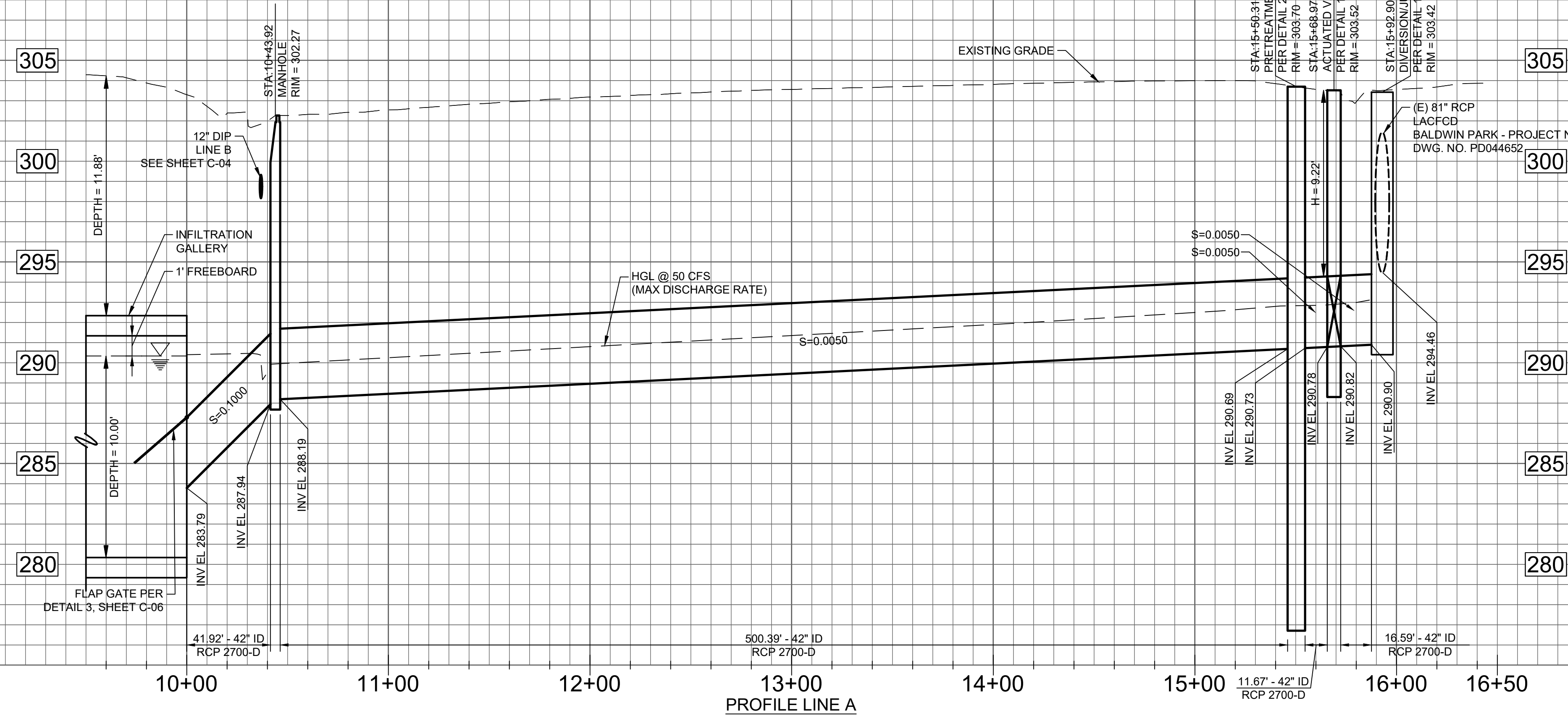
MATCH LINE: SEE SHEET C-01



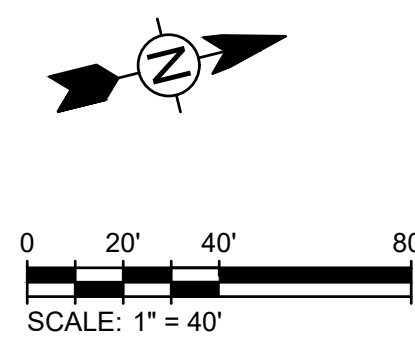
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	<p>APPROVED</p> <p>BY _____ DATE _____</p> <p>CITY ENGINEER</p>	NO.	REVISION	REVISED BY	APPROVED BY	
<p>PROJECT ENGINEER</p> <p>DATE _____</p>						SHEET 7 OF 12

SCALE: HOR. 1" = 40'  
VERT. 1" = 4'



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APPROVED  
BY \_\_\_\_\_ CITY ENGINEER \_\_\_\_\_ DATE \_\_\_\_\_

NO.	REVISION	REVISED BY	APPROVED BY	DATE

PROJECT ENGINEER \_\_\_\_\_ DATE \_\_\_\_\_

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

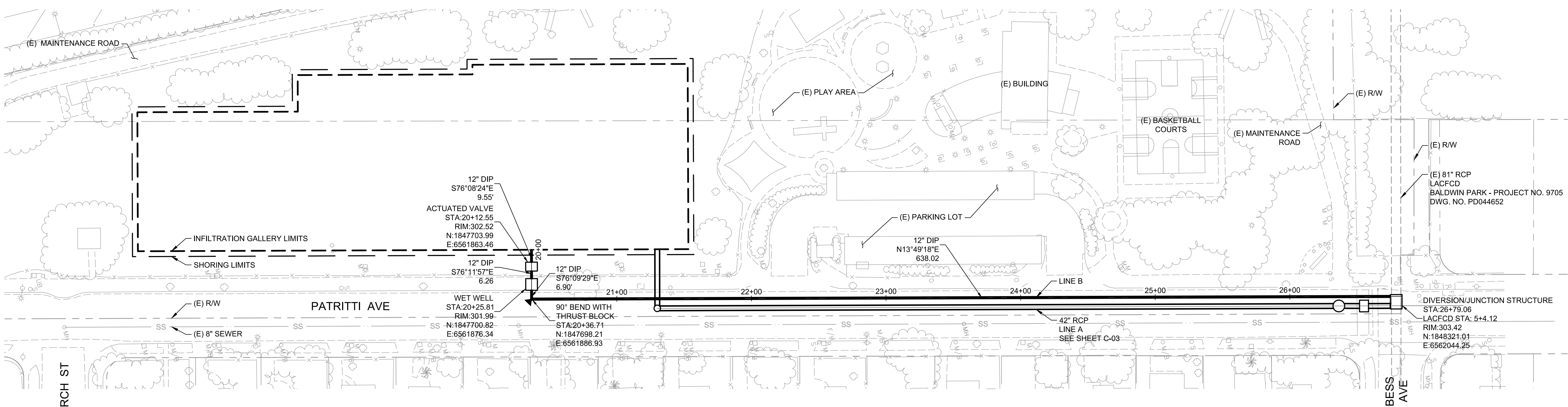
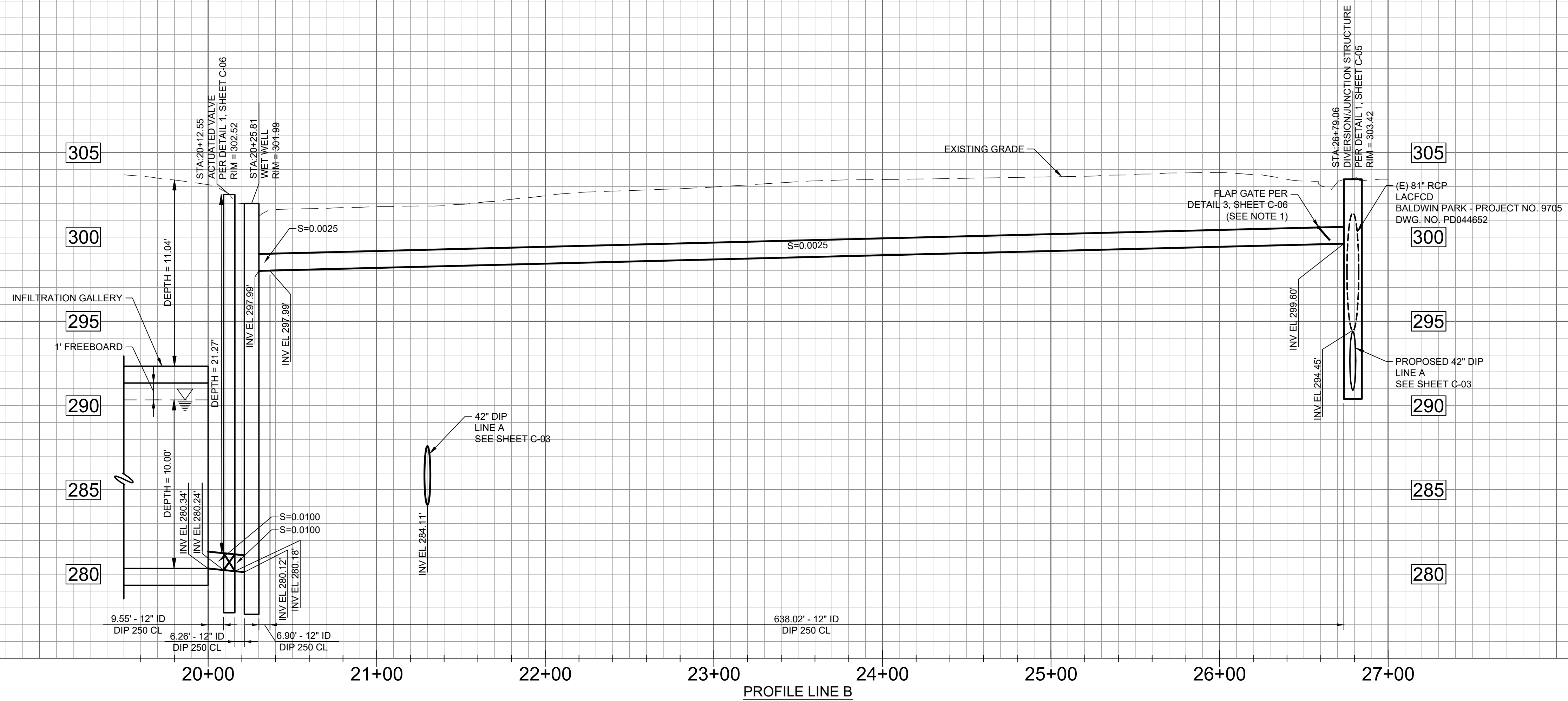
**BARNES PARK**  
MULTI-BENEFIT STORMWATER CAPTURE PROJECT

**PLAN AND PROFILE**  
**LINE A**

DWG C-03 SHEET 8 OF 12

1/8/2018 5:06:40 PM - P:\01287205-001297-16008\CAD\DWG\CAD\BARNES PARK (BALDWIN PARK)\C-03 - PLAN AND PROFILE LINE A.DWG - LARASH, NICK

SCALE: HOR. 1" = 40'  
VERT. 1" = 4'



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APPROVED BY \_\_\_\_\_ DATE \_\_\_\_\_  
CITY ENGINEER

NO.	REVISION	REVISED BY	APPROVED BY	DATE

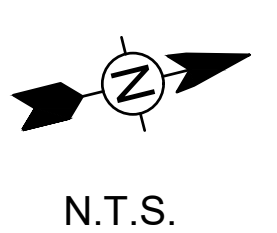
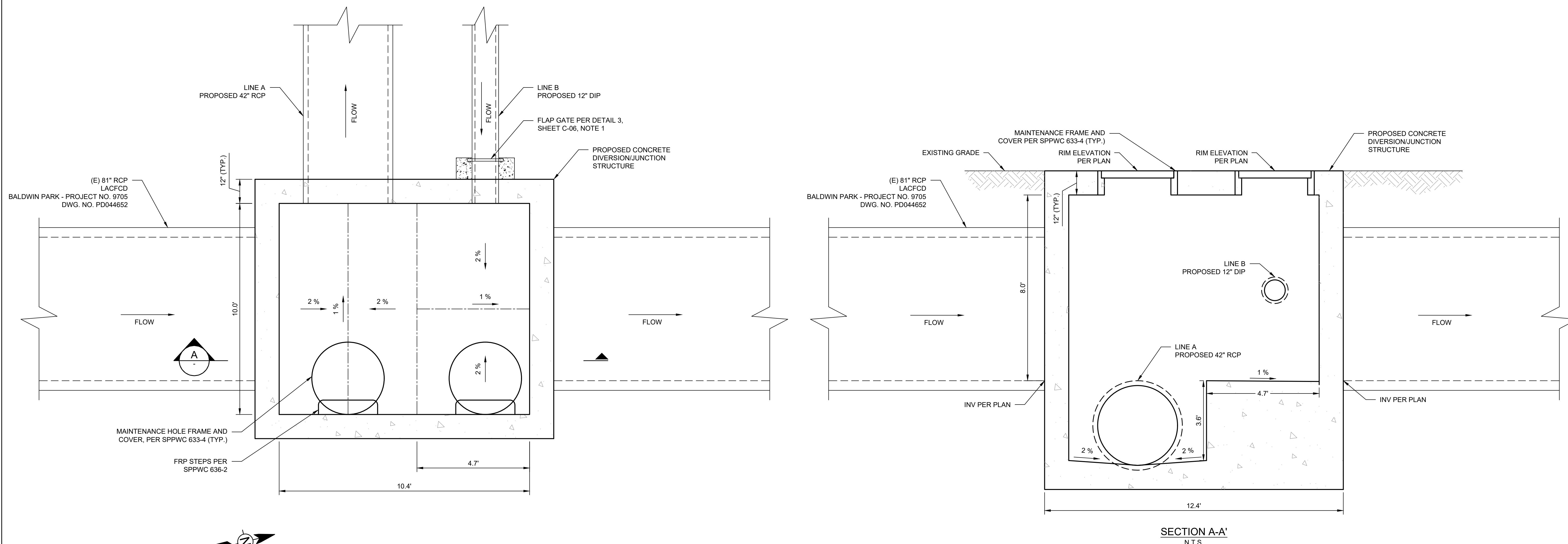
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

**BARNES PARK**  
MULTI-BENEFIT STORMWATER CAPTURE PROJECT

**PLAN AND PROFILE**  
**LINE B**

PROJECT ENGINEER DATE DWG C-04 SHEET 9 OF 12

1/13/2018 10:23:36 AM - P:\01287205\0128716008\CAD\SHR\FILES\BARNES PARK (BALDWIN PARK)\C-04 - PLAN AND PROFILE LINE B.DWG - LARASH NICK

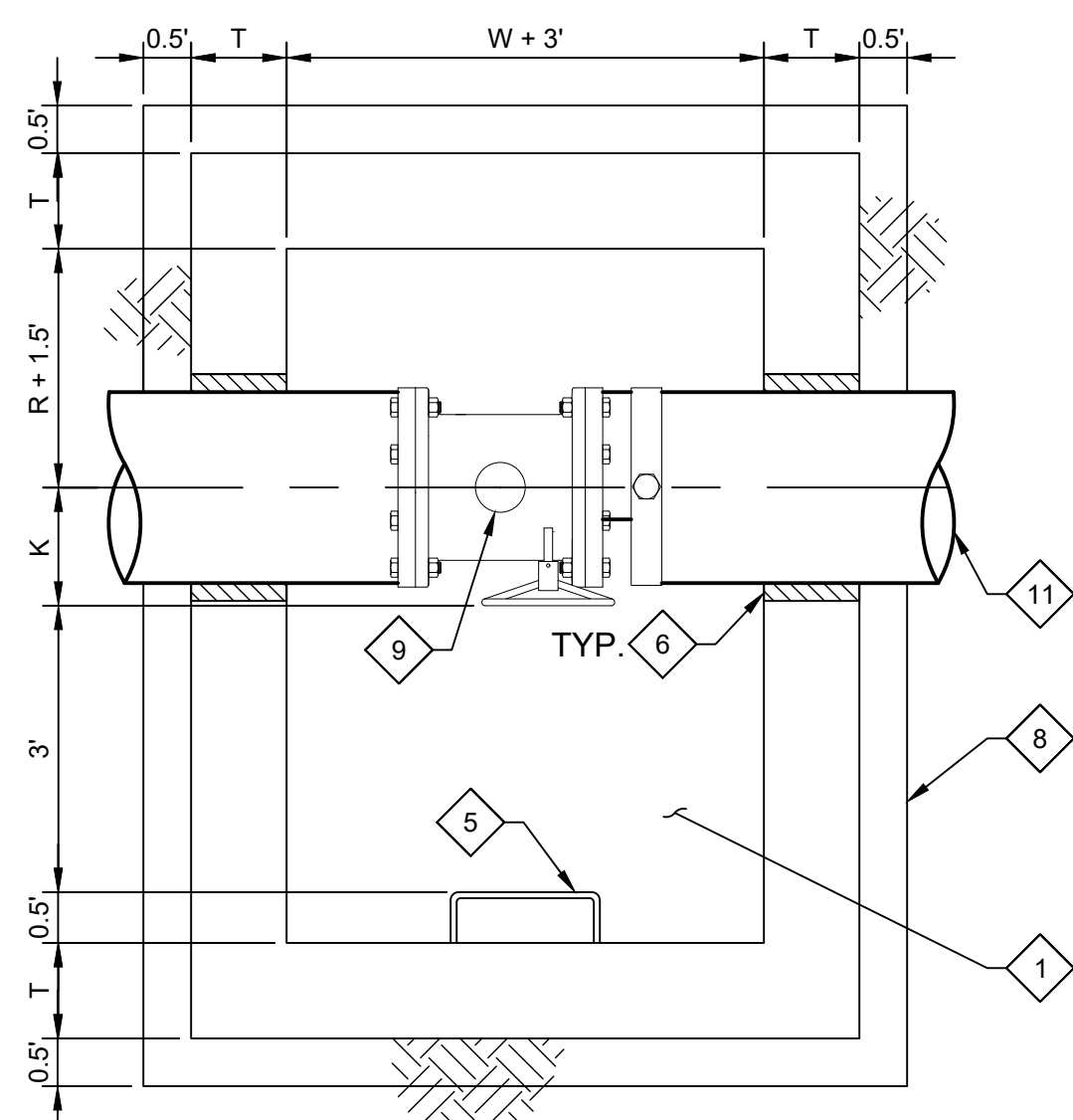


- NOTES:**
1. PROVIDE TEMPORARY DIVERSION, AS NEEDED
  2. FRP STEPS WILL BE PLACED AT 12" SPACING. REFER TO SPECS FOR STEP SIZE AND OTHER INFORMATION.

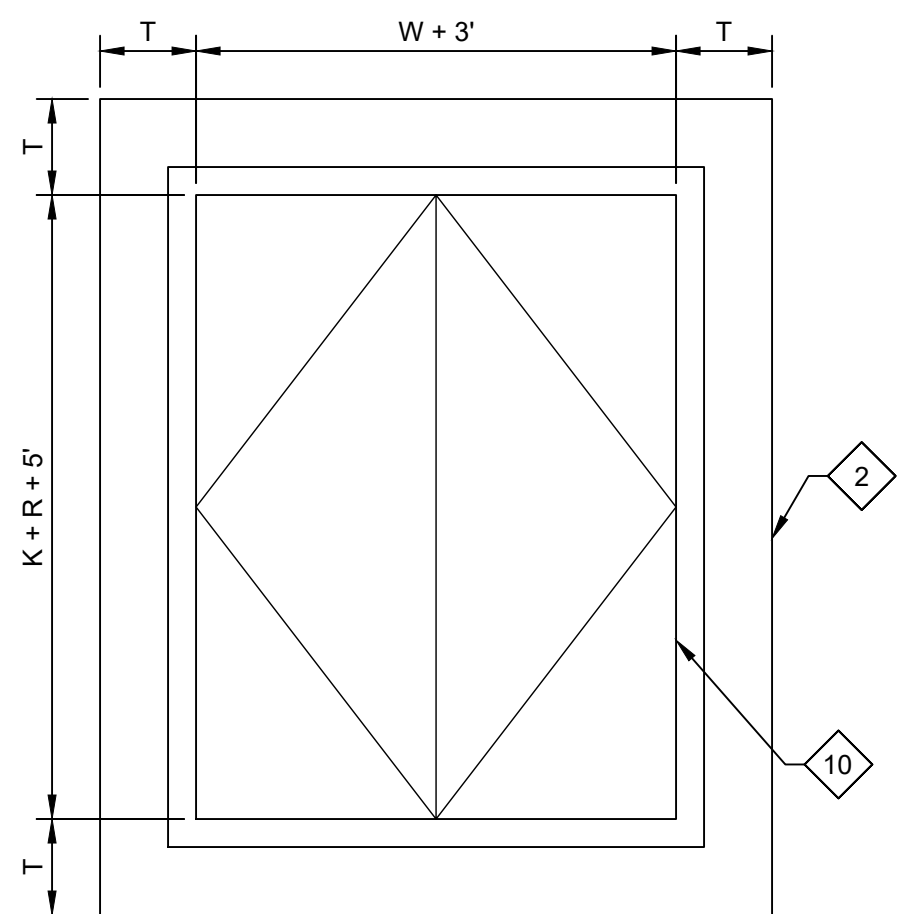
1 DIVERSION/JUNCTION STRUCTURE AT 81" RCP  
N.T.S.

30% DESIGN - 9/7/2018

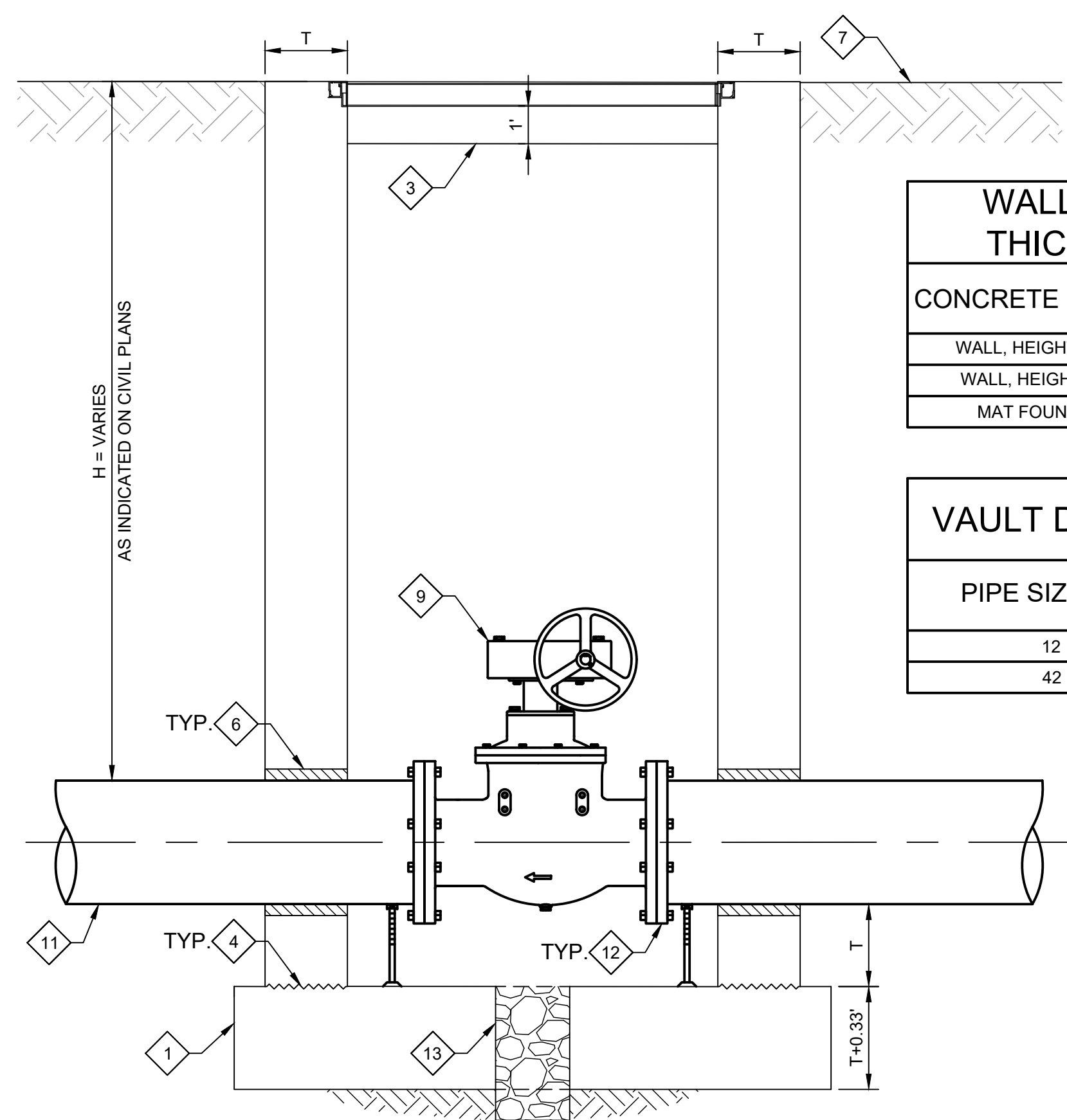
<p><b>TETRA TECH</b> www.tetratech.com 3475 E. FOOTHILL BLVD PASADENA, CA 91107 (626) 351-4664</p>	NO.	REVISION	REVISED BY	APPROVED BY	DATE	COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS <b>BARNES PARK</b> MULTI-BENEFIT STORMWATER CAPTURE PROJECT <b>DETAILS I</b>
	APPROVED					
BY _____ CITY ENGINEER						PROJECT ENGINEER _____ DATE _____ DWG C-05 SHEET 10 OF 12



FOUNDATION PLAN FOR ACTUATED VALVE VAULT



ROOF PLAN FOR ACTUATED VALVE VAULT



VAULT VALVE SECTION

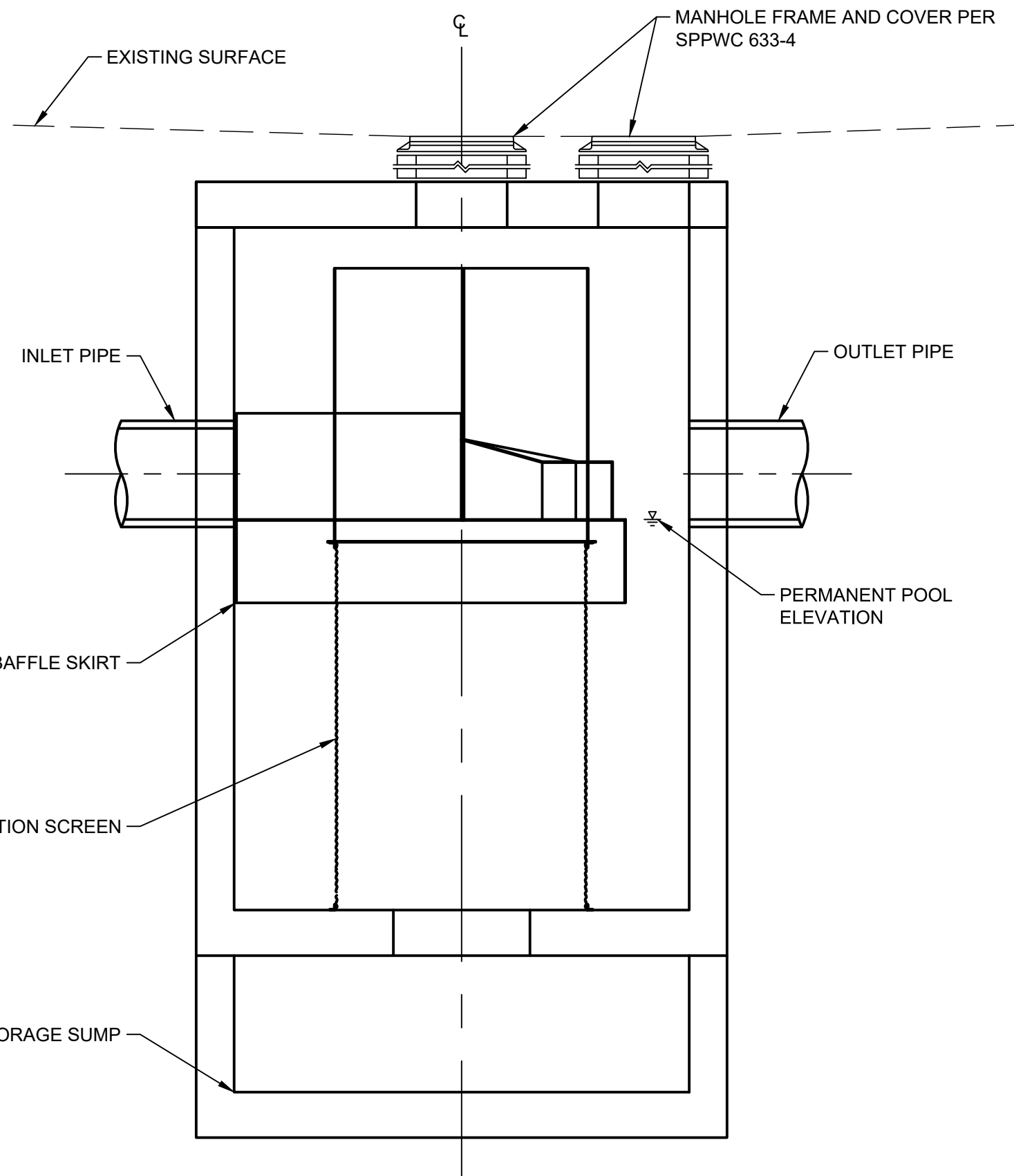
WALL AND FOUNDATION THICKNESS SCHEDULE	
CONCRETE ELEMENT	THICKNESS (IN.)
WALL, HEIGHT (H) <= 9'	T = 12
WALL, HEIGHT (H) > 9'	T = 16
MAT FOUNDATION	T + 4

VAULT DIMENSION SCHEDULE	
PIPE SIZE (IN.)	DIMENSION (IN.)
12	K = 16.81; R = 6; W = 14
42	K = 25.25; R = 21; W = 62

KEYNOTES:

1. CONCRETE MAT FOUNDATION
2. CONCRETE WALL
3. 1'-0" DEEP CONCRETE ROOF BEAM W/ 3 - #8 BOTTOM LONGITUDINAL BARS, 3 - #5 TOP LONGITUDINAL BARS & #4 STIRRUPS AT 1'-0" O.C.
4. ROUGHENED SURFACE
5. S.S. LADDER PER SPPWC STD. PLAN 635-3
6. PENETRATION SEAL - SEE DETAIL 4 HEREON
7. FINISHED GRADE
8. EDGE OF FOUNDATION
9. ELECTRIC ACTUATED PLUG VALVE
10. BILCO TYPE "JD-AL H20" ALUMINUM DOUBLE LEAF EQUIPMENT HATCH WITH INTEGRATED FALL PROTECTION GRATING OR APPROVED EQUAL
11. PIPE SIZE AND MATERIAL - SEE CIVIL SHEETS FOR TYPE, SIZE, AND LOCATIONS
12. STEEL FLANGE ADAPTER FOR CONNECTION FROM REINFORCED CONCRETE PIPE TO ACTUATED PLUG VALVE
13. 1.0' DIA x 2.0' DEEP FRENCH DRAIN WITH 1.5" GRAVEL

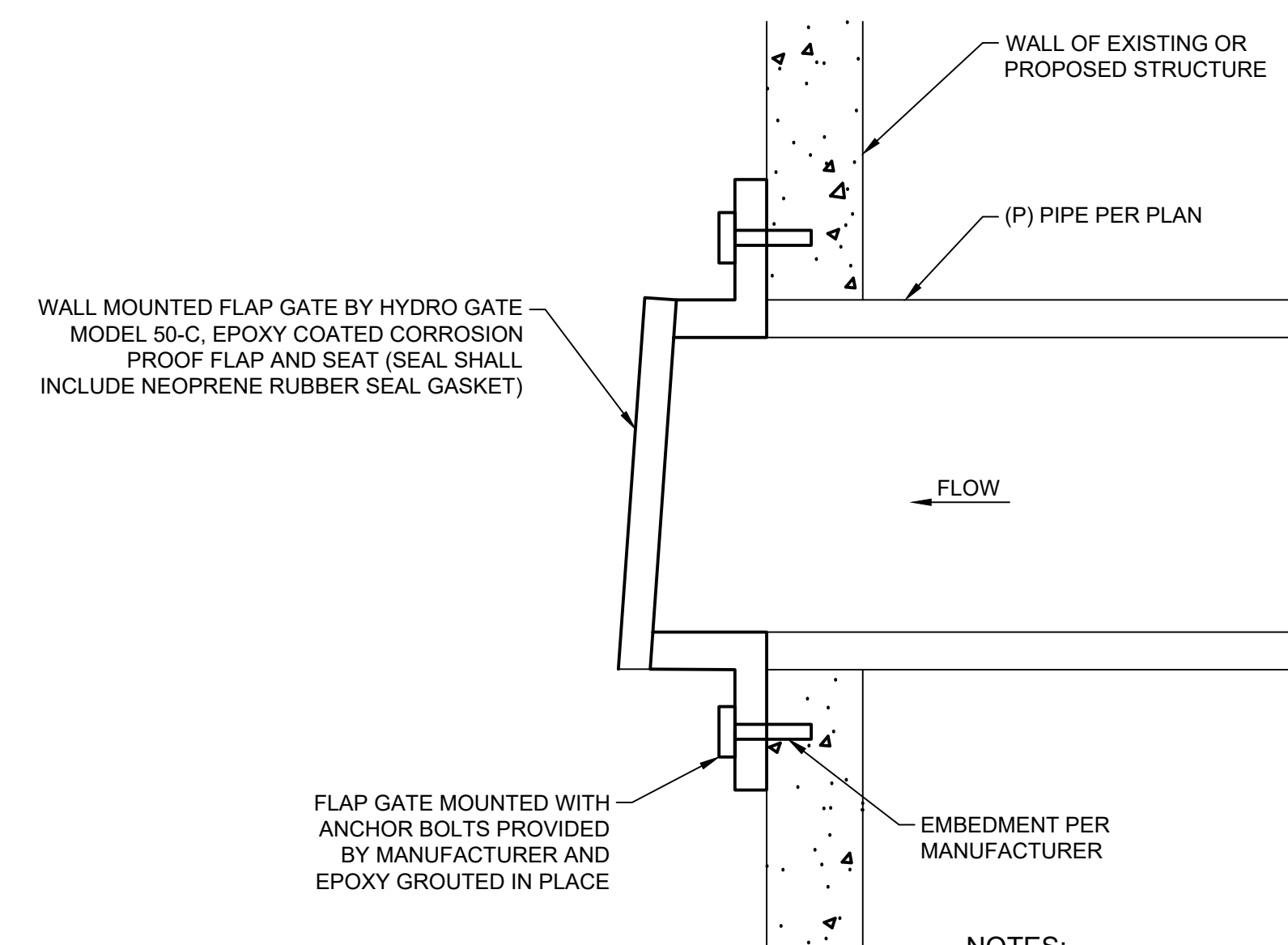
1 ACTUATED VALVE  
NTS



PERFORMANCE REQUIREMENTS

WATER QUALITY FLOW RATE (CFS)	50
PARTICLE SIZE REMOVAL	125 MICRONS

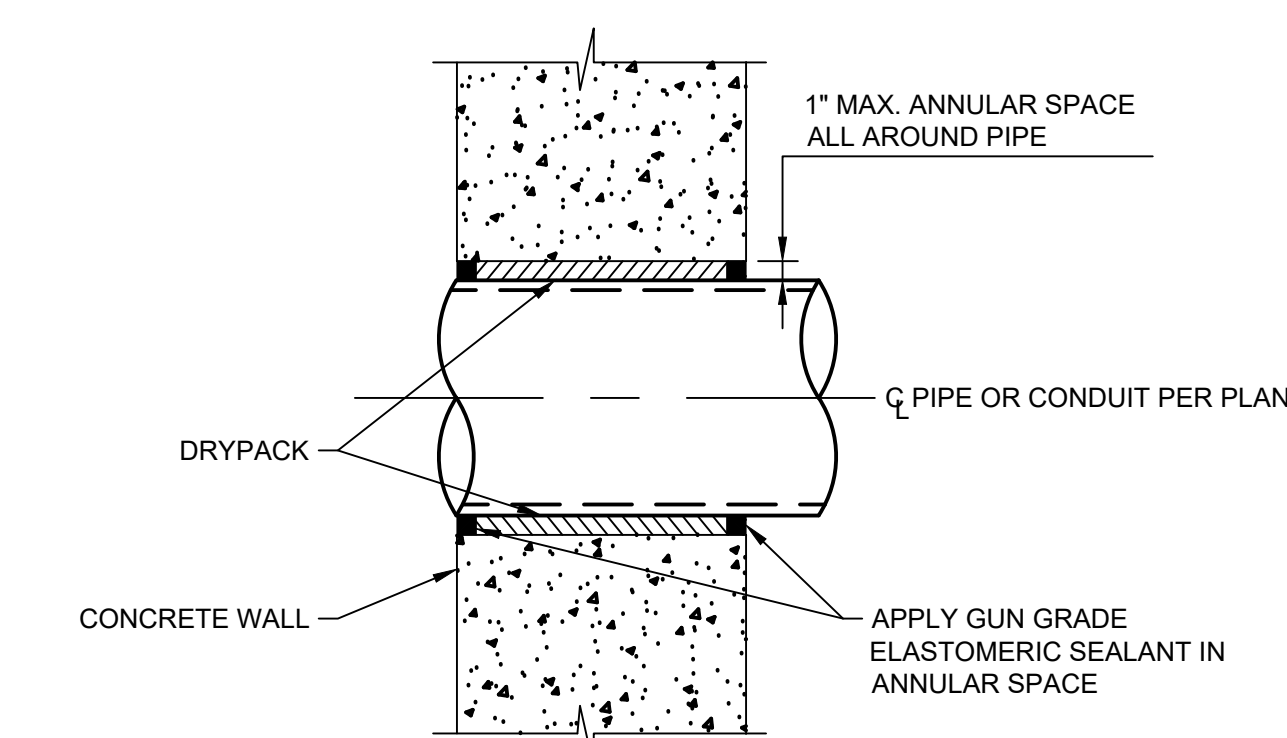
2 PRETREATMENT DEVICE  
NTS



NOTES:

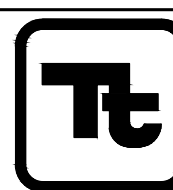
1. FOR CONNECTIONS TO LACFCD FACILITIES, FLAP GATE SHALL BE RECESSED.

3 FLAP GATE  
NTS



4 PENETRATION SEAL AT WALL  
NTS

30% DESIGN - 9/7/2018



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APPROVED

BY

CITY ENGINEER

DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE

PROJECT ENGINEER DATE

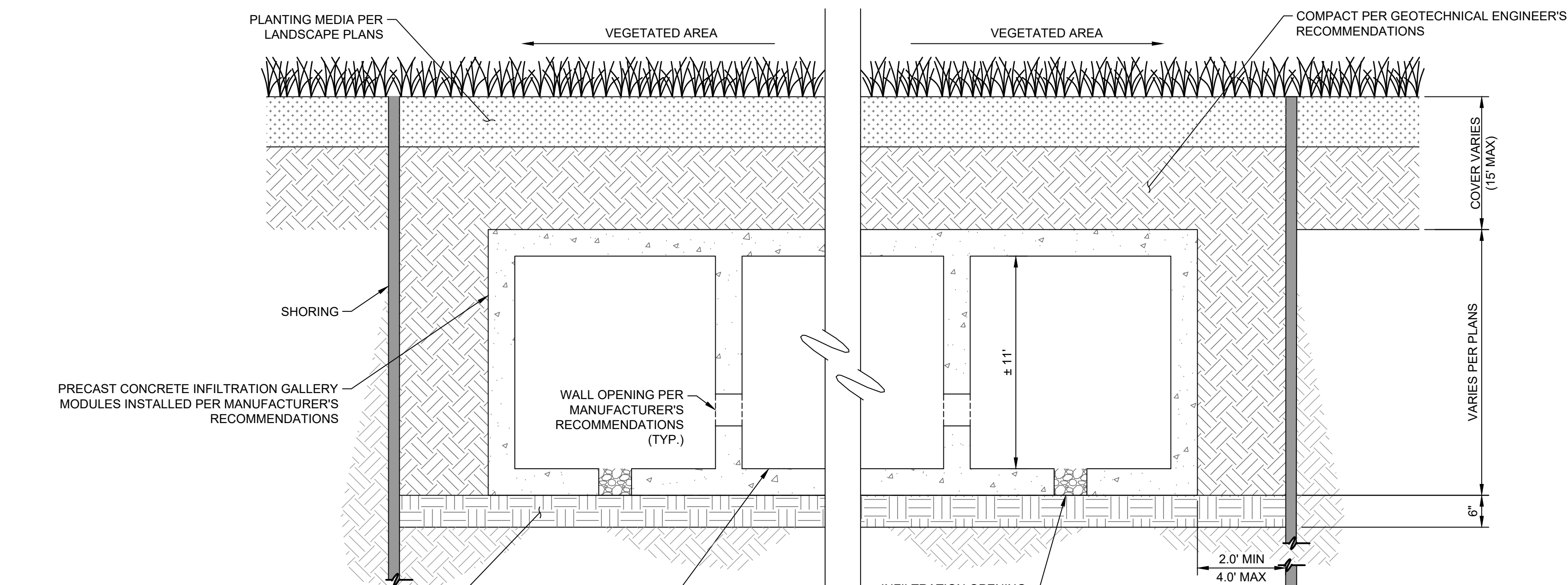
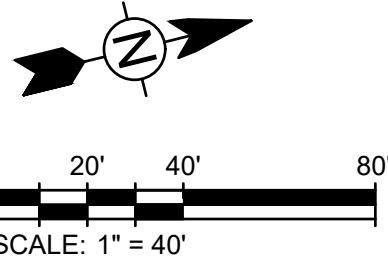
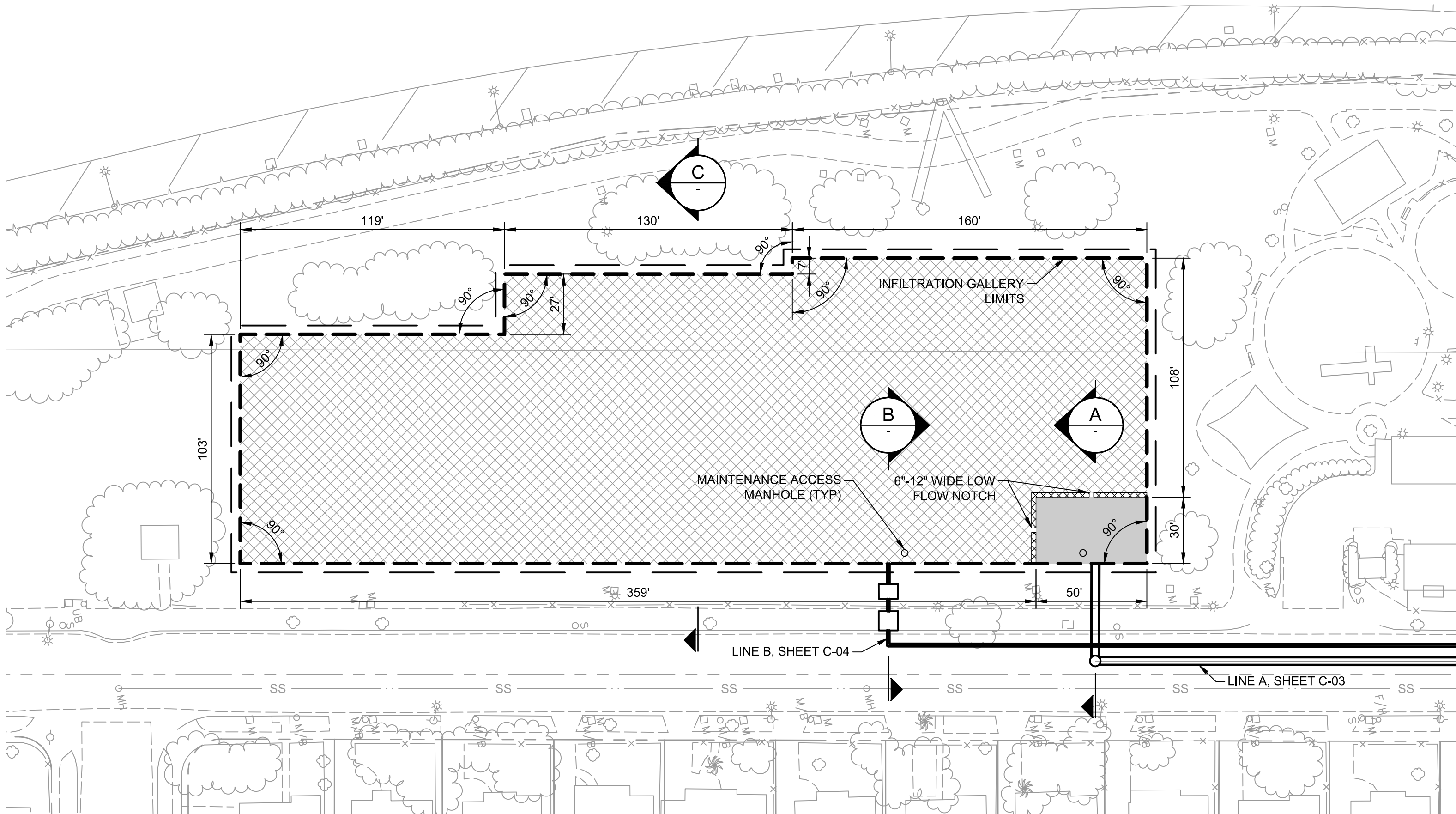
DWG C-06

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

BARNES PARK  
MULTI-BENEFIT STORMWATER CAPTURE PROJECT

DETAILS II

SHEET 11 OF 12



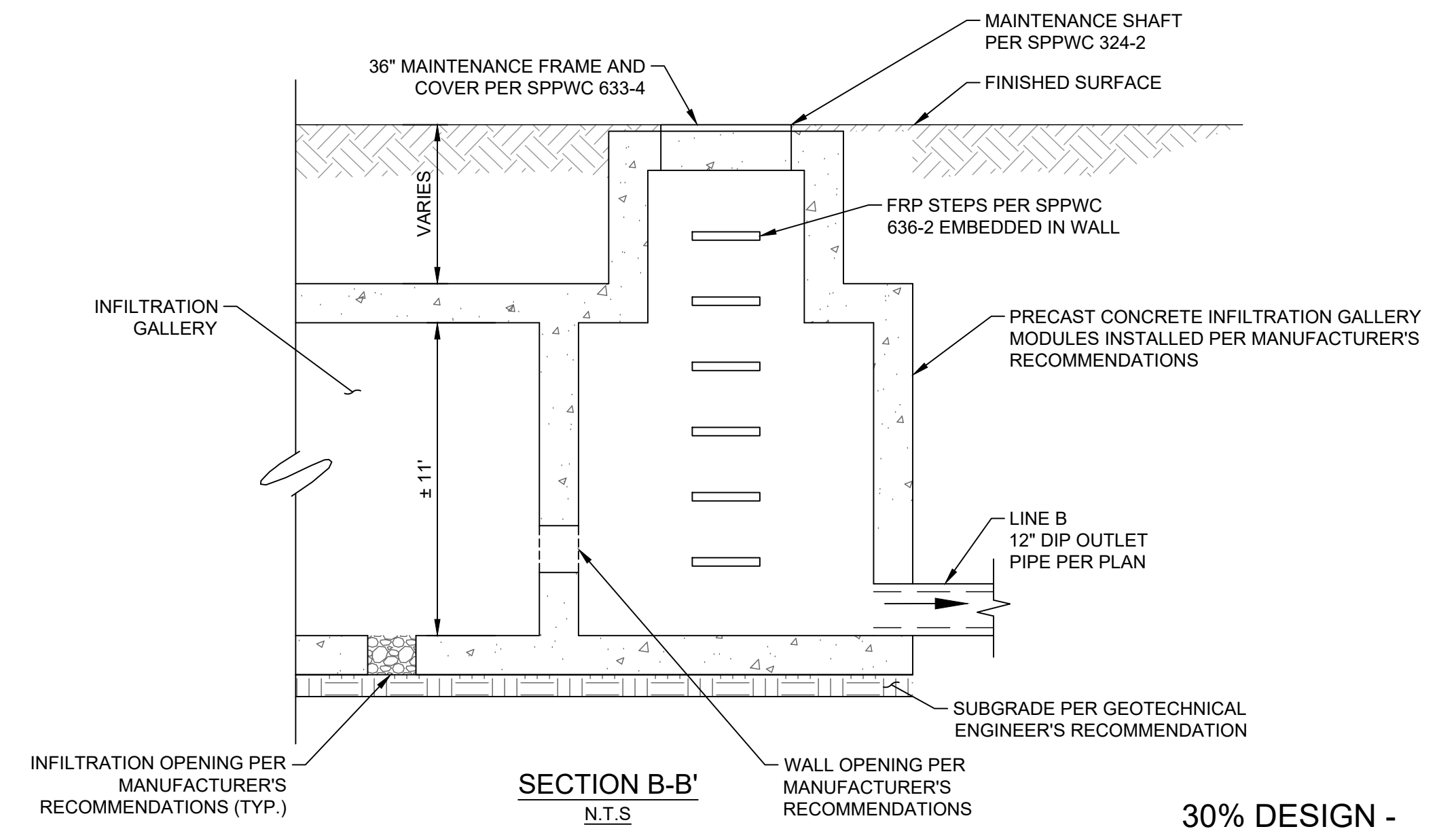
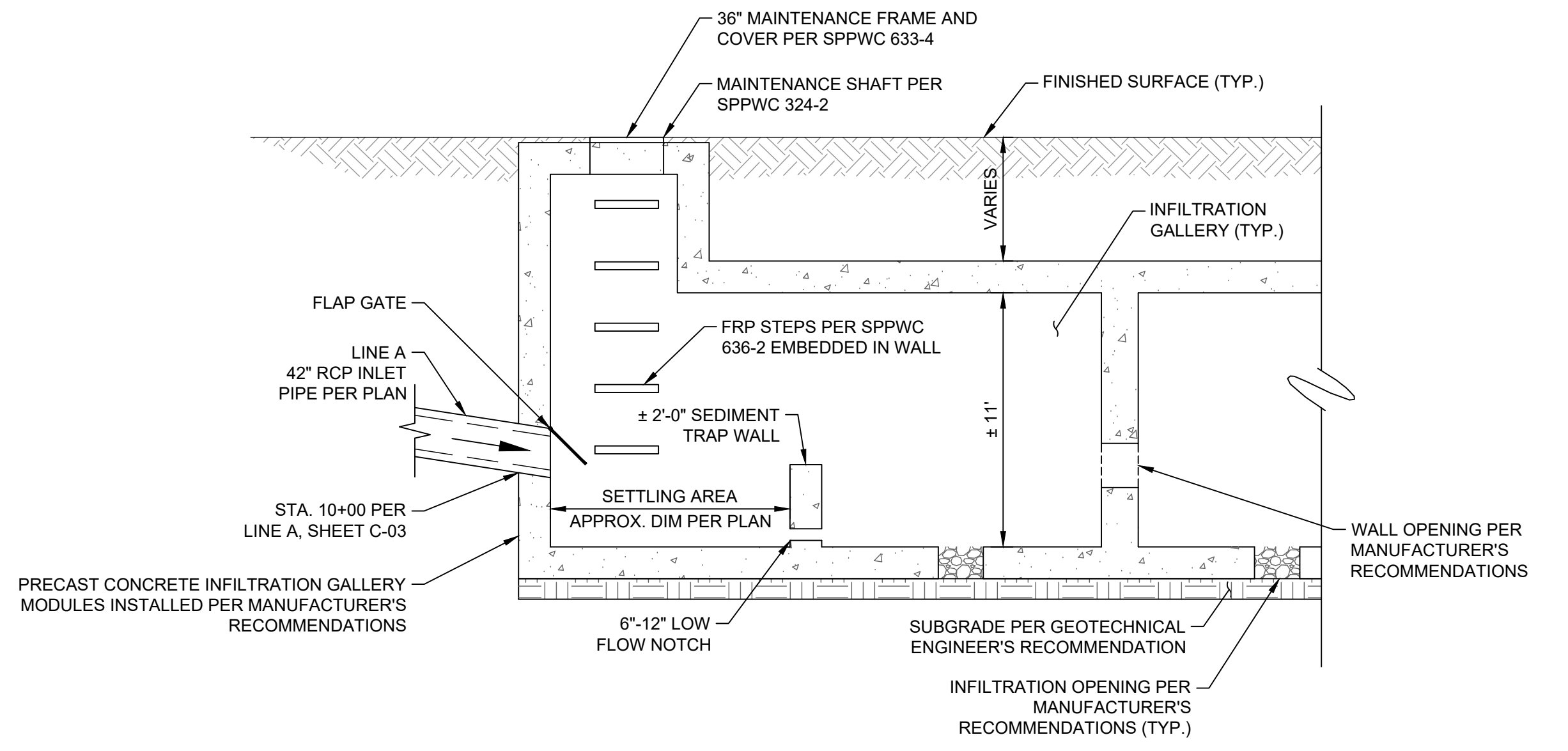
1 INFILTRATION GALLERY

- LEGEND:**
- INITIAL ENERGY DISSIPATION/CONTAINMENT/SETTLEMENT AREA
  - INFILTRATION GALLERY
  - ± 2' TALL SEDIMENT TRAP WALL
  - SHORING LIMITS FOR INFILTRATION GALLERY
- NOTES:**
1. ALL MODULES AND APPURTENANCES SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS BY THE CONTRACTOR.
  2. LIMITS OF EXCAVATION SHALL BE A 2' MINIMUM AND 4' MAXIMUM. SETBACK FROM INFILTRATION GALLERY LIMITS UNLESS OTHERWISE REQUIRED BY MANUFACTURER AND APPROVED BY CITY. SHORING LIMITS FOR ALL OTHER STRUCTURES OTHER THAN THE INFILTRATION GALLERY SHALL BE DETERMINED AND DESIGNED BY THE CONTRACTOR IN ACCORDANCE WITH THE SPECIFICATIONS. SHORING SHALL NOT EXTEND PAST PROPERTY LINES OR INTO PUBLIC RIGHT-OF-WAY.
  3. ALL PIPE CONNECTIONS SHALL BE EXTENDED/TRIMMED AS NEEDED.

**INFILTRATION GALLERY STATISTICS:**

TOTAL INFILTRATION GALLERY AREA: 1.18 ACRE

TOTAL INFILTRATION VOLUME (SEE NOTE 4): 10.0 ACRE-FEET



30% DESIGN - 9/7/2018

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APPROVED BY \_\_\_\_\_ DATE \_\_\_\_\_

BY CITY ENGINEER DATE \_\_\_\_\_

NO.	REVISION	REVISED BY	APPROVED BY	DATE

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

**BARNES PARK**  
MULTI-BENEFIT STORMWATER CAPTURE PROJECT

**DETAILS III**

DWG C-07

SHEET 12 OF 12



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**ATTACHMENTS FOR SECTION 8.7:**

**OTHER**

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**BARNES PARK OPINION OF PROBABLE CONSTRUCTION COSTS**

Client: <b>City of Baldwin Park (Barnes Park)</b>			Prepared by: <b>AM</b>	
Project: <b>Upper San Gabriel River EWP Feasibility Study - 10.0 AC-FT</b>			Checked by: <b>JLF</b>	
Status: <b>30% Engineering Design</b>			Date: <b>11/27/2018</b>	
Description	Qty	Unit	Unit Price	Total
<b>Miscellaneous</b>				<b>\$685,683</b>
Mobilization / Demobilization (5% of Costs)	1	LS	\$640,683.00	\$640,683
Traffic Control	1	LS	\$35,000.00	\$35,000
Arborist Monitoring	1	LS	\$10,000.00	\$10,000
<b>Channel Diversion and Pretreatment</b>				<b>\$511,003</b>
Diversion Structure	1	EA	\$38,000.00	\$38,000
Diversion Structure Installation	1	LS	\$12,000.00	\$12,000
Shoring for Diversion Structure	1,144	SF	\$10.00	\$11,440
Excavation for Diversion Structure	233	CY	\$30.00	\$6,990
Backfill and Compaction for Diversion Structure	175	CY	\$25.00	\$4,375
Hauling for Diversion Structure	76	CY	\$28.00	\$2,128
Actuated Valve and Vault	1	EA	\$25,000.00	\$25,000
Pretreatment Device (50 CFS)	1	EA	\$150,000.00	\$150,000
Shoring for Pretreatment Device	1,144	SF	\$10.00	\$11,440
Excavation for Pretreatment Device	234	CY	\$30.00	\$7,020
Backfill and Compaction for Pretreatment Device	179	CY	\$25.00	\$4,475
Hauling for Pretreatment Device	72	CY	\$28.00	\$2,016
Manhole (4' I.D. x 18' Depth)	1	EA	\$8,700.00	\$8,700
Shoring for Manhole	1,008	SF	\$5.00	\$5,040
Excavation for Manhole	131	CY	\$30.00	\$3,930
Backfill and Compaction for Manhole	117	CY	\$25.00	\$2,925
Hauling for Manhole	19	CY	\$28.00	\$532
Piping from 81" RCP (42" RCP)	571	LF	\$130.00	\$74,230
Excavation for Piping	1,775	CY	\$8.00	\$14,200
Shoring for Piping	17,438	SF	\$5.00	\$87,190
Backfill and Compaction for Piping	1,412	CY	\$8.00	\$11,296
Backfill and Compaction for Piping Base (crushed aggregate)	160	CY	\$46.00	\$7,360
Hauling for Piping	472	CY	\$28.00	\$13,216
Flap Gate	1	EA	\$7,500.00	\$7,500
<b>Site Preparation and Demolition - Existing Park Area</b>				<b>\$62,544</b>
Concrete Sidewalk and Walkway Removal	215	SF	\$28.00	\$6,020
Concrete Curb and Gutter Removal	13	LF	\$130.00	\$1,690
AC Pavement Removal	11,180	SF	\$3.50	\$39,130
Wrought Iron Fence (Salvage and Reinstall)	13	LF	\$46.00	\$598
Turf Removal	7,553	SY	\$2.00	\$15,106
<b>Storage</b>				<b>\$8,233,763</b>
Underground Infiltration Gallery Precast Structures	491,220	CF	\$7.50	\$3,684,150
Excavation	57,120	CY	\$15.00	\$856,800
Installation	1	LS	\$310,000.00	\$310,000
Aggregate Backfill	1,000	CY	\$30.00	\$30,000
Subgrade (6" Stone Base with 2' Overhang Around Perimeter)	1,000	CY	\$40.00	\$40,000
Backfill and Compaction	31,228	CY	\$25.00	\$780,700
Hauling	33,660	CY	\$28.00	\$942,480
Shoring (4' offset)	31,153	SF	\$50.00	\$1,557,633
Maintenance Hole	2	EA	\$16,000.00	\$32,000



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**BARNES PARK OPINION OF PROBABLE CONSTRUCTION COSTS**

Client: **City of Baldwin Park (Barnes Park)**  
 Project: **Upper San Gabriel River EWP Feasibility Study - 10.0 AC-FT**  
 Status: **30% Engineering Design**

Prepared by: **AM**  
 Checked by: **JLF**  
 Date: **11/27/2018**

Description	Qty	Unit	Unit Price	Total
<b>Wet Well and Conveyance</b>				<b>\$457,867</b>
Wet Well	1	EA	\$19,500.00	\$19,500
Wet Well Installation	1	LS	\$31,000.00	\$31,000
Submersible Pumps and Valves	1	LS	\$165,000.00	\$165,000
Shoring for Wet Well	2,418	SF	\$30.00	\$72,540
Excavation for Wet Well	367	CY	\$30.00	\$11,010
Backfill and Compaction for Wet Well	298	CY	\$25.00	\$7,450
Hauling for Wet Well	90	CY	\$28.00	\$2,520
12" DIP to Pump Station	16	LF	\$100.00	\$1,600
12" DIP to Drain	645	LF	\$100.00	\$64,500
Excavation for Piping	291	CY	\$10.00	\$2,910
Backfill and Compaction for Piping	233	CY	\$8.00	\$1,864
Backfill and Compaction for Piping Base (crushed aggregate)	40	CY	\$46.00	\$1,840
Hauling for Piping	76	CY	\$28.00	\$2,128
Shoring for Piping	9,201	SF	\$5.00	\$46,005
Actuated Valve and Vault	1	EA	\$25,000.00	\$25,000
Flap Gate	1	EA	\$3,000.00	\$3,000
<b>Electrical Service, Controls, Instrumentation</b>				<b>\$322,000</b>
Electrical Service	1	LS	\$60,000.00	\$60,000
Control Panel and PLC Programming	1	LS	\$80,000.00	\$80,000
Conduit & Wiring	1	LS	\$100,000.00	\$100,000
NEMA 4 Junction Box, 6"x6"x6" (1 each for 480V and 120V conduits)	6	EA	\$2,000.00	\$12,000
Misc. Conduit Fittings, Elbows, Core Drilling and Sealing, etc.	1	LS	\$25,000.00	\$25,000
Instrumentation	1	LS	\$45,000.00	\$45,000
<b>Landscape and Irrigation Modifications</b>				<b>\$207,568</b>
Re-Planting/Seeding Excavation Areas	67,977	SF	\$0.50	\$33,989
Irrigation System (including all components and mainline)	74,827	SF	\$1.71	\$127,954
Shrubs, Perennials, and Grasses	6,850	SF	\$2.50	\$17,125
Tree Planting	17	EA	\$500.00	\$8,500
90-Day Plant Establishment Period	1	LS	\$20,000.00	\$20,000
<b>Site Amenities and Improvements</b>				<b>\$103,108</b>
Concrete Paving	215	SF	\$10.00	\$2,150
Concrete Curb and Gutter	13	LF	\$26.00	\$338
AC Paving	11,180	SF	\$9.00	\$100,620
<b>Start-up, Testing, Prepare Operations &amp; Maintenance Manuals, and Prepare Record Drawings</b>				<b>\$94,500</b>
SWPPP Implementation	1	LS	\$40,000.00	\$40,000
Start-up and Testing	1	LS	\$46,500.00	\$46,500
O&M Manuals	1	LS	\$4,000.00	\$4,000
Record Drawings	1	LS	\$4,000.00	\$4,000
<b>SUBTOTAL</b>				<b>\$10,678,036</b>
			20% Contingency	\$2,135,608
			<b>Total Construction Costs</b>	<b>\$12,813,644</b>
			Construction Administration (15% of Construction)	\$1,922,047
			<b>Total Soft Costs</b>	<b>\$1,922,047</b>
			<b>GRAND TOTAL</b>	<b>\$14,735,691</b>



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**BARNES PARK OPINION OF PROBABLE CONSTRUCTION COSTS**

Client: <b>City of Baldwin Park (Barnes Park)</b>	Prepared by: <b>AM</b>
Project: <b>Upper San Gabriel River EWP Feasibility Study - 10.0 AC-FT</b>	Checked by: <b>JLF</b>
Status: <b>30% Engineering Design</b>	Date: <b>11/27/2018</b>

Description	Qty	Unit	Unit Price	Total
-------------	-----	------	------------	-------

<p><b>Assumptions and Exclusions</b></p> <ol style="list-style-type: none"> <li>1 This is a rough order of magnitude preliminary opinion of probable construction costs only. Actual costs may vary.</li> <li>2 The unit cost data is derived from inhouse sources, recent bids on similar construction, and RSMMeans current construction cost data.</li> <li>3 This opinion of cost is based on the project program and plans made available at the time of preparation.</li> <li>4 Material prices are based on current quotations and do not include escalation.</li> <li>5 This opinion of cost assumes that all improvements will be constructed at one time.</li> <li>6 Quantity take offs were performed when possible and parametric estimates and allowances are used for items that cannot be quantified at this stage of the design.</li> <li>7 This opinion has been based on a competitive open bid situation with a recommended 5 - 7 bonafide reputable bids from general contractors and a minimum of 3 bidders for all items of subcontracted work.</li> <li>8 All unit costs take into account sales tax, general conditions, bonding and insurance, and subcontractor and general contractor overhead and profit.</li> <li>9 Where applicable, unit costs include the cost of freight.</li> </ol> <p><b>The following are excluded:</b></p> <ol style="list-style-type: none"> <li>1 Environmental clearances and permits</li> <li>2 Hazardous spoil disposal, if encountered</li> <li>3 Property and Right of Way acquisition or easements</li> <li>4 Legal and accounting fees</li> <li>5 Plan check, building permit fees</li> <li>6 Utility Connection Fees</li> <li>7 Testing and inspection</li> <li>8 Fire and all risk insurance</li> <li>9 Removal of unforeseen underground obstructions</li> <li>10 Relocation of unforeseen subsurface utilities</li> <li>11 Signage and wayfinding</li> <li>12 Additional fill or import</li> <li>13 Loose furniture and equipment</li> <li>14 Utility connection fees</li> <li>15 Tel/data system</li> <li>16 Construction contingency</li> <li>17 Work done after business hours</li> <li>18 Design, engineering and consulting fees other than those specifically listed in the above estimate</li> </ol> <p><b>Items that may affect the cost estimate:</b></p> <ol style="list-style-type: none"> <li>1 Modifications to the scope of work included in this estimate</li> <li>2 Unforeseen sub-surface conditions</li> <li>3 Restrictive technical specifications or excessive contract conditions</li> <li>4 Any other non-competitive bid situations</li> <li>5 Bids delayed beyond the projected schedule</li> </ol>
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# **Preliminary Initial Study Barnes Park Multi-Benefit Project Baldwin Park, California**

*Prepared for:*

City of Industry  
P.O. Box 3366  
15625 E. Stafford, Suite 100  
City of Industry, CA 91744

*Prepared by:*

Tetra Tech  
5383 Hollister Avenue, Suite 130  
Santa Barbara, CA 93111

June 19, 2018

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## APPENDICES

### A FIGURES (CONCEPTUAL SITE PLAN)

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## 1.0 PROJECT INFORMATION

Project title:	Barnes Park Multi-Benefit Project
Project location:	3251 Patriitti Avenue Baldwin Park, CA 91706
Assessor Parcel Numbers (APNs):	8550-001-904 and 8550-001-906
General Plan Designation:	Park
Zoning Designation:	Open Space (OS)
Surrounding land uses:	North: Residential East: Residential South: 605 Freeway, 10 Freeway West: 605 Freeway, San Gabriel River

### 1.1 ENVIRONMENTAL SETTING

Barnes Park is located in Baldwin Park, within a 384-acre watershed that drains through the upstream storm drain system directly into the San Gabriel River Tributary, which runs adjacent to the west side of the park. Park amenities include two fully equipped playground areas, basketball courts, a large field, and game room highlighted with a pool table, foosball, a Sony Playstation 2 and three Hewlett-Packard tablet computers. Access to the park is provided on Patriitti Avenue.

### 1.2 PROJECT DESCRIPTION

The Barnes Park Multi-Benefit Project (proposed project) would feature an underground stormwater vault that would capture and infiltrate runoff from an 81-inch storm drain that collects stormwater from the residential area northeast of the park. Runoff from this wash would be diverted to a pretreatment system and then to an underground infiltration vault. Treated water would infiltrate to the groundwater for recharge, or be directed back to the storm drain if the vault is full. Additional housing for pumping/filtration infrastructure may necessitate the construction of a small utility building.

#### Construction Activities

Construction is anticipated to begin in 2022 with a duration of approximately 18 months. Construction activities would include heavy earth-moving and crane equipment for both the excavation of the site as well as the placement of pre-fabricated concrete vault structures in the ground once excavation has occurred. Excess excavated soil would be removed off-site.

Once the vault structure is in place, it would be connected to the existing storm drain, requiring later excavation and installation of additional pipeline. Construction in the existing storm drain would be required to install connective infrastructure there and would involve permanent placement of a grated drop inlet to divert flows to the underground unit. Once installation is complete, fill would be placed back on top of the unit up to the existing park grade and the area would be restored back to the grassy field it once was (landscape replacement-in-kind).

Approximately 25 personnel would be used for the project construction with activities typically occurring Monday through Friday between the hours of 7:00 am and 6:00 pm.

During project construction, park facilities to the north of the field would remain open and available for park users. The area surrounding the field would be secured with construction fencing and would be closed to the public. The parking lot would also be used as a construction ingress/egress area.

**Maintenance Activities**

Ongoing maintenance activities would be required to ensure the unit and pretreatment devices are kept free of debris so that sediment and larger materials do not accumulate. These maintenance activities would typically take a day of work on a monthly ongoing schedule and would involve a vacuum truck on-site at access locations for the unit.

**BMP Components**

<b>Site</b>	<b>Diversion</b>	<b>BMP Storage</b>	<b>Exfiltration</b>	<b>Rate</b>
Barnes	50 cfs	10.0 ac-ft	Infiltration	5.0 in/hr

Additional Details:

- Diversion structure from 81” storm drain
- Pretreatment unit
- Subsurface storage/infiltration facility
- Optional pump station and return line

**1.3 ANTICIPATED PERMITS AND APPROVALS**

Approval or permits from the following agencies are anticipated to be required:

- City of Baldwin Park

## 2.0 INITIAL STUDY CHECKLIST

Potential environmental impacts/environmental constraints associated with the proposed project are addressed in the Initial Study (IS) Checklist and associated discussions as follows. The IS is based on desk top review of the conceptual design and identifies topics where additional study may be required including records searches, field surveys, and technical analysis and studies. In cases where additional actions are required to determine impact, the box for “potential impact” is checked.

### 2.1 ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked could be potentially affected by this project based and/or require additional study to determine impact on a desk top review of the conceptual design and publicly available documents.

- |  |   |   |
|--|---|---|
| <input type="checkbox"/> Aesthetics                                    | <input type="checkbox"/> Agriculture and Forestry Resources       | <input checked="" type="checkbox"/> Air Quality               |
| <input checked="" type="checkbox"/> Biological Resources               | <input checked="" type="checkbox"/> Cultural Resources            | <input type="checkbox"/> Geology/Soils                        |
| <input checked="" type="checkbox"/> Greenhouse Gas Emissions           | <input checked="" type="checkbox"/> Hazards & Hazardous Materials | <input checked="" type="checkbox"/> Hydrology/Water Quality   |
| <input type="checkbox"/> Land Use/Planning                             | <input type="checkbox"/> Mineral Resources                        | <input checked="" type="checkbox"/> Noise                     |
| <input type="checkbox"/> Population/Housing                            | <input type="checkbox"/> Public Services                          | <input checked="" type="checkbox"/> Recreation                |
| <input checked="" type="checkbox"/> Transportation/Traffic             | <input checked="" type="checkbox"/> Tribal Cultural Resources     | <input checked="" type="checkbox"/> Utilities/Service Systems |
| <input checked="" type="checkbox"/> Mandatory Findings of Significance |   |   |

2.2 ENVIRONMENTAL IMPACT ANALYSIS

2.2.1 AESTHETICS

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

**Discussion:**

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

**Less Than Significant Impact.** A scenic vista generally provides focal views of objects, settings, or features of visual interest; or panoramic views of large geographic areas of scenic quality, primarily from a given vantage point. A scenic vista may include, but is not limited to, designated view corridors and scenic outlooks. Substantial constraints occur if the proposed project would introduce incompatible visual elements within a field of view containing a scenic vista or substantially alters a view of a scenic vista. The proposed project would include primarily subsurface infrastructure improvements except for a small utility building for pumping/filtration infrastructure. Given that the proposed improvements would occur primarily subsurface and park conditions restored after construction, project impact is anticipated to be less than significant.

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

**No Impact.** The project site is not located within the vicinity of a designated or eligible state scenic highway based on a review of the California Scenic Highway Mapping System (Caltrans 2018). Therefore, no project impact would result.

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

**Less Than Significant Impact.** The proposed project includes the construction and operation of a storm water infrastructure improvements within Barnes Park. Infrastructure improvements would be installed underground except for the small utility building for pumping and filtration equipment. Since the infrastructure improvements would primarily occur underground, there would be minimal visual change compared to existing conditions, and the proposed project would not substantially degrade the existing

visual character or quality of the site and its surroundings. Therefore, project impact is anticipated to be less than significant.

**d. Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?**

**Less Than Significant Impact.** The proposed project would not be a substantial source of light or glare. The proposed project includes stormwater infrastructure improvements within Barnes Park. Except for a small utility building for pumping and filtration equipment, all the stormwater infiltration system components would be installed underground. The above ground building would be constructed in accordance with City standards with building materials that would not generate excessive levels of reflective glare. The building may include some low intensity security lighting that would not be intrusive and would not represent a substantial source of new lighting. Therefore, project lighting impact is anticipated to be less than significant.

2.2.2 AGRICULTURE AND FOREST RESOURCES

	Potential Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a.	Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?			X
b.	Conflict with existing zoning for agricultural use or conflict with a Williamson Act contract?			X
c.	Conflict with existing zoning for, or cause rezoning of, forest land (as defined in PRC Section 12220(g)) or timberland (as defined in PRC Section 4526)?			X
d.	Result in the loss of forest land or conversion of forest land to non-forest use?			X
e.	Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?			X

**Discussion:**

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

**No Impact.** The project site is the existing Barnes Park that would continue to be utilized as a public park with implementation of the proposed project. There are no agricultural uses on or adjacent to the project site. Therefore, the proposed project would not convert farmland to non-agricultural uses and no project impact is anticipated.

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

**No Impact.** Based on a review of the City of Baldwin Park Zoning Map the project site is zoned open space. The project site is currently developed and utilized as a public park and would continue to be used as a public park with implementation of the proposed project. No change in land use is proposed. Therefore, the proposed project would not conflict with existing zoning for agricultural use.

The California Land Conservation Act of 1965, commonly referred to as the Williamson Act, enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space use. In return, landowners receive property tax

assessments which are much lower than normal because they are based upon farming and open space uses as opposed to full market value (CDC 2018). The project site is an existing City park and would not conflict with a Williamson Act Contract. Therefore, no project impact is anticipated.

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

**No Impact.** The project site is zoned open space. The project site is currently utilized as a public park within a developed urban environment. There is no forest land on or adjacent to the project. Therefore, no project impact is anticipated.

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

**No Impact.** There is no forest land located on or adjacent to the project site. Therefore, the proposed project would not result in the loss of forest land or conversion of forest land to a non-forest use and no project impact is anticipated.

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

**No Impact.** The proposed project would not involve changes to the existing environment which, due to their location or nature, could result in the conversion of Farmland to non-agricultural use. As identified above, the project site is located with a developed urban environment and there are no agricultural uses on or adjacent to the project site. The project site is currently developed and utilized as a public park and would continue to be used as a public park with implementation of the proposed project. Therefore, no project impact is anticipated.

**2.2.3 AIR QUALITY**

		Potential Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:					
a.	Conflict with or obstruct implementation of the applicable air quality plan?			X	
b.	Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	X			
c.	Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a non-attainment area for an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?	X			
d.	Expose sensitive receptors to substantial pollutant concentrations?	X			
e.	Create objectionable odors affecting a substantial number of people?			X	

**Discussion:**

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

**Less Than Significant Impact.** The proposed project is located within the South Coast Air Basin (SCAB), which is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). The SCAQMD is responsible for administering the Air Quality Management Plan (AQMP) for the Basin, which is a comprehensive air pollution control program for attaining state and federal ambient air quality standards. The City of Baldwin Park has an adopted an Air Quality Element as part of their General Plan. The Air Quality Element contains policies and goals for attaining air quality standards. A significant impact could occur if the proposed project is inconsistent with the AQMP or the applicable plans.

The proposed project would place stormwater infrastructure improvements (primarily subsurface except for a small utility building for pumping and filtration equipment) within the existing Barnes Park. The project site would continue to be used as a public park with no change in land use with implementation of the proposed project and would be consistent with the Park General Plan land use designation. Therefore, the proposed project is not expected to conflict with or obstruct implementation of the applicable air quality plan.

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

**Potential Impact.** The SCAQMD has established thresholds of significance for criteria pollutants generated during construction and operation, and a significant impact would occur if the proposed project would result in construction or operational emissions that exceed the thresholds. Significance thresholds are established to assist lead agencies in determining whether a project may have a significant air quality impact. Projects with emissions below established thresholds will not have a significant impact on air quality. Projects with emissions equal to or exceeding the established significance threshold will have a potentially significant adverse impact on air quality. A summary of the SCAQMD air quality significance thresholds is presented in Table 3.

**Table 3: SCAQMD Air Quality Significance Thresholds**

Pollutant	Construction (lb/day)	Operation(lb/day)
NO <sub>x</sub>	100	55
VOC	75	55
PM <sub>10</sub>	150	150
PM <sub>2.5</sub>	55	55
SO <sub>x</sub>	150	150
CO	550	550
Lead	3	3
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402	

Notes: CO carbon monoxide  
 lb/day pounds per day  
 NO<sub>x</sub> oxides of nitrogen (nitric oxide and nitrogen dioxide)  
 PM<sub>2.5</sub> respirable particulate matter less than 2.5 microns in diameter  
 PM<sub>10</sub> respirable particulate matter less than 10 microns in diameter  
 SCAQMD South Coast Air Quality Management District  
 SO<sub>x</sub> oxides of sulfur  
 VOC volatile organic compounds

Air emissions originate from construction and/or operation of a project. Construction emissions are temporary emissions occurring only while a project is being constructed and end when construction is complete. Operation emissions are long-term and begin once a project starts day-to-day operations.

Construction of the proposed project would require heavy equipment such as loaders, and excavators, and substantial amounts of soil would require export from the site. Consequently, there is a possibility for construction emissions to exceed the SCAQMD significance thresholds, even with mitigation, depending on the construction phasing and schedule. Although such exceedances would not represent a substantial environmental constraint to the proposed project, it may have the effect of increasing the length of time required for individual project approvals by requiring a Mitigated Negative Declaration or Environmental Impact Report for California Environmental Quality Act (CEQA) compliance.

Operational emissions from the proposed project are not expected to differ significantly from current park operations. The proposed project includes the construction of stormwater infrastructure improvements within Barnes Park. Except for the small utility building, all the stormwater improvements would be

installed underground. Once the proposed project is constructed, the park would be restored and its operations would resume to pre-construction conditions. Thereby, project operational emissions are anticipated to be less than significant.

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

**Potential Impact.** Construction of the proposed project could result in emissions that exceed SCAQMD significance thresholds, and pose constraints related to project approval, as discussed above. Construction of the proposed project, in conjunction with construction of other water quality and related improvements, could result in cumulative air quality impacts. The potential for cumulative construction related air quality impacts should be addressed as part of the site-specific environmental compliance for the proposed project.

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

**Potential Impact.** As previously discussed, construction of the proposed project could result in emissions that exceeds SCAQMD significance thresholds. The project site is located within proximity to residences and a school (De Anza Elementary), which are sensitive receptors.

The SCAQMD has established localized significance thresholds (LSTs) to address the impacts that pollutant concentrations could have on nearby receptors. There is a potential for construction to result in emissions in excess of the applicable LSTs, which would have the effect of increasing the length of time required for individual project approvals for CEQA compliance.

The SCAQMD also prescribes toxic air contaminant thresholds (TACs) that, if exceeded, would result in a significant impact to nearby sensitive receptors. TACs would result from construction activities of the proposed project and would be emitted primarily through the combustion of diesel fuel by construction equipment. Exceedances of TACs would also have the potential effect of increasing the length of time required for individual project approvals for CEQA compliance.

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

**Less Than Significant Impact.** Construction of the proposed project would result in some odors associated with diesel emissions from construction equipment. Odors from construction sources would be significant if they were to become a nuisance pursuant to SCAQMD Rule 402. To become a nuisance, odor resulting from the proposed project would need to generate multiple valid odor complaints. Diesel odors are common in urbanized environments, and during project construction, would be temporary and localized, and not expected to result in substantial odor impacts.

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

## 2.2.4 BIOLOGICAL RESOURCES

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

### Discussion:

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

**Potential Impact.** The project site is an existing park located in the City of Baldwin Park and is developed with active and passive recreational uses within an urban environment. A review of the California Natural Diversity Database maintained by the California Department of Fish and Wildlife

should be conducted to identify any previously recorded candidate, sensitive or special status species located on the project site or within the vicinity of the site.

The San Gabriel River that may be used by migrating birds and other sensitive species runs adjacent to the park on the western side, approximately 0.1 mile away. The project site includes landscaped open space areas, which include trees that could be used as nesting sites. Impacts to migratory birds and active nests are prohibited under the Federal Migratory Bird Treaty Act (MBTA), 50 C.F.R. Part 10, and Sections 3500 through 3705 of the California Fish and Game Code protect most migratory bird species and active nests from harm or destruction. Nearly all native North American bird species are on the MBTA list. The nesting season varies according to species, but is generally February 15 through August 15 for most birds and January 31 through September 1 for raptors. If tree and vegetation removal would occur during nesting months, a nesting bird survey at the project site should be performed to prevent disturbance of active nests. Such surveys are standard mitigation applied during site specific environmental documentation. The requirements for nesting bird surveys are not expected to result in substantial environmental constraints, but could result in additional time requirements for CEQA compliance.

Based on the results of the records search and the presence of trees within the project site, a field visit by a qualified biologist may be needed to determine potential impact and to identify mitigation measures (if warranted).

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

**Potential Impact.** No sensitive natural communities are anticipated to be located at the park. Barnes Park is developed with active and passive recreation uses within a developed urban neighborhood. No riparian habitat is located at the park, but it is directly adjacent to the San Gabriel River which is located approximately 0.1 mile to the west of the project. Walnut Creek, which is a soft bottom channel, is located approximately 0.25 mile to the south of the park. No changes to Walnut Creek are proposed as part of the project. A field visit may be needed by a qualified biologist to determine potential impact and to identify mitigation measures (if warranted).

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

**Potential Impact.** Due to the close proximity of the project site to the San Gabriel River, a field visit by a qualified biologist may be needed to determine potential impact and to identify mitigation measures (if warranted). Walnut Creek is found to the south of the project site and no changes to Walnut Creek are proposed as part of the project. Treated stormwater from the residential area northeast of the park would either be filtered to the groundwater for recharge or directed back to the storm drain before entering the creek.

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

**Potential Impact.** The park is located within a highly developed urban region and is not part of a native resident or migratory wildlife corridor. However, the project site is adjacent to the San Gabriel River,

which wildlife may use for migration. No native wildlife nursery site is known to occur in the project site. Trees within the project site may aid migratory wildlife. A field visit by a qualified biologist may be needed to determine potential impact and to identify mitigation measures (if warranted).

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

**Potential Impact.** The Baldwin Park Code of Ordinances Chapter 153.165, addresses tree preservation and protection. Should trees require removal as part of the project, then compliance with City code should be evaluated. Therefore, removal of trees at the park may be a potential environmental constraint.

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

**No Impact.** Based on a preliminary review, there are no known habitat conservation plans applicable to the project site. Therefore, no project impact is anticipated.

2.2.5 CULTURAL RESOURCES

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

Discussion

a. Would the project cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?

**Potential Impact.** A historical resource is defined in Section 15064.5(a)(3) of the CEQA Guidelines as any object, building, structure, site, area, place, record, or manuscript determined to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California. Historical resources are further defined as being associated with significant events, important persons, or distinctive characteristics of a type, period, or method of construction; representing the work of an important creative individual; or possessing high artistic values. Resources listed in or determined eligible for the California Register of Historical Resources, included in a local register, or identified as significant in a historic resource survey are also considered historical resources under CEQA.

A project with an effect that may cause substantial adverse change in the significance of a historical resource is a project that may have a significant impact on the environment. Substantial adverse change is defined as physical demolition, relocation, or alteration of a resource or its immediate surroundings such that the significance of an historical resource would be materially impaired. Direct impacts are those that cause substantial adverse physical change to a historical resource. Indirect impacts are those that cause substantial adverse change to the immediate surroundings of a historical resource such that the significance of a historical resource would be materially impaired.

The project site includes a grassy field area within the existing Barnes Park. The proposed project includes water quality improvements that would be located primarily subsurface except for a small utility building. While there are no structures located on the grassy field area; it is nonetheless recommended that a records search be conducted for the Area of Potential Effect (APE) and a 1-mile radius (study area) at the South Central Coastal Information Center (SCCIC) of the California Historical Resources Information System (CHRIS) at California State University, Fullerton, California. As part of the record search, the SCCIC database of survey reports and overviews, documented cultural resources, cultural landscapes, and ethnic resources would be consulted. Additionally, the search typically includes a review of the following publications and lists: California Office of Historical Preservation (OHP) Historic Properties Directory/National Register of Historic Properties, OHP Archaeological Determinations of

Eligibility, California Inventory of Historical Resources/California Register of Historic Resources, California Points of Historical Interest, California Historical Landmarks, Caltrans Bridge Survey, ethnographic information, historical literature, historical maps, and local historic resource inventories.

**b. Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?**

**Potential Impact.** The project site is located within Barnes Park that is developed for recreational uses. The onsite development is low intensity and there could be undisturbed soils below the site that contain archaeological resources. Based on this, site-specific cultural resource investigation, including a cultural resources records search should be conducted via the SCCIC. Mitigation measures that may be applied in the site-specific environmental document may include monitoring of excavation work by a qualified archaeologist with the authority to halt construction, and the subsequent evaluation and curation of any discovered resources. This potential constraint could have the effect of increasing the length of time required for project approvals and CEQA compliance.

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

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

**d. Would the project disturb any human remains, including those interred outside of formal cemeteries?**

**Less than Significant Impact.** The project site is the existing Barnes Park that is used for recreation. However, it is still possible that human remains could exist within subsurface soils. California Health and Safety Code Section 7050.5 requires that in the event of the discovery of human remains outside of a dedicated cemetery, all ground disturbances must cease and the county coroner must be notified. Section 7052 establishes a felony penalty for mutilating, disinterring, or otherwise disturbing human remains, except by relatives. Sections 5097.94 and 5097.98 of the Public Resources Code specify a protocol to be followed when the Native American Heritage Commission receives notification of a discovery of Native American human remains from a county coroner. Compliance with existing laws regarding the handling of human remains discovered outside of formal cemeteries are expected to address any issues associated with the unanticipated discovery of human remains during project construction, and no environmental constraints are anticipated.

**2.2.6 GEOLOGY AND SOILS**

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

**Discussion:**

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

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

**No Impact.** The park is not on a mapped Alquist Priolo Earthquake Fault zone (California Geological Survey 1999), (Tetra Tech 2018). The closest zoned fault for surface rupture is the is the East Montebello Fault Zone section located approximately 4.25 miles southwest of the project site. No impact would occur.

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

**Less Than Significant Impact.** The Southern California region is known to be seismically active. Earthquakes occurring within approximately 60 miles of the site are generally capable of generating ground shaking of engineering significance to the proposed construction (Tetra Tech 2018). The project area is located in the general proximity of several active and potentially active faults. Active faults are defined as those that have experienced surface displacement within the Holocene period (approximately the last 11,000 years). The East Montebello Fault Zone section located approximately 4.25 southwest of the site. The site is located in an area that has a number of active faults and an earthquake on any fault in the vicinity of the park would subject the park to seismic ground shaking. The proposed project is not a habitable structure so a less than significant impact would occur as a result of strong seismic ground shaking. The 2018 geotechnical study completed at the site concluded that construction of the project is feasible from a geotechnical standpoint provided that the facilities infiltrate at a depth greater than 20 feet (Tetra Tech 2018). Seismic design parameters identified in the geotechnical study are based on Chapter 16 of the 2016 California Building Code and on information provided by the U.S. Geological Survey for seismic design (USGS 2018 b).

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

**Less than Significant Impact.** The park has been mapped in an area subject to ground failure from liquefaction (California Geological Survey 1999). Based on a geotechnical investigation conducted at the site to determine the potential for liquefaction during a seismic event, the majority of the on-site soils are not susceptible to liquefaction. The combined dynamic settlement at the ground surface ranges from about 0.5 to 1.5 inches. It is noted that although the magnitude of the estimated dynamic settlements corresponds to a mean estimated settlement and can vary on the order of +/- 50 percent, the standard of practice uses the mean estimated values in developing guidelines and evaluating potential damage to structures. Differential settlements per County of Los Angeles Administrative Manual, Liquefaction/Lateral Spreading/GS045.0 (GS045.0) are assumed to be about half of the total settlements i.e., about 0.3 to 0.7 inches over a span of 30 feet. Therefore, structural mitigation is acceptable at this site, and the Structural Engineer should account for this differential settlement in the design of the foundation and the structure (Tetra Tech 2018).

**iv.) Landslides?**

**No Impact.** The park has not been mapped in an area subject to ground failure landslides (California Geological Survey 1999; Tetra Tech 2018). No project impact would occur.

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

**Less Than Significant Impact.** The proposed project includes water quality infrastructure improvements. During construction, a Stormwater Pollution Prevention Plan (SWPPP) is required for construction sites over an acre that would identify BMPs to manage soil erosion from wind and stormwater. Upon completion of project construction activities, the site would be restored. Therefore, a less than significant impact is anticipated.

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

**Less Than Significant Impact.** The park is on a geologic unit that is either unstable or likely to become unstable as a result of the project (California Geological Survey 1999). The geotechnical study performed for this site concluded that the site is within an area identified by the State of California as subject to hazard of liquefaction (Tetra Tech 2018). As groundwater was noted within 10 feet of the surface, a liquification hazard analysis was completed at the site. The results of analysis indicated that for the potential for liquefaction during a seismic event, the majority of the on-site soils are not susceptible to liquefaction. The combined dynamic settlement at the ground surface ranges from about 0.5 to 1.5 inches. The 2018 geotechnical report also concluded that the site is not in an Earthquake-Induced Landslide Hazard Zone. No evidence of land sliding was observed on or in the vicinity of the site during the geotechnical sampling completed at the site (Tetra Tech 2018). The 2018 geotechnical report also concluded that the site is not located in an area mapped as subject to historic or current subsidence (US Geological Survey 2018a). Geotechnical sampling of soils yielded results that concluded that soils on site are susceptible to collapse but that structural mitigation in the design of the foundation and structure of the project would off-set the settlement (Tetra Tech 2018).

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

**No Impact.** Based on a geotechnical survey conducted at the park, the subsurface geology was observed to be fill soils characterized as silty sands within the upper 1-foot (Tetra Tech 2018). Native alluvium deposits that consisted of well graded and poorly graded sands with silty sands interbeds (Tetra Tech 2018). Soils at the site are not expansive in nature. As the project site is not located on expansive soils, no impacts would occur to park facilities.

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

**No Impact.** The proposed project would not use septic tanks or alternative wastewater disposal systems and no project impact would result.

2.2.7 GREENHOUSE GAS EMISSIONS

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

**Discussion:**

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

**Potential Impact.** Regulated greenhouse gases (GHGs) include carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>). GHGs are commonly quantified in the equivalent mass of CO<sub>2</sub>, denoted CO<sub>2</sub>eq, which takes into account the global warming potential (GWP) of each individual GHG compound. The most common GHG that results from human activity is CO<sub>2</sub>, followed by CH<sub>4</sub> and N<sub>2</sub>O.

The proposed project would generate GHG emissions during construction that should be evaluated, including CO<sub>2</sub> and equivalents. However, construction emissions are amortized over 30 years and are not likely to result in substantive annual greenhouse gas emissions.

Operation of the proposed project would consist of the pumping of stormwater to the treatment devices, and are not expected to generate substantial levels of greenhouse gasses. Project operational impact is anticipated to be less than significant.

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

**Potential Impact.** GHG emissions would conflict with applicable plans, policy or regulation if the proposed project conflicts with any of the plans, policies or regulations adopted for the purpose of reducing GHG emissions in the City of Baldwin Park. The proposed project would provide new stormwater infrastructure that is not anticipated to generate substantial greenhouse gas emissions. Nonetheless, the proposed project would generate GHG emissions during construction that should be evaluated, including compliance with applicable plans.

2.2.8 HAZARDS AND HAZARDOUS MATERIALS

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

**Discussion:**

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

**Less Than Significant Impact.** A hazardous material is defined as any material that due to its quantity, concentration, physical or chemical characteristics, poses a significant present or potential hazard to human health or to the environment if released. Hazardous materials include, but are not limited to, inorganic and organic chemicals, solvents, mercury, lead, asbestos, paints, cleansers, or pesticides.

Operation activities associated with the proposed water quality infrastructure improvements would not involve the use of acutely hazardous materials or waste, and the limited use of any hazardous materials would be contained, stored, and used in accordance with the manufacturer's instructions. Due to the limited use of small quantities, the project would not create a significant hazard to the public or the environment through reasonably foreseeable use, transport, and disposal. A less than significant impact would occur in this regard.

Construction activities associated with the proposed project are not likely to involve the use of substantial quantities of hazardous materials and the most likely source of hazardous materials would be from vehicles and construction equipment at the site. However, there could be small amounts of hazardous materials, including solvents and lubricants used to maintain construction equipment. Generally, these materials would be used in concentrations that would not pose significant threats during the transport, use and storage of such materials. Furthermore, it is assumed that potentially hazardous materials would be contained, stored, and used in accordance with manufacturers' instructions and handled in compliance with applicable standards and regulations, including California Occupational Safety and Health Administration (OSHA) requirements, and Title 8 and 22 of the Code of California Regulations. Accordingly, risks associated with hazards to the public or environment posed by the transport, use or disposal of hazardous materials during construction are considered less than significant with compliance with required standards and regulations.

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

**Potential Impact.** Operational activities associated with the public park and proposed water quality infrastructure improvements would not involve the use of acutely hazardous materials or waste, and the limited use of any hazardous materials would be contained, stored, and used in accordance with the manufacturer's instructions. Due to the limited use of small quantities, the project would not create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials in to the environment. A less than significant impact is anticipated.

Construction activities would result in the removal of soil at the project site. The Phase I ESA for the project site indicates fill material should be sampled and analyzed for chemicals of potential concern (COPCs) (Tetra Tech 2018). Dust suppression may be necessary during future construction and/or excavation activities at the site. Additionally, near-surface fill material/soils should be sampled and analyzed for hazardous substances prior to being removed from the site for any purpose (Tetra Tech 2018).

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

**Less Than Significant Impact.** The proposed project includes water quality infrastructure improvements that would not utilize processes that could emit hazardous emissions or otherwise release hazardous substances or wastes. Because of this, no environmental constraint associated with the proposed project are expected.

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

**No Impact.** The project site is not identified as a hazardous materials site based on a review of the EnviroStor database (DTSC 2018) and State Water Board's Geotracker Database (SWRCB 2018). Site observations and the information reviewed for the Phase I Environmental Site Assessment did not indicate recognized environmental conditions (RECs), controlled RECs (CRECs), historical RECs (HRECs), PECs, or BERs associated with the site regarding environmental liens, activity use limitations (AULs), aboveground storage tanks (ASTs), underground storage tanks (USTs), current or historical hazardous materials usage, solid waste management, current or historical hazardous waste management, polychlorinated biphenyls (PCBs), mercury, water supply, wastewater, radon, air emissions, dry cleaners, microbial growth and moisture intrusion, or environmental non-compliance issues (Tetra Tech 2018).

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

**No Impact.** Based on review of a Google Earth Image date March 16, 2017, and AirNav.com (AirNav.com 2018), no airports are located within 2 nautical miles of the Site. The closest airport to the Site is the El Monte Airport, which is located approximately 2.25 nautical miles west of the Site.

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

**No Impact.** There are numerous private airports throughout Los Angeles County that include heliports. The proximity of heliports to the proposed project would not result in exposure of people to safety hazards, as the proposed project is water quality infrastructure improvements that are unmanned and would have no effect on air transport activities or their flight paths.

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

**Less Than Significant Impact.** The project site is currently used for recreational activities and the proposed project would add water quality infrastructure improvements within the park. Except for the small utility building, all water quality infrastructure improvements would be installed underground. No changes to the existing roadway network are proposed as part of the project. While it is expected that the majority of construction activities for the project would be confined on-site, short-term construction activities may temporarily affect access on streets during certain periods of the day. Minor traffic control may be necessary during such activities. However, any street work would occur under permit from the City and appropriate notifications would need to be made to local emergency providers so that alternative routes can be planned for in the event of an emergency. As a standard practice, street work would be subject to the requirements of a Traffic Control Plan approved by the local transportation agency, or would comply with applicable work area traffic control requirements. In addition, contractors typically would have steel plating available in the event excavations need to be quickly spanned. Aside from any needed temporary street work, no other disruptions to the local transportation system would occur, and substantial interruptions to emergency access are not anticipated.

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

**No Impact.** The project site is an existing park located within an urbanized area. The areas immediately surrounding the project site are urbanized, and no increased wildland fire hazard is expected as a result of the water quality improvements.

## 2.2.9 HYDROLOGY AND WATER QUALITY

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

**Discussion:**

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

**Potential Impact.** The proposed project would install and operate water quality improvement facilities within the San Gabriel River Watershed, which would divert, treat, and infiltrate stormwater. The proposed project would generally result in beneficial impacts to downstream receiving water quality as part of long-term operations.

During construction, the proposed project would require site work and grading. Construction activity could result in soil erosion and loss of topsoil, which could then affect water quality. Since the project is anticipated to disturb greater than one acre of land (including laydown and stockpile areas), the project must comply with the State Water Resources Control Board Order No. 2009-0009-DWQ, *National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities* (Construction General Permit). The Construction General Permit requires development of an SWPPP, implementation of erosion and sediment best management practices, monitoring, and reporting. Pursuant to the Construction General Permit, prior to terminating permit coverage the project site must be stabilized and not pose any additional sediment discharge risk than it did prior to the commencement of construction activity.

During operation of the BMP, pretreatment of runoff would be performed prior to its infiltration; however, it's unlikely pretreatment units would be able to treat all types and concentrations of contaminants in the runoff. Therefore, further analysis is needed to determine the underlying soil type, the depth to groundwater, and the proximity of the BMP to production wells.

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

**Less than Significant Impact.** The proposed project would feature an underground stormwater vault that would capture and infiltrate runoff from an 81-inch storm drain that collects stormwater from the residential area northeast of the park. Runoff from this wash would be diverted to a pretreatment system and then to an underground infiltration vault. Treated water would infiltrate to the groundwater for recharge, or be directed back to the storm drain if the vault is full. As such, there would be a net increase in recharge rate at the site. Therefore, project impact is anticipated to be less than significant.

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

**Less Than Significant Impact.** Barnes Park is located in the City of Baldwin Park, within a 384-acre watershed that drains through the upstream storm drain system directly into the San Gabriel River Tributary, which runs adjacent to the west side of the park. The proposed project would feature an underground stormwater vault that would capture and infiltrate runoff from an 81-inch storm drain that collects stormwater from the residential area northeast of the park. Runoff from this wash would be diverted to a pretreatment system and then to an underground infiltration vault. Treated water would infiltrate to the groundwater for recharge, or be directed back to the storm drain if the vault is full.

Therefore, the proposed project is not anticipated to substantially alter the drainage pattern of the project site or vicinity, or to result in substantial erosion or siltation.

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

**Less Than Significant Impact.** The proposed project would be located within the existing Barnes Park. The project site would be restored following construction. Infiltration would occur subsurface and would not result in erosion. The proposed project would feature an underground stormwater vault that would capture and infiltrate runoff from an 81-inch storm drain that collects stormwater from the residential area northeast of the park. Runoff from this wash would be diverted to a pretreatment system and then to an underground infiltration vault. Treated water would infiltrate to the groundwater for recharge, or be directed back to the storm drain if the vault is full. While a negligible amount of impervious surfaces would be created, it would not substantially increase the rate or amount of surface runoff in a manner that would result in flooding on-site or off-site. Therefore, project impact is anticipated to be less than significant.

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

**Less Than Significant Impact.** The proposed project consists of redeveloping a portion of Barnes Park with a stormwater BMP to improve water quality. The proposed project would feature an underground stormwater vault that would capture and infiltrate runoff from an 81-inch storm drain that collects stormwater from the residential area northeast of the park. Runoff from this wash would be diverted to a pretreatment system and then to an underground infiltration vault. Treated water would infiltrate to the groundwater for recharge, or be directed back to the storm drain if the vault is full. Thereby, the diversion rate would be much larger than the discharge rate and a less than significant impact is anticipated.

**f. Would the project otherwise substantially degrade water quality?**

**Less Than Significant Impact.** No adverse impacts/constraints regarding water quality are anticipated beyond those discussed under Checklist Item 2.2.9 a.

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

**No Impact.** No housing is located on the site and no housing is proposed as part of the project. Therefore, no project impact would result.

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

**No Impact.** The project site is located within Zone X, areas determined to be outside the 0.2% annual chance floodplain according to Flood Insurance Rate Map (FIRM)06037C1700F. Therefore, the proposed project would not place buildings or structures within a 100-year floodplain. No project impact would result.

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

**Less Than Significant Impact.** Dam inundation is flooding that occurs due to structural failure of a dam. Failure of a dam may be caused by seismic activity, severe flooding that causes water to exceed the capacity of the dam, or landslides that flow into a reservoir displacing water. The proposed project are infrastructure improvements that would not house people or otherwise increase the risk of exposure to risks related to potential flooding. Therefore, project impact is anticipated to be less than significant.

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

**Less Than Significant.** The proposed project is located inland and is not within a tsunami hazard zone or near inland water bodies that could be subject to a seiche. In addition, the project site is relatively flat and are not subject to mudflows. Therefore, project impact is anticipated to be less than significant.

**2.2.10 LAND USE AND PLANNING**

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

**Discussion:**

**a. Would the project physically divide an established community?**

**No Impact.** The proposed project would not physically divide an established community. The project site is currently used as a public park and would continue to do so with implementation of the proposed project. Implementation of the proposed project would result in primarily subsurface improvements to the City’s stormwater system and would not make any changes to existing city streets. Therefore, no project impact is anticipated.

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

**No Impact.** The proposed project would place stormwater infrastructure improvements primarily subsurface except for a small utility building within the existing Barnes Park. The project site would continue to be used as a public park with no change in land use with implementation of the proposed project and would be consistent with the general plan land use designation that identifies the site as Park.

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

**No Impact.** Based on a preliminary review, there are no known habitat conservation plans applicable to the project site. Therefore, no project impact is anticipated.

2.2.11 MINERAL RESOURCES

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

**Discussion:**

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

**No Impact.** The proposed project would be located within an existing park developed with recreational uses and the land would continue to be used as a public park with implementation of the proposed project. The project site is located within an urban environment and is adjacent to residential land uses that contain sensitive receptors (residences) which are generally not compatible land uses with mineral extraction. Therefore, no impacts on minerals are anticipated.

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

**No Impact.** The proposed project would be located within an existing park developed with recreational uses and the land would continue to be used as a public park with implementation of the proposed project. No impacts on minerals are anticipated.

2.2.12 NOISE

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

**Discussion:**

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

**Potential Impact.** Noise is defined as unwanted sound; however, not all unwanted sound rises to the level of a potentially significant noise impact. To differentiate unwanted sound from potentially significant noise impacts, the City has established noise regulations that take into account noise-sensitive land uses. The proposed project would be located primarily subsurface expect for a small utility building and the surface restored such that existing activities could resume following completion of construction. Operation of the water quality improvements would be automated and pump systems required to convey stormwater to the buried facilities would either be subsurface or placed in a small utility structure. Noise from operations is not expected to be noticeable and is not anticipated to result in substantial elevations in ambient noise levels at the project site or vicinity. The water quality improvements would require periodic maintenance; however, maintenance activities would not result in substantial elevation in ambient noise.

Construction of the water quality improvement facilities would result in short-term temporary noise impacts associated with construction equipment and haul trip activities. Noise is regulated by Chapter 153.140.070, Noise of the Baldwin Park Code of Ordinances. Given the extent of construction, construction duration, and the surrounding noise receptors, there may be temporary elevations in noise

levels from construction activities that should be evaluated for compliance with City noise requirements and mitigation measures identified as warranted.

**b. Would the project result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?**

**Potential Impact.** Operation of the pumps being installed as part of the proposed project would not generate vibration; however, construction of the underground storage facilities and site grading would require the use of equipment that could generate vibration. According to the Federal Transit Administration (FTA) guidelines, a vibration level of 65 VdB is the threshold of perceptibility for humans (FTA 2006). For a significant impact to occur, vibration levels must exceed 80 VdB during infrequent events (FTA 2006).

Possible sources of construction vibration from the proposed project may include bulldozers, dump trucks, backhoes, rollers, and other construction equipment that produces vibration. The vibration generated by project construction should be evaluated for potential impact since project construction activities would occur within proximity to existing residences within the surrounding neighborhood.

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

**Less Than Significant Impact.** Operation of the proposed project is not expected to result in a permanent increase in ambient noise levels. The pump station would be underground or housed in a small utility structure; therefore, there is not anticipated to be a substantial source of new noise.

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

**Potential Impact.** Operation of the proposed project is not expected to result in a permanent increase in ambient noise levels since the pump station would be located underground or housed in a small utility structure that would not be a substantial source of new noise. Construction activities would require a variety of equipment. Typical construction equipment would not be expected to generate noise levels above 90 dBA at 50 feet, and most equipment types would typically generate noise levels of less than 85 dBA at 50 feet. The highest noise levels during construction are normally generated during the use of earth moving equipment or pavement removal. Given the extent of construction, construction duration, and the surrounding noise receptors, there may be temporary elevations to the ambient noise levels from construction activities that should be evaluated and mitigation measures identified as warranted.

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

**No Impact.** Based on review of a Google Earth Image date March 16, 2017, and AirNav.com (AirNav.com 2018), no airports are located within 2 nautical miles of the Site. The closest airport to the Site is the El Monte Airport, which is located approximately 2.25 nautical miles west of the Site.

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

**Less Than Significant Impact.** There are numerous private airports throughout Los Angeles County, which include heliports. The proximity of the heliports to the proposed project would not result in exposure of people to excessive noise levels, since the proposed project is water quality infrastructure improvements that would have no effect on air transport activities or their flight paths, and would not cause people to move closer to a private airport.

2.2.13 POPULATION AND HOUSING

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

**Discussion:**

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

**Less than Significant Impact.** The proposed project would make improvements to the stormwater system. The project site is an existing public park and would continue operating as a public park with implementation of the proposed project. The construction of the proposed project would require construction workers. However, due to the relatively small size of the project and short duration of project construction activities, the proposed project is not anticipated to induce employees to move to the project vicinity and induce population growth or the need for housing. During long-term project operations, workers would be needed for routine maintenance activities. However, the proposed project is not anticipated to generate a substantial number of new jobs. Therefore, project impact is anticipated to be less than significant.

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

**No Impact.** The project site is an existing public park that does not contain any housing units. Since no existing housing would be removed, there would be no need for the construction of replacement housing elsewhere. Therefore, no project impact is anticipated.

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

**No Impact.** The project site is an existing public park that contains no housing units. No people would be displaced as a result of the proposed project since no housing units are onsite. Therefore, no project impact is anticipated.

2.2.14 PUBLIC SERVICES

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

**Discussion:**

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

**i.) Fire Protection**

**Less Than Significant Impact.** Except for the small utility building, the storm water infrastructure improvements would be installed underground. Since these infrastructure improvements would primarily be underground and the proposed project would not result in an increase use of park facilities, project impact on fire protection services is anticipated to be less than significant.

**ii.) Police Protection**

**Less Than Significant Impact.** The project is a water quality improvement project that would not increase housing or induce population growth that could in turn increase the need for new police protection services. Therefore, project impact is anticipated to be less than significant.

**iii.) Schools**

**Less Than Significant Impact.** Demand for educational services is typically linked to an increase in population growth in the area through the development of new housing units or the generation of new jobs. The proposed project includes water quality improvement facilities that are infrastructure improvements that would not increase housing or induce population growth through the generation of a substantial number of new jobs that could, in turn, increase the need for schools. Therefore, project impact is anticipated to be less than significant.

**iv.) Parks**

**Less Than Significant Impact.** Demand for park and recreational services is typically linked to an increase in population growth in the area through the development of new housing units or the generation of new jobs. The water quality improvement facilities are infrastructure improvements that do not increase housing stock and do not result in the movement or relocation of people. Therefore, project impact is anticipated to be less than significant.

**v.) Other Public Facilities**

**Less Than Significant Impact.** Demand for public services is typically linked to an increase in population growth in the area through the development of new housing units or the generation of new jobs. The proposed project includes water quality improvement facilities that are infrastructure improvements that would not increase housing or induce population growth through the generation of substantial number of new jobs that could in turn increase the need for new public facilities. Therefore, project impact is anticipated to be less than significant.

2.2.15 RECREATION

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

**Discussion:**

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

**Potential Impact.** Demand for park and recreational services is typically linked to an increase in population growth in the area through the development of new housing units or the generation of new jobs. The water quality improvement facilities are infrastructure improvements that do not increase housing stock and do not result in the movement or relocation of people. Therefore, project long-term operational impact is anticipated to be less than significant.

During construction, some park users may elect to use other parks during the approximately 18-month construction period. During project construction, park facilities to the north of the field would remain open and available for park users. The area surrounding the field would be secured with construction fencing and would be closed to the public. The parking lot would also be used as a construction ingress/egress area. The temporary closure of the recreational uses on part of the park is likely to require close coordination between the City, local residents, and community stakeholders to develop suitable mitigation options for addressing the temporary loss of recreational uses. This represents an environmental constraint that could have the effect of increasing the length of time required for project approval and CEQA compliance.

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

**Less Than Significant Impact.** The proposed project is located within the existing Barnes Park and would remove and replace the grassy field area. No expansion of recreational facilities is proposed as part of the proposed project. Therefore, project impact is anticipated to be less than significant.

## 2.2.16 TRANSPORTATION/TRAFFIC

		Potential Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:					
a.	Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, including mass transit and non-motorized travel and relevant components of the circulation system, including, but not limited to, intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	X			
b.	Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?			X	
c.	Result in a change in air traffic patterns including either an increase in traffic levels or a change in location that results in substantial safety risks?				X
d.	Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?			X	
e.	Result in inadequate emergency access?			X	
f.	Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?				X

**Discussion:**

**a. Would the project conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, including mass transit and non-motorized travel and relevant components of the circulation system, including, but not limited to, intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?**

**Potential Impact.** The proposed project would not make substantive changes to the circulation system or street capacities. The proposed project would involve water quality infrastructure improvements at the existing Barnes Park that would not result in the generation of a substantial number of new vehicle trips as part of long-term operations. During construction, there would be a short-term and temporary increase in vehicle trips associated with construction workers and equipment. Once operational, vehicle trips to the existing park would be similar to existing conditions. Therefore, it is recommended that an evaluation of construction vehicle trips be conducted and a recommended haul route identified in addition to any mitigation measures (if needed) to reduce any short-term, temporary construction impacts.

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

**Less Than Significant.** The proposed project would not make substantive changes to the circulation system or street capacities. The proposed project includes infrastructure improvements and would not be a significant traffic generator as part of long-term operations. Therefore, project impact is anticipated to be less than significant.

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

**No Impact.** Construction of water quality infrastructure improvements on the project site would not affect air traffic levels or change the location of the flight paths at an airport. Therefore, no project impact would result.

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

**Less than Significant Impact.** The proposed project would add water quality infrastructure improvements at Barnes Park that would be located primarily subsurface except for a small utility building. The project site is currently used for recreational activities and would continue to do so with implementation of the proposed project. No changes to the existing street system are proposed as part of the project. Therefore, project impact is anticipated to be less than significant.

**e. Would the project result in inadequate emergency access?**

**Less Than Significant Impact.** The project site is currently used for recreational activities and the water quality infrastructure improvements would primarily be located underground. No changes to the existing street system are proposed as part of the project. While it is expected that the majority of construction activities for the project would be confined on-site, short-term construction activities may temporarily affect access on streets during certain periods of the day. Minor traffic control may be necessary during such activities. However, any street work would occur under permit from the City and appropriate notifications would need to be made to local emergency providers so that alternative routes can be planned for in the event of an emergency. As a standard practice, street work would be subject to the requirements of a Traffic Control Plan approved by the local transportation agency, or would comply with applicable work area traffic control requirements. In addition, contractors typically would have steel plating available in the event excavations need to be quickly spanned. Aside from any needed temporary street work, no other disruptions to the local transportation system would occur, and substantial interruptions to emergency access are not anticipated. Therefore, project impact is anticipated to be less than significant.

**f. Would the project conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?**

**No Impact.** The proposed project would be located primarily subsurface, except for a small utility building, and would not result in permanent changes to the street systems that could affect alternative transportation routes, such as bike lanes or bike paths. Therefore, no project impacts are anticipated.

**2.2.17 TRIBAL AND CULTURAL RESOURCES**

	Potential Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a.	Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:			
	i.) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or	X		
	ii.) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	X		

**Discussion:**

**a. Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:**

**i.) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or**

**Potential Impact.** The project site is the existing Barnes Park that is currently developed with recreational uses. It is recommended that a Native American Heritage Commission (NAHC) sacred lands search and outreach letters to NAHC listed tribes be conducted to identify any known tribal historical resources that could be located within or adjacent to the project APE.

ii.) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

**Potential Impact.** The project site is the existing Barnes Park and subsurface construction activities may encounter native soils. A records search via SCCIC and NAHC sacred lands search should be conducted to identify any significant tribal cultural resources within or adjacent to the project area of potential effect (APE). Assembly Bill (AB) 52 requires a lead agency to evaluate a project's potential to impact to "tribal cultural resources" and requires the lead agency to consult with any California Native American tribe(s) that has previously requested that the lead agency provide the tribe with notice of such projects and consultation, and is traditionally and culturally affiliated with the geographic area of a proposed project. Consultations must include discussing the type of environmental review necessary, the significance of tribal cultural resources, and the significance of the project's impacts on the tribal cultural resources (as applicable), and alternatives and mitigation measures recommended by the tribe.

## 2.2.18 UTILITIES AND SERVICE SYSTEMS

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

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

**No Impact.** The proposed project would not generate wastewater that would require treatment by the local wastewater treatment plant. Therefore, no project impact is anticipated.

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

**No Impact.** The proposed project is a water quality improvement project that would not consume or require potable water and therefore, would not generate wastewater. Therefore, no project impacts on water supply or wastewater treatment services are anticipated as a result of this project.

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

**Potential Impact.** The proposed project is a stormwater infrastructure improvement project designed to improve water quality. The project as a whole will require additional evaluation to determine whether implementation of the project could result in any individual or cumulative impacts from construction or operation that may require mitigation to reduce impact and/or that could result in a significant impact.

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

**No Impact.** The proposed project is a stormwater improvement project that would not consume or require water service. Therefore, no impacts on water supply are anticipated.

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

**Less Than Significant Impact.** During project construction, a negligible amount of wastewater would be generated by construction workers. It is anticipated that portable toilets would be provided by a private company and the waste disposed off-site. Wastewater generation from construction activities is not anticipated to cause a measurable increase in wastewater flows at a point where, and at a time when, a sewer's capacity is already constrained or that would cause a sewer's capacity to become constrained. The proposed project would not generate wastewater upon operation of the project. Therefore, project impact is anticipated to be less than significant.

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

**Less than Significant Impact.** The proposed project is a stormwater infrastructure project that would not generate substantial amounts of solid waste. Project construction waste would be recycled to the extent feasible. Once operational, waste generation from the proposed project would primarily be from routine maintenance activities that would not be a significant source of new waste. Although some solid wastes would be generated by the proposed project, the amounts would be minimal and are not anticipated to adversely affect landfill capacity. Therefore, project impact is anticipated to be less than significant.

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

**Less Than Significant Impact.** The proposed project would not generate a substantial amount of solid waste and would comply with applicable federal, state, and local statutes and regulations related to solid waste. Project construction waste would be recycled to the extent feasible. Once operational, waste generation from the proposed project would primarily be from routine maintenance activities that would not be a significant source of new waste. Therefore, project impact is anticipated to be less than significant.

2.2.19 MANDATORY FINDINGS OF SIGNIFICANCE

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

**Discussion:**

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

**Potential Impact.** Construction of the proposed project would remove vegetation from the project site that could affect biological resources and may require additional study and site specific mitigation measures. Construction activities may also have the potential to encounter archaeological and paleontological resources, which could require site-specific mitigation. These potential constraints have been identified above, and would need to be addressed during site-specific CEQA compliance once additional technical analysis has been completed.

**b. Does the project have impacts that are individually limited, but cumulatively considerable? (“Cumulatively considerable” means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)**

**Potential Impact.** Construction of the proposed project could contribute to short-term temporary construction related cumulative air quality, noise, and traffic impacts that could require site-specific

mitigation. These potential impacts would need to be addressed in future site-specific CEQA documentation once additional technical analysis has been completed and include mitigation measures as warranted.

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

**Potential Impact.** The proposed project could result in impacts on human beings related to air quality, hazardous materials, and noise from construction activities, as previously discussed. These potential impacts would need to be addressed in a future site-specific CEQA documentation once additional technical analysis has been completed and include mitigation measures as warranted.

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