



Maywood Riverfront Park – Stormwater  
Capture Elements Summary Report

August 24, 2023

Prepared for:  
Council for Watershed Health  
Communities for a Better Environment  
East Yard Communities for Environmental  
Justice  
Los Angeles Neighborhood Land Trust

Prepared by:  
Stantec

# Table of Contents

<b>EXECUTIVE SUMMARY .....</b>	<b>III</b>
<b>1 PROJECT BACKGROUND .....</b>	<b>1</b>
1.1 Introduction .....	1
1.2 WaterTalks .....	3
1.3 Existing Site Conditions .....	3
1.3.1 Site Location .....	3
1.3.2 Contamination on Site .....	5
1.4 Funding .....	6
<b>2 SLEEPY LAGOON MEMORIAL PROJECT .....</b>	<b>7</b>
2.1 Project Description .....	7
2.2 Drainage Area and Runoff .....	8
2.3 Bioswale Solution .....	10
2.4 Project Evaluation .....	11
<b>3 MAYWOOD RIVERFRONT PARK STORMWATER CAPTURE PROJECT ALTERNATIVES .....</b>	<b>12</b>
3.1 Possible Solutions .....	12
3.2 Infiltration Gallery Option .....	14
3.2.1 Mounding Analysis .....	14
3.2.2 Recommendation .....	15
3.3 Diversion to Sanitary Sewer .....	15
3.3.1 Sewer Capacity Review for City of Maywood .....	16
3.3.2 Preliminary Cost Estimate .....	19
<b>4 CONCLUDING RECOMMENDATIONS .....</b>	<b>22</b>
<b>LIST OF TABLES</b>	
Table 2-1: Peak Flow Rates and Runoff Volumes of Listed Design Storms (Source: Sleepy Lagoon Report Appendix D, Carollo Engineers) .....	9
Table 2-2: Drainage Zoning (Source: Sleepy Lagoon Report Appendix D, Carollo Engineers) .....	9
Table 3-1: Analytical Model Run Results .....	14
Table 3-2: Estimate Project Construction Costs .....	19
Table 3-3: Annual Operations and Maintenance Preliminary Cost Estimates .....	21
Table 3-4: LACSD Wastewater Treatment Annual Surcharge .....	22
<b>LIST OF FIGURES</b>	
Figure 1-1: Conceptual Site Plan for Grant Submissions (Source: Los Angeles Neighborhood Land Trust) .....	1
Figure 1-2: Maywood Riverfront Park Events Timeline .....	2
Figure 1-3: Site Location .....	4
Figure 1-4: Former Site Property .....	5
Figure 1-5: SCWP Scoring Criteria (Source: Los Angeles County's Safe Clean Water Program) .....	7
Figure 2-1: Drainage Area (Source: Sleepy Lagoon Report Appendix D, Carollo Engineers) .....	8
Figure 2-2: Location of Existing Swale (Source: Sleepy Lagoon Report) .....	10
Figure 2-3: Proposed Concept for Bioswale Garden (Source: Sleepy Lagoon Report Appendix G, DakeLuna Consultants) .....	11
Figure 3-1: Subsurface infiltration gallery or detention basin for sewer diversion conceptual schematic ..	13
Figure 3-2: City of Maywood Sewer Network (Source: City of Maywood – Wet Weather Sewer Flow Monitoring and Model Calibration Technical Memorandum) .....	16



Figure 3-3. Wet Weather Sewer Flows (Source: City of Maywood – Wet Weather Sewer Flow Monitoring and Model Calibration Technical Memorandum) .....	17
Figure 3-4. d/D ratios for typical flow conditions (left) and Peak Wet Weather Flow conditions (right) (Sources: City of Maywood Sewer System Hydraulic Model and City of Maywood – Wet Weather Sewer Flow Monitoring and Model Calibration Technical Memorandum) .....	18

## **LIST OF APPENDICES**

<b>APPENDIX A. SAFE CLEAN WATER PROGRAM .....</b>	<b>1</b>
<b>APPENDIX B. SLEEPY LAGOON REPORT .....</b>	<b>2</b>
<b>APPENDIX C. ANALYTICAL GROUNDWATER MOUNDING ANALYSIS .....</b>	<b>3</b>
<b>APPENDIX D. CITY OF MAYWOOD SEWER SYSTEM CAPACITY DOCUMENTS.....</b>	<b>4</b>



# Executive Summary

## Land and Water Acknowledgement

The authors of this Report recognize and acknowledge that the geographic area represented in this document is the unceded ancestral lands and waters of the Tongva near the village of Wenot. We honor their elders both past and present and the descendants who are citizens of the Tribe for their exemplary respect for water; we honor their continued connection to and protection of this land.

## Report Summary

The Maywood Riverfront Park project was identified as a top priority project by the Leadership Group (decision making group of environmental justice community based organizations from across LA County) within the [WaterTalks Program](#) (a state funded program also called the Disadvantaged Community and Tribal Involvement Program) to meet the high-priority needs of community members in the Lower San Gabriel and Los Angeles Rivers Greater LA County (GLAC) Integrated Regional Water Management (IRWM) Sub Region. After conducting a robust strengths and needs assessment identifying water needs through engaging community members from the region, the project was elevated as a project that would meet top priorities from the assessment and was supported to move forward by the Leadership Group. Work on the project has included significant leadership and involvement from East Yard Communities for Environmental Justice (EYCEJ), Sacred Places Institute (SPI) and Communities for a Better Environment (CBE) who are both on the Leadership Group.

The Maywood Riverfront Park has several components and there have been funds and plans secured through Measure A to revitalize the park by incorporating priorities including new sports courts, water play features, exercise equipment, stormwater capture elements, native plant habitat and a memorial to the original Sleepy Lagoon Site. While other elements of the projects are well defined, EYCEJ, SPI and CBE wanted to explore stormwater capture options other than rehabilitation of the existing swale in the east side of the park. After evaluating the concept design further, the project would not provide enough water quality benefits, incurs a higher cost to divert flows from the western edge of the park to the eastern side of the park, and does not consider the distribution of contamination on site due to historical industrial processes. Other cost-effective options for the projects evaluated were a subsurface infiltration gallery and a subsurface detention basin that diverts wet weather flows into the sanitary sewer. The infiltration gallery option was evaluated and was determined to need more groundwater mounding analysis to determine movement of the contaminated groundwater plume underneath the site. Additionally, the extensive contamination on site would require coordination with the Regional Water Quality Control Board (RWQCB) and Department of Toxic Substances and Control (DTSC). Afterwards, a diversion to sanitary sewer option was pursued. Although it was clear that the City of Maywood sewer network was able to handle additional flows into the system, the high cost of operations and maintenance for the project was infeasible for the City of Maywood to fund over the project's life of 30 to 50 years. As a result, a regional or subregional stormwater capture project that could improve water quality and enhance water supply in a



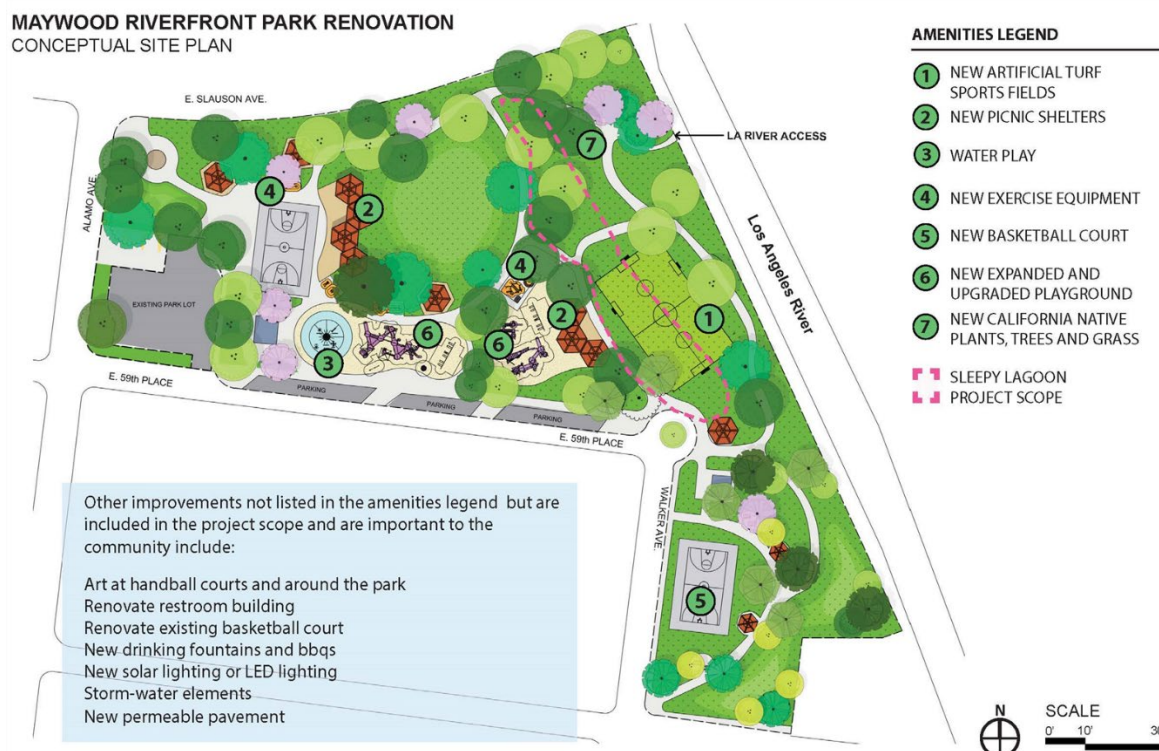
cost-effective manner was impractical to pursue despite the public interest and proximity to the Los Angeles River.



# 1 Project Background

## 1.1 Introduction

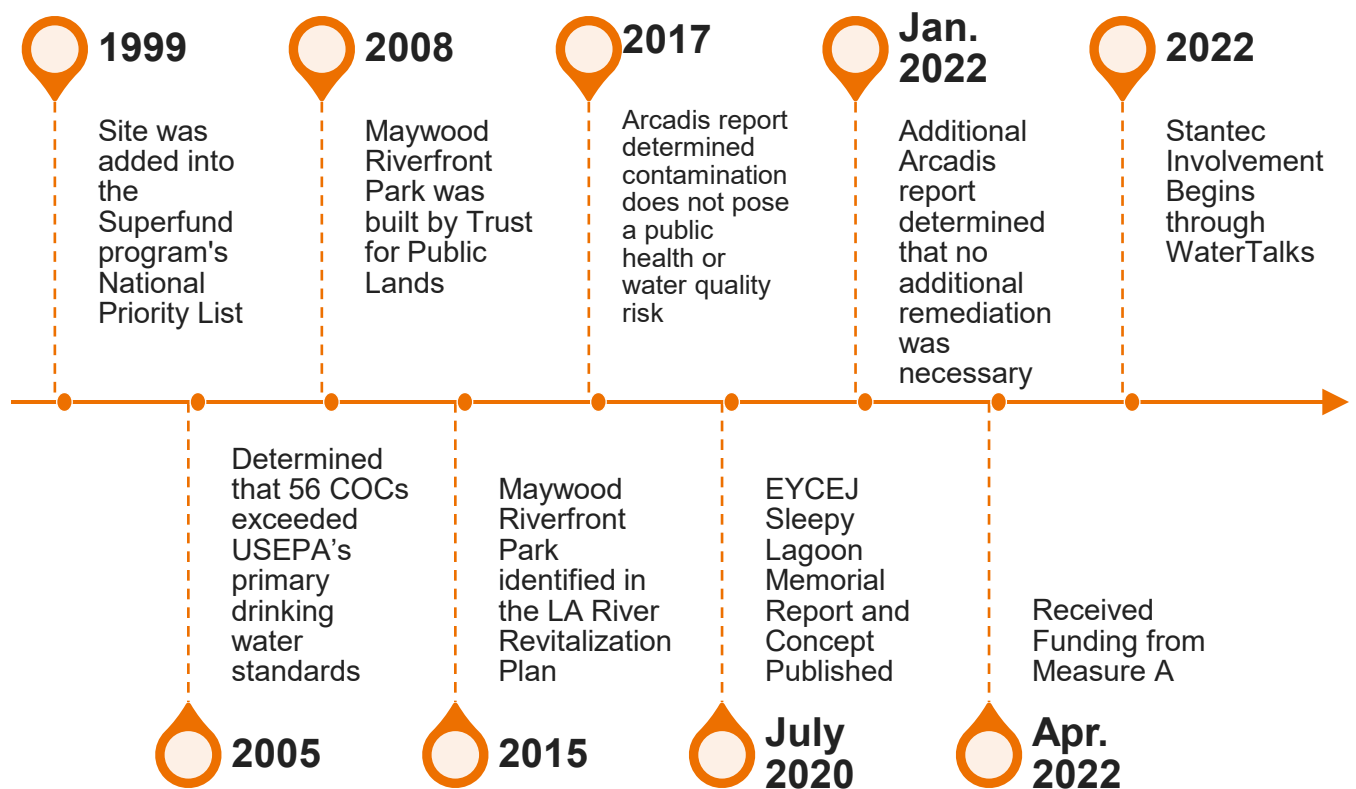
The Maywood Riverfront Park Renovation project is a community-member and community-based organization driven effort to revitalize the park for the community in the City of Maywood. Through mobilization of the project partners including the Los Angeles Neighborhood Land Trust (LANLT), Communities for a Better Environment (CBE), East Yard Communities for Environment Justice (EYCEJ), Council for Watershed Health (CWH), and Tongva cultural bearers, project components were identified via targeted engagement with the local tribal citizens, historians, residents of the City of Maywood and adjoining Southeast Los Angeles communities. These consisted of new artificial turf for sports fields, new picnic shelters, water play features, new exercise equipment, sports courts, native plant habitat and a flagship memorial to the Original Sleepy Lagoon site to recognize native and migrated peoples as shown in **Figure 1-1**. This project was also identified under the 2015 Lower LA River Revitalization Plan as a priority project for its proximity to the LA River and opportunity to enhance connectivity and local water capture and use.



**Figure 1-1. Conceptual Site Plan for Grant Submissions (Source: Los Angeles Neighborhood Land Trust)**



Among the addition of all the site amenities, community members expressed interest in developing stormwater capture elements in the park area as part of this project. Previously, a report from the EYCEJ detailing the Sleepy Lagoon Memorial Project detailed stormwater management elements through bioretention that the project sought to achieve a multi-benefit project status and to uphold EYCEJ's values of sustainable development for all stormwater and public space projects. During the progress of this project, the stormwater elements were separated from other project amenities and project funding from WaterTalks was dedicated to further evaluating the feasibility of the bioretention concept compared to other options such as diversion to sanitary sewer or infiltration into groundwater aquifers below. The project was awarded approximately \$650,000 of Measure A funding to engage in park improvements on April 5, 2022. At that point, through the WaterTalks program, the community-based organizations worked with Stantec to develop a pathway for creating a stormwater capture project through seeking alternative funding sources such as the Safe Clean Water Program or Measure W to fund the water component. The timeline in **Figure 1-2** describes the progress of the Sleepy Lagoon thus far.



**Figure 1-2. Maywood Riverfront Park Events Timeline**



Stantec's objective was to recommend the best stormwater project that would fit in the site, balance the drainage area, footprint of the project, and other infrastructure to best achieve the project proponents' multi-benefit regional and sub-regional goals. Multi-benefit regional and sub-regional goals include water quality benefits, water supply benefits, or community investment benefits. Water quality benefits include removal of critical pollutants such as zinc and E.Coli which were identified as the priority contaminants in the area. Water supply benefits constitute how much water can be captured, infiltrated or detained to replenish the groundwater aquifer below or for irrigation use on the landscaping elements. Lastly, the community investment benefits factor in whether the project can provide shade, reduce heat island effects, enhance park space, improve access to waterways and can reduce localized flooding.

## 1.2 WaterTalks

The [WaterTalks Program](#) (Disadvantaged Community and Tribal Involvement Program) is a state-funded public program that uses community involvement to recommend water-related projects prioritized based on issues of greatest concern. These include but are not limited to clean water, flood protection, drainage and vector concerns, multi-objective parks, recreation and habitats, green walkable neighborhoods and safe routes to school, and health and well-being. Within the GLAC IRWM subregion, the Maywood Riverfront Park project was identified as a top priority project by local environmental justice community-based organizations (such as EYCEJ, SPI and CBE) to meet the high-priority water needs of community members. A robust strengths and needs assessment revealed that interested parties wanted to create a project that would function as a greenspace, reflect community needs and enhance the local environment. The Maywood Riverfront Park presented an opportunity for developing a multi-benefit greenspace to enhance or restore ecosystem by using native plantings and natural best management practices and highlight the historic location of Sleepy Lagoon, a place for communities of color to use as a swimming hole or place for recreation in the 1940s.

## 1.3 Existing Site Conditions

### 1.3.1 SITE LOCATION

The site is comprised of approximately 7.8 acres, located at the northeastern corner of the intersection of Alamo Avenue and 59<sup>th</sup> Place in Maywood, California. Directly north of the site is Slauson Avenue, and directly east is the Los Angeles River. The site location is shown in **Figure 1-3**.









**Figure 1-4: Former Site Property**

### 1.3.2 CONTAMINATION ON SITE

Stantec reviewed water quality data and reports from previous sites to identify areas and contaminants of concern. Most contamination found within the shallow aquifer is the result of historical on-site usage and storage of various chemicals, as well as exposure to the nearby Pemaco Superfund site. In 2005, it was determined that over 56 contaminants of concern (COCs) exceeded the USEPA's primary drinking water



standards, including chlorinated solvents, metals, semi-volatile organic compounds, non-halogenated volatile organic compounds, and polycyclic aromatic hydrocarbons (USEPA, 2005).

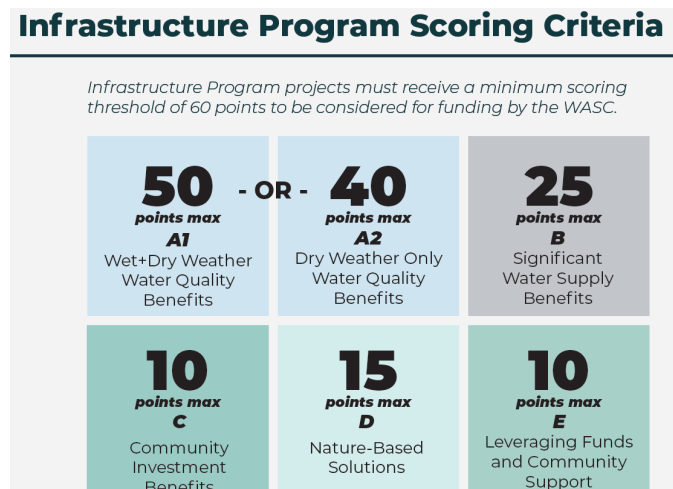
A post-remediation assessment by Arcadis demonstrated that residual COC concentrations do not pose a risk to public health or water quality (Arcadis 2017). A further investigation by Arcadis was performed in 2022 to pinpoint potential data gaps. It addressed the potential migration and residual concentrations of benzene and toluene in the eastern portion of the site, and potential residual concentrations and vapor intrusion of DCA, DCE, TCA, TCE, and PCE in the west (Arcadis 2022). This report indicated that the plumes of chlorinated VOCs within the perched aquifer in the east have not migrated further into the former W.W. Henry Property area. Although residual toluene remains in soil, the concentration and activity do not pose a threat to surrounding groundwater in the east. In the western portion of the site, TCE specifically was detected in the Exposition Aquifer A and B Zones, but data suggests that vertical and lateral migration has not occurred. These Zones have been impacted by an off-site source, however vapor intrusion assessment results indicate that no additional remediation is necessary (Arcadis 2022).

Based on prior assessments, the history of local contamination will lead to issues with infiltration at the site. **Section 3.2** will provide more detail on the possible risks of the plume spreading with infiltration.

## 1.4 Funding

The City of Maywood has limited funding for capital improvements projects, as per their operating and capital improvement budget from fiscal year 2021-2022. To receive funding for the project, the project team wanted to apply to the Safe Clean Water (SCW) Program (Measure W) for the stormwater capture project. The SCWP program generates about \$280 million per year from a parcel fee within Los Angeles County to fund multi-benefit stormwater capture projects that improve water quality, increase local water supply and benefit communities. For the Lower Los Angeles River Watershed Area, where this project is located, there is an anticipated annual return of \$12.4 million. To qualify for SCW Infrastructure Project funding, the project would need to achieve a minimum of 60 points out of 110 points through the program scoring criteria in order to be considered by a Watershed Area Steering Committee. The point breakdown is shown in **Figure 1-5** below.





**Figure 1-5: SCWP Scoring Criteria (Source: Los Angeles County's Safe Clean Water Program)**

In short, these categories include the amount of water captured in acre-feet per event or year, water quality pollutant load reduction, project total cost, community investment benefits, nature-based solutions implemented and leveraging funds and community support. A further description of the regional program funding process can be found in **Appendix A**.

After evaluating the existing work performed for Sleepy Lagoon Project evaluated in **Section 2**, alternative configurations were considered to create the best possible multi-benefit project to reduce the runoff discharge and its associated pollutants for the LA River Upper Reach 2 Watershed Management Area to comply with the Los Angeles County Municipal Separate Storm Sewer (MS4) National Pollutant Discharge Elimination System (NPDES) Permit. Typically, while projects implementing bioswales provide nature-based solution benefits in mimicking natural processes to capture water and utilizing natural materials to promote native vegetation, they do not provide as much stormwater pollutant reduction as other projects do. As a result of this, the stormwater capture component of the project pivoted to considering an infiltration gallery or diverting flows to sanitary sewer as they are more cost-effective structures that would take less footprint and coordination with existing park improvement projects.

## 2 Sleepy Lagoon Memorial Project

### 2.1 Project Description

EYCEJ, with the assistance of other community members and groups, prepared the Sleepy Lagoon Memorial project report and published it on July 22, 2020, attached as **Appendix B**. The report outlined the historical and cultural significance of the Sleepy Lagoon and the extensive community engagement utilized to develop the Maywood Riverfront Park improvement designs. The report also included a stormwater capture component which was a topic of interest in the community as a Civil Engineering Appendix. The appendix included a drainage area analysis by Carollo and a bioswale design provided by DakeLuna.







Peak flow rates and runoff volumes over the drainage area for storms ranging from a 0.75-inch to a 500-year storm are shown in **Table 2-1**. These different design storms are used to determine sizing for stormwater capture systems. Systems that are able to capture and treat flows from an 85th percentile 24-hour storm meet the SCWP's requirement to provide water quality benefits to the region.

As The Sleepy Lagoon Memorial project was looking to apply for funding from SCWP, the bioswale was designed to capture the runoff from an 85<sup>th</sup> percentile storm. It was designed to capture a 24-hour runoff volume of 2.28 acre-feet with peak flow rate of 3.80 cubic feet per second.

**Table 2-1: Peak Flow Rates and Runoff Volumes of Listed Design Storms (Source: Sleepy Lagoon Report Appendix D, Carollo Engineers)**

Design Storm	Peak Flow Rate (cfs)(1)	24-Hr Runoff Volume (ac-ft)
.75 Inch	5.4	1.9
85 Percentile	7.3	2.3
1 Year	14.7	4.0
2 Year	22.2	5.5
5 Year	40.7	40.7
10 Year	56.0	10.1
25 Year	74.3	74.3
50 Year	91.4	14.2
100 Year	111.7	16.0
500 Year	155.7	20.0

Carollo's analysis also determined the sources of the runoff in the area. The runoff mainly came from industrial zones with 40% of the runoff, roads and sidewalks with 18%, parks with 14%, residential zones with 10%, schools with 10%, and mixed use with 9% of the drainage. See **Table 2-2** for drainage zoning.

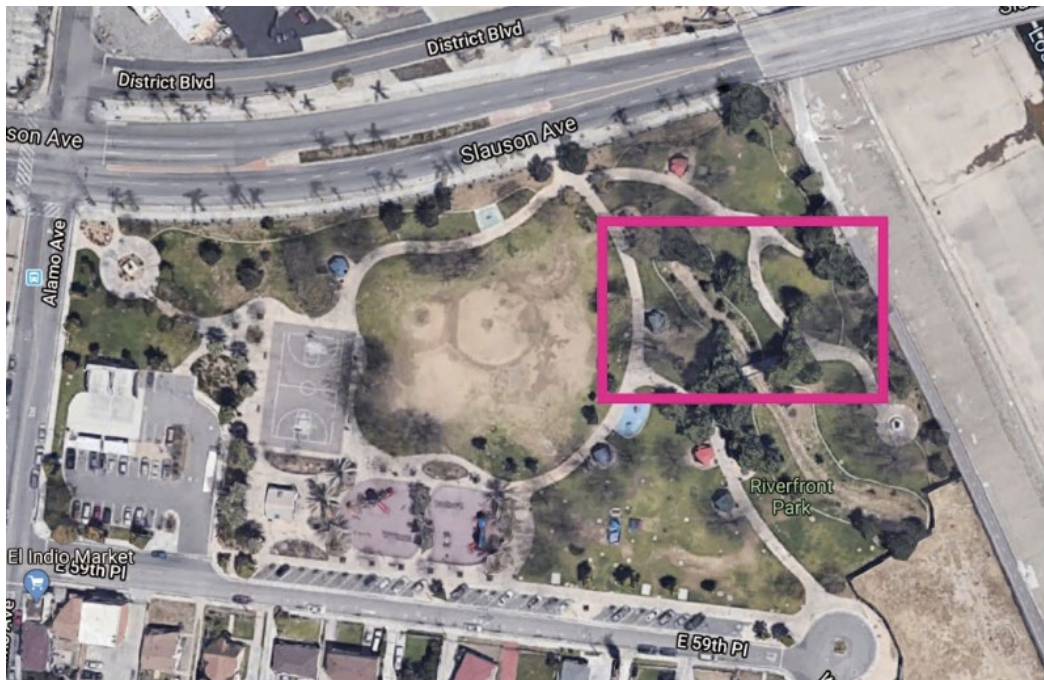
**Table 2-2: Drainage Zoning (Source: Sleepy Lagoon Report Appendix D, Carollo Engineers)**

Category(1)	Drainage Area (acres)(2)	Percentage of Drainage
Industrial	17.8	40%
Mixed Use	3.9	9%
Park	6.3	14%
Residential	4.5	10%
School	4.3	10%
Roads/Sidewalk	8.1	18%
<b>Total</b>	<b>44.8</b>	<b>100%</b>



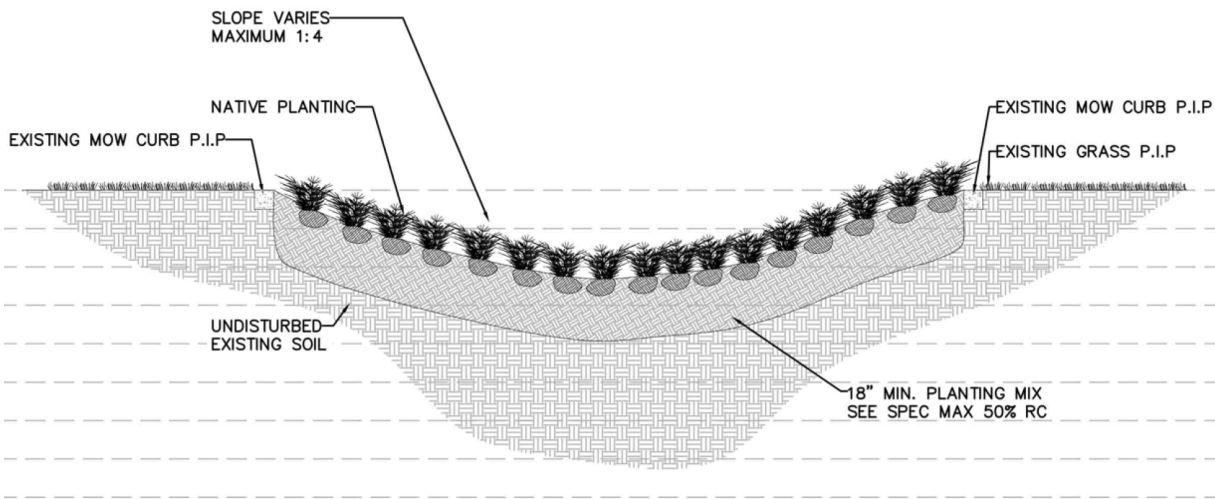
## 2.3 Bioswale Solution

The stormwater capture solution that EYCEJ began developing was a bioswale as a part of the Sleepy Lagoon Memorial project. The landscape architecture group, DakeLuna, was contracted to develop designs to improve the existing swale. DakeLuna had proposed new plantings and irrigation to revitalize the swale in the northeast corner of the Maywood Riverfront Park (**Figure 2-2**). The proposed revitalized bioswale was intended to capture dry weather and wet weather runoff from a 36-inch gravity main identified along Alamo Avenue on the Western boundary of Riverfront Park as shown on **Figure 2-1** and denoted as “Drainage Point”. The plan also proposed diversion of additional flows from catch basin at East 59<sup>th</sup> Place and Walker Avenue to the bioswale. A stormwater conduit from the bioswale would then drain to the Los Angeles River that lies to the east of the park.



**Figure 2-2: Location of Existing Swale (Source: Sleepy Lagoon Report)**

The swale features were intended to reduce run-off speed, trap entrained sediments, and screen out trash. Conceptual design for bioswale garden by DakeLuna Consultants can be seen in **Figure 2-3**.



**Figure 2-3: Proposed Concept for Bioswale Garden (Source: Sleepy Lagoon Report Appendix G, DakeLuna Consultants)**

With wet weather flows (assuming conservative infiltration rates), DakeLuna’s proposed bioswale would receive an average annual inflow or 23.9 ac-ft of water. The bioswale would have an average annual capture of 21.9 ac-ft that would contribute to regional water supply. All of these details and more can be found in **Appendix B**.

The East Yard Communities for Environment Justice (EYCEJ) had a lack of opportunity for public response during the pandemic. Prior to the WaterTalks effort, LANLT and CBE were working on a park revitalization plan separate from the EYCEJ Sleepy Lagoon study during the same timeframe. ReDesignLA combined the park revitalization plan and the Sleepy Lagoon study to facilitate a holistic vision of the park.

## 2.4 Project Evaluation

After further analysis, the bioswale would not achieve the water quality and supply benefits desired by the stakeholders to be considered a beneficial regional project. The stormwater capture component of the Sleepy Lagoon Memorial at Maywood Riverfront Park was designed to convey the water from the bioswale to the LA River. This would not provide water supply benefit for the region as it is not considered reuse. To be eligible for SCW Program funding the project would need a minimum of 60 points to be considered and without any water supply benefits, it would prove difficult to obtain this funding. To be a viable project under consideration for the City of Maywood, the project would need outside funding sources. Carollo outlined a series of other potential sources including the Municipal Program, Regional Program, Storm Water Grant Program (SWG Program), and Prop 1; however, these options are harder to receive stormwater project funding for. DakeLuna estimated that the concept would cost about \$12.4 million with approximately 420 days of construction. These costs included \$5.785M for potential stormwater diversion elements.





Additionally, issues with the contamination at the site have made it more difficult to construct in this area because of the Pemaco Superfund site where the existing swale is located. The construction of the proposed bioswale also created issues with coordination of the other planned park renovations. The coordination of the required trenching from the bioswale to the LA River would halt progress on the other park improvements that were already moving forward.

EYCEJ decided to find other possible, more beneficial stormwater solutions while continuing work on the proposed park amenities presented in the Sleepy Lagoon Memorial report. An ideal stormwater capture solution would have water quality benefits, water supply benefits, and provide beneficial use for collected water.

### **3 Maywood Riverfront Park Stormwater Capture Project Alternatives**

Considering the evaluation of the Sleepy Lagoon Project proposed in **Section 2.4**, other options for stormwater capture were evaluated by the Stantec team. These options were evaluated in order to increase cost effectiveness, minimize footprint area, and avoid coordination efforts with all park renovations.

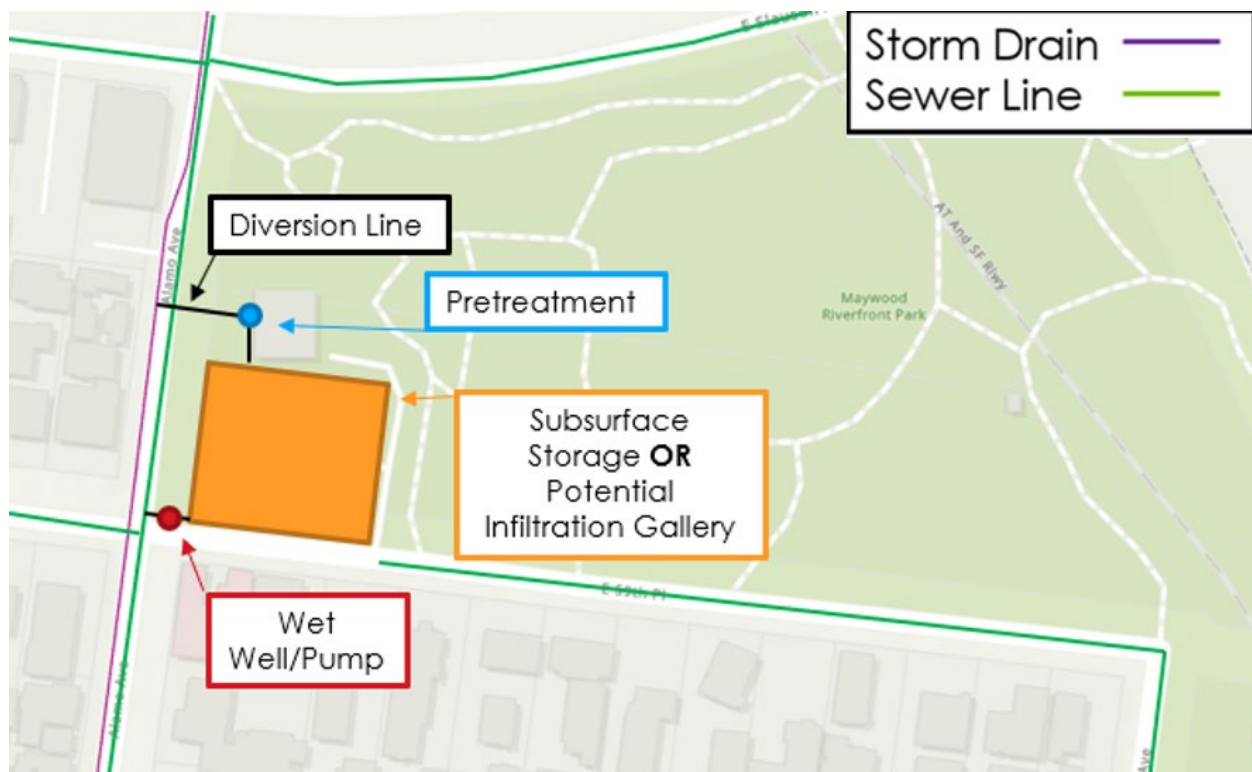
#### **3.1 Possible Solutions**

Alternative features considered for the site were adjusted configurations of a bioswale within the park, a bioretention pond, an infiltration gallery with a pretreatment unit, a detention gallery with a pretreatment unit to capture, treat and release flows into a sanitary sewer, or on-site advanced treatment and reuse of stormwater for park irrigation. Bioswales and bioretention ponds in the park were assumed to take up a large footprint to capture the entire 85<sup>th</sup> percentile, 24-hour storm and require a continuous water supply to be fully operational. In addition, these surface level solutions would introduce more considerations for vector minimization, planting plans and maintenance, introduction of new soil media and other limitations. As a result, these sets of options were phased out entirely.

For the on-site advanced treatment and reuse of stormwater for park irrigation option, the stormwater used for irrigation would have to adhere to State and Regional Water Quality Standards as well as comply with the county permitting procedures. Namely, this is the Title 22 Disinfected Tertiary Standards which involves a demonstration of filtration processes, disinfection processes and a compliance target for fecal coliform bacteria growth. This option proved to be very cost prohibitive for the City of Maywood due to extensive operation and maintenance requirements including but not limited to filter replacements, chemical hazard handling, UV bulb replacements and regular pump maintenance. Additionally, there are monitoring and reporting requirements to show demonstration of compliance to the Title 22 Standards by preparation of an annual engineering report and conducting sampling and laboratory testing at a minimum of three times a year.



For these reasons, the two preferable options were the below grade stormwater features which included either a subsurface infiltration gallery to replenish the groundwater below or a detention basin that will divert stormwater flows to the sanitary sewer for water reuse downstream. **Figure 3-1** depicts a schematic that shows a subsurface stormwater feature located in the parking lot to minimize disruption of other park improvements and reduce cost in diversion piping. Both options require a pretreatment unit in order to extend the life of the stormwater capture facility downstream, either the infiltration gallery or detention basin. These units can include Continuous Deflective Separators (CDS) units or Nutrient Separating Baffle Boxes (NSBB) which can remove up to 100% of trash capture for the design storm and effectively remove 80% or more of sediments and hydrocarbon from diverted flows. Depending on if the system will infiltrate or divert to the sanitary sewer, the end of the process will either infiltrate to the groundwater aquifers below or require a wet well to pump pressurized flows into the City of Maywood's Sewer System and subsequently, into the LA County Sanitation District's network.



**Figure 3-1: Subsurface infiltration gallery or detention basin for sewer diversion conceptual schematic**

For the infiltration gallery, the project must consider impacts infiltrating stormwater has on the flow characteristics of the underlying shallow groundwater as it contains dissolved contaminants. A mounding study is required to understand if the insertion of treated stormwater would migrate existing groundwater plumes to adjacent properties. For the diversion to sanitary sewer option, it is critical to understand the existing City sewer's capacity and the cost to divert flows into the County's Sanitary Sewer as that incurs an additional operating cost yearly. The following sections will discuss these items further.

## 3.2 Infiltration Gallery Option

An infiltration gallery has to consider the location of and potential movement of the underlying contaminant plume on the site. There needs to be an understanding on how groundwater mounding will move existing contaminants around and change responsibilities of overlying property owners.

### 3.2.1 MOUNDING ANALYSIS

An analytical model was performed to assess the spatiotemporal effects of infiltrating treated stormwater into a surficial perched aquifer. The existence of a localized shallow groundwater contamination of Trichloroethene (TCE) and the presence of the Pemaco Superfund site within the park limits require the Regional Water Quality Control Board (RWQCB) to understand the movement of groundwater plumes in terms of distance and direction throughout different timescales.

The model was developed in Aquifer Test Pro and used conservatively high geologic parameters were used to simulate the worst-case scenario. This analysis was run over the course of a year and completed four model runs representing low and high infiltration rate for a smaller footprint of 0.28 acres and a larger one of 0.56 acres. The infiltration rates were determined from LA County's lowest allowable infiltration rate for a stormwater infiltration project value of 0.3 in/hr and the United States Department of Agriculture Web Soil Survey's determined value for the project location of 3.8 in/hr. These are demonstrated in the model run results shown in **Table 3-1**. All options would infiltrate the complete 85<sup>th</sup> percentile, 24-hour storm volume of 2.28 ac-ft.

**Table 3-1: Analytical Model Run Results**

	Recharge Area (ac)	FS of 3 Design Infiltration Rate (in/hr)	Infiltration Time (days)	Approx. Radius of Maximum Mound Extent (ft)	Increase of GW Level at Pemaco Site Boundary (ft)	Time for Mound Extent to Reach Plume Edge (days)	Time for Mound Extent to Dissipate (days)
Large Footprint1	0.56	3.78	0.54	638	0.31	12	306
Large Footprint2	0.56	0.31	6.60	638	0.30	146	>365
Small Footprint1	0.28	3.78	1.08	610	0.30	13	299
Small Footprint2	0.28	0.31	13.20	~565	0.25	167	>365

The results indicate that the maximum mound height (increase in height of water table directly below the stormwater infiltration gallery) in each scenario was approximately 21 feet. Due to the mounding, there will be an additional 15 feet of horizontal groundwater spread due to an increase of groundwater velocity of nearly half a foot per day as a result of the mounding. Overall, this would push the plume southeast of the Pemaco site and onto adjacent property owners. Note that the existing contaminant plumes are noted



to be stable from existing reports and the characteristics of the underlying clay would reduce the anticipated effect of mounding.

Upon informing the RWQCB of these analytical mounding results, they noted that further numerical mounding is needed although none of the scenarios would cause a mound large enough to impact the ground surface. This analysis would require approximately \$60,000 and a three-month long effort to characterize the spatial distribution and concentrations of contaminants, inform the bearing od direction of the plume movement southeastward and would consider the effects of the geologic features including aquifer thickness, permeable openings in the clay layers or clay elevation values. More information on the mounding study can be found in **Appendix C**.

### **3.2.2 RECOMMENDATION**

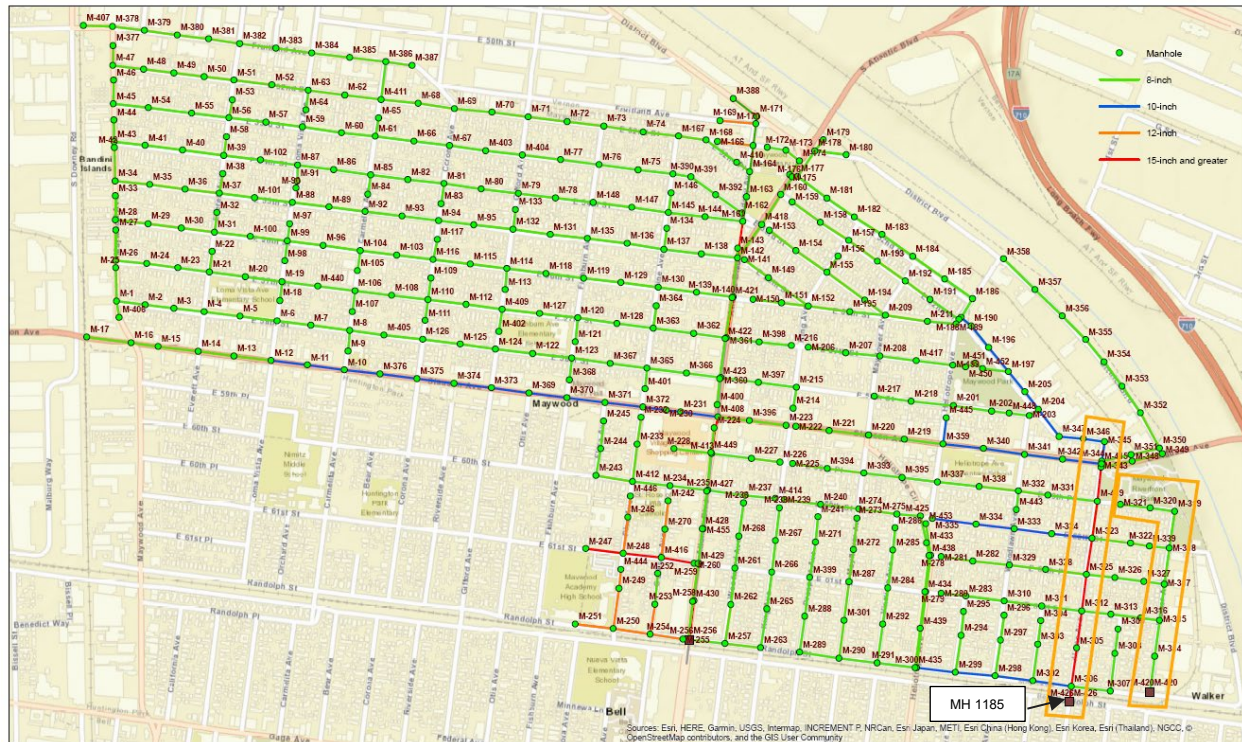
Based on the results, infiltration was not recommended because intensive coordination with the RWQCB and the Department of Toxic Substances and Control (DTSC) would be needed to determine the exact impacts of contaminant plume movements. It also may implicate the City and the project team in responsibility for the contaminant plume in perpetuity and remove responsibility from the original polluting companies. The RWQCB informed the project team that at the WW Henry Site contains contaminants other than TCE, which complicates the groundwater mounding issue. As a result, infiltration would only be deemed feasible after an in-depth geotechnical study with percolation testing. This would prove to be risky as there is a chance that after a significant investment the project would be deemed infeasible.

## **3.3 Diversion to Sanitary Sewer**

To divert any flows to the sewer, it must be confirmed that there is capacity in the existing City's sewer. Additionally, the City must pay an additional operating cost to the LA County Sanitation District (LACSD) to divert flows from the city's sewer into the main county system. This cost is calculated using the influent water quality and amount of water diverted.

Based on the City's provided sewer line network, there are two sewer lines available near Maywood Riverfront Park; a 15-inch sewer line underneath Alamo Avenue connected into the LA County Sanitation District's sewer network and an 8-inch sewer line along 59<sup>th</sup> Place and Walker Avenue that connects into the City of Bell's sewer network. These are shown as orange boxes in **Figure 3-3**. The 15-inch sewer line along Alamo Avenue was selected for diversion because it is nearly double the size of the line along 59<sup>th</sup> Place and Walker Avenue. It also does not require any additional coordination with the City of Bell as it directly flows into the LACSD's Wilcox Avenue Trunk Sewer at the intersection of Randolph and Alamo.



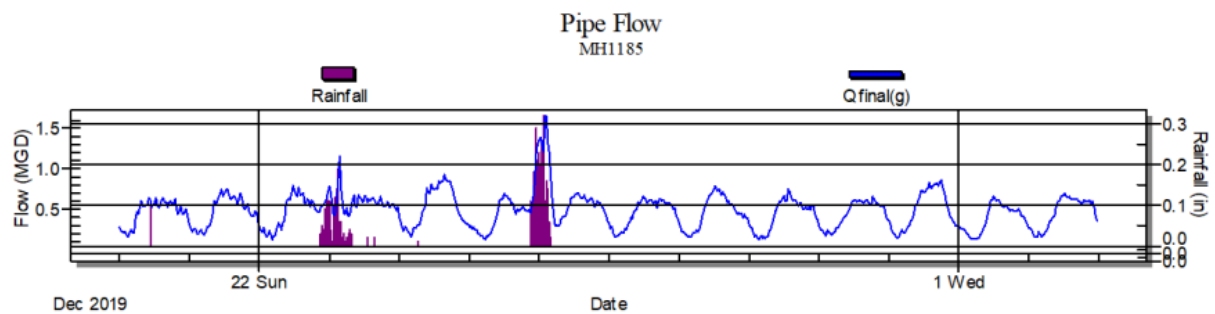


**Figure 3-2: City of Maywood Sewer Network (Source: City of Maywood – Wet Weather Sewer Flow Monitoring and Model Calibration Technical Memorandum)**

### 3.3.1 SEWER CAPACITY REVIEW FOR CITY OF MAYWOOD

To determine the sewer capacity for the City of Maywood, Stantec reviewed sewer connection and sub-basin data, as well as analysis of flow conditions and wet weather flow modeling. Among the documents reviewed were the 2019 Sewer System Hydraulic Model and the 2020 Wet Weather Sewer Flow Monitoring and Model Calibration which are attached in **Appendix D**.

While the City does not have a combined sewer system, it is important to still examine wet weather conditions as there may be inflow through manholes or illegal connections, as opposed to infiltration from the soil into pipelines. **Figure 3-3** below shows instances of rainfall that correlate with spikes in the sewer flowrates indicating that there are additional flows entering the sewer during rainfall events. MH1185 is the maintenance hole directly prior to discharge into LACSD's Wilcox Avenue Trunk Sewer from Alamo Ave.

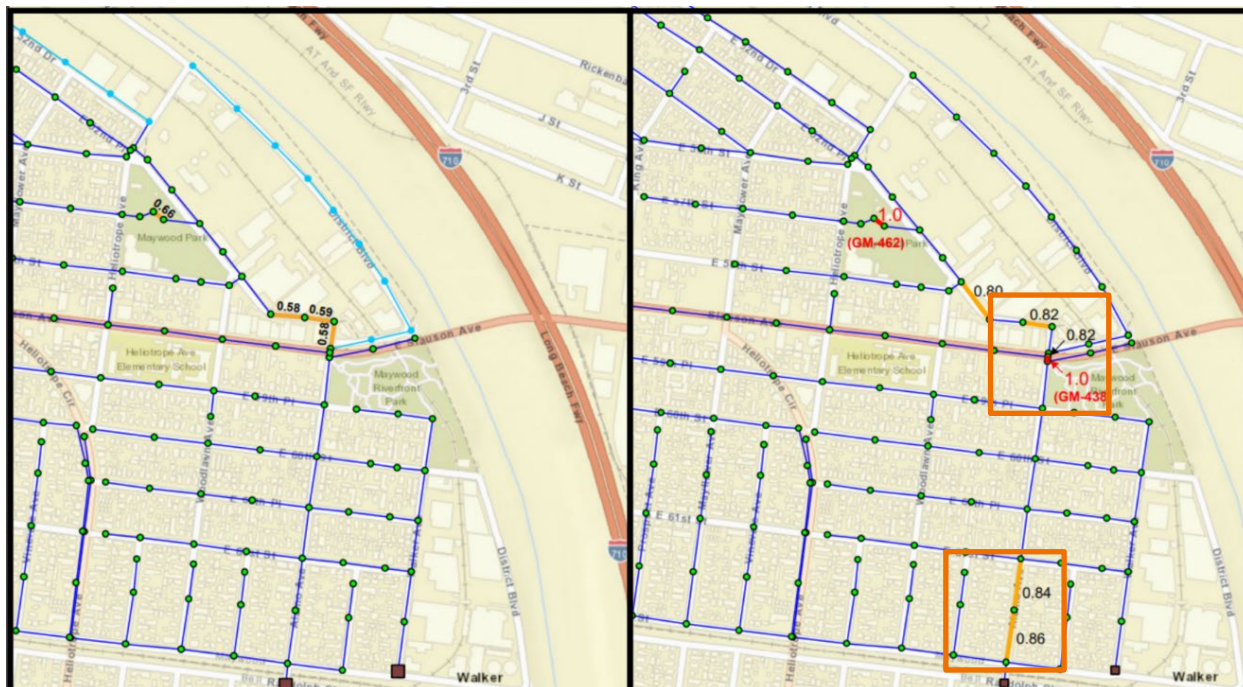


**Figure 3-3. Wet Weather Sewer Flows (Source: City of Maywood – Wet Weather Sewer Flow Monitoring and Model Calibration Technical Memorandum)**

The metric for defining pipe capacities under certain conditions is the depth over diameter ( $d/D$ ), where the ratio compares the depth of flow in the pipe compared to a diameter in the pipe. In the 2019 study,  $d/D$  values greater than 0.50 for pipes 12" and smaller and 0.75 for pipes 15" and larger were flagged. These areas were flagged so that the 2020 wet weather study could confirm or deny that during peak wet weather flow (PWWF), there is sufficient capacity for the flows. Note that under PWWF conditions, a  $d/D$  value under 0.90 is considered adequate for existing pipelines.

The  $d/D$  values are shown for typical conditions and peak wet weather flow (PWWF) conditions under **Figure 3-4**. The figure shows two main areas of concern in the PWWF conditions.





**Figure 3-4. d/D ratios for typical flow conditions (left) and Peak Wet Weather Flow conditions (right) (Sources: City of Maywood Sewer System Hydraulic Model and City of Maywood – Wet Weather Sewer Flow Monitoring and Model Calibration Technical Memorandum)**

In the typical flow conditions analysis (2019), the 10-inch stretch of pipe immediately upstream of the intersection of Slauson Avenue and Alamo Avenue along 52<sup>nd</sup> Place was flagged with having a d/D of 0.58 to 0.59. In the 2020 wet weather flow study, this same location did not see a d/D greater than 0.90, see **Figure 3-4**; therefore, this area did not pose issues to sewer diversion.

For peak wet weather flow conditions, the Alamo sewer line has some points of concern from Randolph Street in the south up to the Slauson Avenue to the north. A critical junction where the pipeline is overwhelmed is at manhole GM-438 in Slauson Avenue and Alamo Avenue where the d/D ratio is 1. Wet weather flows diverted to a detention basin here could alleviate this reduced pipe capacity upstream and the orange portions of the sewer line downstream. These flows would remain in the detention basin until wet weather flows subsided and then would be diverted into the sewer once sewer capacity reduced back to the levels seen in the left image of **Figure 3-4**.

As per LACSD requirements, the project would only divert the captured wet weather flows from the 85<sup>th</sup> percentile storm during typical/dry weather conditions and not during wet weather events. Diverting during a storm even may cause the system to be overwhelmed as there may be additional infiltration from surrounding soils and inflow through manholes or illegal connections. Therefore, there would be no issues with diverting flows to the City's sewer systems during typical flow conditions (**Figure 3-4**, left).

### 3.3.2 PRELIMINARY COST ESTIMATE

After confirming with engineers contracted with the City of Maywood that treated stormwater flows could be introduced into their system, there had to be a detailed cost estimate, shown in **Table 3-2** below, to confirm whether a stormwater detention basin would be more economical than a bioswale project. Again, as opposed to the Sleepy Lagoon bioswale project, this underground detention basin is isolated to the parking lot and part of the handball courts. It does not consider any of the landscaping replacements, artwork or irrigation elements and focuses solely on engineering costs related to the project.

**Table 3-2. Estimate Project Construction Costs**

Maywood Riverfront Park Estimated Construction Costs					
Item	Description	Qty	Unit	Unit Cost	Total
<b>Administration</b>					
1	Mobilization / Demobilization (10%)	1	LS	10%	\$288,060
2	SWPPP Implementation (1%)	1	LS	1%	\$28,806
3	Permitting	1	LS	\$100,000.00	\$100,000
4	Traffic Control Plans - 59th Place	1	LS	\$10,000.00	\$10,000
5	Traffic Control Plans - Alamo Ave	1	LS	\$10,000.00	\$10,000
Subtotal Administration:					\$436,866
<b>Alamo Avenue</b>					
6	Demo Curb & 2' Gutter	200	LF	\$35.00	\$7,000
7	Demo Exist Sidewalk	500	SF	\$6.00	\$3,000
8	R&R Signs	2	EA	\$750.00	\$1,500
9	Construct Wheelchair Ramps	1	EA	\$6,000.00	\$6,000
10	Construct New Sidewalk	500	SF	\$10.00	\$5,000
11	Adjust to grade Catch Basins	1	EA	\$7,500.00	\$7,500
Subtotal Bay View Avenue:					\$30,000
<b>Onsite</b>					
12	Demo Asphalt Parking Lot	11250	SF	\$ 6.00	\$67,500
13	Demo Curb in Parking Lot	600	LF	\$ 30.00	\$18,000
14	Demo On-Site Concrete	2000	SF	\$ 6.00	\$12,000
15	Relocate (5) Existing Trees	1	LS	\$ 35,000.00	\$35,000
16	Install Parking Lot Landscaping	750	SF	\$ 20.00	\$15,000
17	Install Asphalt in Parking Lot	9000	SF	\$ 22.00	\$198,000
18	Construct Inline Storm Drain Diversion Structure	1	LS	\$ 60,000.00	\$60,000
19	Construct 4 cfs Hydrodynamic Separator	1	LS	\$ 90,000.00	\$90,000
20	Construct Wet Well/Pump Station and Isolation Valve Vault	1	LS	\$ 250,000.00	\$250,000
21	Construct Detention Tank (2.3 AF)	1	LS	\$ 1,320,000.00	\$1,320,000
22	Drawdown Pump Facility to Sewer	1	LS	\$ 350,000.00	\$350,000
23	Construct 24-inch Overflow Line to Catch Basin	60	LF	\$ 85.00	\$5,100
24	Construct Overflow Connection to Existing Catch Basin	1	LS	\$ 5,000.00	\$5,000
25	Reinstall On-site Drainage System	1	LS	\$ 75,000.00	\$75,000
26	Remove and replace lighting	1	LS	\$ 50,000.00	\$50,000
27	Electrical and SCADA	1	LS	\$ 300,000.00	\$300,000
Subtotal Onsite:					\$2,850,600
Total Administration					\$436,866
Total Alamo Avenue					\$30,000
Total Onsite					\$2,850,600
Subtotal Direct Construction Costs (Rounded Up):					\$3,317,466
5% Contingency:					\$ 165,873
Subtotal Construction Costs plus Contingency (Rounded Up):					\$3,483,000
	Project Delivery (Consultant Design & CM Services)	1	L	20%	\$ 696,600
Grand Total (Rounded Up):					\$4,179,600

In addition to the capital construction costs, operations and maintenance costs are a critical component to the project. While the Safe Clean Water Program and other funding programs would cover a majority or





all the capital construction cost, there are limitations to operations and maintenance coverage over the project lifetime. General costs applied every year to make sure the project has continued success for 30 to 50 years are shown in **Table 3-3**.

Per LACSD surcharge forms, any rainwater or stormwater accepted into the public sewer system from any area larger than 400 square feet is considered industrial wastewater and regulated as such.

LACSD also would need a \$50,000 payment for the analysis of county sewer capacity for the proposed diverted flows (there is potential to receive money back depending on analysis costs). The tasks are expected to take 12 weeks from the receipt of deposit.

Additionally, to connect to the LACSD network, the project owner must contribute to the Wastewater Treatment Surcharge Program to cover wastewater collection, treatment, and disposal services. Since the flow of the project is greater than 6 million gallons, the long form wastewater treatment surcharge statement for Fiscal Year 2021 to 2022 was used. Based on **Table 3-4**, the combined cost of the annual operations and maintenance and the LACSD Wastewater Treatment Annual Surcharge is roughly \$110,000 annually.



**Table 3-3. Annual Operations and Maintenance Preliminary Cost Estimates**

Annual Operations and Maintenance Preliminary Cost Estimate						
Description	Crew Size	Times per year	Crew Rate	Time (hours)	Equipment Rate	Total
Common Maintenance Items						
Vacuum Truck Rental	-	6	-	-	\$1,000.00	\$6,000
Subtotal Common Maintenance Items:						\$6,000
Diversion Catch Basin						
Inspection	1	8	\$125.00	2	-	\$2,000
Cleaning	2	8	\$250.00	3	-	\$5,000
Subtotal Diversion Catch Basin:						\$7,000
Storm Drain Diversion Structure						
Inspection	1	8	\$125.00	2	-	\$2,000
Cleaning	2	8	\$250.00	3	-	\$5,000
Subtotal Diversion Structure:						\$7,000
Hydrodynamic Separator						
Inspection	1	8	\$125.00	4	-	\$2,000
Cleaning	2	1	\$250.00	4	-	\$1,000
Vacuum Wash	-	1	-	-	\$1,500.00	\$1,500
Oil Sorbent Replacement	-	1	-	-	\$1,200.00	\$1,200
Subtotal Hydrodynamic Separator:						\$4,700
Underground Detention Tank						
Inspection	1	8	\$125.00	6	-	\$6,000
Cleaning	2	1	\$250.00	8	-	\$2,000
Subtotal Underground Detention Tank:						\$8,000
Wet Well and Pump						
Inspection	1	8	\$125.00	2	-	\$2,000
Cleaning	2	4	\$250.00	4	-	\$4,000
Electrical Usage	-	12	-	-	\$300.00	\$3,600.00
Valve Maintenance	-	1	-	-	\$1,000.00	\$1,000.00
Control Panel Maintenance	-	1	-	-	\$1,000.00	\$1,000.00
Wet Well Pump and Motor Replacement (2)	-	1/20	-	-	\$150,000.00	\$7,500.00
Storm Drain, Sewer and Irrigation Pump Replacement (2)	-	1/20	-	-	\$25,000.00	\$1,250.00
Subtotal Wet Well and Pump:						\$20,350
<b>TOTAL:</b>						<b>\$53,050</b>



**Table 3-4. LACSD Wastewater Treatment Annual Surcharge**

	Total Yearly Wastewater Quantities	Wastewater Quantities After Pretreatment	Rate	Cost
Flow Volume (Millions of Gallons)	7.15	7.15	\$ 923.00	\$ 6,599.45
Chemical Oxygen Demand (Thousands of lbs)	237.05	144.60	\$ 163.00	\$ 23,569.88
Suspended Solids (Thousands of lbs)	286.95	57.39	\$ 461.10	\$ 26,462.53
Total				\$ 56,631.86

## 4 Concluding Recommendations

Although Maywood Riverfront Park has a large footprint of nearly 8 acres, is adjacent to the LA River, and has plans to renovate existing open spaces based on authentic and thorough community input, it is not recommended that the project team pursue regional or subregional stormwater management due to technical, regulatory, and financial challenges.

The project team and Stantec explored multiple options that resulted in barriers difficult to overcome.

- Bioswale: issues with cost, contamination, and coordination with the park renovation.
- Infiltration Gallery: issues with the contaminated groundwater plume and underlying soils of the site that continued infiltration during wet weather would exacerbate.
  - To proceed with this option, there would need to be increased coordination with agency partners, a numerical groundwater mounding analysis and a detailed soil management plan to make sure the project is feasible. Note: These additional costs may lead to the discovery that the project is not feasible or requires more operation and maintenance than for similar projects than the City can provide.
- Diversion to sanitary sewer option: the sewer capacities in the City are feasible for diversion during typical flow conditions, however, the City was concerned for providing high O&M costs for a project that does not generate water supply benefit as their budget is very limited. Assuming a project longevity of 30 years, it is difficult for the City to justify a \$110,000 annual fee for a stormwater project that does not address a significant portion of their compliance targets as a Permittee of the 2021 Municipal Separate Storm Sewer System (MS4) Permit.



While a regional or subregional stormwater management solution within Maywood Riverfront Park may not be feasible to implement, there are opportunities to capture stormwater that falls onsite on the park to provide community enhancements and reduce heat island effect. These on-site interventions may provide limited on-site water supply and improved water quality benefit but can improve the landscape of the park and reduce localized flooding within the area.



## **Appendix A. Safe Clean Water Program**



## Appendix B. Sleepy Lagoon Report



## **Appendix C. Analytical Groundwater Mounding Analysis**



## **Appendix D. City of Maywood Sewer System Capacity Documents**

