

# Regional Pathogen Reduction Study

Scientific Studies Program  
Fiscal Year 2022-2023

Central Santa Monica Bay Watershed Area, Lower LA River Watershed Area, Lower San Gabriel Watershed Area, North Santa Monica Bay Watershed Area, Rio Hondo Watershed Area, Santa Clara River Watershed Area, South Santa Monica Bay Watershed Area, Upper LA River Watershed Area, and Upper San Gabriel River Watershed Area

Project Lead: Gateway Water Management Authority  
Presenter: Richard Watson



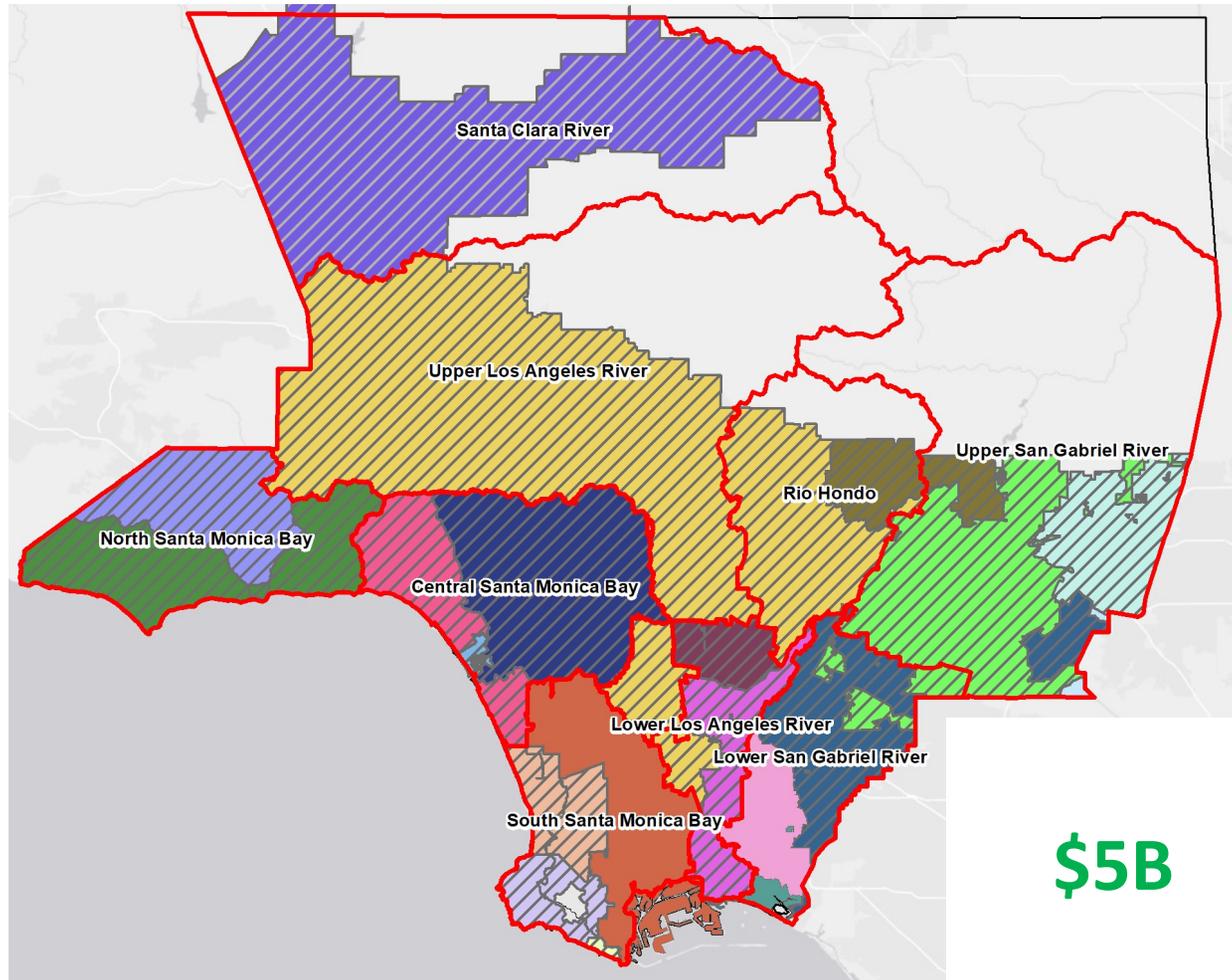
# Study Overview

- This Study aims to use the latest available science to measure water-borne pathogens across watersheds. It will help identify key sources of human health risk, and develop cost-effective protective strategies
- Nexus to Stormwater and Urban Runoff Capture and Pollution Reduction
  - Study will facilitate improved targeting of pathogen sources and water to capture and/or treat
  - Study may reduce the level of stormwater capture for bacteria compliance purposes through the identification of non-MS4 sources of risk thereby improving the protection of human health
  - Study will likely lead to partnering with various parties, such as wastewater agencies and homeless services agencies, to address human sources of pathogens.





# Study Location





## Study Details

### *Problem Statement:*

- Waterborne pathogens represent the most significant potential threat to the health of people recreating in and around the ocean and inland waters of Los Angeles County.
- Current standards are based on FIB (fecal indicator bacteria), which are used as proxies for pathogens.
  - FIB are ubiquitous; a vast network of structural control measures would need to be implemented to provide adequate control – projected cost over \$5 billion.
  - USEPA and academia agree that human sources of pathogens pose the greatest risk
  - Unless high-risk sources are targeted, water capture projects may receive large FIB loads, but miss the highest risk human sources.

(Continued)



## Scientific Study Details (Continued)

### *Methodology:*

- Study work plan will be developed through a stakeholder-led process with the input of technical experts, including academics.
  - Stakeholder engagement is at the forefront of the study to ensure that diverse viewpoints are incorporated.
- Study will collect samples from beaches and waterbodies. Samples will be analyzed for traditional bacterial indicators, viruses, and human markers during wet and dry weather.
  - Identify areas with highest risk to support a focus on those areas
  - Identify the sources causing the highest risk to focus on those sources
- Study will assess control measure effectiveness and efficiency
  - Identify the best BMPs to address the sources
  - Support planning, applying municipal funds, requests for SCWP funding, and actions by other parties

(Continued)



## Scientific Study Details (Continued)

- *Regional collaboration efforts:*
  - Small Group Initiated Discussions and built a scope for a Safe, Clean Water Regional Program project
  - Presented Approach to E/WMP Groups
  - Discussed with proponents of watershed-specific studies
  - Discussed with Regional Board staff
- Revised study twice to address concerns
  - Clearly focused on human pathogens
  - Clarified that study is a component of overall strategy to protect human health
  - Clarified that implementation continues during the study
  - Recognized that we do not need to wait until the end of the study to take action
  - Reduced first year cost of study



## Recent Revisions to Regional Pathogen Summary

- Added North Santa Monica Bay back into study
- Added an illustrative overview in Attachments (for Section 2.3)
- Added a Details Attachment (for Section 2.4)
- Attachments include a fact sheet, a table of potential constituents, and a map of potential monitoring sites
- Clarified that focus is on urbanized areas
- Clarified that monitoring sites would be chosen from MS4 monitoring sites.



## Cost & Schedule

Phase	Description	Cost	Schedule
Task 1	Stakeholder Process	\$490,000	7/22 – 6/27
Task 2	Health Risk Assessment	\$5,880,000	7/22 – 9/26
Task 3	Risk Management	\$1,734,600	4/23 – 3/27
Task 4	Application of Study Findings	\$490,000	1/26 – 6/27
<b>TOTAL</b>		<b>\$8,594,600</b>	



# Funding Request

WASC	Year 1	Year 2	Year 3	Year 4	Year 5
CSMB	\$47,109.15	\$329,764.06	\$282,654.91	\$307,364.38	\$107,432.50
LLAR	\$33,843.21	\$236,902.50	\$203,059.29	\$220,810.57	\$77,179.51
LSGR	\$44,169.54	\$309,186.78	\$265,017.24	\$288,184.85	\$100,728.71
NSMB	\$4,748.60	\$33,240.22	\$28,491.61	\$30,982.33	10,829.20
RH	\$30,413.67	\$212,895.68	\$182,482.01	\$198,434.45	\$69,358.42
SCR	\$15,866.36	\$111,064.53	\$95,198.17	\$103,520.32	\$36,183.27
SSMB	\$48,654.33	\$340,580.32	\$291,925.99	\$317,445.93	\$110,956.29
ULAR	\$102,094.95	\$714,664.67	\$612,569.72	\$666,120.09	\$232,827.71
USGR	\$49,973.39	\$349,813.71	\$299,840.33	\$326,052.14	\$113,964.40
<b>TOTAL</b>	<b>\$376,873.21</b>	<b>\$2,638,112.47</b>	<b>\$2,261,239.26</b>	<b>\$2,458,915.06</b>	<b>\$859,460.00</b>



## Summary of Benefits

- By developing a better understanding of pathogens present in the region's watersheds, the relative risk to human health they pose, and the effectiveness of various control measures, new or adapted BMPs can be established that improve water quality and reduce human health risks at our beaches and inland waterbodies.
- Short-term: results could be used to protect people from health risks that aren't currently known.
- Long-term: results will enable the targeted placement of BMPs in locations where they can maximize the prevention or treatment of key sources of human pathogens.



**Questions?**



# Community-Centered Optimization of Nature-Based BMPs Starting with the Gaffey Nature Center Facility

Scientific Studies Program

Fiscal Year 2022-2023

All Watersheds

SEITec

Shahriar Eftekharzadeh, PhD, PE



# Study Overview

## Biofiltration BMP Optimization

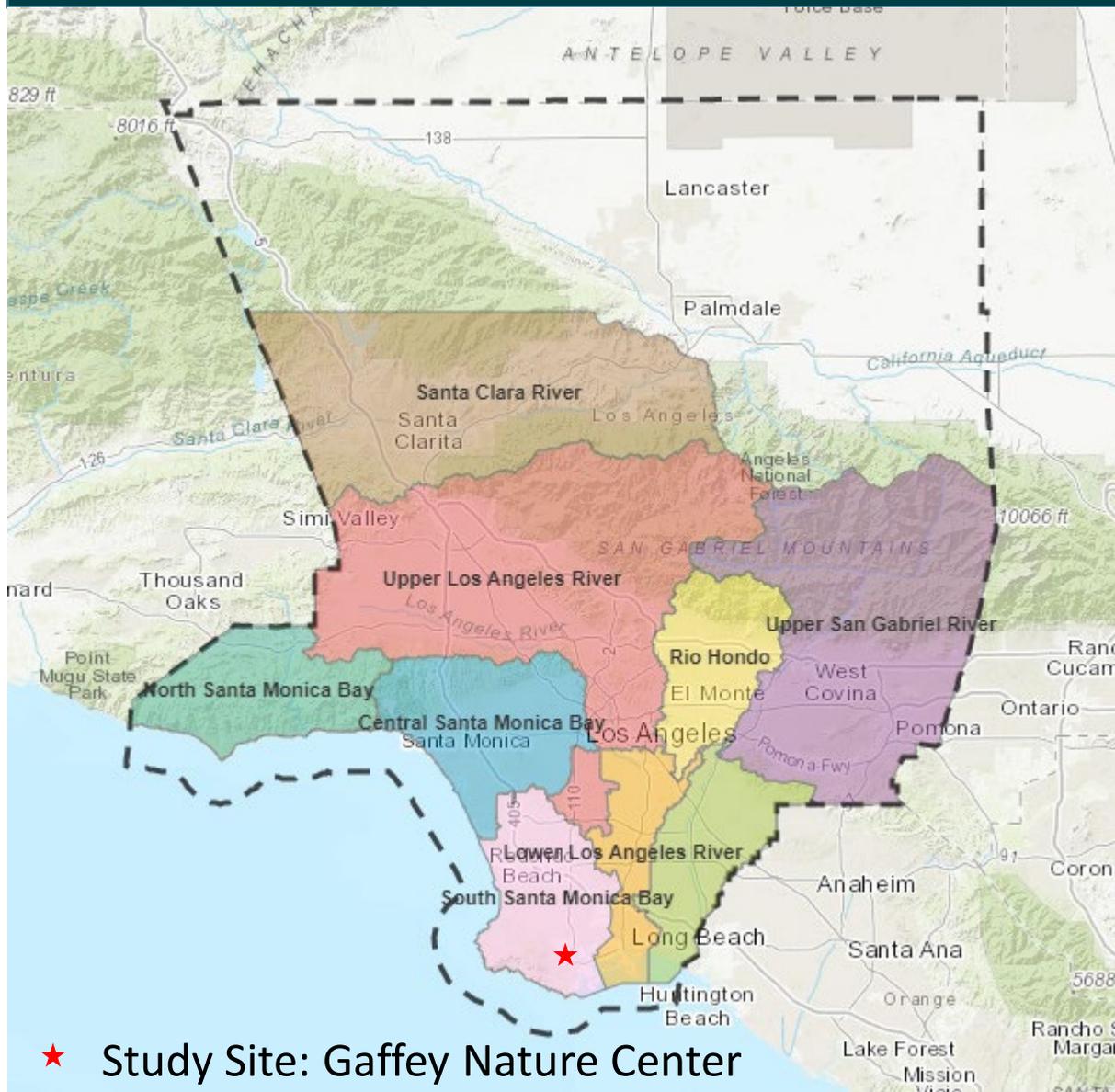
This study aims to optimize:

1. plant varieties and species, and
2. the design, construction, and O&M of nature-based biofiltration BMPs, with special focus on the community.





# Study Location



**Study Location:** The “Gaffey Nature Center” in San Pedro, a purposely built facility to study nature-based stormwater BMPs.

**Study Benefits:** This study will benefit the implementation of nature-based stormwater BMPs in **ALL watersheds.**



# Study Location – The Gaffey Nature Center

- 3.1-acre site at N. Gaffey St. and 110-FWY in San Pedro, CA
- Land leased to LASAN for BMP education and research
- Construction work completed in September 2021

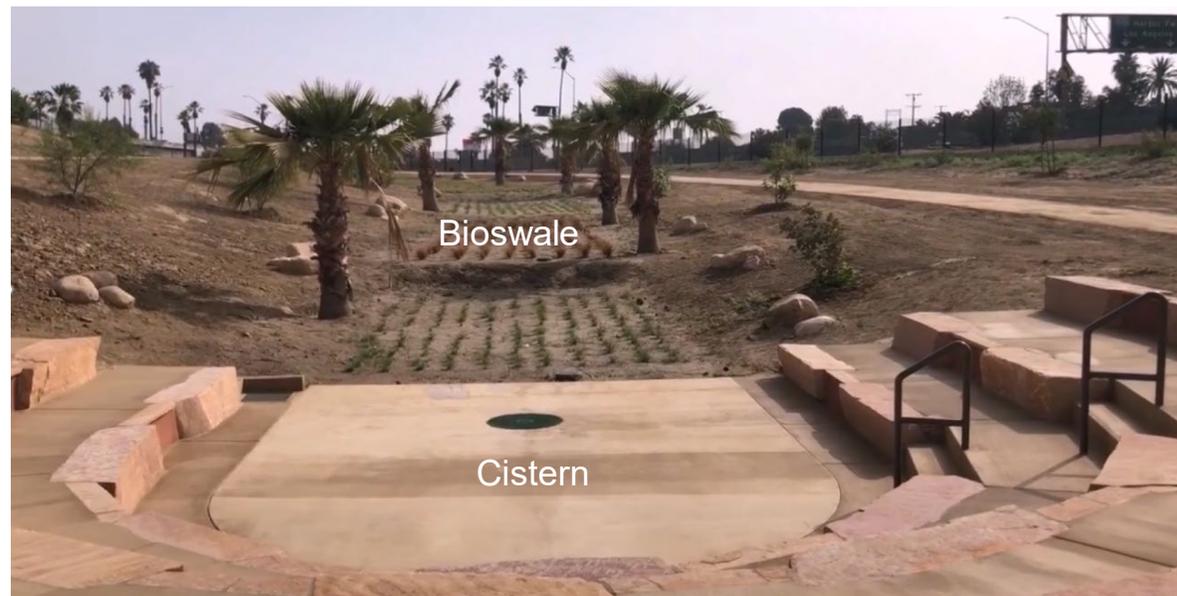




# The Gaffey Nature Center

## Site incorporates

- City's first vertical cistern, now in several SCW projects
- Central hydroponic bioswale on laser-leveled basins
- Diverse variety of CA-native plants for nature-based BMPs





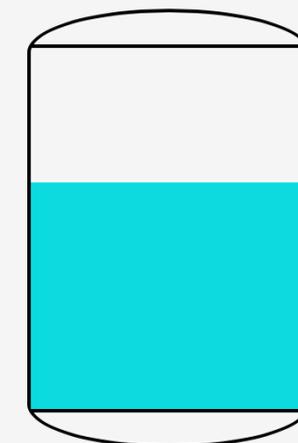
# The Gaffey Nature Center

## Site incorporates

- Solar powered pumps and recirculation system
- Internet connectivity
- Infrastructure for instrumentation and remote sensing



110-Gaffey WaterSilo



7.52  
feet



# The Gaffey Nature Center

## Site incorporates

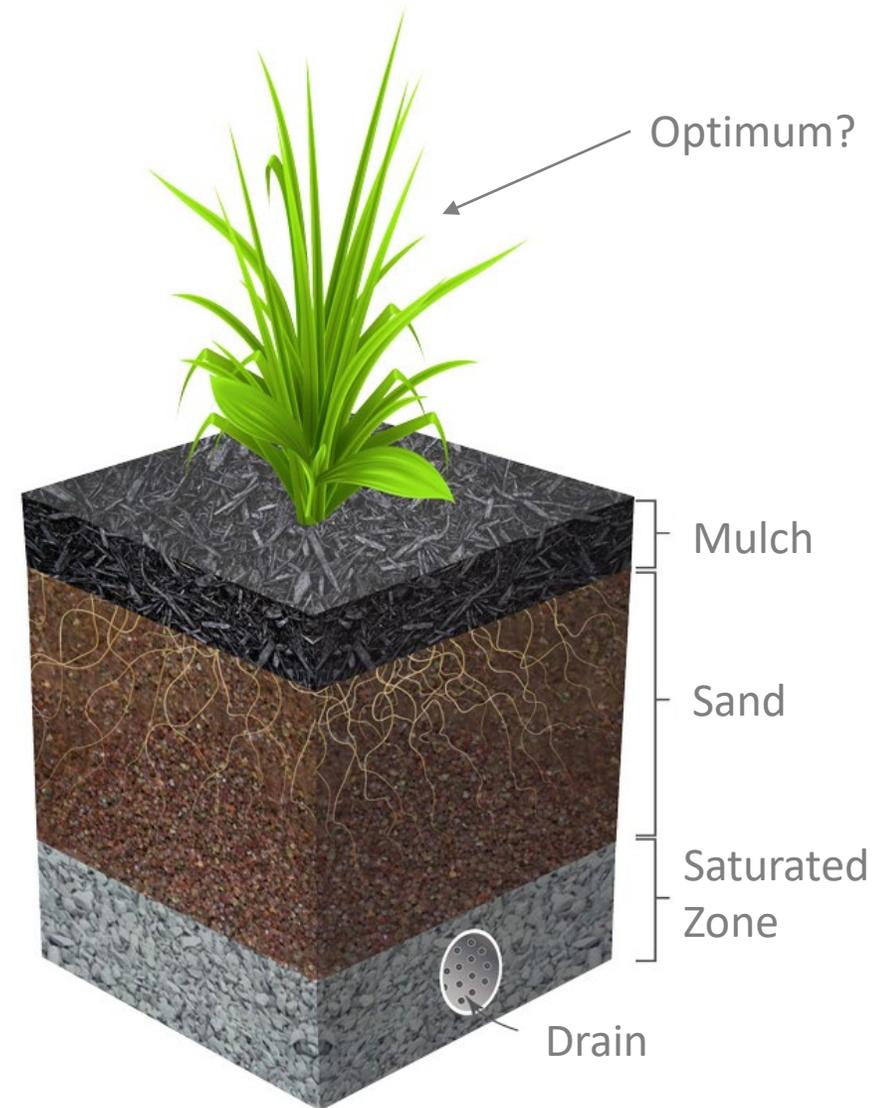
- Outdoor amphitheater and educational signage
- Experimental plots with CA-native BMP grass varieties
- Basic infrastructure for research and public involvement





# Problem Statement

- Los Angeles has adopted Biofiltration for nature-based stormwater BMPs.
- The process relies on bio-diverse native species and beneficial-use varieties.
- There is no research on CA-Native species and varieties, with enormous potential.
- Urgently need credible research to guide the planning, design, O&M of biofiltration using CA-native species and varieties.





# Problem Statement – Continued

- A key overlooked potential of nature-based BMPs is biomass production, cooling, and air quality improvement.
- Benefits include carbon sequestration, raw materials supply, medicinal use, animal feed, and human consumption.
- Realizing such benefits requires a community-centered approach involving intimate participation and ownership.
- A key requirement is education and training for bioswale development consistent with community interests.





# Study Objectives

1. Develop Guidelines and Standard Operating Procedures for optimized design, construction, and O&M of nature-based biofiltration BMPs.
2. Incorporate guidelines in a future revision of the City and County ROW and LID manuals.





# Experiment Questions

**Q1**: What are the optimal plants and planting practices for biofiltration in California?

**Q2**: What are the BMP optimization variables for maximum efficacy?

**Q3**: How will community skills, needs, and level of involvement influence optimization?





# Study Tasks

Task	Scope
<b>Task 1: Goals &amp; Parameters</b>	<ul style="list-style-type: none"><li>• Identify goals and specify the independent variables</li><li>• Define baseline conditions</li><li>• Identify performance parameters to measure and monitor</li></ul>
<b>Task 2: Study Setup</b>	<ul style="list-style-type: none"><li>• Procure equipment and tools</li><li>• Construct plots</li><li>• Plant selected varieties</li><li>• Install instrumentation and data collection system</li></ul>
<b>Task 3: Perform Study</b>	<ul style="list-style-type: none"><li>• Operate and maintain experimentation plots</li><li>• Collect onsite samples for processing and analysis</li><li>• Perform field measurements and collect data</li><li>• Download the data loggers</li><li>• Perform plot maintenance activities</li><li>• Send samples to labs and document lab reports</li><li>• Monitor site surveillance data</li></ul>



# Study Tasks – Continued

Task	Scope
Task 4: Data Analysis	<ul style="list-style-type: none"><li>• Develop and implement data documentation architecture and data processing procedures</li><li>• Develop and execute calculation procedure for the key performance parameters</li><li>• Develop and rollout dashboard for collected data and calculated performance parameters</li></ul>
Task 5: Data Evaluation and BMP Optimization	<ul style="list-style-type: none"><li>• Examine and evaluate experimentation plots performance</li><li>• Use result to develop and define optimized designs</li></ul>
Task 6: Study Deliverables	<ol style="list-style-type: none"><li>1. <b>Study Report</b> – Concise account of the study objectives, data, analysis, results, conclusions, and recommendations.</li><li>2. <b>Design Manual</b> – Practical guide to designing biofiltration nature-based BMPs</li><li>3. <b>Standard Plans</b> – Series of plans and details as standard practice for biofiltration BMPs</li></ol>





# Cost & Schedule

Task	Description	Cost	Completion Date
Begin Study	Execute funding agreement	N/A	Sep. 2022
Task 1: Goals & Parameters	Identify goals, baseline conditions and performance parameters	\$206,000	Nov. 2022
Task 2: Study Setup	Procure equipment, construct plots, procure and plant varieties, install instrumentation, setup communication system	\$304,000	Mar. 2023
Task 3: Perform Study	Operate and maintain plots, collect samples and data, download data loggers, maintain plots, document lab reports, monitor site	\$1,675,000	Mar. 2027
Task 4: Data Analysis	Develop and implement study architecture, perform calculations and modeling, develop and rollout dashboard	\$927,000	Sep. 2023
Task 5: Data Evaluation and BMP Optimization	Examine plot performances, develop and define optimized designs, implement optimized designs in experiment plots	\$324,000	Mar. 2027
Task 6: Study Deliverables	<ol style="list-style-type: none"><li>1. Study Report</li><li>2. Design Manual</li><li>3. Standard Plans</li></ol>	\$360,000	Sep. 2027
<b>Total</b>		<b>\$3,800,000</b>	<b>Sep. 2027</b>



# Funding Request

WASC	Year 1	Year 2	Year 3	Year 4	Year5	Total
CSMB	\$175,400	\$135,200	\$153,200	\$151,800	\$144,400	\$760,000
LLAR	\$175,400	\$135,200	\$153,200	\$151,800	\$144,400	\$760,000
LSGR	\$175,400	\$135,200	\$153,200	\$151,800	\$144,400	\$760,000
NSMB	\$175,400	\$135,200	\$153,200	\$151,800	\$144,400	\$760,000
ULAR	\$175,400	\$135,200	\$153,200	\$151,800	\$144,400	\$760,000
<b>TOTAL</b>	<b>\$877,000</b>	<b>\$676,000</b>	<b>\$766,000</b>	<b>\$759,000</b>	<b>\$722,000</b>	<b>\$3,800,000*</b>

\* Labor – 67%, Materials 37%



# Summary of Benefits

This Study will deliver :

- a) Optimum design, construction, operation, and maintenance of biofiltration systems.
- b) Enhanced uses of green infrastructure for efficient biofiltration, community enhancement, and for combating climate change.
- c) Sustainable water storage and sourcing solutions for consumptive use supply during dry periods.
- d) Renewable energy solutions for biofiltration operation and maintenance.
- e) Increased educational benefits of nature-based BMPs for communities.



**Questions?**



# Liberty Canyon Road Green Improvement

Funding Program (Infrastructure Program)

Fiscal Year 2022-2023

North Santa Monica Bay Watershed Area

County of Los Angeles

Josafat Flores, P.E.



# Project Overview

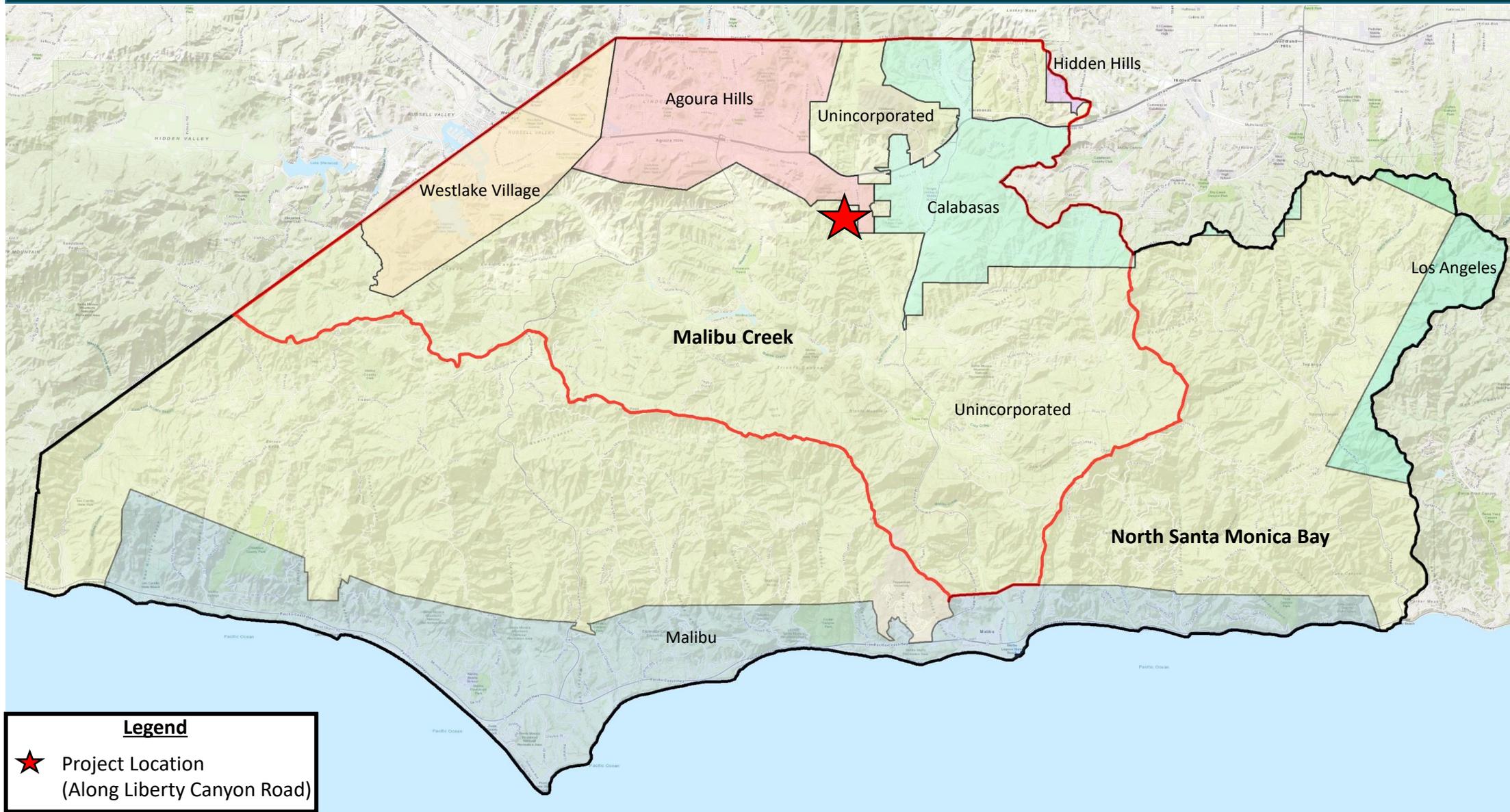
The proposed Project located in the unincorporated community of Agoura Hills will improve water quality and provide community enhancements.

- **Primary Objective:** Water Quality
- **Secondary Objectives:** Community Investment
- **Project Status:** Planning
- **Phases for which SCW funding is being requested:** Design Phase
- **Total Funding Requested:** \$100,000





# Project Location

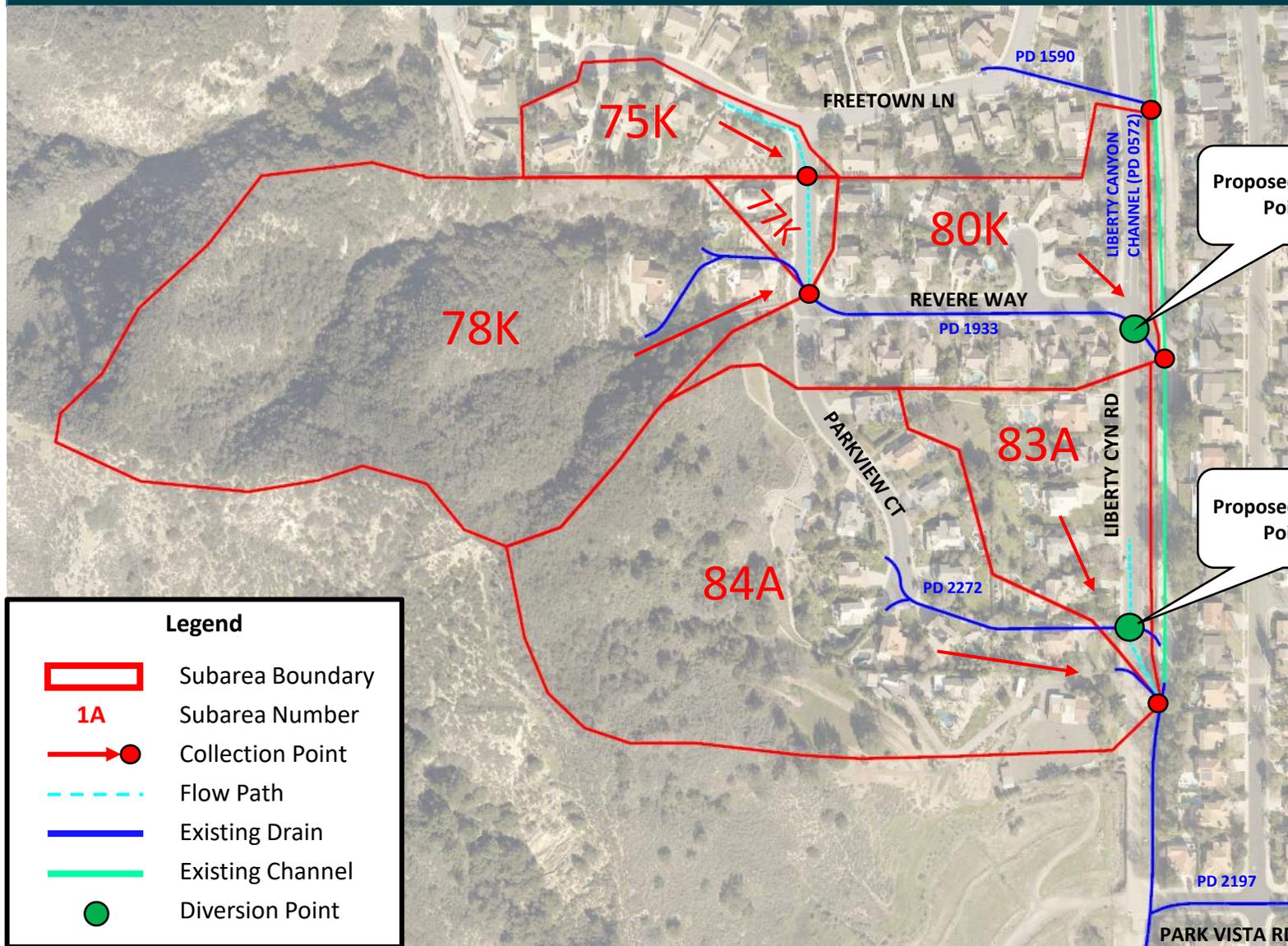




# Project Background

## • Project background:

- County Green Street Master Plan
- Malibu Creek Watershed Enhanced Watershed Management Program (EWMP)





# Project Background



NORTH



## Benefits

### Improved Water Quality

- Protect beneficial uses of the receiving waters
- Reduction of target pollutants

### Community Enhancements

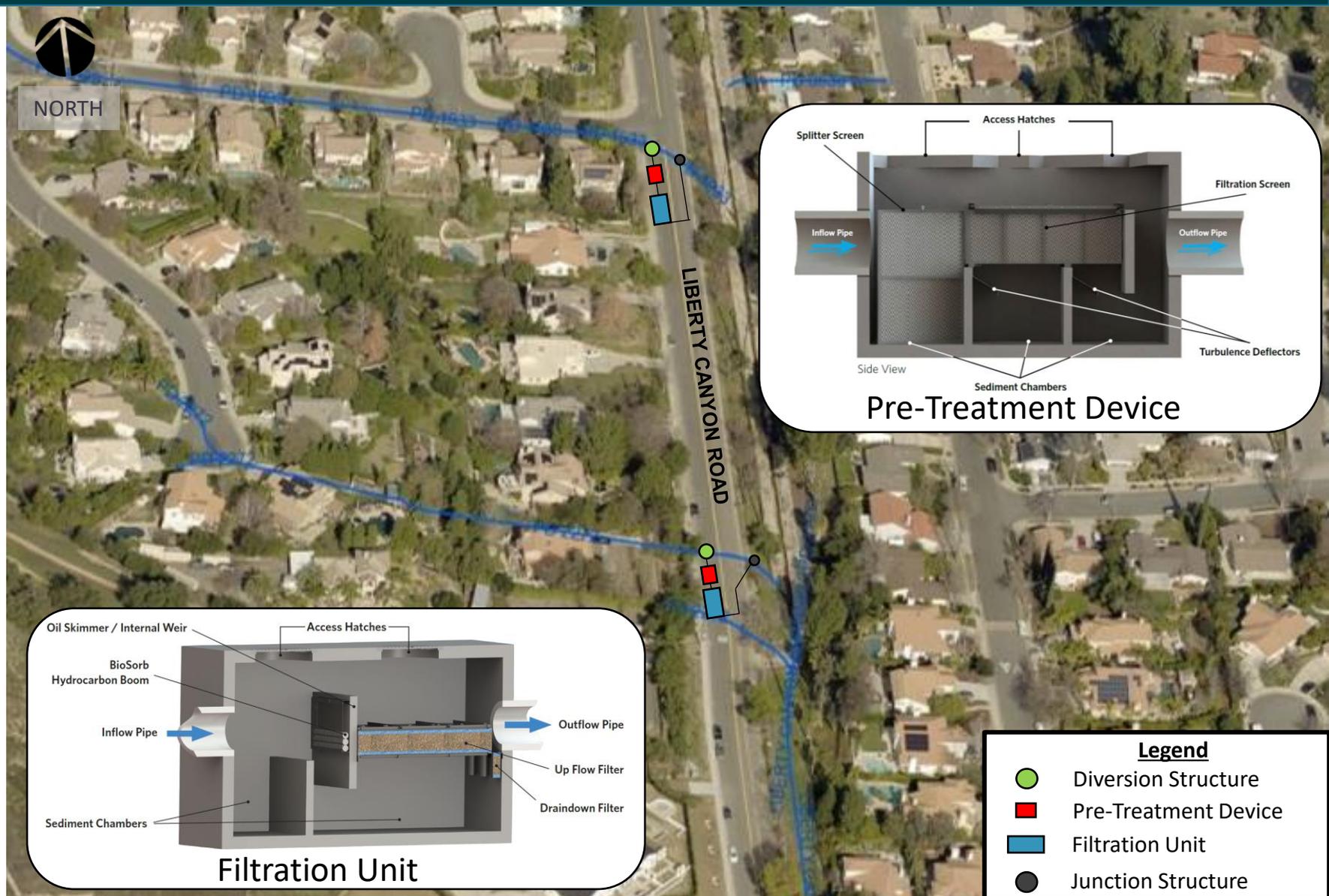
- Creates habitat & Recreational opportunities
- Reduce heat island effect
- Increase number of trees/vegetation



# Project Details

## Details

- Improved water quality
- Pre-Treatment Devices
- Filtration Units
- Potential to capture and treat up to 0.9 acre-feet of stormwater runoff

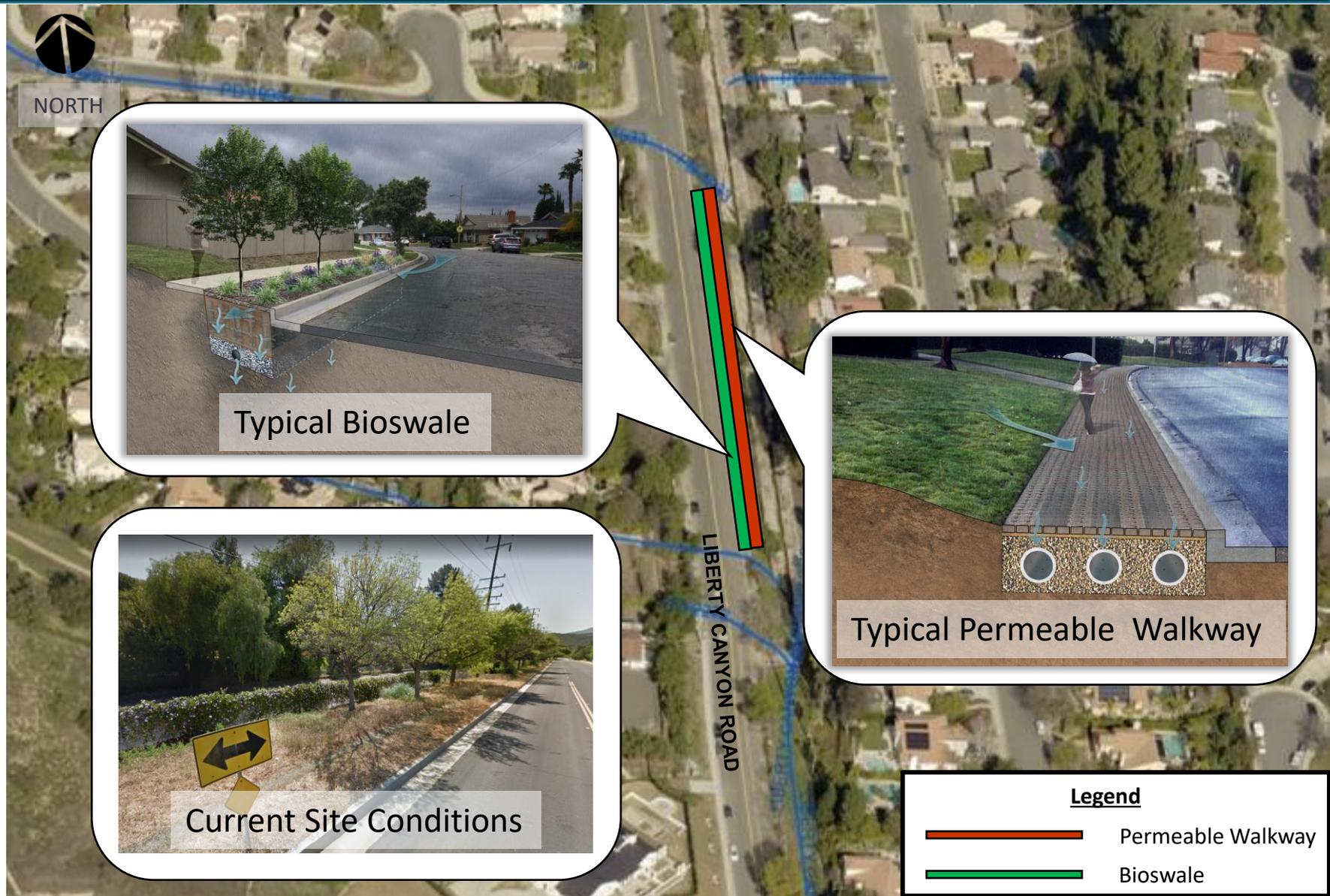




# Project Details

## Details

- Nature-based Solutions
  - Bioswale
    - Potential up to 27 Trees
    - Native/ Drought Tolerant Landscaping
  - Pervious Walkway





# Cost & Schedule

Phase	Description	Cost	Completion Date
Planning	Development of a Project Concept Report, including 30% plans	\$ 250,000	Late 2021
Design	Develop 60%, 90%, and Final Plans, Specifications and Estimates	\$ 150,000	Late 2022
Construction	Award contract and construction implementation	\$ 900,000	Early 2025
<b>TOTAL</b>		<b>\$ 1,300,000</b>	

## Annual Cost Breakdown

Annual Cost:	\$ 76,000
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- Project Lifespan: 50 years
- Lifecycle Cost: \$3.1M



# Funding Request

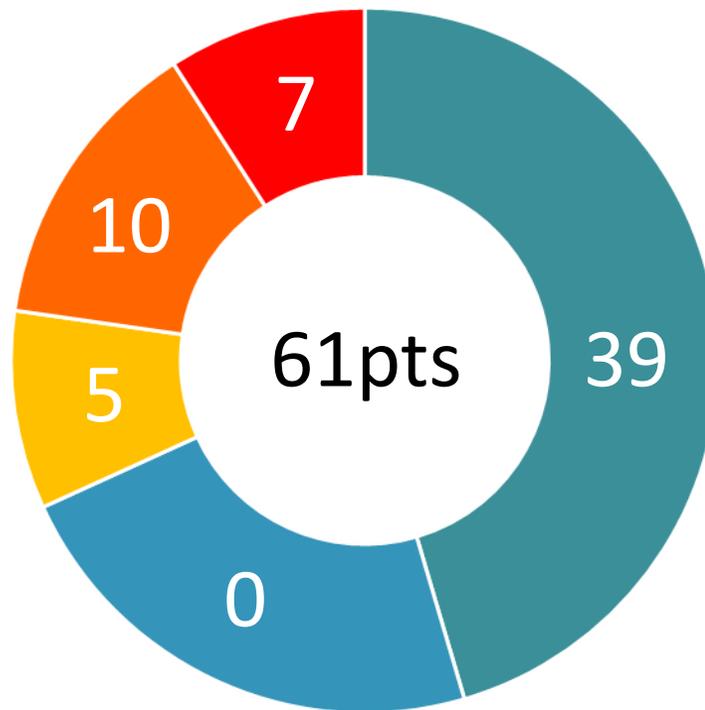
Year	SCW Funding Requested	Phase	Efforts during Phase and Year
1	\$100,000.00	Design	Complete 60% design plans, 90% design plans, and Final plans, Specifications and Estimates.
<b>TOTAL</b>	<b>\$100,000.00</b>		

- Leveraged Funding amount: \$50,000 (33.33%)
- Future SCW Funds: Construction



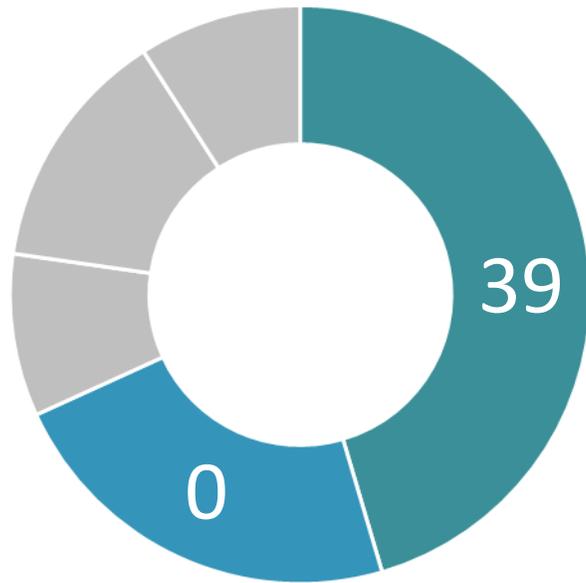
# Preliminary Score

- Water Quality
- Water Supply
- Community Investment Benefits
- Nature Based Solutions
- Leveraged Funds and Community Support





# Water Quality & Water Supply Benefits



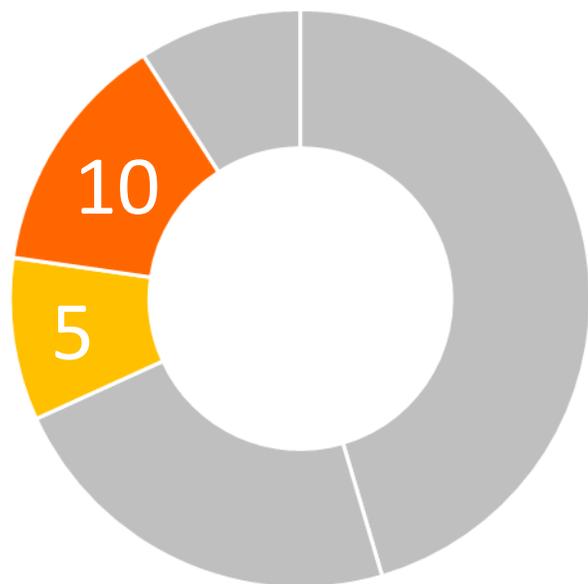
■ Water Quality

■ Water Supply

- **Water Quality Benefits**
  - Project will divert and treat wet weather runoff via:
    - Diversion Structures
    - Pretreatment Devices
    - Flow Through Treatment Systems
  - Tributary Area = 41.8 Acres
  - Capacity = 0.9 Acre-Feet (85<sup>th</sup> percentile, 24-hour storm)
  - Pollutant Reduction (Nutrients & Toxins)
  - Project also has the capacity to also reduce:
    - Trash
    - Sediment



# Community Investment Benefits and Nature Based Solutions



■ Community Investment Benefits

■ Nature Based Solutions

- **Community Investment Benefits**

- Creates habitat & Recreational opportunities
- Reduce Heat Local Island Effect
- Increase shade by planting trees

- **Nature Based Solutions**

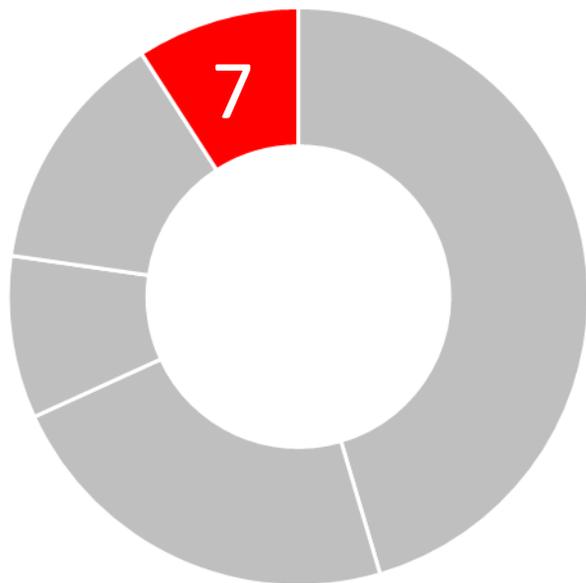
- Through the implementation of:
  - Bioswales
    - Potential up to 27 Trees
    - Native/Drought Tolerant Planting
  - Permeable Walkway



# Leveraging Funds and Community Support

- **Leveraging Funds**

- \$50,000
- 33.33% funding matched
- General fund, Grants, SCW municipal funds



■ Leveraged Funds and Community Support



# Leveraging Funds and Community Support



- **Community Support**
  - Community Outreach
  - July 15, 2021 – On-Site Community Meeting
  - September 23, 2021- NSMB Watershed Community Meeting
- Outreach Plan
  - Information sessions Hosted websites
  - Mailers and/or social media engagements



**Questions?**