Written materials relating to an item on this agenda that are distributed to the legislative bodies within 72 hours before the item is to be considered at its regularly scheduled meeting will be made available for public inspection at the City Clerk's Office, 300 West Third Street 4th Floor and at the Oxnard main library, 251 South A Street during customary business hours. Agenda reports are also on the City of Oxnard web site at www.oxnard.gov.

CITY OF OXNARD CALIFORNIA

AGENDA
OXNARD CITY COUNCIL
PUBLIC WORKS AND TRANSPORTATION COMMITTEE
Council Chambers, 305 West Third Street
April 14, 2026
Regular Meeting - 6:45 PM to 8:15 PM

Zoom details to call-in for public comment during a meeting:

1. Dial Phone Number: (888) 475-4499
2. Enter Meeting ID: 876 5270 0212
3. Passcode: 408979

If you wish to speak during public comments or a particular item on the agenda, please sign-on by following the zoom call-in steps listed above. Once the presiding officer calls for public speakers, press *9 to raise your hand to inform the City Clerk you would like to speak during the public speaking section for that particular item on the agenda, while in the zoom waiting room. Press *6 when asked to unmute. Listen to the instructions provided virtually on the phone while on hold in the zoom waiting room. Please note that there is a slight time delay when viewing the meeting via television.

IN ACCORDANCE WITH ASSEMBLY BILL 2449, MEMBERS OF THE LEGISLATIVE BODY MAY MEET IN-PERSON OR REMOTELY. TO PARTICIPATE REMOTELY VISIT WWW.OXNARD.ORG.

To find out how you may provide public comment, please refer to the instructions below or at **www.https://www.oxnard.org/city-meetings/**.

The public may view the meeting from home on Spectrum channel 10, Frontier channel 35, or YouTube at Youtube.com/oxnardnews. Video recordings of the meeting are typically available online following the meeting at the City's website at www.oxnard.org/city-meetings.

*Please see the link for the Measure M pre-recorded presentation video for each item listed on this agenda.

YOU MAY PARTICIPATE IN THE MEETING IN THE FOLLOWING WAYS:

1. ATTEND THE MEETING AT THE LOCATION LISTED ABOVE: Submit a speaker card to the City Clerk.

2. EMAIL COMMENTS OR SIGN UP TO SPEAK REMOTELY BEFORE THE MEETING

    a. Submit a request to speak remotely by no later than 3 p.m. on the day of the meeting by using the form available at **www.oxnard.org/citymeetings**.
    b. Submit an email to **cityclerk@oxnard.org** no later than 3 p.m. on the day of the meeting (indicate the agenda item number in the subject line). All email correspondence will be forwarded to the legislative body prior to the start of the meeting and made part of the legislative record.
    c. Contact the City Clerk's Office at (805) 385-7803 to submit your request.

3. PROVIDING PUBLIC COMMENTS REMOTELY DURING THE MEETING

In compliance with the Americans with Disabilities Act, if you require special assistance to participate in a meeting, please contact the City Clerk's Office at 385-7803. Notice at least 72 hours prior to the meeting will enable the City to reasonably arrange for your accessibility to the meeting.

Agenda Item Time Estimates include: (Minutes for Presentation + Council Discussion + Public Comment)

a. To provide public comment during the meeting dial (888) 475-4499 and enter the Meeting ID and Passcode listed above as the Zoom details for this meeting. When the presiding officer announces the particular item on the agenda you want to speak on, press *9 to raise your hand while in the zoom waiting room. Once called on, press *6 to unmute your phone.
b. Public comments on agenda items will be taken following the announcement of the item. After the item is announced, members of the public may register or otherwise be recognized for the purpose of providing public comment.

Please review the Zoom instructions on the registration page to help ensure there are no technical difficulties during your comments and help you understand public comment procedures using Zoom. Detailed participation instructions can be found at www.oxnard.org/city-meetings.

In the event of a disruption which prevents a legislative body of the City of Oxnard from broadcasting a meeting using a call-in option or internet-based service option, or in the event of a disruption within the City's control which prevents members of the public from offering public comment using the call-in option or internet-based service option, the legislative body shall take no further action on items appearing on a meeting agenda until public access to the meeting via the call-in option or internet-based service option is restored. However, if any of the broadcast options are disrupted, but any of the other broadcast options is still available to the public, the legislative body may take further action on items appearing on a meeting agenda without waiting for the disrupted broadcast option(s) to be restored.

A. ROLL CALL, POSTING OF AGENDA, FLAG SALUTE
Consideration of Teleconference Participation pursuant to Assembly Bill 2449.

B. PUBLIC COMMENTS ON ITEMS NOT ON THE AGENDA AND NON-ACTION ITEMS
A person may address the legislative body only on matters not appearing on the agenda and within the subject matter jurisdiction of the legislative body, and on non-action items. Speaker requests shall be submitted as set forth on the first page of this agenda. Speakers are limited to three minutes. After 30 minutes, if all speakers have not had the opportunity to speak, the remaining speakers will be given an opportunity to speak prior to the adjournment of the meeting. The legislative body cannot enter into a detailed discussion or take action on any items presented during public comments at this time. Such items may only be referred to the City Manager for administrative action or scheduled on a subsequent agenda for discussion.

C. CONSENT AGENDA

1. City Clerk Department
SUBJECT: Approval of Minutes.
RECOMMENDATION: That the Public Works and Transportation Committee approve the regular meeting minutes for February 24, March 10 and 24, 2026.
Contact: Luly Lopez, (805) 385-7805

D. REPORTS

1. Public Works Department
SUBJECT: Channel Islands Harbor Water Quality Implementation Plan Workshop.
RECOMMENDATION: That the Public Works and Transportation Committee review the attached Craftwater Engineering Implementation Plan and Appendices and recommend that the City Council direct staff to proceed with Phase 1 activities of the selected non-structural, structural, and receiving water strategies as outlined in Table 2 in this staff report.

Please click the following link to view the required Measure M pre-recorded presentation video: https://youtu.be/EyYFXQy5H6w
Contact: Michael Wolfe, (805) 385-8055

E. ITEMS FOR FUTURE AGENDAS

F. ADJOURNMENT

CITY OF OXNARD CALIFORNIA

PUBLIC WORKS AND TRANSPORTATION COMMITTEE AGENDA REPORT

CONSENT AGENDA
AGENDA ITEM NO. C.1

DATE: April 14, 2026

TO: Public Works and Transportation Committee

FROM: Luly Lopez, City Clerk, (805) 385-7805, luly.lopez@oxnard.org

SUBJECT: Approval of Minutes.

RECOMMENDATION

That the Public Works and Transportation Committee approve the regular meeting minutes for February 24, March 10 and 24, 2026.

BACKGROUND

Approval of minutes.

STRATEGIC PRIORITIES

This agenda item is a routine operational item or does not relate to the five strategic priorities adopted by City Council on March 16, 2021.

FINANCIAL IMPACT

There is no financial impact.

Prepared by: Luly Lopez, City Clerk

ATTACHMENTS

1. Minutes of Public Works and Transportation Committee for February 24, 2026
2. Minutes of Public Works and Transportation Committee for March 24, 2026
3. Minutes of Public Works and Transportation Committee for March 10, 2026

MINUTES
OXNARD CITY COUNCIL
PUBLIC WORKS AND TRANSPORTATION COMMITTEE
Regular Meeting
February 24, 2026

A. ROLL CALL, POSTING OF AGENDA, FLAG SALUTE

At 6:47 p.m., Chair Luis A. Mc Arthur called to order the regular meeting of the Oxnard City Council Public Works and Transportation Committee in the City Hall Council Chambers at 305 West Third Street, Oxnard, California. Member Gabriela Basua, Vice Chair Gabriel Teran and Chair Luis A. Mc Arthur were present. The City Clerk stated that the agenda was posted on Tuesday, February 17, 2026 at the Library, City Hall kiosk, City Administrative Offices and on the website.

The meeting opened with the pledge of allegiance to the flag of the United States led by Chair Mc Arthur.

Staff members present were Alexander Nguyen, City Manager; Michelle McCarron, Assistant City Attorney; Michael Wolfe, Public Works Director; Steve Howlett, Assistant Public Works Director; Brian Yanez, Assistant Public Works Director; Jose Arreola, Fleet Services Manager; Patrick Fleming, Project Manager and Lourdes A. López, City Clerk.

Consideration of Teleconference Participation pursuant to Assembly Bill 2449.

B. PUBLIC COMMENTS ON ITEMS NOT ON THE AGENDA AND NON-ACTION ITEMS

No public comments were received.

C. CONSENT AGENDA

1. City Clerk Department
SUBJECT: Approval of Minutes.
RECOMMENDATION: That the Public Works and Transportation Committee approve the regular meeting minutes for January 27, and February 10, 2026.

No public comments were received.

It was moved by Vice Chair Teran, seconded by Member Basua, to approve the Information/Consent item as presented. VOTE: Teran, Basua and Mc Arthur voted in favor; the motion carried 3-0.

D. REPORTS

1. Public Works Department
SUBJECT: Agreement 32600325 with Auto Body International, Inc. for Light and Medium Duty Paint and Body.
RECOMMENDATION: That the Public Works and Transportation Committee recommend that the City Council approve and authorize an Agreement with Auto Body International, Inc. in an amount not to exceed $1,500,000 for an initial term of one year from March 23, 2026, to March 22, 2027, with the option for four consecutive one-year period extensions ending March 22, 2031, for light and medium duty paint and body work.

The Public Works Director, Assistant Public Works Director Yanez and Fleet Services Manager presented and were available to answer questions. Discussion ensued among the Committee and staff.

No public comments were received.

It was moved by Mayor Mc Arthur, seconded by Member Basua, to approve the recommended action as presented. VOTE: Basua, Teran and Mc Arthur voted in favor; the motion carried 3-0.

2. Public Works Department
SUBJECT: Agreement 32600348 with Downstream Services, Inc. for Stormwater Filter Replacement and Maintenance Services, Specification No. PW 26-59.
RECOMMENDATION: The Public Works and Transportation Committee recommends that the City Council approve and authorize an Agreement with Downstream Services, Inc. in the amount not to exceed $1,250,000 for an initial term of one year from March 20, 2026 to March 19, 2027, with the option for four consecutive one-year period extensions ending March 19, 2031, for stormwater filter replacement and maintenance services.

The Public Works Director, Assistant Public Works Director Howlett and Project Manager Fleming presented and were available to answer questions. Discussion ensued among the Committee and staff.

No public comments were received.

It was moved by Mayor Mc Arthur, seconded by Member Basua, to approve the recommended action as presented. VOTE: Teran, Basua and Mc Arthur voted in favor; the motion carried 3-0.

E. ITEMS FOR FUTURE AGENDAS

No requests were made.

F. ADJOURNMENT

There being no further business on the agenda, and without objection, Chair Mc Arthur adjourned the meeting at 7:04 p.m.

LOURDES A. LÓPEZ	LUIS A. MC ARTHUR
City Clerk	Chair

MINUTES
OXNARD CITY COUNCIL
PUBLIC WORKS AND TRANSPORTATION COMMITTEE
Regular Meeting
March 24, 2026

Because there were no items requiring consideration on this date, there was no regular meeting.

_____	_____
LOURDES A. LÓPEZ	LUIS A. MC ARTHUR
City Clerk	Chair

MINUTES
OXNARD CITY COUNCIL
PUBLIC WORKS AND TRANSPORTATION COMMITTEE
Regular Meeting
March 10, 2026

Because there were no items requiring consideration on this date, there was no regular meeting.

_____	_____
LOURDES A. LÓPEZ	LUIS A. MC ARTHUR
City Clerk	Chair

CITY OF OXNARD CALIFORNIA

PUBLIC WORKS AND TRANSPORTATION COMMITTEE AGENDA REPORT

REPORTS
AGENDA ITEM NO. D.1

DATE: April 14, 2026

TO: Public Works and Transportation Committee

FROM: Michael Wolfe, Public Works Director, (805) 385-8055, michael.wolfe@oxnard.org

SUBJECT: Channel Islands Harbor Water Quality Implementation Plan Workshop.

RECOMMENDATION

That the Public Works and Transportation Committee review the attached Craftwater Engineering Implementation Plan and Appendices and recommend that the City Council direct staff to proceed with Phase 1 activities of the selected non-structural, structural, and receiving water strategies as outlined in Table 2 in this staff report.

Please click the following link to view the required Measure M pre-recorded presentation video: https://youtu.be/EyYFXQy5H6w

BACKGROUND

The Channel Islands Harbor is an artificial harbor with abutting commercial and residential developments that include special financing districts Seabridge CFD, Westport CFD, Mandalay Bay WAD-Zone 1, and Harbour Island WAD-Zone 2 (collective "Harbor Districts"). The portion of Channel Islands Harbor north of the Channel Islands Boulevard bridge was created as a part of the development of these neighborhoods in order to provide the properties constructed within the developments the direct benefit of waterfront access. Subsequently, formation of the respective special districts listed above was required to fund costs associated with maintaining and managing the Harbor and its water quality. As specified in each district's Formation Documents, water quality remediation services are authorized services for each of the Harbor Districts; however, the City Council has previously authorized American Rescue Plan Act ("ARPA") funding, and State grant funds, to fund a report examining feasible options for addressing Harbor water quality conditions. Additionally, in 2022, the County of Ventura provided $1.3 million in funding for the implementation of Harbor water quality mitigation measures.

In June 2018, an algal bloom occurred in the Harbor. The bloom was followed by widespread low levels of dissolved oxygen in the water. This is presumably related to the bacterial decomposition of algae during warm weather conditions. The bloom and subsequent low oxygen event may have been caused by the changes in the Harbor water circulation that occurred after the Mandalay Power Generating Station was decommissioned on March 29, 2018, as mandated by the California State Water Resources Control Board. Since the 2018 bloom and low oxygen event, the Harbor has not seen another event of that magnitude.

Since then, the City of Oxnard ("City"), the County of Ventura ("County"), and residents of the Channel Islands Neighborhood Council's ("CINC") Marine Advisory Committee ("MAC") have organized efforts to address water quality issues in the Harbor.

As a part of these efforts, a substantial amount of water quality data was gathered by MAC volunteers to assist with identifying key contaminants and potential sources of contamination within the Harbor. This testing was performed in accordance with a Los Angeles Regional Water Quality Control Board ("LARWQCB") required Quality Assurance Project Plan ("QAPP") which describes key stakeholders, sampling methods and locations, sample analysis, parameters for volunteer sample collection, quality assurance, and goals. This data gathering effort and identification of stakeholders has provided the foundation for the City-led effort to develop a report to examine options for improvements to Harbor water quality conditions and circulation.

On February 24th, 2024, the City Council approved the contract with Craftwater Engineering (Craftwater) for the development of a series of reports detailing a list of potential mitigation measures to address Harbor water quality and circulation challenges, evaluate their potential feasibility, and develop a plan for implementing those measures which were deemed the most effective. Most notably, this included a detailed Implementation Plan intended to guide future project implementation aimed at addressing Harbor water quality and related issues. Since June 2024, Craftwater and City staff have met with various stakeholder groups both individually and in group settings to gather information on local concerns, provide updates on the project, and collaborate on the creation of the mitigation measures and evaluation metrics (see attached list of meeting dates and participants). Further stakeholder input was solicited on the draft and final implementation plan, which proposes a specifically phased approach toward the implementation of a variety of non-structural, structural, and receiving water/circulatory plans.

DISCUSSION

Initial Analysis:

Craftwater Engineering has provided its recommendations for priorities and projects based on the results of its technical research, review of the water sample data, and the feasibility study. Staff's recommendation is for a variation of Craftwater's recommendation and this staff report has been written to outline how staff have arrived at our recommendations. In order to fully understand the recommendations of this staff report, it is important to provide the primary Study goals and objectives. These include:

- Addressing water circulation and quality issues to meet a reasonable standard that supports appropriate Harbor beneficial uses for residents and the public.
- Providing pollutant source control and/or treatment options for the Harbor drainage area to improve dry- and wet-weather discharge input quality.
- Preparing a prioritized and phased Implementation Plan structured to provide a roadmap for viable projects, including costs and potential funding sources.

These are fully defined within the attached Goals and Objectives Memo (Attachment 1). To develop these goals and objectives, Craftwater compiled and analyzed more than 25 years of in-Harbor and source point data, coordinated with various stakeholders and interested parties, and used industry-standard modeling and analyses. This data guided the creation of mitigation measures that were identified as the most effective methods of addressing the Harbor's most acute problems. Special attention was given to the overall trends over time and the closure of the Mandalay Generating Station (MGS). It is important to note that during the review of the data, Craftwater found that no notable observations were made indicating changes in exceedances of constituents at discharge sites before and after the decommissioning of the MGS, which suggests any observed degraded water quality in the Harbor following the MGS decommissioning is primarily a result of decreased circulation. Furthermore, the Los Angeles Regional Water Quality Board and California Coastal Commission provided invaluable guidance on potential conditions for the approval of any in-Harbor project.

Image 1 below depicts the total area considered by this study and will include the location of any recommended mitigation measures.

Image 1: Channel Islands Harbor Watershed

After this analysis, Craftwater identified the following constituents of concern (Table 1) within the Edison Canal and the Harbor. Discharge points were identified as specific points of concern as contributors to these constituents, particularly for pesticides. Efforts to address these constituents and water quality conditions, particularly in areas with poor circulation in the Harbor, were identified as a focus of mitigation strategies. Total Nutrients and Bacteria (specifically Enterococcus) were also noted as concerns. However, these are considered subordinate to the overall impact of the other constituents.

Table 1

Constituent of Concern	Category	Reason for Identification	Potential Sources
Bifenthrin	Pesticide	Magnitude of Exceedances/ Toxicity to Aquatic Wildlife[1]	Agricultural/Landscape Runoff
Permethrin	Pesticide	Magnitude of Exceedances/ Toxicity to Aquatic Wildlife[1]	Agricultural/Landscape Runoff
Copper	Metals	Magnitude of Exceedances/ Toxicity to Aquatic Wildlife[1]	Urban runoff, anti-fouling boat paint, and aerial deposition
Low Dissolved Oxygen	Eutrophic Conditions	Overall indicator of water quality and circulation	Poor Mixing/Circulation

[1] Exceedances were measured against total Water Quality Objectives as defined by the Los Angeles Region (Region 4) Basin Plan, references used for 303(d) listing decisions (impaired water bodies), the EPA's

"California Toxics Rule," and the California Department of Fish and Wildlife.

Constituents of Concerns and Stakeholder Input:

With constituents of concern and their primary sources identified, next steps were to involve the broader stakeholder community in the development of potential mitigation strategies that would address the identified concerns effectively. The following groups were identified in the outreach efforts:

- Channel Islands Neighborhood Council - Marine Advisory Committee (MAC)
- Ventura County Farm Bureau
- Farmers/Agricultural Landowners within the watershed area
- Mandalay Generating Station and Edison Canal Landowners
- Non-Special Districts Division City Staff
- Ventura County Public Works Department Staff

These groups were invited to the regular update meetings, as well as individual outreach sessions held throughout 2024 and 2025i. Additionally, all of these groups were provided multiple opportunities during each phase of the study process to view and provide feedback for each Craftwater work product. The MAC group provided the most consistent attendance and feedback amongst all the stakeholder groups. Ventura County Farm Bureau provided valuable perspective on behalf of agricultural interests and provided a conduit to local farmers and landowners immediately adjacent to the Edison Canal and Harbor. Individual meetings with City of Oxnard departments and divisions (e.g. Public Works Engineering, Environmental Resources, and Wastewater), which would have exposure to or be responsible for the implementation of certain mitigation measures, were also held to allow City staff to inform the projected feasibility of specific structural and non-structural programs.

Stakeholder feedback was valuable in the assessment of the potential mitigation measures, which included projected implementation challenges. For example, the Farm Bureau recommended that the report limit recommendations for mitigation strategies considered to be duplicative of already existing agriculture industry efforts. Conversely, the MAC group provided feedback suggesting projects containing circulation improvement components be prioritized.

With the stakeholders identified and the problem well-defined, Craftwater developed a list of possible mitigation strategies which would address the constituents of concern through multiple methodologies. Methodologies are separated into three categories labeled Non-Structural, Structural, and Receiving Water.

- Non-Structural strategies generally involve education programs and procedural methods that the City may implement internally through existing departments, contracts, or maintenance efforts.
- Structural strategies involve the construction of structural "Best Management Practices" (BMPs) at specific points within the watershed to physically treat runoff prior to reaching the Harbor. Three distinct types of Structural BMPs were evaluated as part of the Study's approach: Filtration BMPs, Infiltration BMPs, and Agricultural Runoff Treatment Systems.
- Receiving Water strategies primarily focus on improving water quality through reducing residence time and increasing overall circulation once water has been "received" into the Harbor body itself. Increased in-Harbor circulation improves water quality by increasing mixing, which subsequently dilutes in-Harbor pollutant concentrations.

At this point of the study, the MAC group provided additional input reiterating that the mitigation strategies that addressed circulation were not being prioritized highly enough. Craftwater and City staff made direct attempts to address these concerns through the implementation of a weighted category project evaluation approach in collaboration with the MAC group to address these concerns. This methodology can be seen within pages 10 through 15 of the Craftwater Implementation Plan report (Attachment 2).

Approach to Strategy Selection:

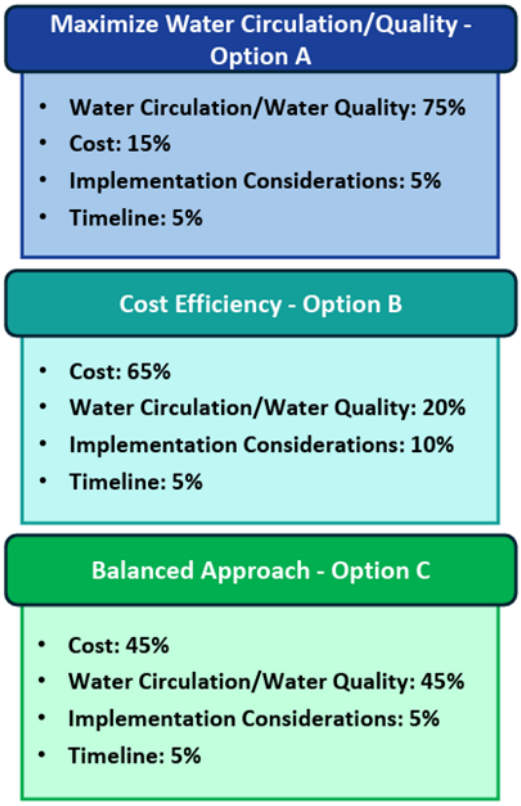


Image 2: Category Weighting by Priority

The primary purpose of this weighted approach was to show that depending upon the highest chosen priority, different mitigation strategies will score higher than others that are more closely aligned with other priorities. For example, if circulation is chosen as the overall highest priority (Option A), then the strategies which include resuming pump operations or extending the Edison Canal, rise to the top of the recommended strategies to be pursued. However, prioritizing circulation subsequently de-prioritizes the cost and the implementation challenges. For this reason, staff is recommending the Balanced Approach (Option C) as is generally described on page 16 of the Implementation Plan (Attachment 2). Score weights within the Balanced Approach (Option C) are shown within Image 2.

Non-Structural and Structural strategies consistently rose to the top under each weighting scenario, including staff's recommended Balanced Approach (Option C). It is extremely important to note that large scale circulation strategies (Receiving Water) are not prioritized under the Balanced Approach. This is due to a combination of factors including: high regulatory risks, costs, and are primarily located in areas of shared regulatory jurisdiction and land ownership. All of these concerns lower the overall feasibility of these strategies and subsequently have led to their exclusion from the Balanced Approach. However, specifically due to MAC input and staff's recognition of the potential long-term need for circulation improvements, staff is ultimately recommending and Craftwater has provided for the inclusion of a Receiving Water strategy as a part of the final Implementation Plan recommendation for Phase 1 of strategy implementation.

With the inclusion of a Receiving Water strategy, there are specific mitigation strategies identified from each of the three strategy categories, Non-Structural, Structural, and Receiving Water, providing a comprehensive approach to the recommended implementation efforts. The Detailed Implementation Plan (Attachment 3 to this staff report, Appendix B to the Craftwater Implementation Plan report) provides specific implementation details for proposed strategies recommended from the Balanced Approach.

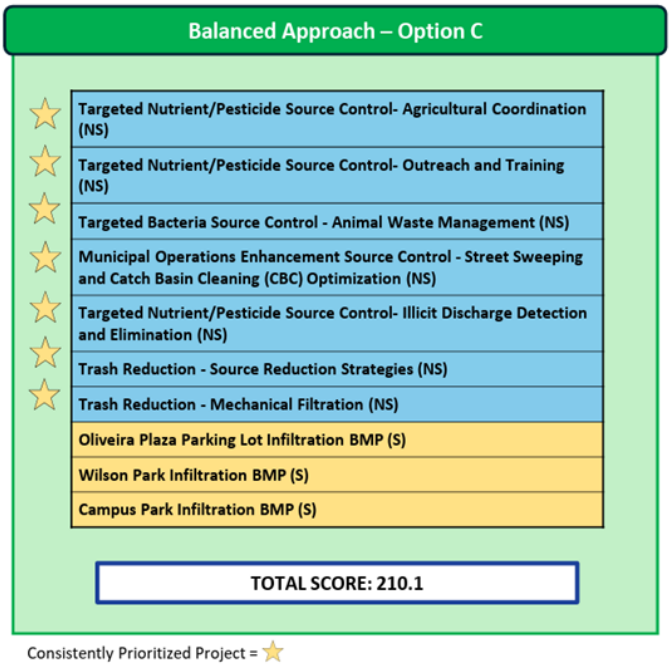


Image 3: Balanced Approach - Option C, the listed projects are those which scored highest using the balanced approach score weighting

In an effort to more efficiently use the limited funds that are currently available to the City to take projects/programs to the next step(s), staff is not recommending the entire list of strategies that are identified within the Option C approach. Staff is specifically choosing to limit the proposed Non-Structural strategies to those which correspond to the recommended structural strategies and exhibit synergy with existing City programs. Strategies that duplicate efforts being provided by outside parties (such as agricultural outreach and training) are also not being

recommended for inclusion to further limit the impact on available funding. However, Non-Structural approaches to water quality management are very important to the overall approach, as regulatory bodies such as the California Coastal Commission and Regional Water Quality Control Board will require the demonstration of a comprehensive approach to total pollutant load reduction prior to permitting the construction of any large Receiving Water strategy. Finally, in recognition of the breadth of the recommended strategies, Craftwater and Staff are recommending a phased plan for their implementation. Even after narrowing the total number of recommended mitigation strategies, the scale and cost of this effort requires an approach which breaks implementation into smaller component pieces. The following section of this report summarizes the proposed Phase 1 implementation of the recommended mitigation strategies.

Phase 1 Implementation Recommendations:

Below are the staff recommended strategies organized by category:

Table 2

Non-Structural	Projected Pollutant Load Reduction[1]	Structural	Projected Pollutant Load Reduction[1]	Receiving Water	Projected Residence Time Reduction[2]
Targeted Nutrient/Pesticide Source Control - Agricultural Coordination	62%	Wilson Park Infiltration BMP	10%	Passive Edison Canal Connection	73%
Municipal Operations Enhancement Source Control - Street Sweeping and Catch Basin Cleaning Optimization	49%	Oliveira Plaza Parking Lot Infiltration BMP	27%		
Targeted Nutrient/Pesticide Source Control - Illicit Discharge Detection and Elimination	27%	Agricultural Runoff Treatment System	1%		
Trash Reduction - Mechanical Filtration	11%				

[1] Load reduction is defined as the expected reduction in pollutant load being treated by the strategy that would otherwise enter the Harbor.

[2] Residence Time Reduction is defined as the expected reduction in average residence time of water within the Harbor.

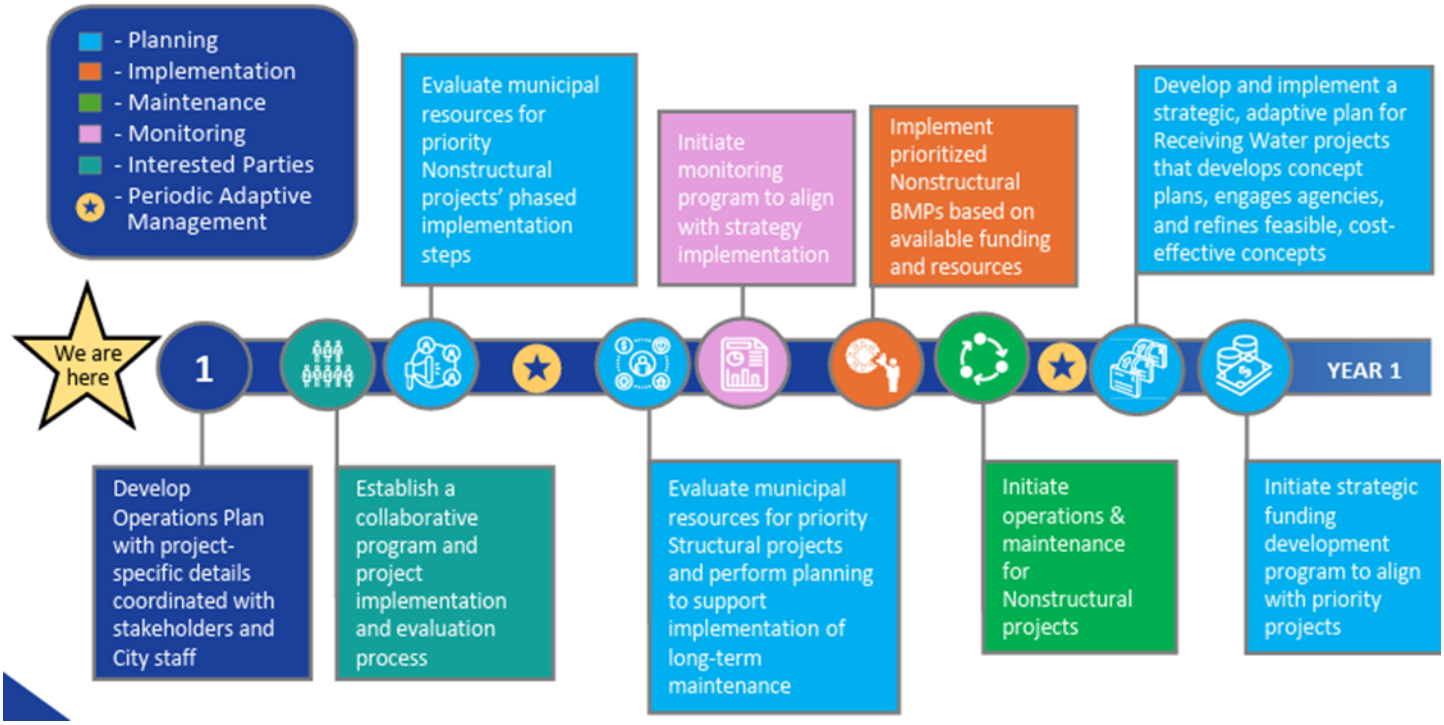
Overall, staff selected strategies from within the balanced approach in order to balance cost concerns with real-world water quality improvement. Furthermore, multi-benefit project potential, water quality benefit magnitude, and site-specific feasibility considerations were all considered in the final recommendations. Each of the listed strategies directly impacts one or multiple constituents of concern. On a cost basis, the strategies are all projected to be among the most efficient options for addressing total pollutant loads based upon Craftwater's findings.

In regard specifically to the recommended Structural BMPs, the Campus Park Infiltration BMP was removed as the current Campus Park Activation CIP project includes infiltration and filtration BMPs within its design. It was replaced by the Agricultural Runoff Treatment BMPs due to their low estimated capital and O&M costs (and high cost-efficiency) and their anticipated effectiveness in addressing nutrients in agricultural runoff, particularly nitrogen, which contributes greatly to algal growth and subsequently, instances of depressed dissolved oxygen levels within the Harbor.

Additionally, in recognition of the continued stakeholder feedback regarding the need for improved residence times, staff is recommending the inclusion of the Passive Edison Canal Connection (Receiving Water strategy) within Phase 1 for further exploration. While the capital cost of the Passive Edison Canal Connection is projected to be the most expensive Receiving Water strategy, it is projected to incur less long-term cost and have fewer continued logistical concerns than other receiving water strategies, in addition to also being

considered the most cost-effective from a residence time reduction standpoint.

The next steps for the Phase 1 implementation are anticipated to occur over the next few years and involve a variety of simultaneous steps. Non-Structural strategies are front-loaded within the timeline, as they are anticipated to have the least complex implementation concerns. For example, initial steps within Phase 1 for Targeted Nutrient/Pesticide Source Control — Agricultural Coordination will involve the creation of a program schedule and material production for outreach efforts directly to the landowners and operators within the watershed area. It should be noted that all the identified Strategies may be altered during Phase 1 if they are found to be ineffective, face major implementation concerns, or if funding or regulatory opportunities for other strategies become available during the initial implementation phase. Further implementation actions for each of the specified strategies can be found within Appendix D of the attached Craftwater Implementation Plan Report. Below is an illustration of the proposed Year 1 Timeline.



Evaluation and/or Monitoring of Strategies:

In addition to implementation of the multi-faceted strategies (above), an adaptive management plan is recommended for the evaluation of each strategy throughout the implementation process. This has been primarily identified as a need for a continued monitoring plan. This monitoring plan may be limited to the identified constituents of concern (Bifenthren, Permethrin, Copper, Dissolved Oxygen, Enterococcus, and Nutrients), which will lower the overall cost of the program. Outside testing and monitoring resources are recommended to be included in the City's monitoring approach, which may further broaden the scope of information received, while limiting the overall cost of the monitoring program. Separate monitoring approaches will be applied to Non-Structural and Structural strategies, incorporating both quantitative and qualitative metrics such as pollutant load reduction, operational performance, debris removal, and program participation. Collected data will be compiled, analyzed for trends and performance, and summarized in regular reporting informing ongoing program refinement, with data gaps identified for supplemental monitoring as needed.

This is planned to be one of the earliest components of the Phase 1 implementation plan, in order to provide baseline information while allowing the City to incrementally measure the impact each strategy is having on the monitored constituents. If a strategy is evaluated as having little impact, it will be recommended for removal or

replacement within the plan. Additionally, if insurmountable regulatory concerns are raised during initial discussions with permitting agencies, such as the Coastal Commission and LARWQCB, regarding the planned Receiving Water strategy implementation, then the strategy may also need to be removed or replaced.

Summary of Next Steps:

In summary, Phase 1 of the Implementation Plan as recommended by staff involves the following:

Non Structural Strategy Implementation

- Solicitation of environmental science professional services for:
    - Development of outreach materials for coordination based Non-Structural Strategies
    - Programmatic optimizations and technological upgrades for existing street sweeping and catch basin cleaning efforts
    - Development of work plan and protocols for illicit discharge detection and elimination
- Selection of sites for installation of trash capture devices
    - Solicitation for drainage study and designs per each location

Structural Strategy Implementation

- Solicitation for professional planning, engineering and design services for selected Structural BMPs
- Coordination with agricultural landowners at key discharge locations for direct agricultural runoff treatment

Receiving Water Strategy Implementation

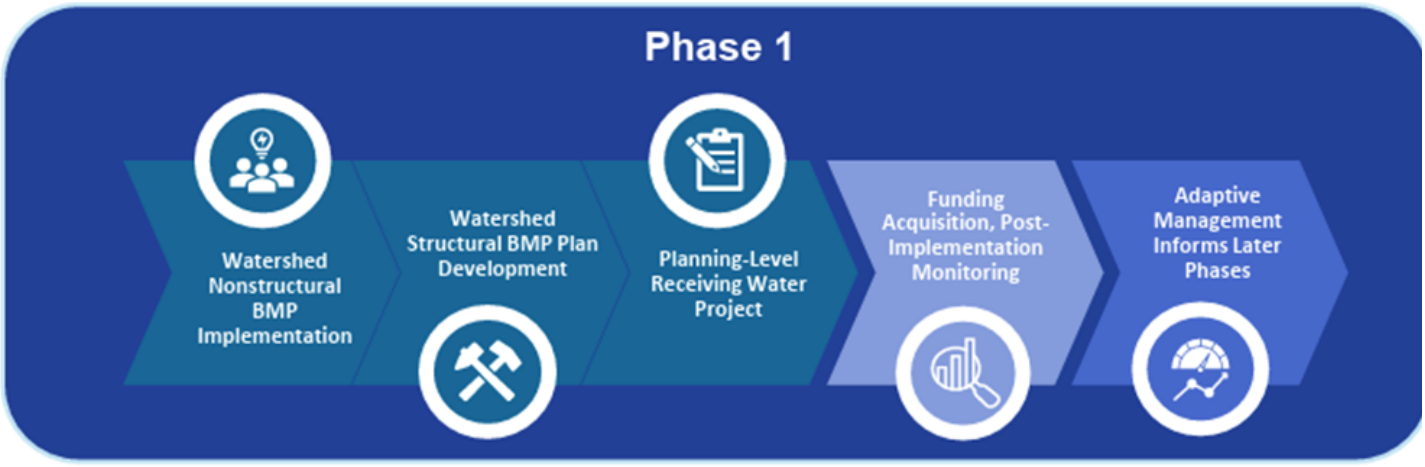
- Direct MGS landowner engagement
- Solicitation of environmental science professional services for:
    - Regulatory agency consultation and environmental review
    - Preliminary concept design(s) plan development

Continued Monitoring/Adaptive Management

- Solicitation for environmental science professional services for:
    - Development of a monitoring program to include comprehensive project data compilation
    - Planning and development of water quality monitoring protocols, data collection mechanism(s), laboratory analysis, long-term data and trend analyses, and reporting.
    - Program planning and adaptive management processes

Funding Identification

- Solicitation for funding acquisition services (grant writing and application)
- Identification of additional funding programs which match implementation strategies



It should be noted that the implementation of staff's recommendation will involve many different divisions and departments in the City. It may also require significant staff time and resources. As such, an approval of these recommendations will need to be weighed with other existing priorities for City departments/divisions that will participate in the implementation of these recommendations. Also, some of the proposed strategies have on-going General Fund budgeting impacts. For example, construction of a structural element (e.g. Wilson Park Infiltration BMP) will result in having to maintain and repair/replace the new infrastructure in perpetuity.

STRATEGIC PRIORITIES

This agenda item supports the Quality of Life strategy. The purpose of the Quality of Life strategy is to restore and increase quality services and programs that enrich Oxnard's diverse community, promotes safe neighborhoods, encourages community engagement, and supports our residents in their efforts to improve their quality of life.

FINANCIAL IMPACT

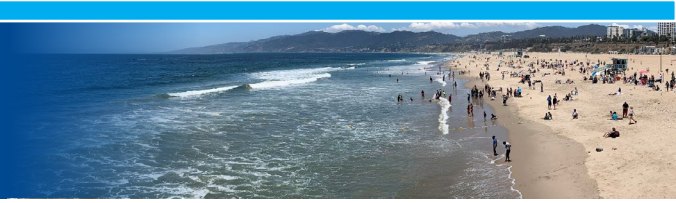
The Craftwater Feasibility Study and Implementation Plan project has so far been funded entirely by American Rescue Plan Act (ARPA) funds, Ventura County, and California Department of Water Resources grant funds. Since fiscal year 2022-23, approximately $948,164 has been spent as of March 6, 2026 on water quality monitoring efforts and this study. The total combined dollar amount secured for water quality-related efforts to date is $3.1 million. As there is approximately $2.1 million remaining that is dedicated to water quality-related work, staff is proposing the following estimated spending plan for the proposed Phase 1 strategies' planning and implementation:

Strategy Type	Strategy	Proposed Allocation	Cost Details
Non-Structural	Targeted Nutrient/Pesticide Source Control - Agricultural Coordination	$50,000	Develop and produce materials; create outreach schedule
	Municipal Operations Enhancement Source Control - Street Sweeping and Catch Basin Cleaning Optimization	$100,000	Analysis & optimization of sweeping routes and CBC work plan; technological upgrades
	Targeted Nutrient/Pesticide Source Control - Illicit Discharge Detection and Elimination	$50,000	Development of work plan and protocols;
	Trash Reduction - Mechanical Filtration	$100,000	Selection of sites; drainage study, design plans (10 sites)
Structural	Wilson Park Infiltration BMP	$100,000	Conduct project-level feasibility assessment; prepare concept-level designs; evaluate permitting needs
	Oliveira Plaza Parking Lot Infiltration BMP	$150,000	Conduct project-level feasibility assessment; prepare concept-level designs; evaluate permitting needs
	Agricultural Runoff Treatment System Pilot Project	$75,000	Coordination with agricultural landowners; concept-level designs (3 sites)
Receiving Water	Passive Edison Canal Connection	$250,000	Preliminary concept design; regulatory agency consultation
Monitoring	Post-Implementation Monitoring	$50,000+ (annually)	Development of monitoring work plan and protocols
Funding Identification	Funding Identification & Grant Planning/Submission	$75,000	Research and pursue funding opportunities to supplement available funds
	Total	$1,000,000	

Prepared by: Steve Howlett, Assistant Public Works Director, Anthony Miller, Special Districts Manager

ATTACHMENTS

1. Craftwater Goals and Objectives Memorandum
2. Craftwater Implementation Plan Report
3. Appendix B - Craftwater Detailed Phased Implementation Plan
4. Appendix C - Craftwater Mitigation Strategies Matrix
5. Craftwater Weighted Prioritization Project Matrix Guide
6. City/Craftwater Meeting Schedules
7. City of Oxnard Special Districts Map
8. City of Oxnard Special Districts List
9. Presentation



MEMO

TO: Anthony Miller, City of Oxnard

FROM: Craftwater

SUBJECT: Goals & Objectives Memorandum

Channel Island Harbor Water Quality Feasibility Study & Implementation Plan

Channel Islands Harbor (Harbor) is a constructed harbor area located in western Ventura County and in the City of Oxnard (City). The Harbor serves as the port for over 4,000 recreational, commercial, and industrial vessels and the adjacent area includes residential, commercial, and industrial land uses. For over 60 years, the Mandalay Generating Station (MGS) used a Once-Through Cooling (OTC) pump system to cool power generation equipment. In 2018, the OTC pumps were decommissioned, resulting in a decrease in water circulation with subsequent observations by interested parties that indicate degradation of water quality. The Channel Islands Harbor Water Quality Feasibility Study (Study, CIHWQFS) and Implementation Plan effort will identify, evaluate feasibility, and document the potential costs and benefits of proposed mitigation strategies to address Harbor water quality-related challenges.

The ultimate goals of the Study are to develop a suite of mitigation strategies that will provide solutions to the water quality challenges facing the Harbor, and to outline a plan to implement those strategies. The strategies will span a range of options from pollutant source control and treatment options for the watershed areas draining into the Harbor to methods of enhancing water circulation and oxygenation within the Harbor. These strategies will aim to meet the goals in a phased approach, where the implementation plan will outline how solutions can be realistically applied in the near-, medium-, and long-term. This plan will be essential to provide a clear pathway forward and communicate the vision, strategies, and the cost-benefit analysis of these solutions to a wide array of stakeholders, ensuring that the project is transparent and accessible to all interested parties.

At this stage of the Study there is a need to establish a framework that will allow for the evaluation of various mitigation strategies in the context of the project's overall goals. This memo aims to support a collaborative process where project stakeholders can review and help refine the metrics for evaluating mitigation strategies.

Presented herein is the process and information used to establish the Study goals and objectives, as well as the summary of evaluation metrics to be used for assessing proposed mitigation strategies to meet those goals and objectives (which will be detailed in a future report).

1.0 PROCESS TO ESTABLISH GOALS & OBJECTIVES

This section discusses the methods and processes used to establish the overall goals and objectives of the Study. Methods and processes include background research, data analysis, and coordination with interested parties. In order to provide context to the water quality challenges facing the Harbor and its contributing watershed, a literature review was conducted focusing on professional reports and scholarly articles, a field visit to the Harbor and surrounding area was performed, and data from various sources including the Channel Islands Harbor Water Quality Program, Ocean Monitoring Program, Ventura County Stormwater Quality Monitoring Program, and Ventura County Agricultural Irrigated Lands Group Monitoring Program were reviewed and analyzed.

1.1 Literature Review

The literature review generally focused on watershed pollutant loading inputs and processes within harbors, bays, and/or estuaries that can potentially lead to water quality conditions like hypoxia, eutrophication, pesticide/bacterial impairment, and circulation issues in coastal environments. Compiled reports and articles were reviewed for key information relevant to the water quality and circulation concerns facing the Harbor. Insights from the literature review are summarized below in Section 2.1**.** The complete literature review with full references cited is included with this memo as ***Appendix A – CIHWQFS Literature Review.***

1.2 Field Visit

A field visit was conducted with City and consultant representatives on July 8, 2024. The team discussed conditions in the four main harbor communities: Seabridge, Westport, Mandalay Bay, and Harbor Island. This included 11 locations within and around the Harbor, where water quality and stakeholder concerns facing the Harbor and its contributing watershed area were discussed. Photographs and details from the field visit are included in the field notes that were previously distributed among the team and is included with this memo as ***Appendix B – Field Visit Notes***.

1.3 Data Review

The data review helped to identify areas within Channel Islands Harbor, Edison Canal, and Discharges from the municipal separate storm sewer system (MS4) system and agricultural lands that have had notably impaired water quality. Existing data was analyzed to narrow in on constituents of concern that have not been meeting established water quality objectives (WQOs) for the Harbor and associated water bodies. Measurements of pesticides, nutrients, metals, bacteria, and other standard water quality parameters were available from the City of Oxnard, County of Ventura, Marine Advisory Committee (MAC), California Environmental Data Exchange Network (CEDEN), and previous work covering the study area from development of the Watershed Management Programs (WMP).

A master observations database used for the data analysis was constructed from nearly 250,000 observations collected between July 2003 to May 2024. The 54 monitoring locations in the database represent Kiddie and Hobie Beach (Beach), discharges from the MS4 system and agricultural lands (Discharges), Edison Canal (Edison Canal), Channel Islands Harbor (Harbor), and the Pacific Ocean (Ocean), and are pictured in ***Figure 1-1***. Data collection methods included grab samples, composite samples using autosamplers, and dissolved oxygen and chlorophyll-a measurements in the Harbor from continuously monitoring sensors. The sources of data available are summarized in ***Table 1-1***. The data were cleaned and harmonized to create a master observations database to be used in the data analysis, with findings presented in ***Section 3.0***.

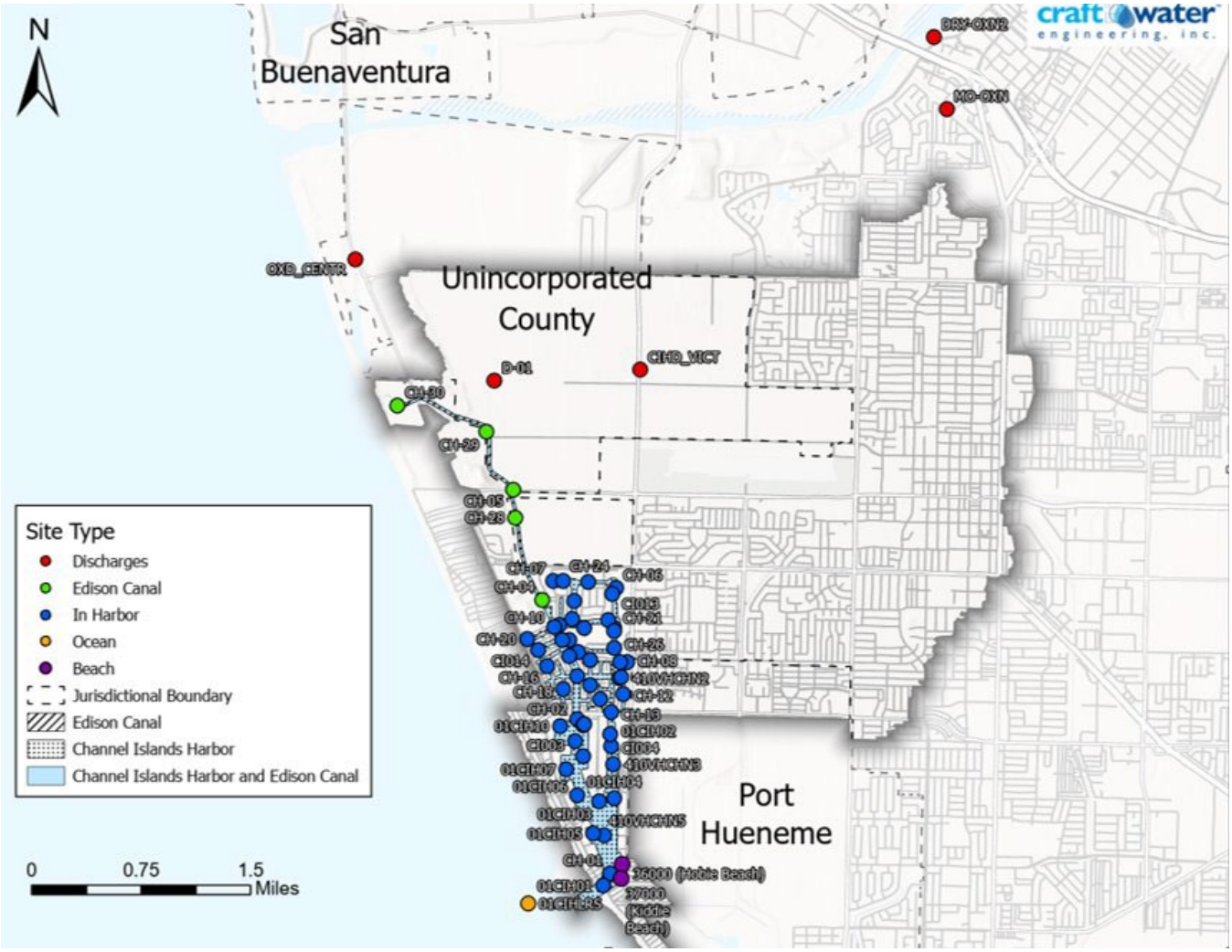


Figure 1-1. Compiled Monitoring Locations (July 2003 to May 2024; various sources).

Table 1-1. Datasets and Sources in Data Review.

Dataset	Source	Period of Data Available
Channel Islands Harbor: Nutrient Sources and Sinks Study	City of Oxnard	2018
Data for Toxicity Report for Ventura County Watershed Protection District	County of Ventura	2021-2023
MO-OXN Dataset of Chemical, Metal, and Bacteria Conditions from County of Ventura	County of Ventura	2021
Channel Islands Harbor Water Quality Data Memorandum by Anchor QEA	MAC	2018
Study 319 Report: Monitoring of Dissolved Copper in California Coastal Waterbodies	MAC	2022

Dataset	Source	Period of Data Available
Continuous Sensor Data at Seabridge and Westport	MAC	2018 - 2024
Channel Island Harbor Water Quality Program	WMP Development - City of Oxnard	2018 - 2024
Ventura County Agricultural Irrigated Lands Group (VCAILG) Monitoring Program	WMP Development - Ventura County Watershed Protection District	2011 - 2021
Ventura County Stormwater Quality Monitoring Program	WMP Development - Ventura County Watershed Protection District	2010 - 2020
Ventura County Watershed Protection District Ocean Monitoring Program	WMP Development - Ventura County Watershed Protection District	2009 - 2023
Additional Physical, Chemical, and Biological Measurements	CEDEN	2003 - 2023

The Los Angeles Region (Region 4) Basin Plan, which includes waterbodies in Ventura County, was referenced to determine the beneficial uses applicable to Channel Islands Harbor and Edison Canal. The Regional Water Board applies beneficial use designations to waterbodies to document the ecosystem services and resources that are inherent to a water body, which provide objectives for the level of water quality protective of those uses. With each of these beneficial uses comes a set of WQOs that state a limit to physical, chemical, and/or biological constituents to be protective of said beneficial use. Beneficial uses for both the Harbor and Edison Canal are as follows:

- Commercial and Sport Fishing (COMM)
- Industrial Service Supply (IND)
- Marine Habitat (MAR)
- Navigation (NAV)
- Water Contact Recreation (REC-1)*
- Non-Contact Water Recreation (REC-2)*
- Wildlife Habitat (WILD)

**Water Contact Recreation (also known as REC-1) encompasses activities "involving body contact with water, where ingestion of water is reasonably possible" such as swimming and wading (California Regional Water Quality Control Board, 2014). Non-Contact Recreation (also known as REC-2) encompasses activities that take place in water but do not necessarily involve direct contact with water. The REC-1 designation for these waterbodies in the Basin Plan are limited to small portions. Lack of public access precludes recreational activities in Edison Canal, and water contact recreational activities are limited in Channel Islands Harbor to the easements of homes in the Mandalay Bay community and the waters at Kiddie and Hobie Beaches. For the data analysis, WQOs associated with both Water Contact Recreation and Non-Contact Water Recreation were evaluated across locations.*

In addition to the Basin Plan, WQOs were sourced based on references used for 303(d) listing decisions. The Clean Water Act 303(d) list identifies impairments to water bodies, which are intended to enforce the creation of Total

Maximum Daily Loads (TMDLs) for constituents found to be negatively impacting water quality. Listing decisions for different constituents included references to the California Toxics Rule, which was established by the EPA to set numeric limits on harmful substances in waters in California to protect the health of humans and the environment, including aquatic life. In addition, certain 303(d) listing decisions for pesticides were based on objectives established in a hazard assessment by California Department of Fish and Game for synthetic pyrethroid insecticides from 2000. Constituents with WQOs in the Harbor are listed in ***Table 1-2*** along with the source of their respective WQO values.

Table 1-2. Water Quality Objectives (WQOs) for constituents of concern in Channel Islands Harbor.

Analyte	Category	WQO	Units	Source
E. Coli	Bacteria	320	CFU/100 ml	Basin Plan
Enterococcus (Discrete)	Bacteria	110	CFU/100 ml	Basin Plan
Enterococcus (Geometric Mean)	Bacteria	35	CFU/100 ml	Basin Plan
Fecal Coliform (Discrete)	Bacteria	400	CFU/100 ml	Basin Plan
Fecal Coliform (Geometric Mean)	Bacteria	2,000	CFU/100 ml	Basin Plan
Total Coliform	Bacteria	10,000	CFU/100 ml	Basin Plan
Biological Oxygen Demand (BOD)	Eutrophic Conditions	48	mg/L	Basin Plan
Chemical Oxygen Demand (COD)	Eutrophic Conditions	360	mg/L	Basin Plan
Chlorophyll-a	Eutrophic Conditions	20	ug/L	EPA Guidance and Carlson Trophic Status Index
Dissolved Oxygen	Eutrophic Conditions	5	mg/L	Basin Plan
Oxygen Saturation	Eutrophic Conditions	80	%	Basin Plan
Antimony	Metals	0.006	mg/L	Basin Plan
Arsenic	Metals	0.01	mg/L	Basin Plan
Cadmium	Metals	hardness-dependent	ug/L	California Toxics Rule
Chromium	Metals	hardness-dependent	ug/L	California Toxics Rule
Copper	Metals	hardness-dependent	ug/L	California Toxics Rule
Lead	Metals	hardness-dependent	ug/L	California Toxics Rule
Mercury	Metals	0.002	mg/L	Basin Plan
Nickel	Metals	hardness-dependent	ug/L	California Toxics Rule
Selenium	Metals	0.05	mg/L	Basin Plan
Silver	Metals	hardness-dependent	ug/L	California Toxics Rule

Analyte	Category	WQO	Units	Source
Zinc	Metals	hardness-dependent	ug/L	California Toxics Rule
Ammonia (various species)	Nutrients	pH dependent	mg/L	Basin Plan
Nitrate as N	Nutrients	10	mg/L	Basin Plan
Nitrate/Nitrite as N	Nutrients	10	mg/L	Basin Plan
Nitrite as N	Nutrients	1	mg/L	Basin Plan
Nitrogen	Nutrients	10	mg/L	Basin Plan
Phosphorus	Nutrients	1	mg/L	No applicable WQO; common practice to evaluate as 10% of TN WQO
Total Kjeldahl Nitrogen	Nutrients	10	mg/L	Basin Plan
Total Nitrogen	Nutrients	10	mg/L	Basin Plan
pH	Other	6.5 ≤ pH ≤ 8.5	pH units	Basin Plan
Aldrin	Pesticides	0.65	ug/L	California Toxics Rule
Aldrin	Pesticides	650	ng/L	California Toxics Rule
Azinphos methyl	Pesticides	0.01	ug/L	Basin Plan
(various species)	Pesticides	0.00397	ug/L	California Department of Fish and Game
Chlordane (various species)	Pesticides	0.004	ug/L	California Toxics Rule
Chlorpyrifos	Pesticides	0.009	ug/L	Basin Plan
Cypermethrin	Pesticides	0.016	ug/L	Basin Plan
DDT (various species)	Pesticides	0.001	ug/L	California Toxics Rule
Demeton (various species)	Pesticides	0.1	ug/L	Basin Plan
Diazinon	Pesticides	0.82	ug/L	Basin Plan
Dieldrin	Pesticides	0.0019	ug/L	California Toxics Rule
Endosulfan	Pesticides	0.0087	ug/L	California Toxics Rule
Endosulfan I	Pesticides	0.056	ug/L	California Toxics Rule
Endosulfan II	Pesticides	0.056	ug/L	California Toxics Rule
Endrin	Pesticides	0.0023	mg/L	Basin Plan
Endrin Aldehyde	Pesticides	0.81	mg/L	California Toxics Rule
Endrin Ketone	Pesticides	0.81	mg/L	California Toxics Rule
HCH, gamma-	Pesticides	0.08	mg/L	California Toxics Rule
Heptachlor	Pesticides	0.00001	mg/L	Basin Plan
Heptachlor epoxide	Pesticides	0.00001	mg/L	Basin Plan

Analyte	Category	WQO	Units	Source
Malathion	Pesticides	0.1	ug/L	Basin Plan
Methoxychlor	Pesticides	0.03	ug/L	Basin Plan
Mirex	Pesticides	0.001	ug/L	Basin Plan
Permethrin (various species)	Pesticides	0.001	ug/L	California Department of Fish and Game
Toxaphene	Pesticides	0.003	mg/L	Basin Plan
Benz(a)anthracene	Toxics/ Organics	0.049	ug/L	California Toxics Rule
Benzo(a)pyrene	Toxics/ Organics	0.0002	mg/L	California Toxics Rule
Chrysene	Toxics/ Organics	0.049	ug/L	California Toxics Rule
Dibenz(a,h)anthracene	Toxics/ Organics	0.049	ug/L	California Toxics Rule
Pentachlorophenol	Toxics/ Organics	7.9	ug/L	California Toxics Rule
Pyrene	Toxics/ Organics	11000	ug/L	California Toxics Rule
Total PCB Aroclor	Toxics/ Organics	0.0005	mg/L	Basin Plan
E. Coli	Bacteria	320	CFU/100 ml	Basin Plan

After the WQOs were established, observations from the master observations database were compared against the WQO values. Observations exceeding established WQOs were flagged as exceedances and the magnitude of that exceedances were calculated as the percent above the WQO. Results were summarized across different site types and by various other groupings and are presented in ***Section 3.0***.

1.4 Interested Party Coordination

During development of the Study goals and objectives and continued refinement of mitigation strategy evaluation metrics, regular coordination was held, and will continue to be held, with various interested parties including the MAC, local agricultural community representatives and the Farm Bureau, residents, City operations staff and management, adjacent landowners, regulatory agency staff, and others. Interested party coordination includes monthly update meetings, one-on-one focused discussions, and informal communications. Input from these meetings is regularly incorporated into the Study analyses and outcomes.

2.0 BACKGROUND RESEARCH

This section provides an executive summary of the background research that was conducted for the Study. Full details of both the Literature Review and the Field Visit can be found in ***Appendix A – CIHWQFS Literature Review*** and ***Appendix B – Field Visit Notes***, respectively.

2.1 Literature Review Summary

The following is a summarization of major takeaways from the literature review. The literature review, with all references used to prepare it, can be found in ***Appendix A – CIHWQFS Literature Review***.

2.1.1 Upstream Inputs

Nutrient enrichment in receiving waters, primarily from agricultural and urban runoff, is a leading cause of eutrophication, which results in harmful algal blooms and low dissolved oxygen levels. Southern California's unique bays, harbors, and estuaries are highly vulnerable to nutrient enrichment due to significant watershed modifications and geomorphological features. Seasonal shifts in nutrient sources—from riverine inputs in the wet season to bottom sediment nutrient recycling in the dry season—play a critical role in nutrient dynamics. Bottom sediments act as reservoirs of nutrients, releasing nitrogen and phosphorus during hypoxic conditions and supporting algal growth during low external loading. The combined effects of nutrient pulses after storm events, prolonged by altered hydrology, contribute to ongoing nutrient loading in these estuaries. Agricultural and urban land use areas are also capable of acting as sources of pesticides and fecal bacteria in stormwater, that can contribute to impairments and exceedances of WQOs in receiving waters.

2.1.2 Harbor Environments & Circulation

The physical dynamics of water circulation like residence time and flushing time are critical in regulating nutrient levels and oxygenation in estuaries and harbors and can play a role in dilution of other constituents. These factors are particularly important in understanding how nutrients and oxygen are distributed, and they help predict when and where hypoxia is likely to occur. In estuarine harbors with restricted tidal flow or poor circulation, nutrients and pesticides tend to accumulate, leading to harmful conditions such as hypoxia, where dissolved oxygen levels drop below critical thresholds, or toxicity to marine life. Hypoxia events are influenced by tidal, daily, lunar, and seasonal cycles. Poorly flushed areas, especially those with man-made structures restricting water flow, are highly susceptible to these events. Poor harbor circulation also contributes to exceedances of safe levels of fecal bacteria in recreational waters, as flushing out of these bacteria may be inhibited.

Physical processes like tidal range, wind, and water depth also regulate hypoxia and algal bloom dynamics. Systems with better tidal exchange can dilute nutrient concentrations more effectively, reducing the severity of eutrophication. Water bodies with long water residence times and limited flushing see more frequent and intense algal blooms, often driven by nutrient resuspension from sediments and stratification that prevents proper mixing.

2.1.3 Management Implications

Effective management of harbor water quality requires addressing bacterial, pesticide, and nutrient inputs as well as physical water circulation. Strategies like enhancing tidal flushing and monitoring parameters such as dissolved oxygen, bacteria, pesticide, and nutrient levels are critical for adaptive management, especially in water bodies with complex circulation dynamics. An array of structural and nonstructural solutions can be employed to address the variety of concerns facing Channel Islands Harbor, which will be addressed at future stages of the Study.

2.2 Field Visit Summary

The field visit to Channel Island Harbor provided valuable insights into water quality and land use across various watershed and harbor locations to support the goals of the Study. The following is a summarization of major takeaways from the field visit. Photographs and details from the field visit are included in the field notes that were previously distributed among the team and are attached to this memo as ***Appendix B – Field Visit Notes***.

Visual observations during the field visit varied across the harbor. In many areas, water appeared clear with minimal trash or suspended sediment, and there was evidence of good circulation, particularly in more open sections close to the outlet to the ocean. However, some areas exhibited signs of stagnation, cloudiness, and surface scum, especially in more isolated or confined zones. Trash accumulation was noted in certain locations, especially at the debris boom that separates Edison Canal from the Harbor. It was noted that dead marine animals have also been found at this location, and fish kills have occurred in confined areas.

Land use immediately surrounding the Harbor is diverse, ranging from recreational beaches and parks to residential neighborhoods with individual boat slips to commercial areas with large parking lots and high boat density. Inputs contributing to water quality in this zone may include pet waste, waste from wildlife such as birds and seals, and urban runoff. The areas draining to Edison Canal are predominantly agricultural lands, which showed signs of irrigation drainage contributing dry-weather flow to the canal. Water in the canal was noted to be rather stagnant and contained varied amounts of trash.

Overall, the harbor displayed a range of water quality conditions, with some areas performing well in terms of clarity and circulation, while others faced challenges related to debris, stagnation, and pollutants. Harbor maintenance responsibility is shared between the City and Ventura County, with additional coordination from the Army Corps of Engineers and the Coast Guard. The diverse land use and shared responsibility for maintenance highlight the need for coordinated efforts to address these water quality concerns.

3.0 DATA REVIEW FINDINGS

This section presents results from analyses of the data reviewed for the Study from the sources referenced in ***Table 1-1***. As discussed in ***Section 1.3***, available data from the ocean and beaches at the outlet of the Harbor, MS4 and agricultural discharges to Edison Canal and the Harbor, and Edison Canal and the Harbor themselves were analyzed against applicable WQOs protective of established beneficial uses. The frequency and magnitude of WQO exceedances is presented for all locations and further broken down by site type to investigate potential linkage between inputs to the Harbor and observed in-Harbor conditions. The analysis highlights constituents of concern based on those with the highest frequency and magnitude of exceedances, for which will be the focus of evaluating each mitigation strategy's ability to improve water quality conditions in the Harbor.

3.1 All Sites

Overall results comparing discrete observation data (other than dissolved oxygen discrete samples, which are combined with continuous observations in ***Section 3.1.1***) against their respective WQO values prior to (Before) and following (After) the MGS decommissioning in 2018 for the Beach, Discharge, Edison Canal, Harbor, and Ocean locations are presented in ***Figure 3-1***. This analysis was intended to identify any significant changes in conditions following the MGS decommissioning. However, due to limited data available at the Edison Canal, Ocean, and Harbor locations prior to the MGS decommissioning there are limited observations comparing these periods. Results are still presented in ***Figure 3-1*** for context. Across all site types and periods of data analyzed, the highest frequency of exceedances were observed at the Discharge locations, with similar exceedance frequencies before and after the MGS decommissioning. Harbor sites exceedance frequencies slightly increased following the MGS decommissioning, but as stated above, this is based on drastically different sizes of datasets available for the respective periods.

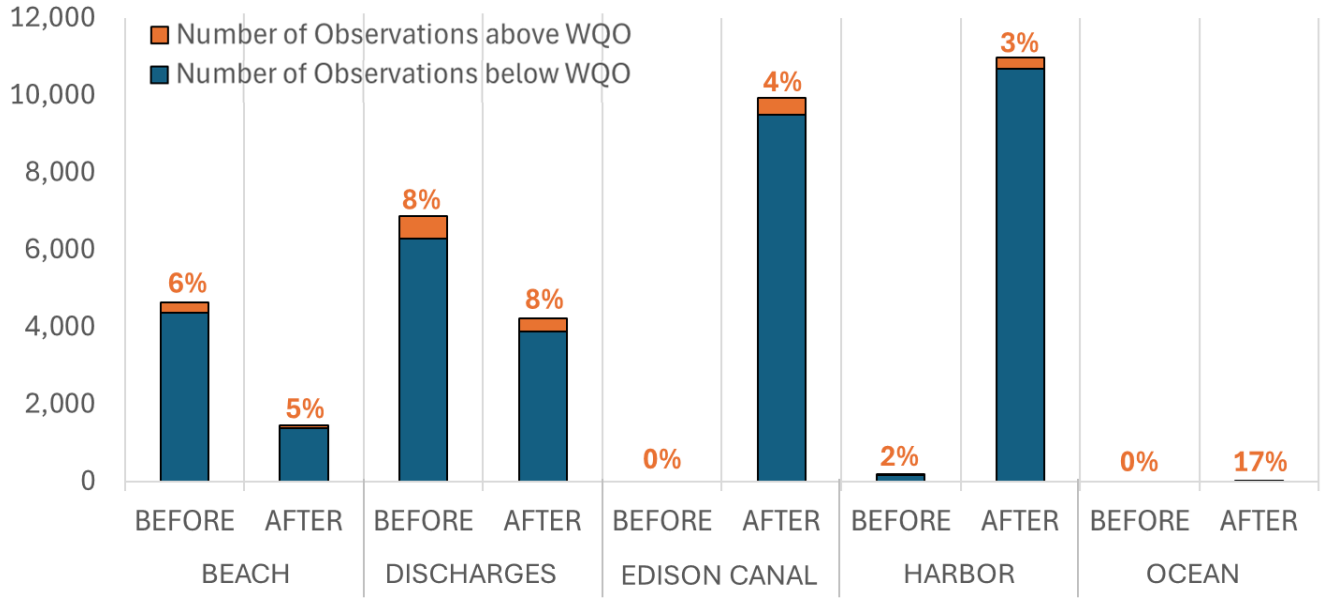


Figure 3-1: Count of Observations and Frequency of Exceedances of WQOs by Site, Before and After MGS Decommissioning in 2018.

3.1.1 Dissolved Oxygen

Measurements from grab samples, composite samples, and continuous sensors in Channel Islands Harbor were combined to perform the analysis for dissolved oxygen. Dissolved oxygen observations were available at Discharges, Edison Canal, and Harbor sites. Depression of dissolved oxygen refers to dissolved oxygen concentrations below the 5 mg/L WQO limit, which can result in anaerobic conditions impairing aquatic life. The number of observations by site type and season (Summer is defined as May-September, Winter as October-April) are presented in ***Figure 3-2.*** Seasonal differences were explored to identify if problematic conditions of depressed dissolved oxygen were more prevalent during the summer season in the Harbor.

During the summer months, depressed dissolved oxygen, or any observations below the minimum of 5 mg/L, were more frequent as compared to winter months in the Harbor. Overall, dissolved oxygen dropped below recommended levels across 10.4% of all observations in the Harbor. Low observations of dissolved oxygen in Discharges or Edison Canal were very rare, only dropping below 5 mg/L for 3.0% of all observations from Discharges and 2.8% of all observations from Edison Canal.

The overall trend of depressed dissolved oxygen in the summer can be explained, at least in part, by increased water temperatures, which reduce oxygen solubility and promote biological activity that consumes oxygen. The lack of circulation, especially in areas like the Harbor, exacerbates the problem during warmer months, which can lead to more frequent and severe depressed dissolved oxygen.

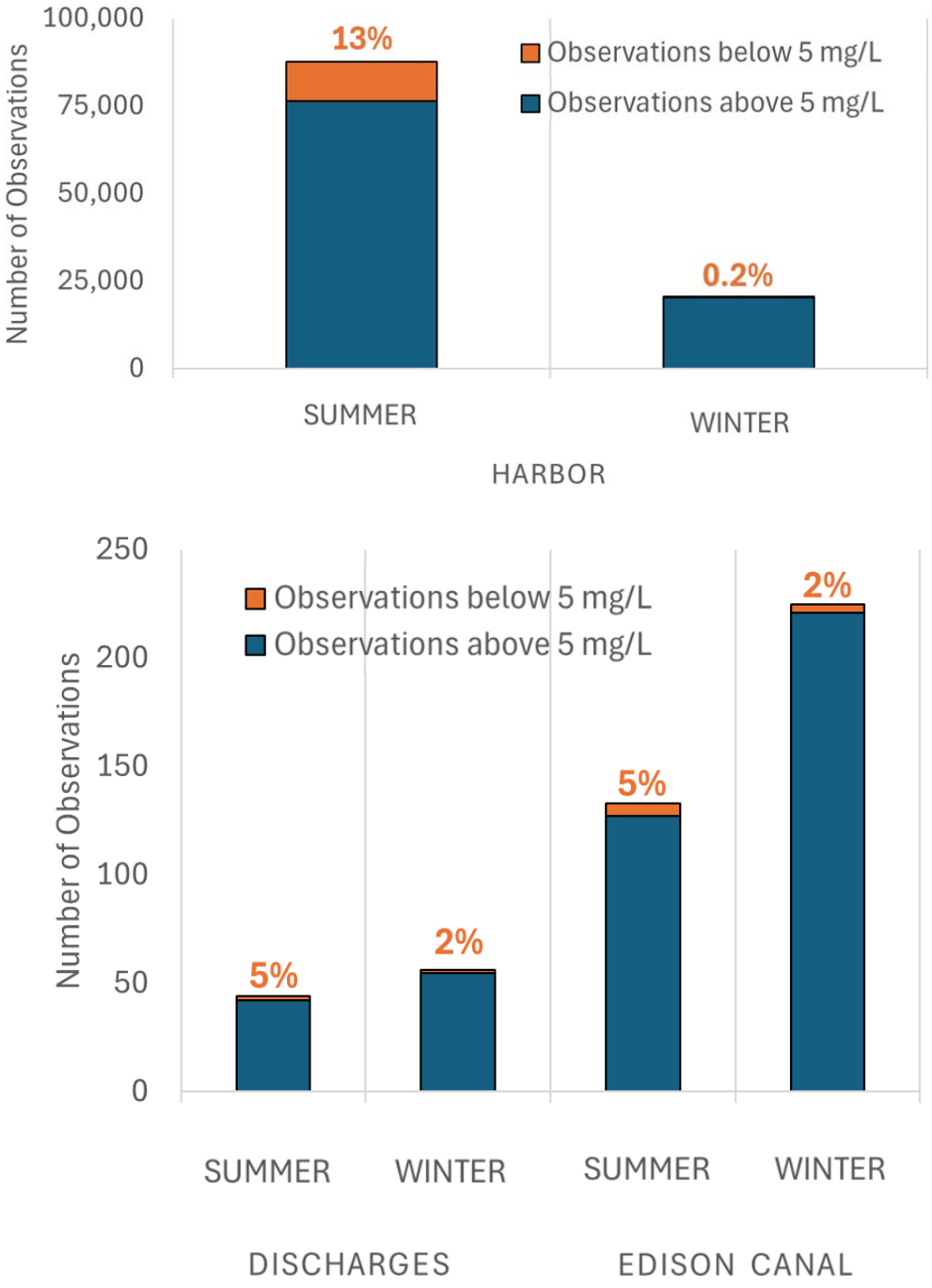


Figure 3-2. Count of Dissolved Oxygen Observations and Frequency of Depressed Values (below 5 mg/L) by Season.

3.1.2 Chlorophyll-a

Measurements from continuous monitoring sensors in Channel Islands Harbor were used to assess chlorophyll-a concentrations as part of the analysis characterizing water quality conditions. Chlorophyll-a indicates algal growth that can be potentially harmful to aquatic life. The number of observations in the Harbor and by season (Summer

is defined as May-September, winter as October-April) are presented in ***Figure 3-3***, which also shows the frequency of exceedances (when Chlorophyll-a is above 20 ug/L). Seasonal differences were explored to identify if problematic conditions of algal growth were more prevalent during the summer season in the Harbor.

In the summer, there are a total of 95,120 observations of chlorophyll-a in the Harbor, with an overall frequency of exceedances of 8.1%. In the winter, there were 21,263 observations, with a frequency of exceedances of 4.9%. In addition to the frequency, the median magnitude of chlorophyll-a exceedance in the summer is 40%, or 1.4 times the WQO, indicating that when exceedances do occur, the levels are moderately higher than the WQO. The median magnitude of exceedances in the winter was 64%, or 1.64 times the WQO, indicating that winter algae blooms may be slightly more severe or widespread than those in the summer. However, the low frequency of exceedances in both seasons suggests that while there is some evidence of periodic algae blooms, the majority of the time chlorophyll-a levels remain below the limit that would impair aquatic life.

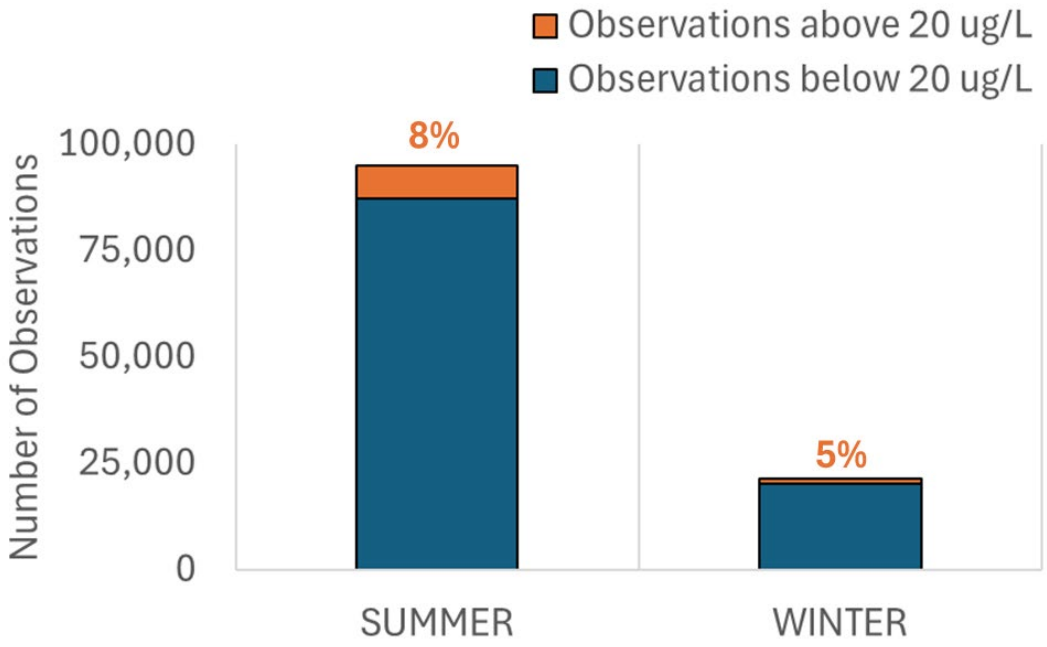


Figure 3-3: Count of Chlorophyll-a Observations and Frequency of Exceedances (above 20 ug/L) in the Harbor, by Season.

3.2 Discharges

Available data from discharges from the MS4 system and agricultural lands in the Channel Islands Harbor watershed were reviewed. Discharge data provides context for constituents entering the Harbor from the upstream watershed, either directly or indirectly via Edison Canal. Observations included measured bacteria, metals, and pesticides, and were analyzed relative to applicable WQOs as listed in ***Table 1-2***. ***Figure 3-4*** and ***Figure 3-5*** present results in terms of the median magnitude of exceedances, as the percent above their respective WQOs. ***Figure 3-6*** presents the same median magnitudes of exceedances along with the frequency of exceedances of their respective WQOs.

Observations from discharges highlight several trends, particularly for constituents such as Mirex, Permethrin (trans), and Permethrin (cis), which stand out due to higher magnitudes of exceedance. In general several pesticides measured in discharges exceeded WQOs at higher frequencies and magnitudes. Mirex exhibits a high median magnitude of exceedance at over 74,460%, or 745 times the WQO, making it a notable outlier. However, it is important to note that while the magnitude of exceedance is the highest observed across constituents at discharge sites, the frequency of exceedance for Mirex is at 9%. Permethrin (trans) and Permethrin (cis) show the next highest magnitudes of exceedance at 14,800% (149 times the WQO) and 10,110% (102 times the WQO), respectively, and a frequency of 11%. The next highest magnitude of exceedances were for Chlordane and Methoxychlor, with median exceedances at 9,900% (100 times the WQO) and 3,780% (39 times the WQO), respectively.

The top five constituents with the highest magnitude of exceedances at Discharge sites were **Mirex, Permethrin, Chlordane, Methoxychlor,** and ***Enterococcus***. The top five constituents with the highest frequency of exceedances at Discharge sites were **Chlordane, Dibenz(a,h)anthracene, DDT, *Enterococcus*** (excluding Total Coliform and Fecal Coliform as secondary fecal indicator bacteria objectives), and **Bifenthrin**.

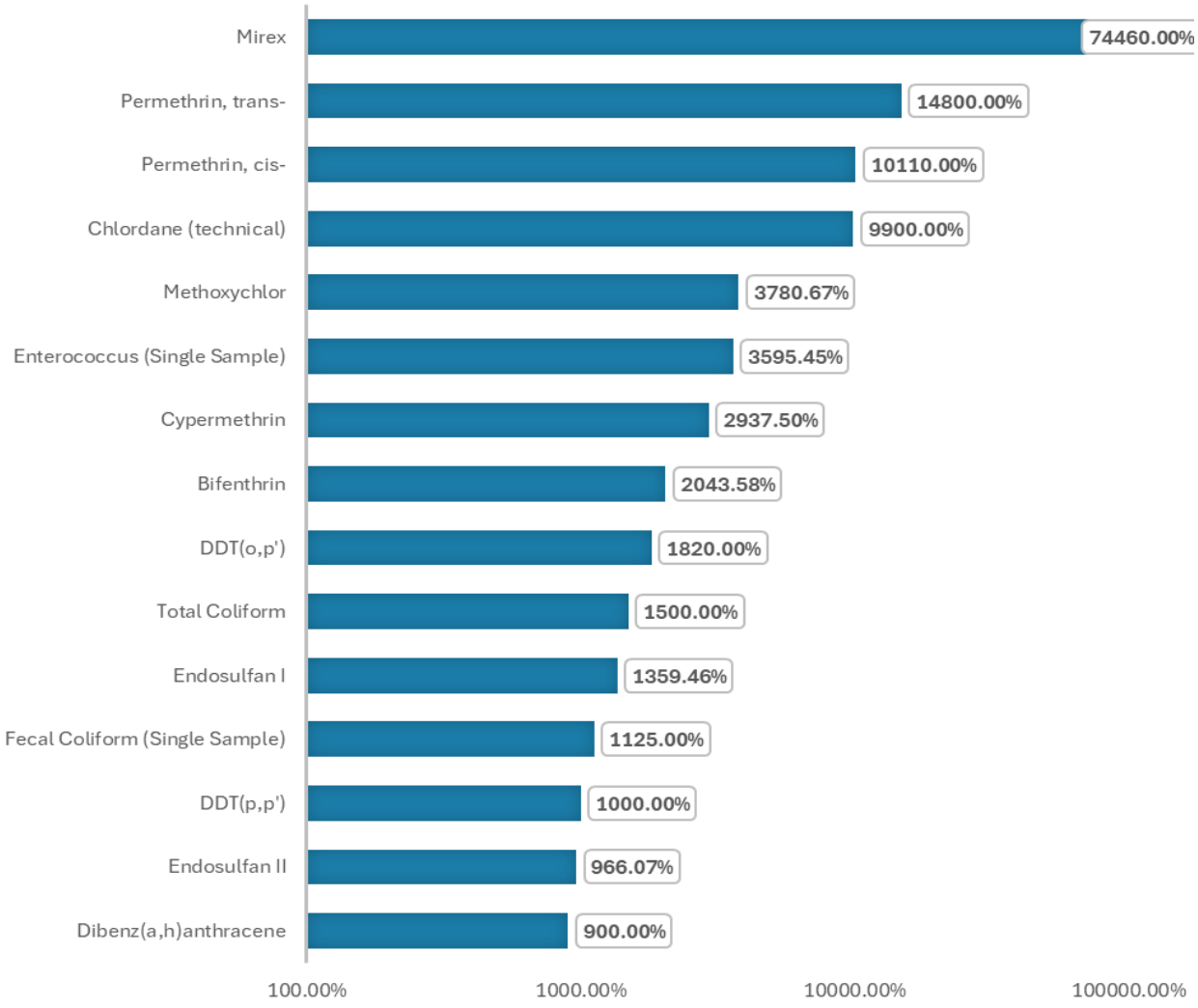


Figure 3-4. Median Magnitude of Exceedances of WQOs at Discharge Sites (top 15 constituents exceedance magnitudes).

Note: Select pesticides included distinct measurements of trans- and cis- isomers, which represent different arrangements of atoms in the molecule.

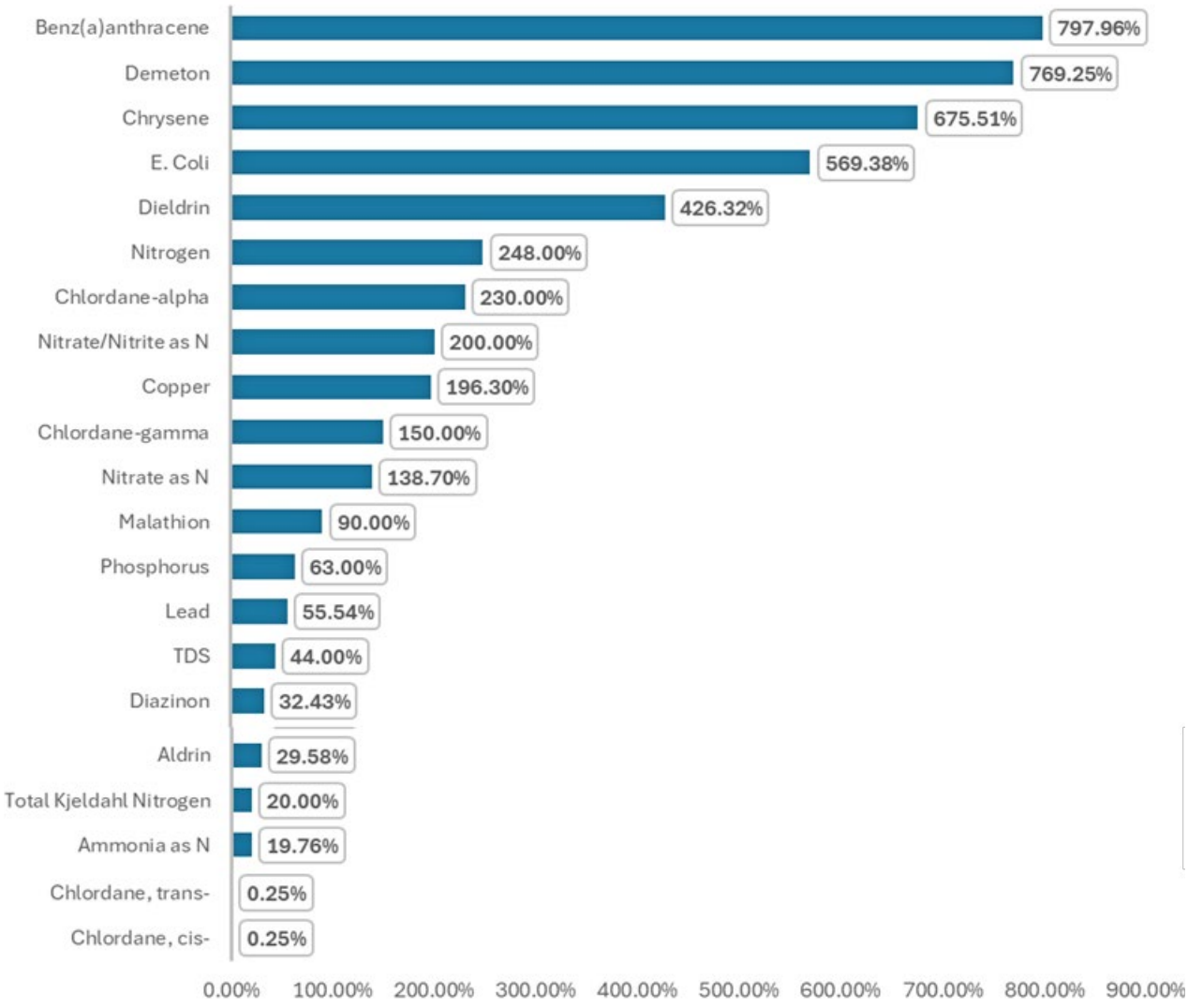


Figure 3-5: Median Magnitude of Exceedances of WQOs at Discharge Sites (remaining constituents with exceedances).

Note: Select pesticides included distinct measurements of trans- and cis- isomers, which represent different arrangements of atoms in the molecule.

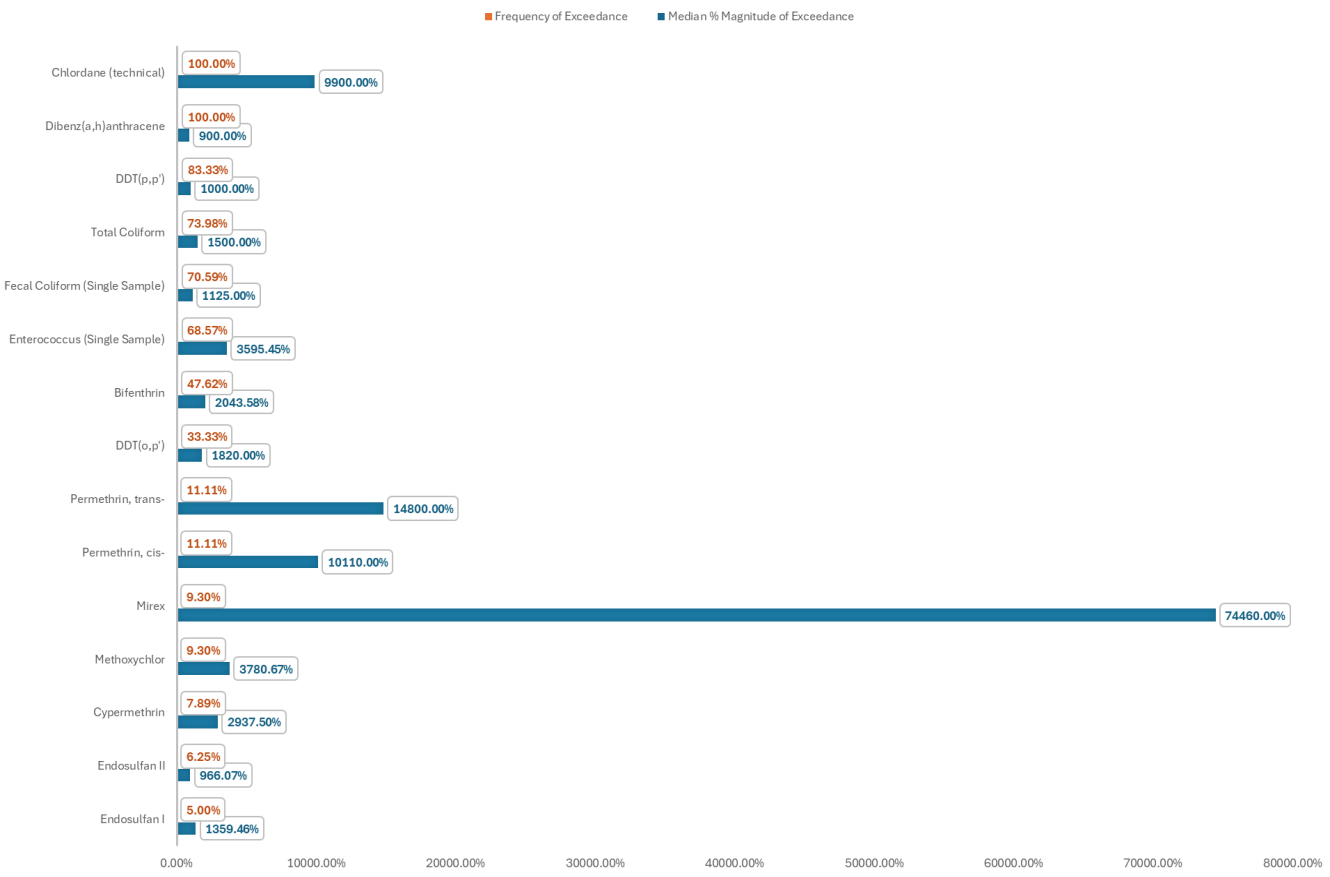


Figure 3-6: Frequency of Exceedances and Median Magnitude of Exceedances of WQOs at Discharge Sites.

3.3 Edison Canal

Available data from Edison Canal, which feeds into Channel Islands Harbor, were reviewed. Observations included grab samples and composite samples with measured bacteria, metals, and pesticides, and were analyzed relative to applicable WQOs as listed in ***Table 1-2***. ***Figure 3-7*** and ***Figure 3-8*** presents results in terms of the median magnitude of exceedances, as the percent above their respective WQOs. ***Figure 3-9*** presents the same median magnitudes of exceedances along with the frequency of exceedances of their respective WQOs.

Pesticides such as Permethrin are the most notable constituents at Edison Canal sites, with a median exceedance of over 1,000,000% (more than 10,000 times the WQO). This highlights high levels of contamination, combined with the fact that Permethrin exceeded limits across 50% of the observations, indicating not only high magnitudes but also frequent instances of exceedance. Metals of concern are Copper, which had a median exceedance of over 28,000% (over 280 times the WQO) with a 59% frequency of exceedance, and Selenium, which exceeded limits across all observations analyzed. Bifenthrin follows closely, with a median exceedance of 8,212% (83 times the WQO) and a 72% frequency of exceedance. DDT, had a median exceedance of 5,400% (55 times the WQO) but a frequency of only 8%. Further, nutrients such as Nitrogen in the form of Nitrate and Nitrite exhibit more moderate exceedances compared to the pesticides and metals, with median exceedance magnitudes of 472% (5.7 times the WQO) and 180% (2.8 times the WQO), respectively.

The top five constituents with the highest magnitude of exceedances at Edison Canal sites were **Permethrin, Copper, Bifenthrin, DDT,** and ***Enterococcus***. The top five constituents with the highest frequency of exceedances at Edison Canal sites were **Selenium, Bifenthrin, Copper, DDT,** and **Permethrin** (excluding TDS [Total Dissolved Solids] as a secondary pollutant of concern)**.**

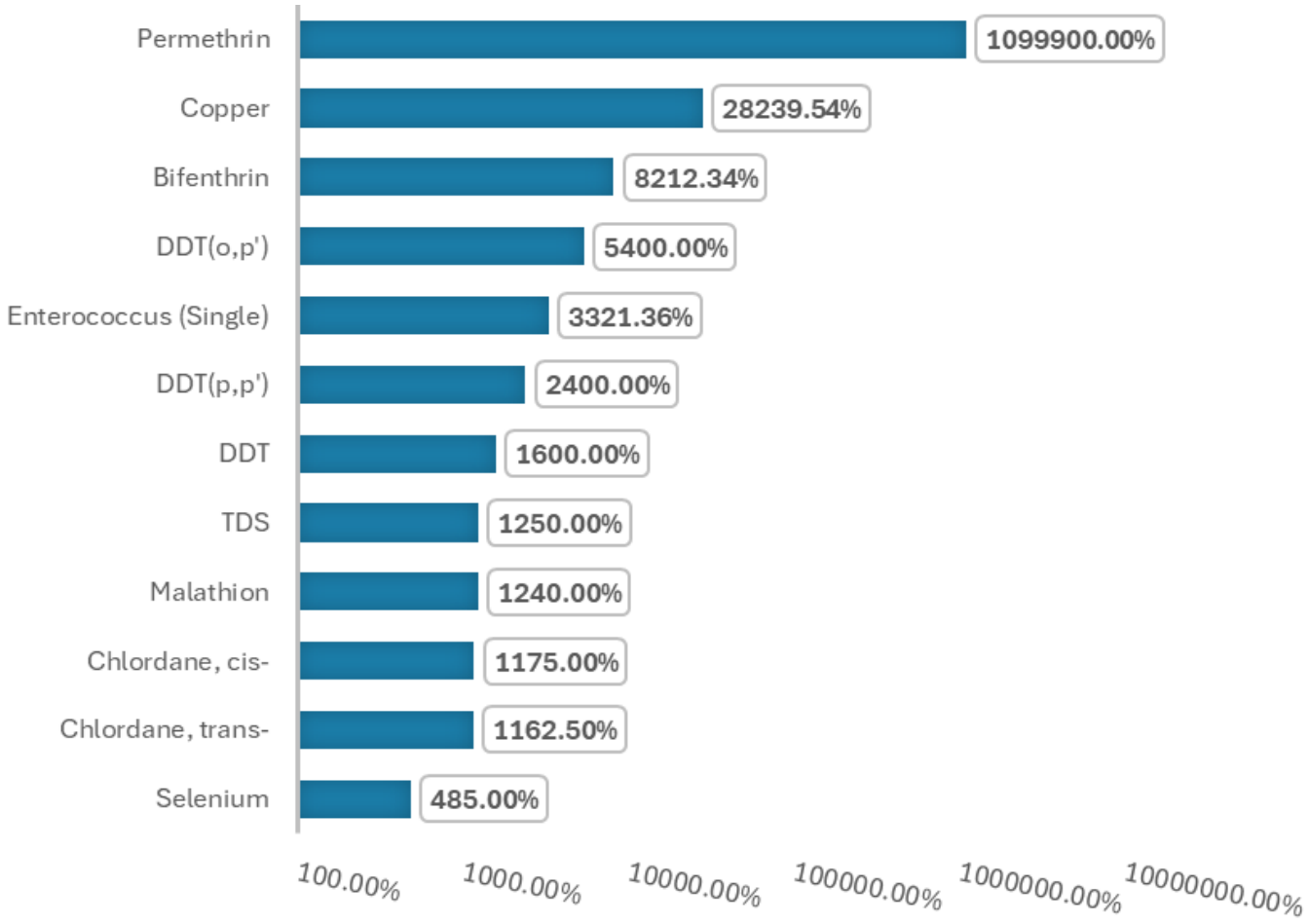


Figure 3-7: Median Magnitude of Exceedances of WQOs at Edison Canal Sites (top 12 constituents exceedance magnitudes).

Note: Select pesticides included distinct measurements of trans- and cis- isomers, which represent different arrangements of atoms in the molecule.

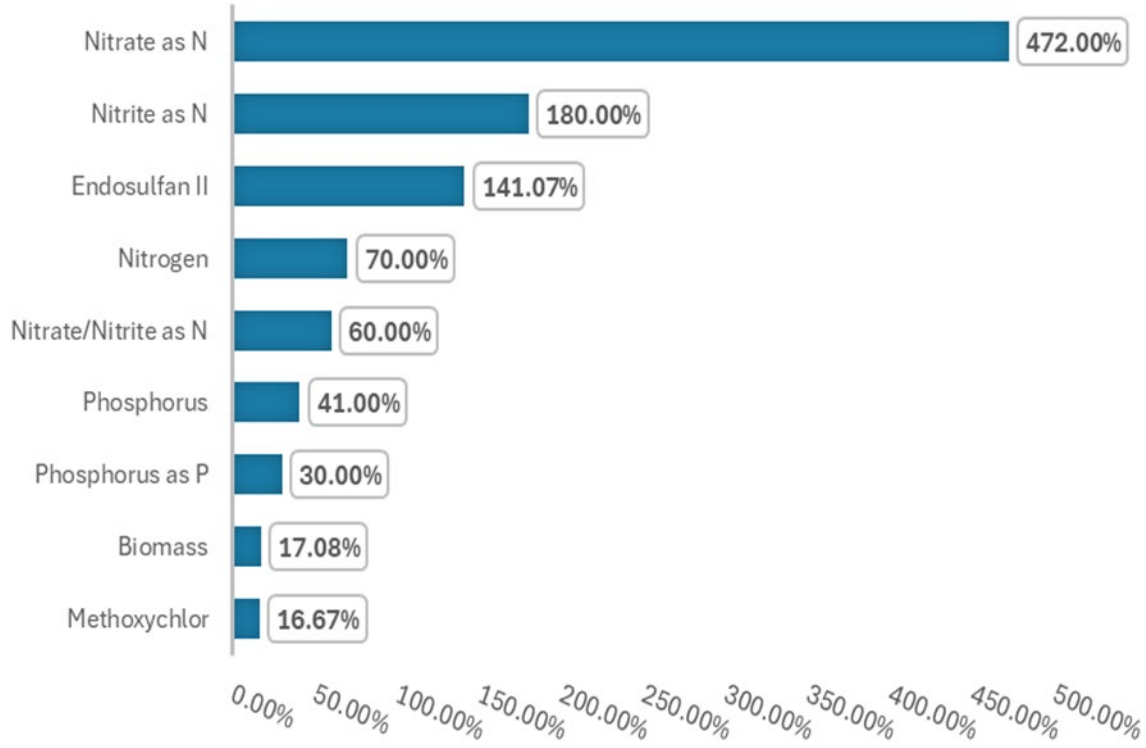


Figure 3-8. Median Magnitude of Exceedances of WQOs at Edison Canal Sites (remaining constituents with exceedances).

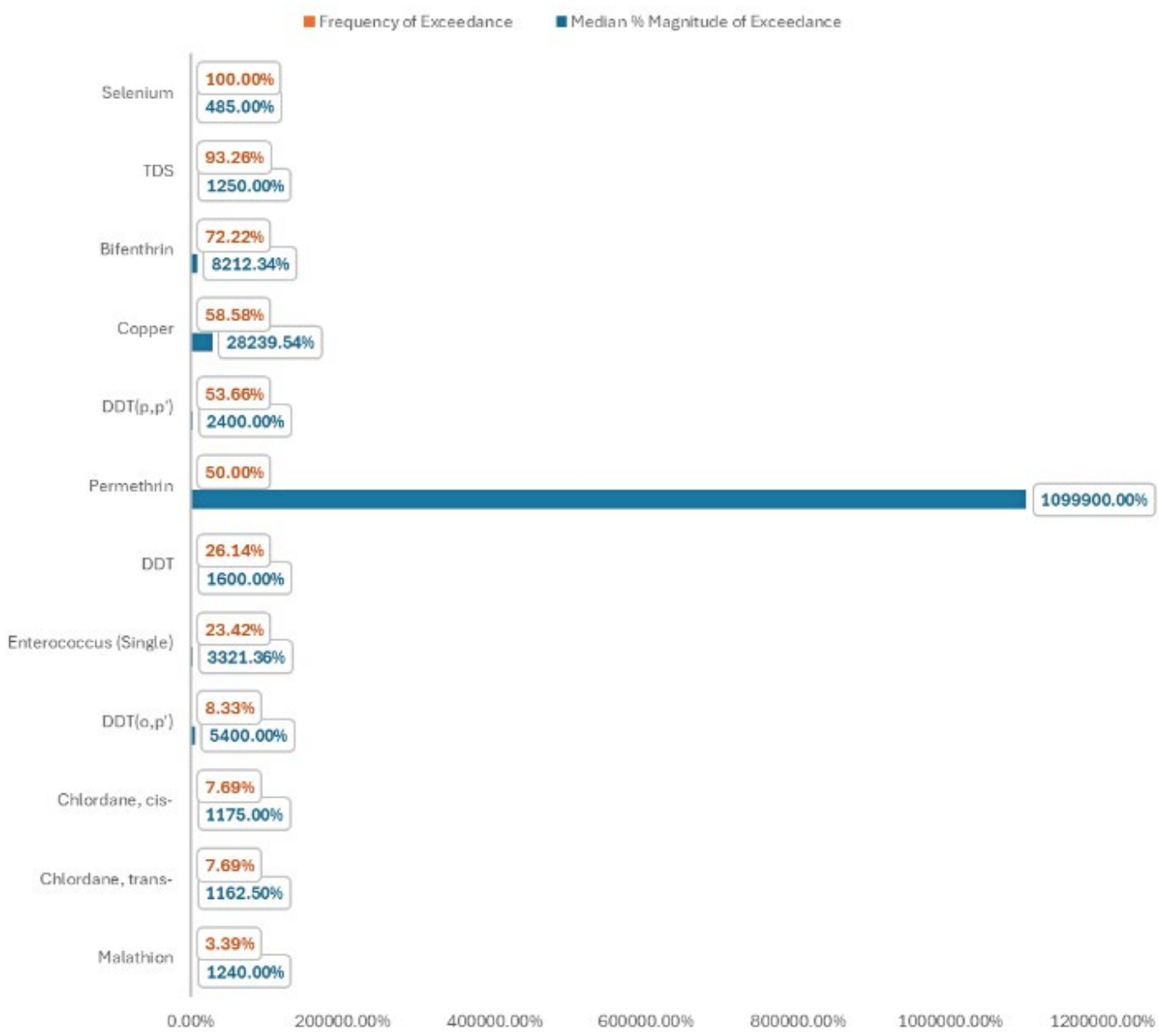


Figure 3-9: ***Frequency of Exceedances and Median Magnitude of Exceedances of WQOs at Edison Canal Sites.***

3.4 Channel Islands Harbor

Available data from observations throughout the Harbor were reviewed and included grab samples and composite samples with measured bacteria, metals, and pesticides, and were analyzed relative to applicable WQOs as listed in ***Table 1-2***. ***Figure 3-10*** presents results in terms of the median magnitude of exceedances, as the percent above their respective WQOs. ***Figure 3-11*** presents the same median magnitudes of exceedances along with the frequency of exceedances of their respective WQOs.

Within the Harbor, similar to Edison Canal, Permethrin stood out with the highest median magnitude of exceedances, with a median exceedance of nearly 200,000% (2,000 times the WQO). However, the frequency of

exceedance for Permethrin is 17% across all Harbor observations. Copper is another constituent of concern similar between Edison Canal and the Harbor, showing a median exceedance in the Harbor of over 28,000% (over 281 times the WQO) and a relatively higher frequency of exceedances in the Harbor of 43%. Malathion, though its median exceedance is 4,700% (48 times the WQO), has a much lower frequency of 2%. Further, constituents like *Enterococcus* show a consistent pattern of exceedance as compared to REC-1 standards with a median exceedance of 1,526% (16 times the WQO) and a frequency of exceedances of 20%. Bifenthrin in the Harbor had a median magnitude of exceedance of over 400% (over 5 times the WQO), and a 35% frequency of exceedance.

The top five constituents with the highest magnitude of exceedances at Harbor sites were **Permethrin, Copper, Malathion, *Enterococcus*,** and **DDT** (excluding TDS [Total Dissolved Solids] as a secondary constituent of concern). The top five constituents with the highest frequency of exceedances at Harbor sites were **Selenium, Copper, Bifenthrin, DDT,** and ***Enterococcus*** (excluding TDS [Total Dissolved Solids] as a secondary constituent of concern)**.**

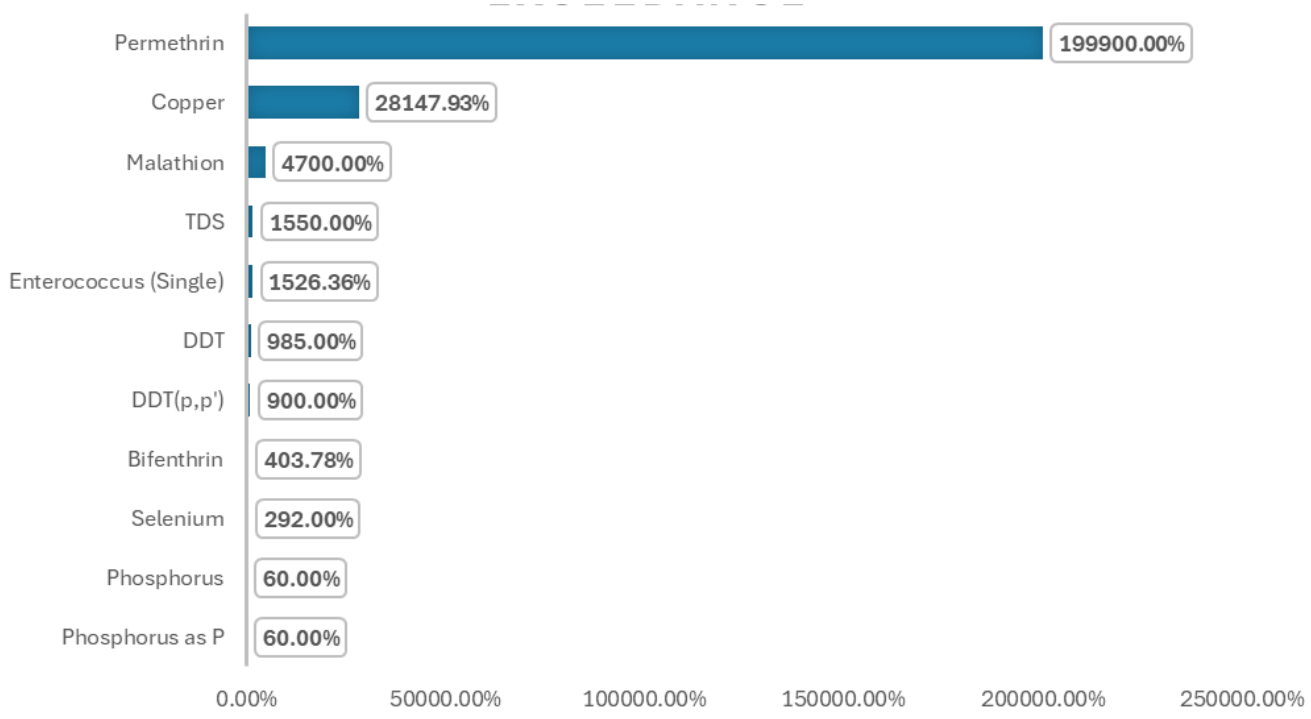


Figure 3-10: Median Magnitude of Exceedances of WQOs at Harbor Sites.

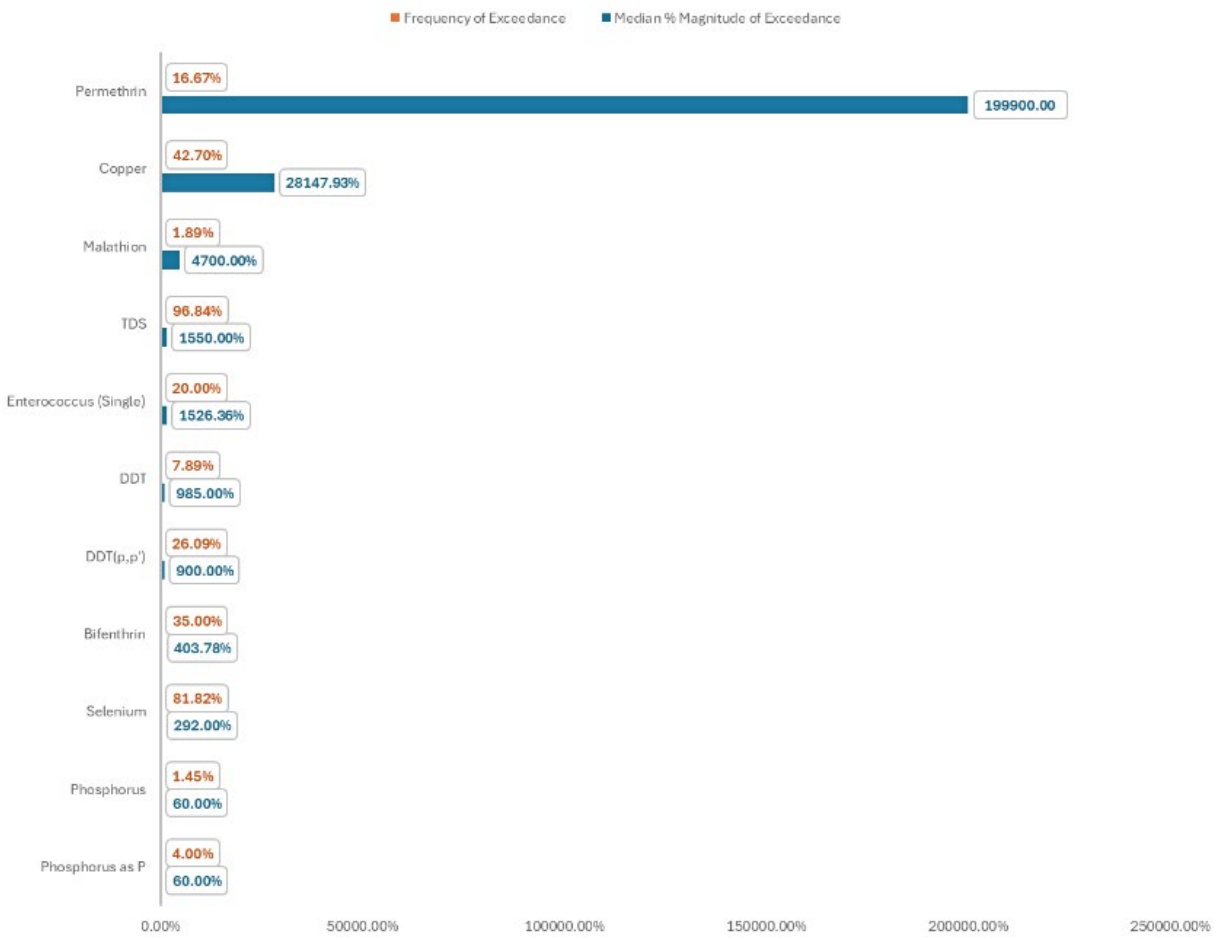


Figure 3-11: Frequency of Exceedances and Median Magnitude of Exceedances of WQOs at Harbor Sites.

3.5 Beaches

Available data from Beach sites, which represent Kiddie and Hobie beaches at the mouth of the Harbor, were reviewed. While the beaches are not the focus of this Study, water quality conditions were reviewed for context at the downstream extent of the Harbor. Observations included grab samples and composite samples specifically for fecal indicator bacteria. ***Figure 3-12*** presents results in terms of the median magnitude of exceedances, as the percent above their respective WQOs. ***Figure 3-13*** presents the same median magnitudes along with the frequency of exceedance of their respective WQOs. WQOs for discrete observations (tagged with _Single) and geometric means over a rolling 30-day period (tagged with _Geo) were referenced where applicable for different fecal indicator bacteria.

Enterococcus had a median magnitude of exceedance for the single observation objective at beaches at over 200% (3 times the WQO), followed by Fecal Coliform at 169% (2.7 times the WQO), and Total Coliform at 142% (2.4 times the WQO). However, the frequency of these exceedances remains relatively low, with *Enterococcus* exceeding single observation limits 8.0% of the time and Fecal Coliform and Total Coliform only 4.0% and 2.6%, respectively. Geometric mean calculations of *Enterococcus* had a lower median magnitude of exceedance of 44% (1.4 times the WQO), but a frequency of exceedance at 13%.

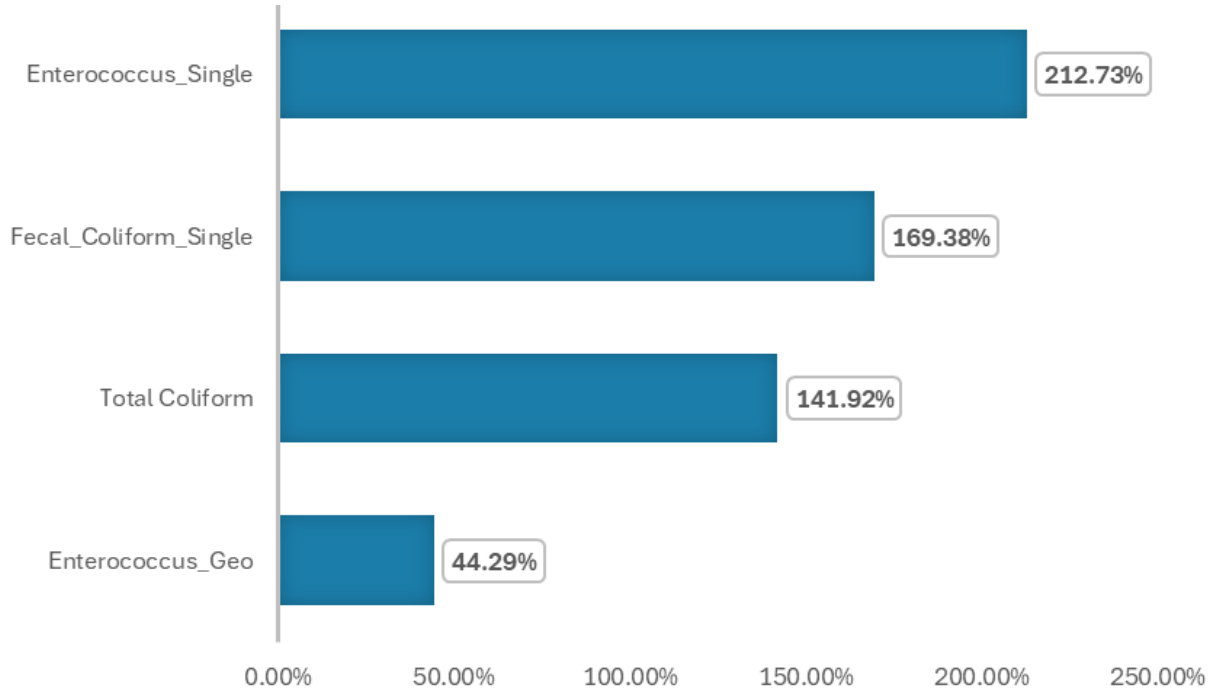


Figure 3-12: Median Magnitude of Exceedances of WQOs at Beach Sites (Kiddie and Hobie Beaches).

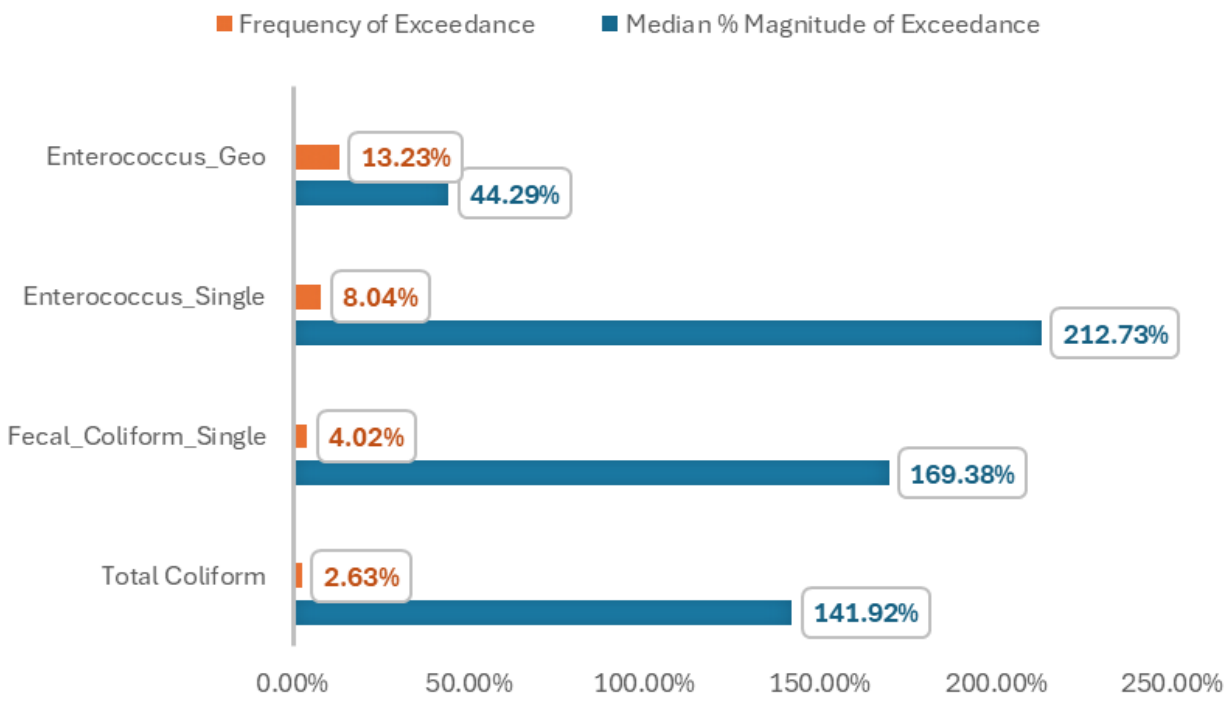


Figure 3-13: Frequency of Exceedances and Median Magnitude of Exceedances of WQOs at Beach Sites (Kiddie and Hobie Beaches).

3.6 Constituents of Concern and Key Takeaways

This section summarizes the key takeaways from the data analysis, highlights constituents of concern based on the frequency and magnitude of exceedances observed in Edison Canal and the Harbor, and constituent trends at the various monitoring locations. ***Figure 3-14*** and ***Figure 3-15*** present the median magnitudes of exceedances of Bifenthrin and Permethrin across individual monitoring sites in Edison Canal and the Harbor to provide more spatial context on exceedances observed. Bifenthrin and Permethrin were an initial focus given both pesticides were recently added to the 2024 303(d) list for impairments to Channel Islands Harbor. ***Figure 3-16*** present the average percent below the dissolved oxygen minimum threshold (5 mg/L) across individual monitoring sites in Edison Canal and the Harbor. Dissolved oxygen is a key parameter to focus on as it relates to water quality conditions protective of aquatic life.

3.6.1 Constituents of Concern

Bifenthrin and Permethrin are consistently identified as constituents of concern in both Edison Canal and the Harbor areas. These pesticides exhibit high exceedance magnitudes, particularly during dry days.

1. Bifenthrin shows a median exceedance magnitude reaching up to **550,000%** (over 5,500 times the WQO) in the Harbor under dry weather conditions.

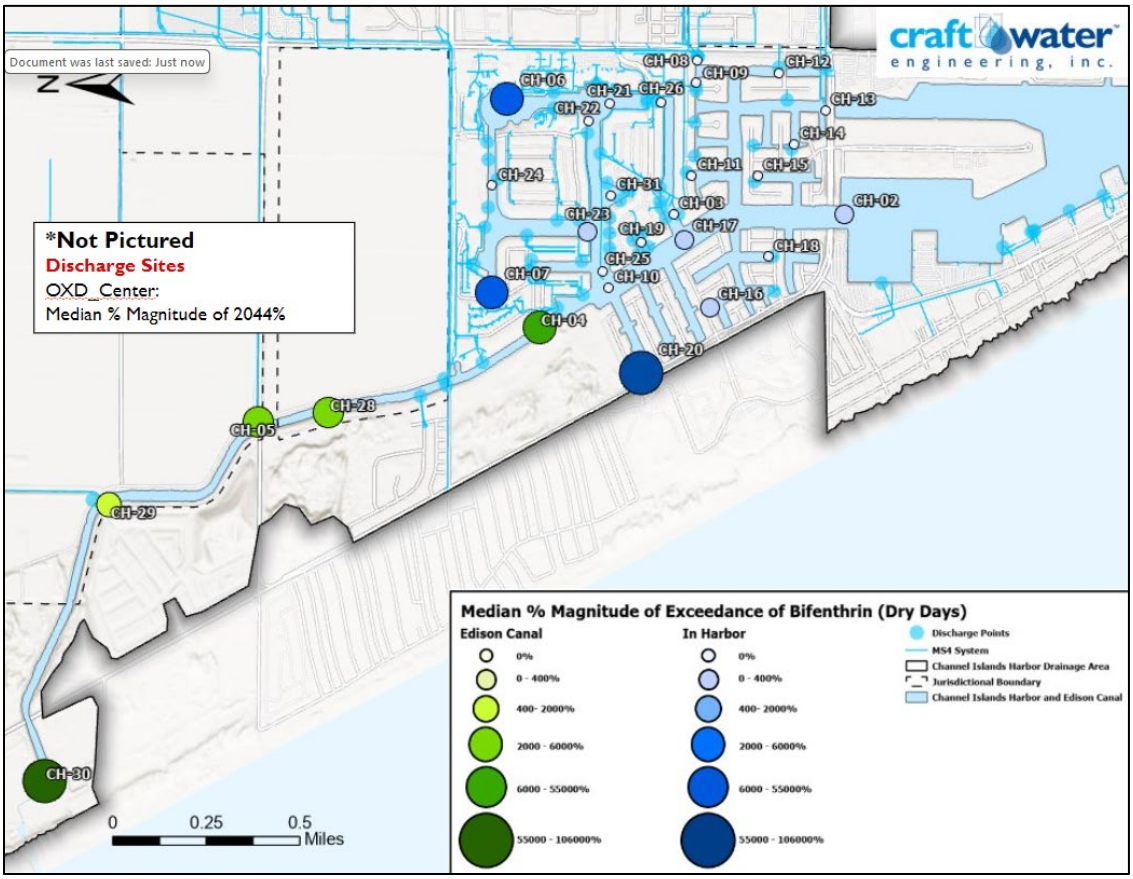


Figure 3-14. Bifenthrin Magnitude of Exceedances in Edison Canal and Harbor.

2. Permethrin exceeds standards by up to 530,000% (over 5,300 times the WQO) in Edison Canal and the Harbor, with the highest concentrations observed near discharge points.

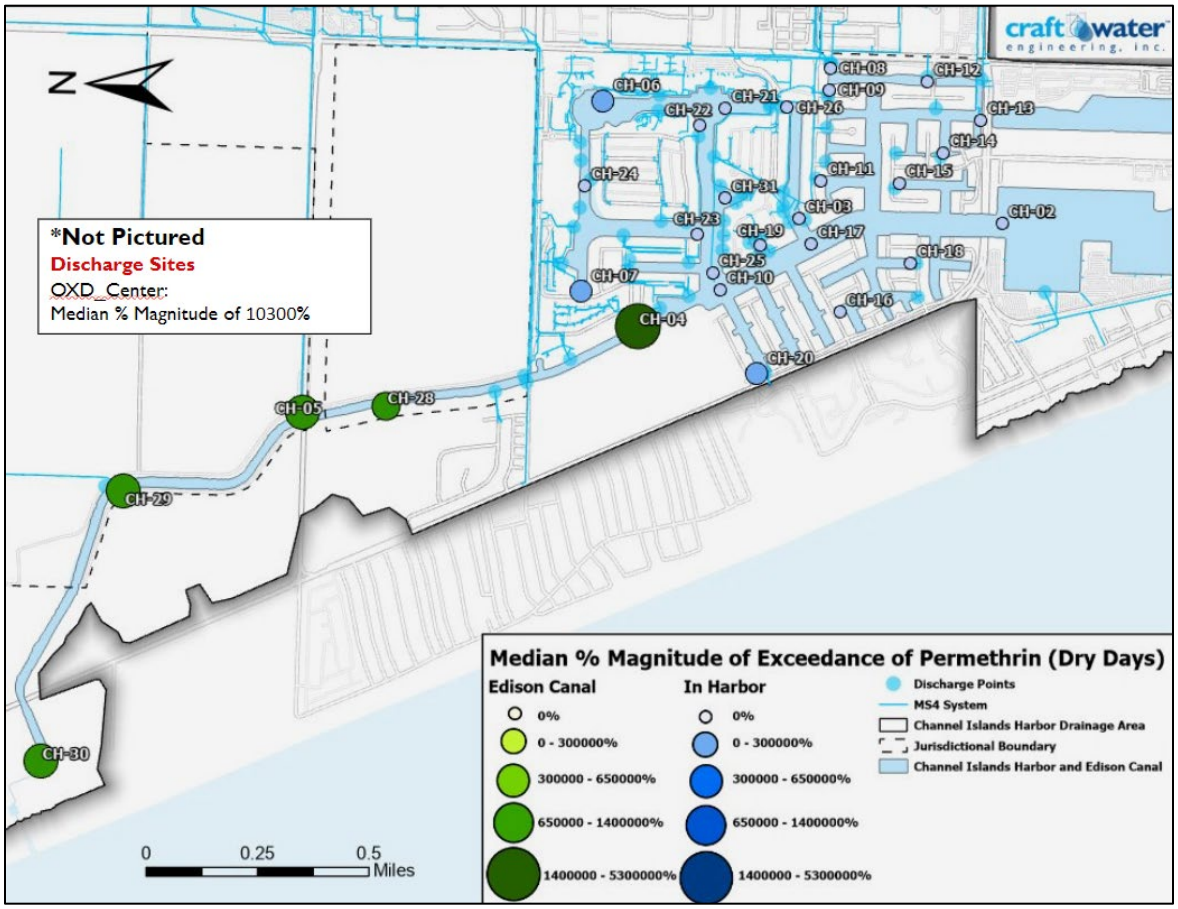


Figure 3-15. Permethrin Magnitude of Exceedances in Edison Canal and Harbor.

3. Dissolved oxygen also emerges as a critical condition in the Harbor, with concentrations dropping below recommended values supportive of aquatic life. Depressed dissolved oxygen was observed in both Edison Canal and the Harbor, with 7-12% below recommended levels on wet days and up to 88% below recommended levels on dry days.

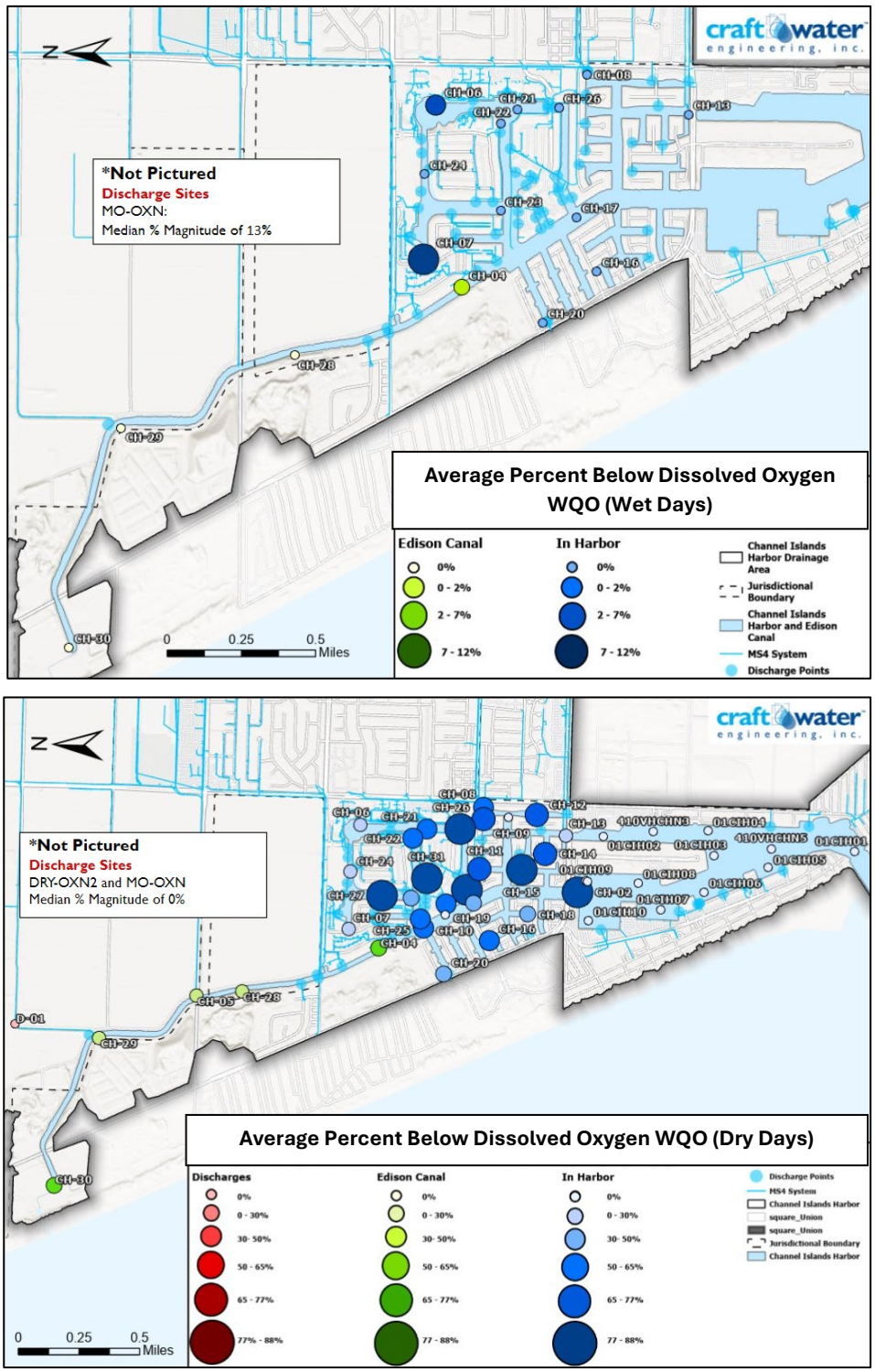


Figure 3-16: Dissolved Oxygen Percent Below WQO in Edison Canal and Harbor During Wet (Top) and Dry (Bottom) Days.

4. Median Copper concentrations exceed WQOs by over 25,000% (over 250 times the WQO) in Edison Canal and the Harbor.

3.6.2 Sources of Pollution

5. Discharge sites representative of agricultural runoff are likely contributors to the high levels of Bifenthrin and Permethrin. These sites have been shown to exhibit large median exceedance magnitudes, with some discharge points (e.g., OXD_CENTR) showing a median exceedance magnitude of 2,044% (over 21 times the WQO) for Bifenthrin.

6. Depressed dissolved oxygen in both Edison Canal and the Harbor can be linked to poor mixing, particularly in areas of the Harbor where circulation is limited, leading to higher exceedance frequencies (up to 13% during summer months). This trend is more severe in more isolated sections of the harbor near Seabridge and Mandalay.

7. Urban runoff, anti-fouling boat paint, and aerial deposition are potential sources of Copper observed in the Edison Canal and Harbor observations.

8. No notable observations were made indicating changes in exceedances of constituents at Discharge sites before and after the decommissioning of the MGS, which suggests any observed degraded water quality in the Harbor following the MGS decommissioning is primarily a result of decreased circulation.

9. Seasonal Influence:

    - The data demonstrated a difference between summer and winter conditions. Depressed dissolved oxygen was more frequent and severe during summer due to warmer water temperatures, which lower oxygen solubility and increase biological activity, leading to greater oxygen consumption.

    - Chlorophyll-a exceedances align with this pattern, as observed during summer, highlighting the link between temperature, nutrient availability, and phytoplankton blooms.

3.6.3 Conclusions

Constituents of concern within Edison Canal and the Harbor are Bifenthrin and Permethrin, as well as Copper based on the magnitude and frequency of exceedances. Bacteria is also of concern, with a focus on *Enterococcus* observed exceedances. Though nutrients generally demonstrated low magnitudes and frequencies of exceedances across observations, they are linked to potential algal growth in the Harbor and therefore impacting overall conditions. Finally, depressed Dissolved Oxygen in certain areas of the Harbor is a condition of concern to aim to address. Discharge points are likely contributors to these constituents, particularly for the pesticides. Efforts to address these constituents and water quality conditions, particularly in areas with poor circulation in the Harbor, are a focus of mitigation strategies moving forward with the Study.

4.0 MITIGATION STRATEGY EVALUATION METRICS

This section highlights select metrics used for the evaluation of potential mitigation strategies. The metrics will be used to construct a weighted decision matrix to allow for a comprehensive summarization of each strategy's potential benefits, costs, feasibility, and constraints. The decision matrix will be organized into three main sections: Benefits, Implementation Considerations, and Costs. Benefit metrics aim to both quantitatively and qualitatively assess pollutant load reductions and in-harbor water quality as well as identify additional benefits to the community. Implementation considerations are the metrics by which mitigation strategy feasibility will be assessed. Cost metrics will consider capital and long-term costs for mitigation strategies as well as possible funding mechanisms. The relative weights applied to the matrix to compare projects will involve stakeholder input and will lead to the construction of the phased implementation plan. A list of all proposed metrics is presented in ***Table 4-1***. Specific metrics for benefits, implementation considerations, and costs are discussed further in sections ***4.1, 4.2,*** and ***4.3,*** respectively.

Evaluation Metric Sources

Study evaluation metric assessments utilize four general categories of information sources: (1) watershed and in-harbor model results, (2) available Geographic Information System (GIS) and community database information, (3) compiled engineering and construction cost data, and (4) best professional judgement. Watershed and in-harbor models provide predictive water quality- and circulation-related conditions based on calibrated representation of site-specific characteristics, input data, and modeled strategies. Various public databases and available GIS information are used to classify and categorize mitigation strategies based on type, location, and environmental/other impact attributes. Compiled engineering and construction cost information generally include industry publications and recent and/or published project cost information. Engineering and environmental professional best professional judgement is used for assessments of certain mitigation strategy criteria where engineering delivery experience, construction or other industry knowledge, and/or environmental permitting acumen is needed to perform evaluations. Evaluation metrics and associated assessment information are summarized in ***Table 4-1***.

Table 4-1. List of Proposed Evaluation Metrics

Evaluation Metric	Metric Group	Unit	Area Applied	Source
Pesticide Load Reduction (Bifenthrin and Permethrin)	Water Quality Benefits	Lbs/yr (sediment as proxy)	Watershed	Modeling -WY 2011-2020
Exceedance Days Reduced (Pesticides)	Water Quality Benefits	Days exceeding ug/L WQOs	Harbor	Modeling -WY 2011-2020
Nutrient Load Reduction (Total Phosphorous and Total Nitrogen)	Water Quality Benefits	Lbs/year; mg/L	Watershed	Modeling -WY 2011-2020
Exceedance Days Reduced (Nutrients)	Water Quality Benefits	Days exceeding mg/L WQOs	Harbor	Modeling -WY 2011-2020
Copper Load Reduction	Water Quality Benefits	Lbs/year	Watershed	Modeling -WY 2011-2020
Exceedance Days Reduced (Copper)	Water Quality Benefits	Days exceeding ug/L WQOs	Harbor	Modeling -WY 2011-2020
Bacteria Load Reduction	Water Quality Benefits	CFU (runoff volume ac-ft/yr as proxy)	Watershed	Modeling -WY 2011-2020
Exceedance Days Reduced (Bacteria)	Water Quality Benefits	Days exceeding CFU/100mL WQOs	Harbor	Modeling -WY 2011-2020
Exceedance Days Reduced (Dissolved Oxygen)	Water Quality Benefits	Days dissolved oxygen below 5 mg/L	Harbor	Modeling -WY 2011-2020
Residence Time	Water Quality Benefits	Days	Harbor	Modeling -WY 2011-2020
Urban Greening	Community Benefits	Acres impervious -> green space	Watershed	NLCD Imperviousness
Recreational Improvements	Community Benefits	Is parcel a park or potential park? (Y/N)	Watershed	Oxnard Parks GIS
Community Anchors	Community Benefits	Is parcel a school, library, medical/healthcare or social service facility, or other public facility (Y/N)	Watershed	Oxnard Public Facilities and Large Family Daycare GIS
Community Education Opportunity	Community Benefits	Can parcel support educational signage or promote education-focused community events? (Y/N)	Watershed	Oxnard City Owned Parcels GIS
Pedestrian & Traffic Safety	Community Benefits	Does parcel contain or is adjacent to right-of-way in high injury network? (Y/N)	Watershed	SCAG High Injury Network GIS

Evaluation Metric	Metric Group	Unit	Area Applied	Source
Oxnard Sustainable Transportation Plan	Community Benefits	Is parcel in or adjacent to priority area? (Y/N)	Watershed	Oxnard Sustainable Transportation Plan GIS
Disadvantaged Community	Community Benefits	Is parcel in a Disadvantaged Community? (Y/N)	Watershed	SB 535 Disadvantaged Communities GIS
Environmental & Social Health Indices	Community Benefits	Is parcel in an environmentally or socially vulnerable community? (Y/N)	Watershed	CalEnviroScreen, The Center for Disease Control Social Vulnerability Index, The California Healthy Places Index, and the SCAG Green Region Initiative and Priority Growth Areas
Parcel Ownership	Implementation Considerations	Is parcel privately owned, or owned by municipality, agency, utility? (Public/Private)	Watershed and Harbor	Oxnard City Owned Parcels GIS
Permitting	Implementation Considerations	Estimated environmental permitting level of effort (High/Med/Low)	Watershed and Harbor	Coastal Zone Management Act,401 Water Quality Certification Program, Clean Water Act Section 404 for Dredge and Fill, Endangered Species Act; Applicable State and Local Biological Guidelines
Utility Constraints	Implementation Considerations	Will strategy be limited by existing utilities? (Y/N)	Watershed and Harbor	Request as-built information from City, Utilities, Agencies
Design/Construction Timeline	Implementation Considerations	Near, Mid, or Long-term, continual/protracted project timeline	Watershed and Harbor	Engineering Review
Long-Term O&M Responsibilities	Implementation Considerations	What is the frequency and staff required for O&M? (Extensive, Moderate, Limited)	Watershed and Harbor	Engineering Review/land owner collaboration
Existing City Maintenance Area	Implementation Considerations	Is parcel already within City maintenance plan? (Y/N)	Watershed	Oxnard City Maintained Areas GIS
Sanitary Sewer Diversion Feasibility	Implementation Considerations	Is sewer diversion feasible? (Potential/No)	Watershed	Oxnard Sanitary Sewer GIS
Order-of-Magnitude Capital Cost	Cost	$	Watershed and Harbor	Standardized Cost Estimation Functions
Order-of-Magnitude Long-Term O&M Cost	Cost	$/year	Watershed and Harbor	Standardized Cost Estimation Functions
Potential Outside Funding Sources	Cost	Does the strategy align with a potential outside funding source? (Y/N) If yes, order -of-magnitude available funding ($)	Watershed and Harbor	Environmental Protection Agency (EPA), State Water Resources Control Board (SWRCB)

4.1 Proposed Benefit Evaluation Metrics for Mitigation Strategies

To evaluate the effectiveness of alternative mitigation strategies, various benefit metrics will be utilized. The modeling tools being developed both for the contributing watershed area (using the USEPA Loading Simulation Program in C++ [LSPC]) and the Harbor itself (using the USEPA Environmental Fluid Dynamics Code [EFDC] and Water Quality Analysis Simulation Program [WASP]) will quantitatively evaluate strategies' effectiveness at reducing pollutants being transported to and cycling within the Harbor. These models will evaluate conditions over a long-term 10-year period, using water year 2011 to water year 2020, and will directly represent constituent movement and cycling for Runoff, Sediment, Total Phosphorus, Total Nitrogen, dissolved oxygen, and select metals, such as Copper. Pesticide fate and transport is associated with suspended sediments, therefore sediment load reductions will be used as a proxy to estimate pesticide removal. Bacteria are a water quality concern for the Harbor, and while the modeling tools do not explicitly handle bacteria, the relationship between runoff from contributing lands and bacteria loading can be better understood in the region based on monitoring data collected. Therefore, runoff responses from rain events will be used as a proxy to estimate the relative bacteria load reductions that each proposed strategy is capable of. Mitigation strategies will also be evaluated for their influence on dissolved oxygen, chlorophyll-a (a proxy for algal growth), and residence times at various locations within the Harbor. Model results for these constituents will be summarized as average annual load reductions and changes to in-harbor concentrations and estimated residence times with and without mitigation strategy implementation. In addition to average annual summarizations, the in-harbor model will evaluate the period leading up to observed algal blooms in spring of 2018 that followed OTC decommissioning. The upstream load reductions and changes in in-harbor conditions from proposed mitigation strategies will be added to the matrix in a quantitative manner.

In addition to the quantitative evaluation of pollution reduction and water quality benefits, strategies will be evaluated for the potential additional community benefits that their implementation could provide. Projects capacity to allow for the creation or improvement of recreational facilities and/or green spaces such as parks, tree canopy, and landscaping will be considered at this stage. Projects that create or update green spaces also can facilitate educating the public about environmental and stormwater related concerns via signage and gathering spaces. Potential project locations will be evaluated in the context of socio-environmental scoring datasets such as CalEnviroScreen, The Center for Disease Control Social Vulnerability Index, The California Healthy Places Index, and the Southern California Association of Governments Green Region Initiative and Priority Growth Areas, which compile various environmental, health, and socioeconomic measures to give a score to each census tract in the state. Poorly scoring areas demonstrate greater need for community improvements and can be prioritized for projects. Projects along corridors identified in the Southern California Association of Governments (SCAG) High Injury Network dataset will be prioritized for potential traffic flow and pedestrian improvements. Community benefits will be added to the decision matrix in a binary flag, where a yes/no will be applied for each strategy for each community benefit.

4.2 Proposed Implementation Consideration Evaluation Metrics for Mitigation Strategies

The implementation consideration evaluation metrics will serve as the main checks for the feasibility of each mitigation strategy across multiple parameters. It will be important to determine the ownership status of any lands that are explored to locate mitigation strategies to identify the responsible parties and gauge their interest and cooperation in hosting a project or other strategy. This step will also help identify what environmental permitting may be required for a particular project location and type, which may contribute to the overall

understanding of a mitigation strategy's ease of implementation. Certain types of strategies may involve a significant component of long-term operations and maintenance of a project or facility, and a relative estimate will be made for the required labor, equipment, disposal methods, and other responsibilities required. The parties responsible for each strategy's maintenance will be identified and their willingness to participate will be considered. Depending on the locations and landowners that are engaged, there will be a potential need for new cooperative agreements of memorandums of understanding to be created between relevant agencies or entities.

Additionally, the technical feasibility of each mitigation strategy will be evaluated. Key technical considerations include, but are not limited to, the design and construction timeline, constraints presented by existing utilities or infrastructure onsite, and physical site suitability.

Regional-scale stormwater capture opportunities on public property have already been identified in the County of Ventura Watershed Management Program for Ventura County Coastal Watersheds (Watershed Management Program). These were developed using public parcels and storm drains and used desktop GIS analysis to determine optimal diversion points and service drainage areas to each parcel. Potential project footprints were identified after buffering 20 feet from existing buildings. Drainage areas, footprints, and diversion points were used to estimate the cost and potential Best Management Practice (BMP) performance of each project parcel. A desktop engineering review of these opportunities was carried out by design engineers to screen out immediately infeasible opportunities identified through the GIS analysis and provide context as to what types of BMPs would best fit in each location. The review helped to gain context for each location: where it is situated within the built environment, topographical considerations, and other tangibles that may point to project viability that may not otherwise be easy to discern from other desktop datasets. The main function of the preliminary engineering review was to assess the constructability and potential of each individual opportunity compared to others within the jurisdiction of interest**.** This review eliminated opportunities with clear challenges that would make cost-effective construction unviable or where limited runoff capture would warrant expensive, overly challenging engineered solutions. In addition, projects kept as opportunities were classified into three different tiers of potential effectiveness (Tier 1 being the best projects per cost). Prioritized project opportunities identified from the Watershed Management Program were reviewed independently with each agency the City in a series of meetings to incorporate local knowledge in the viability and prioritization of a project. This included environmental, ongoing infrastructure planning, or political factors that further informed project preferences or roadblocks in potential constructability. Additional upstream project opportunities may be identified through this Study, including opportunities on private lands, and will undergo similar review for initial feasibility.

4.3 Proposed Cost Evaluation Metrics for Mitigation Strategies

It is important to consider the financial capability of implementing each mitigation strategy that is proposed. Estimations of capital costs as well as costs of long-term operations and maintenance will be made. Additionally, a preliminary estimate of responsible part(ies) for project costs will be made at this stage, as well as recording what party will be responsible for those costs. Once this is established, existing and potential funding opportunities will be evaluated for applicability to the proposed mitigation strategies. These funding sources could include municipal funds, grants, public-private partnerships, or levying taxes, fines/fees, or HOA dues. The applicability and amount of available funding from different sources will be identified as a potential offset to large implementation costs.

5.0 NEXT STEPS

Following the finalization of the Study goals and objectives, the list of potential mitigation strategies will be developed to potentially address them. Strategies will be assessed using the evaluation metrics established herein and align with the Study problem statement and goals. Critical tools to support analysis of evaluation metrics are the watershed and in-harbor models that are under development. Models will be executed in the context of the evaluation metrics to characterize each strategy's relative performance in terms of water quality benefits. Other identified sources of data, as identified in ***Table 4-1***, will be used to characterize community benefits, implementation considerations, costs, and potential funding sources. This will lead to construction of a decision matrix containing relative tiers among potential strategies along with detailed outcomes within each metric. This will provide a transparent and comprehensive summary of outcomes for stakeholders to explore and provide input. The resulting matrix will lead to the construction of a phased implementation plan that will be outlined in a future report.

6.0 REFERENCES

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Implementation Plan
Channel Islands Harbor
Oxnard, CA
March 2026

CRAFTWATER
SCIENCE • STRATEGY • ENGINEERING

INTRODUCTION

The Channel Islands Harbor (Harbor) has experienced serious water quality-related challenges since the 2018 decommissioning of a local power plant's cooling system. Before decommissioning, once-through cooling (OTC) pumps at the plant enhanced in-Harbor circulation which helped to maintain higher dissolved oxygen levels and limit pollutant accumulation. Following decommissioning, reduced circulation led to stagnant zones, exceedances of Water Quality Objectives for various pollutants (e.g. metals and pesticides), and low dissolved oxygen levels indicative of water quality degradation.

The Channel Islands Harbor Water Quality Feasibility Study (Study) program was developed to identify and evaluate strategies to restore circulation, reduce upstream pollutant inputs, and improve overall Harbor conditions. This **Implementation Plan (Plan)** strategy builds upon the results presented in ***Appendix A – Mitigation Strategy Analysis Report[1] & Appendices* (Report)** to develop an integrated, phased approach for improving in-Harbor water quality and circulation. Through this approach, complementary strategies are selected and combined to maximize effectiveness and align with specific priorities, preferences, or funding opportunities.

Figure 1: Aerial view of Channel Islands Harbor

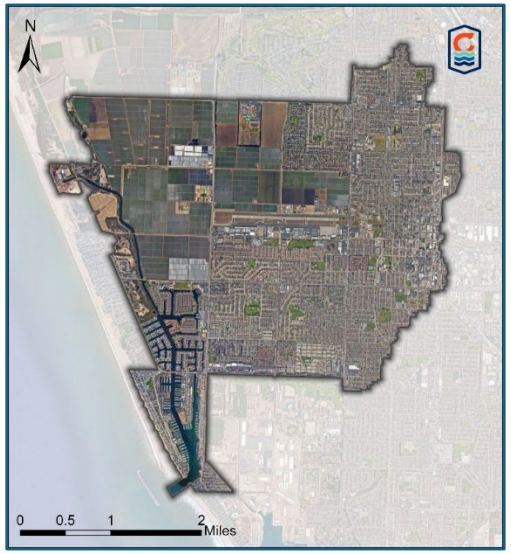
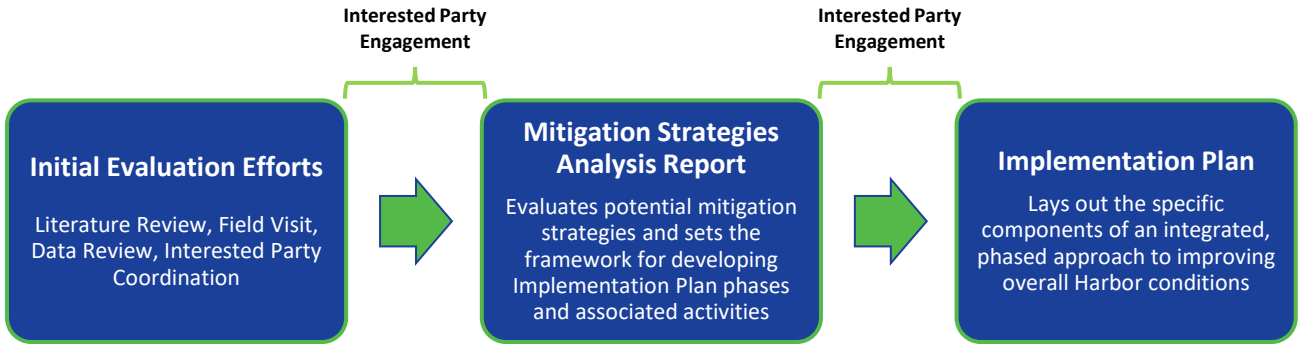


Figure 2: Watershed area of the Channel Islands Harbor



General process and outcomes that inform and support Implementation Plan development

[1] https://www.oxnard.gov/public-works/special-districts/channel-islands-harbor-water-quality

KEY CHALLENGES

The watershed area draining to the Harbor includes diverse land use and ownership, variable dry- and wet-weather runoff contributions, and numerous potential sources of pollutants hindering water quality. Harbor configuration and tidal flushing dynamics contribute to circulation and water quality issues. Multiple municipal and regulatory agencies have management and oversight responsibility in the watershed and Harbor areas. Finally, limited funding opportunities exist to support comprehensive solutions development. Given these challenges, an integrated, phased implementation approach can be used to support a focused and cost-efficient approach to improve Harbor conditions.

Key Factors Affecting Harbor Conditions:

- **Decreased Circulation**
- **Urban and Agricultural Runoff Discharges**

Nutrients	Bacteria	Metals	Pesticides
Potential Sources: • Fertilizers • Urban runoff • Agricultural runoff • Sediment nutrient recycling	**Potential Sources:** • Sewage spills • Animal waste • Contaminated runoff from urban and rural areas	**Potential Sources:** • Brake dust • Tire wear • Aging Infrastructure • Aerial deposition	**Potential Sources:** • Agricultural runoff • Urban runoff • Commercial uses

Complex Land Use & Ownership

Mixed ownership and land uses, including a high percentage of agriculture, complicate planning and implementation.

Multi-Jurisdictional Oversight

Multiple agencies share management and oversight responsibilities within the Harbor drainage area.

Variable Runoff Conditions

Seasonal and episodic fluctuations in dry- and wet-weather flows due to the region's Mediterranean climate.

Regulatory and Permitting Hurdles

Extensive coordination required with local, state, and federal permitting agencies to implement solutions.

Harbor Hydrodynamics

Current Harbor configuration limits tidal circulation and flushing dynamics.

Funding Constraints

Funding sources are limited and competitive for water quality and infrastructure improvements.

PHASED APPROACH

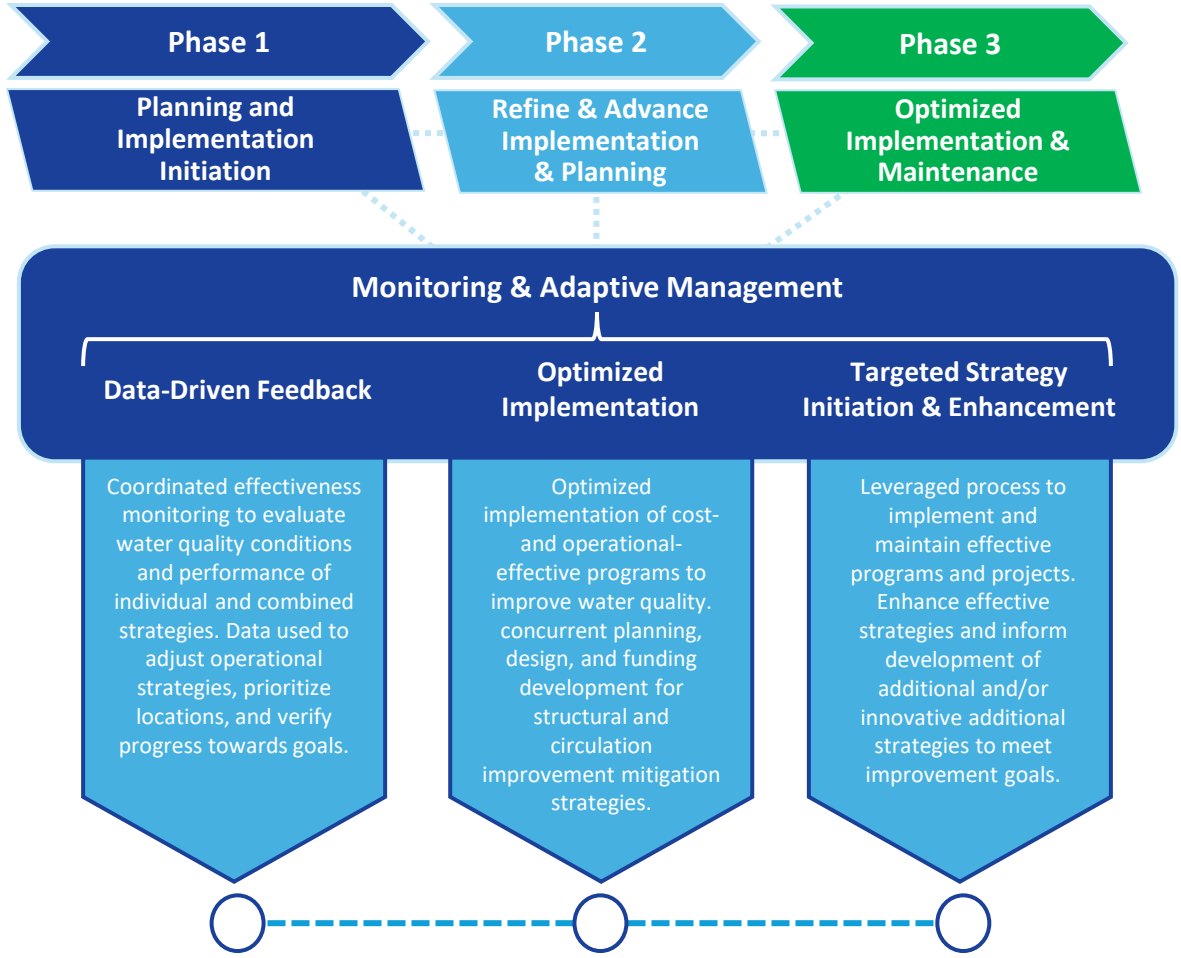
This Implementation Plan presents a phased approach to water quality/circulation improvement strategy implementation and subsequent adaptive management. The phased approach allows for the initial implementation of higher-impact, lower-cost strategies along with associated monitoring and adaptive management efforts to optimize pollutant removal and other activities to address program goals.

Phase 1 initiates **Planning and Implementation. Phase 2** is intended to **Refine and Advance** implementation. **Phase 3** is anticipated to include **Optimized Implementation** and ongoing **Maintenance** for strategies and activities that demonstrably improve water quality and/or circulation. The Implementation Plan includes a robust **Monitoring** and **Adaptive Management** process to guide planning, implementation, and efficacy assessment activities. Adaptive management is used to refine specific strategies and the phased approach through data-driven feedback, optimized implementation, and targeted implementation of potential Watershed and Receiving Water mitigation strategies (detailed on the next page).

A summary of proposed implementation phases is as follows:

- **Phase 1:** Initiates planning and implementation of initial mitigation strategies. Anticipated activities include interested party engagement, hotspot assessment, operations enhancement and/or pilot projects, and planning for priority Watershed Structural and Receiving Water strategies. Additional anticipated activities include funding assessment and positioning, project feasibility and regulatory agency consultation for high permitting effort projects/strategies.
- **Phase 2:** Refine, advance, and fund strategies for implementation. Leverage pilot and monitoring information to optimize ongoing operations and initiate priority planning and implementation of Watershed and Receiving Water activities.
- **Phase 3:** Leverage adaptive management process to continue optimized implementation of ongoing effective projects and implement innovative/additional projects to meet long-term goals.

Adaptive management allows for flexibility and responsiveness by aligning effective projects, funding, regulatory processes, and interested party collaboration.



MITIGATION STRATEGY TYPES

The Study leveraged available data and literature, detailed computer modeling and analysis, and interested party input to develop a suite of mitigation strategies to provide solutions to Harbor water quality challenges. This included extensive collaboration and feedback between the project team and key interested parties such as Harbor managers and users, resident representatives, City department leads, the Harbor Marine Advisory Committee (MAC).

Three mitigation strategy types were evaluated: watershed pollutant source control (**Watershed Nonstructural**) and treatment (**Watershed Structural)** options as well as in-Harbor (**Receiving Water**) strategies that focus on enhancing water circulation.

Quantitative scoring presented in ***Appendix A – Mitigation Strategies Analysis Report & Appendices*** was performed to evaluate potential mitigation strategy attributes and benefits. Water quality benefits including pollutant load reductions and circulation improvement, cost, permitting requirements, jurisdictional responsibility, community benefits and other factors were used to evaluate strategy attributes and benefits.

The Project Fact Sheets and Project Scoring Matrix present key project attributes and strategies. Supplemental resources such as the Goals and Objectives Memorandum, Literature Review, and Field Visit Notes provide context for mitigation strategy screening, evaluation, and selection.

Watershed Nonstructural Strategies (NS)

Potential strategies include education and outreach, street sweeping, catch basin cleaning, animal and other waste management, and other mitigation strategies. These strategies typically correspond with a less-substantial up-front capital cost and in some cases limited annual O&M obligation.

Watershed Structural Strategies (S)

Potential strategies involve filtration and/or infiltration basins and agricultural runoff treatment systems. Numerous individual project opportunities are identified in the watershed area and subsequently evaluated for their suitability for different structural project types and their prospective benefits.

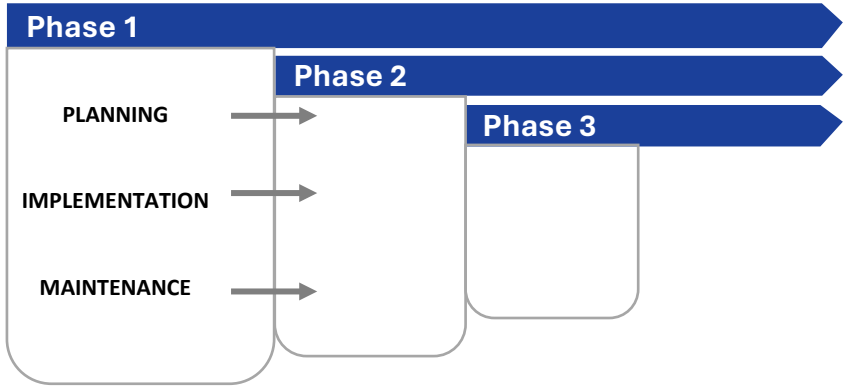
Receiving Water Strategies (RW)

Potential strategies offer enhanced water clarity and quality. These strategies are primarily focused on improvements to water circulation patterns within the Harbor and Edison Canal. This approach may be both the most directly effective in achieving end goals of Harbor water quality improvements and the most challenging to implement from an environmental permitting and funding perspective.

SPECIFIC MITIGATION STRATEGIES

Each mitigation strategy type is associated with different planning, implementation, and maintenance-related activities. **Watershed Nonstructural strategies** focus primarily on targeted source control, trash reduction, and enhancing current projects. The limited administrative planning and design requirements and operations-based nature of these strategies result in expedited timelines. **Watershed Structural strategies** require more detailed planning, design, permitting, and coordination processes in early phases, with fluctuations between high/low planning, maintenance, and implementation periods in subsequent phases. Similarly, the **Receiving Water strategies** have more complex physical, planning, and regulatory targets in early phases with implementation and maintenance efforts to be carried out in later phases.

Within each overall strategy type is a variety of disparate potential mitigation strategies, each of which being associated with different planning, implementation, and maintenance activities due to their varying characteristics. A detailed overview of characteristics specific to each individual mitigation strategy is provided in the Project Fact Sheets document contained in ***Appendix A – Mitigation Strategies Analysis Report & Appendices***. Each potential mitigation strategy will have its own phased implementation plan laid out in ***Appendix B – Detailed Phased Implementation Plan*** of this document.



Strategy Type	Strategy Name
Nonstructural Strategy: Targeted Nutrient/Pesticide/Pollutant Source Control	Outreach & Training
	Illicit Discharge Detection & Elimination
	Agricultural Coordination
Nonstructural Strategy: Targeted Bacteria Source Control	Sewer System Maintenance
	Homeless Encampment Management
	Animal Waste Management
Nonstructural Strategy: Nonstructural Operational Stormwater Programs	Street Sweeping & Catch Basin Cleaning (CBC) Optimization
	Stormwater System Maintenance
Nonstructural Strategy: Trash Reduction	Mechanical Filtration
	Trash Source Reduction
Structural Strategy	Filtration BMPs
	Infiltration BMPs
	Agricultural Runoff Treatment Systems
Receiving Water Strategy	Edison Canal Pump Resumption
	Decommission Canal/Convert to Engineered Wetlands & Potential Water Storage
	Passive Circulation Enhancements
	Open Passive Edison Canal Connection to Ocean
	Storage Tank Water Release between Edison Canal/Harbor
	Reuse Wastewater Release Tank

Table 1: Potential mitigation strategies organized by category

PHASED APPROACH: GENERALIZED PHASES

Presented below in **Table 2** are high-level descriptions of the anticipated general activities to be included in each of the three future implementation phases, beginning with Phase 1.

In Phase 1, the focus is on planning foundational activities, building partnerships, gathering baseline data, initiating permitting and ordinance discussions, and pursuing early funding opportunities. Implementation during this stage is exploratory, prioritizing and piloting high-impact projects to identify feasible, viable opportunities for pollutant reduction. Maintenance efforts are limited to leveraging current monitoring programs and establishing coordination with regulatory agencies. By contrast, Phases 2 and 3 emphasize expansion, optimization, and long-term integration.

Planning begins by establishing consistent protocols, formalizing funding and permitting processes, and integrating performance tracking and public engagement. It generally includes efforts like outreach, coordination, preliminary design, and initial feasibility assessment. Implementation scales up pilot projects into full programs, refining designs based on interested party feedback and feasibility results while securing final permits and construction funding. This typically includes activities such as pilot projects, modeling, cost estimations, and data review as well as furthering coordination and detailed design efforts. Maintenance transitions into ongoing, data-driven evaluation, using monitoring outcomes to adapt and improve operations and guide post-construction planning. Maintenance activities include inspections and cleaning, data collection, post-implementation performance monitoring, technological upgrades and/or repair, and other adaptive management-related efforts.

Overall, the structure demonstrates a clear evolution—from planning and piloting in Phase 1 to full-scale execution and adaptive management in later phases—ensuring continuous improvement and long-term effectiveness. The table below represents a generalized plan for all strategies. Each mitigation strategy has its personalized phased implementation approach presented in ***Appendix B – Detailed Phased Implementation Plan.***

Strategy	Category	Phase 1	Phase 2 /3
Watershed /Receiving Water Strategies	**Planning**	• Engage interested parties (municipal, regulatory, community, AG) to gather baseline data on pollutant sources and hotspots • Ordnance, permits, and code regulation discussions • Begin cost estimation and pursue initial funding opportunities	• Implement consistent protocols, expand performance tracking, and train staff for ongoing monitoring and improvement • Secure targeted funding for implementation and construction • Conduct permitting and documentation, integrate lessons learned, hold regular coordination meetings, and incorporate educational and public-facing elements
	Implementation	• Prioritize and select potential projects • Pilot targeted measures • Identify and scope a high-priority, high-load reduction site with public visibility	• Deploy optimized programs at full scale with established O&M schedules • Refine design concepts based on stakeholder input and feasibility findings • Finalize design, secure permits, and proceed to construction if supported
	Maintenance	• Evaluate existing monitoring and maintenance actions • Coordinate with regulatory agencies	• Evaluate existing monitoring and maintenance actions • Use results to guide future adaptive improvements and post-construction plans

Table 2: Generalized Phased Approached Implementation Plan

TIMELINE

The relative estimated timeline for planning, implementation, and maintenance tasks within the key mitigation strategy types vary according to coordination, permitting, and resource needs (**Figure 3**). The phased approach aligns the key mitigation strategy types with anticipated planning, implementation, and maintenance task chronologies.

Watershed Nonstructural:

- Planning requirements generally relatively low, involving coordination, outreach planning, and resource allocation.
- Implementation phase emphasizes program activation and operational integration, followed by routine maintenance to ensure continuity and performance tracking.
- Periods of reduced maintenance expected to occur as part of seasonal fluctuation and as effectiveness evaluations and adaptive management are used to optimize programs.

Watershed Structural:

- Project planning, design, permitting, operations, and funding coordination require extended planning.
- Recurring periodic project-specific implementation anticipated to initiate ~2-4 years following planning inception.
- Ongoing maintenance anticipated to vary seasonally and be additive as projects are planned and implemented. Periodic review and adaptive management needed to optimize performance outcomes and resource allocations.

Receiving Water:

- Detailed engineering design, multi-agency coordination and permitting, funding and other resource acquisition anticipated to require extended planning.
- Implementation timeframe accounts for potential extensive construction and coordination needs.
- Detailed planning for long-term maintenance anticipated to account for potential specialized equipment, training, and resource needs.

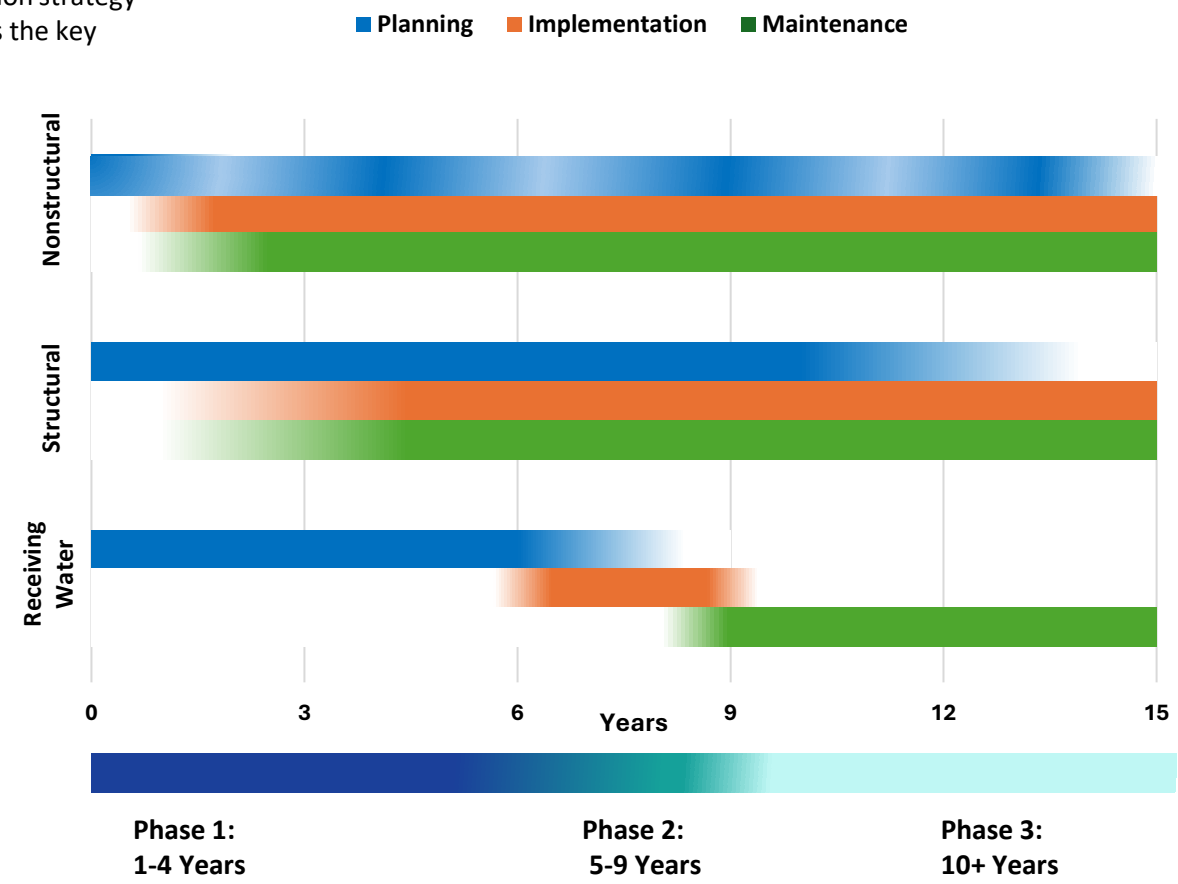


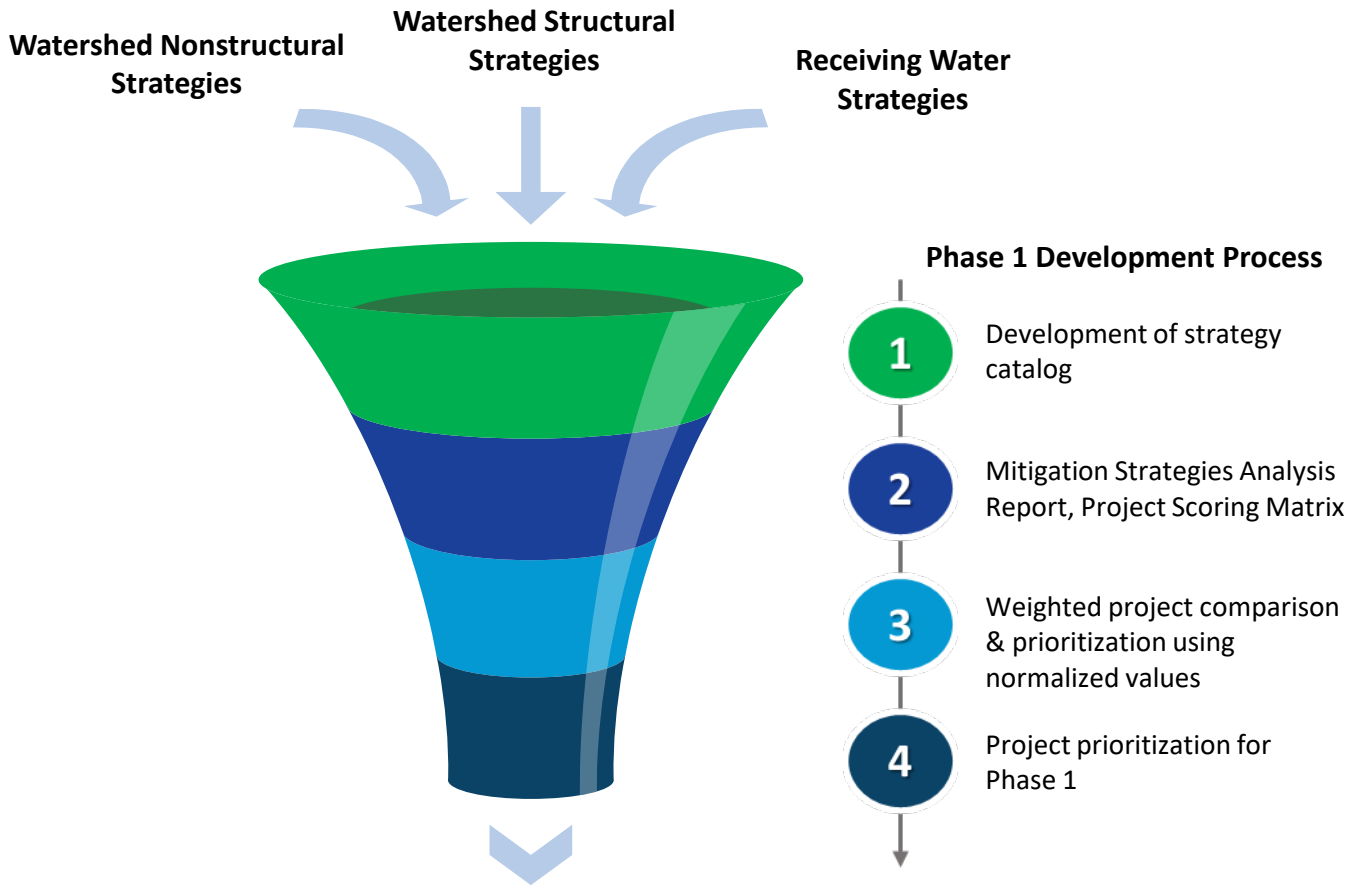
Figure 3: Potential 15-Year Strategy Timeline

IMPLEMENTATION PLAN DEVELOPMENT APPROACH

A total of 103 Watershed Nonstructural, Watershed Structural, and Receiving Water mitigation strategies were evaluated as part of the Study. The Report documented and evaluated a catalog of potential mitigation strategies based on key characteristics. Individual project evaluation and scoring allows for project-specific ranking of anticipated water quality and circulation benefits, cost, implementation considerations including cross-jurisdiction coordination and permitting needs, and other factors.

This Implementation Plan utilizes a weighted category approach to leverage the project-specific attributes and scores within a normalized framework. The mitigation strategy projects vary in scale, scope, and impact, making direct comparison challenging. To ensure objective evaluation, this Implementation Plan applies a normalized scoring methodology that converts diverse project indicators into a standardized scale. Key factors — including water quality improvement, cost-effectiveness, and implementation feasibility — are weighted and standardized so that each project's score reflects its relative performance against shared benchmarks. This enables consistent, defensible comparison across the portfolio and supports data-driven prioritization.

The weighted category approach is aligned with program goals to improve water quality and circulation while balancing cost, schedule, logistics, and funding availability. Further, the approach allows for comparison of project prioritization under various scenarios where project proponents and Harbor interested parties may have differing priorities and implementation approach needs.



PROJECT EVALUATION CATEGORIES & SCORING NORMALIZATION

The weighted category approach includes five Project Evaluation Categories **(Table 3).** These categories reflect program goals to improve water quality and circulation while balancing cost, schedule, and implementation feasibility. Community benefits are listed, given the potential to use these factors as filtering criteria for additional implementation or funding opportunities but are not anticipated to be assigned a weighting factor in development of a prioritized project list.

Project Evaluation Categories compile project-specific scoring information. Scoring criteria results within the categories is normalized to enable a standardized comparison of disparate mitigation strategies with diverse cost, benefit, and efficacy attributes.

Mitigation strategy prioritization Project Evaluation Categories allow for development of custom prioritization techniques to select specific Phase 1 activities based on user-selected benefit priorities and standardized project evaluations. Detailed information of how scoring is carried out through Project Evaluation Categories can be found in ***Appendix D – CIH Project Prioritization Guide***.

Project Evaluation Category & Relevance	Project Scoring Criteria	Weight
Water Quality Benefits OR Water Circulation Improvements		
Address overall Study goals to improve water quality and circulation within the Harbor.	Percent Residence Time Reduction	100%
Cost		
Ensure strategies are the economically feasible and cost-effective for short- and long-term efficiency.	Capital Cost	10%
	Annual O&M Cost	10%
	30-yr Lifecycle Cost	30%
	Cost-Effectiveness	50%
Timeline		
Allows for prioritization of projects based on implementation timeline.	Planning/Permitting	50%
	Post-Planning Implementation	50%
Implementation Considerations		
Allows for prioritization based on planning needs and effort.	Parcel Ownership	25%
	Crosses Jurisdictional Boundaries?	25%
	Permitting Difficulty	50%
Community Benefits		
Supplementary considerations to filter for projects offering multi-benefits and/or diverse funding opportunities.	Trash Reduction	10%
	Community Benefits Proportion	10%
	DAC Benefits	15%
	REC-1 Standards	20%
	REC-2 Standards	20%
	Aesthetic Improvements	25%

Table 3: Project Evaluation Categories and Scoring Criteria = Adjustable Weight Parameter = Filtering Parameter

CATEGORY & CRITERIA WEIGHTING

The respective weights of each category and criterion can be changed in accordance with changes in relative importance, impacting prioritization outcomes and informing next steps. Shifting these 'dials' is intended to be reflective of how placing emphasis on specific project attributes may impact which strategies are prioritized.

- Four categories of criteria are evaluated and used in subsequent prioritization (i.e., Water Quality/Circulation, Cost, Timeline, Implementation Considerations). The Community Benefits category is used only for screening projects.
- Category weights are adjusted to reflect existing preferences and/or priorities.
- Scoring results shift in response to weighting, identifying priority projects within a specific context.
- Phase 1 activities are selected by project prioritization based on the weighted scoring results.

Three potential Category Weight Options (Options), in alignment with potential pathways to fulfillment of Study goals, are proposed. It is anticipated the adaptive management process will result in re-evaluation and potential adjustment of category/criteria weights to capture evolving priorities and conditions.

Parameters

- Water Quality/Circulation
- Cost
- Timeline
- Implementation Considerations
- Community Benefits

Category weights are adjusted in accordance with preferences/priorities.

Scoring results for each project shift in response to weighting of categories.

Priority projects are then identified, informing the onset of Phase 1 efforts.

Weighting and Prioritization Process Overview

PHASE 1 CATEGORY WEIGHT OPTIONS

Three Category Weight Options are proposed and applied to represent potential Phase 1 project prioritization scenarios.

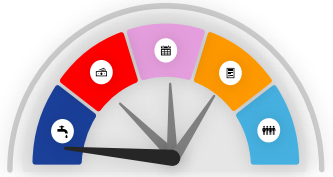
1. **Option A** emphasizes **maximizing water circulation/quality** as the primary category and project attribute for prioritization. This approach allows for projects with higher costs, potentially more challenging implementation, and/or timeline to be prioritized and implemented in Phase 1.
2. **Option B** emphasizes **cost efficiency** as the primary category and project attribute for prioritization. This approach allows for prioritization of lower cost projects in Phase 1 such that additional planning and/or time is available to source funding for more costly, and potentially effective projects that can be reserved for later implementation.
3. **Option C** emphasizes a **balanced approach** to category and project attribute prioritization. This approach is intended to represent an implementation pathway which recognizes that overall project goals for water circulation and improvement must be balanced with other considerations, primarily cost but also including implementation feasibility and schedule.

Application of one or more of these or additional attribute emphasis approaches provides a framework for Phase 1 project ranking and implementation priority. Monitoring, adaptive management, and project outcomes and lessons learned may provide information that modifies the implementation approach moving forward. For Phase 1, an additional option is to review project prioritization results from the application of the three options presented herein and combine the results to select a suite of Phase 1 projects that meet multiple objectives.

The following pages present the project prioritization results of the three Category Weight Options. These results include ~10 projects which score the highest under each of the weight scenarios in accordance with the framework of the Category Weighting Approach. Each project can score a maximum total of 25 points. Scoring and prioritization results are available in ***Appendix C – Weighted Prioritization Project Matrix***.

Maximize Water Circulation/Quality - Option A

- **Water Circulation/Water Quality: 75%**
- **Cost: 15%**
- **Implementation Considerations: 5%**
- **Timeline: 5%**

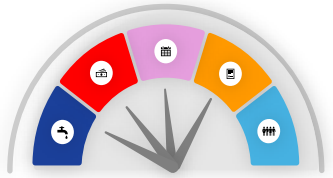


Cost Efficiency - Option B

- **Cost: 65%**
- **Water Circulation/Water Quality: 20%**
- **Implementation Considerations: 10%**
- **Timeline: 5%**

Balanced Approach - Option C

- **Cost: 45%**
- **Water Circulation/Water Quality: 45%**
- **Implementation Considerations: 5%**
- **Timeline: 5%**

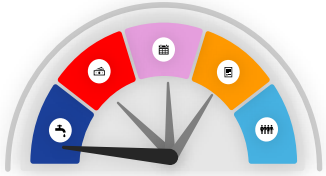


CIRCULATION/WATER QUALITY FOCUS (OPTION A)

The maximize water circulation/quality Option A is designed to include the projects with the highest anticipated effectiveness in improving water circulation and quality. The water circulation/quality maximization approach results in prioritization of Receiving Water Strategies in Phase 1. Using this approach, and recognizing a balance of Watershed Nonstructural and Watershed Structural strategies are needed to support further discussion of in-water mitigation strategies with the regulatory agencies, a group of six Watershed Nonstructural and two Watershed Structural projects are also prioritized for Phase 1. A staggered implementation approach may be applied to pilot Watershed Structural project implementation to optimize project development, plan for funding capital costs, and establish long-term maintenance capacity and funding.

Receiving Water strategies are anticipated to require long lead time, have high cost, and require complex planning and permitting. A comprehensive planning process that further evaluates Receiving Water strategy planning, design, and permitting processes within Phase 1 is recommended. It is anticipated that a 2-3-year planning and feasibility assessment effort is needed to effectively evaluate the relative feasibility and cost for the priority Receiving Water strategies. Accordingly, the Phase 1 recommendation is to initiate a single planning-level Receiving Water pilot project to further explore viability and other relevant considerations such as permit conditions and operations logistics/costs before a single Receiving Water mitigation strategy is selected for implementation.

Projects may be repeated across the different weighting options due to their relatively high effectiveness, lower costs, and/or more feasible requirements. 'Consistently Prioritized Projects' – which rise to the top under multiple weighting scenarios – are designated in each Category Weight Option.



These two projects provide alternative potential scenarios of the Edison Canal Pump Resumption strategy [1].

Maximize Water Circulation/Quality – Option A

	Open Passive Edison Canal Connection to Ocean (RW)
	Storage Tank Water Release Between Canal/Harbor (RW)
	Edison Canal Pump Resumption – 67 MGD (RW) [1]
	Edison Canal Pump Resumption – 4.3 MGD (RW)
★	Targeted Nutrient/Pesticide Source Control- Agricultural Coordination (NS)
★	Targeted Nutrient/Pesticide Source Control- Outreach and Training (NS)
★	Targeted Bacteria Source Control - Animal Waste Management (NS)
★	Municipal Operations Enhancement Source Control - Street Sweeping and Catch Basin Cleaning (CBC) Optimization (NS)
★	Targeted Nutrient/Pesticide Source Control- Illicit Discharge Detection and Elimination (NS)
★	Trash Reduction - Mechanical Filtration (NS)
	Oliveira Plaza Parking Lot Infiltration BMP (S)
	Wilson Park Infiltration BMP (S)
	Campus Park Infiltration BMP (S)

TOTAL SCORE: 246.7

Consistently Prioritized Project = ★

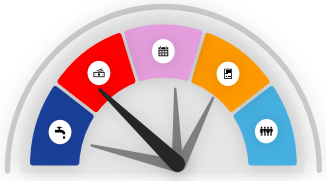
[1]The Edison Canal Pump Resumption Strategy 4.3 MGD is added as an alternative to the 67 MGD scenario, there is potential for a pumping capacity within the range of these two options to be selected. Other Receiving Water strategies are included as alternative options; it is likely that only one Receiving Water strategy will ultimately be implemented.
[2]Note: Receiving Water strategy Lifecycle costs omitted from Group A cost estimate as Phase 1 does not include implementation of a particular Receiving Water strategy.

COST EFFICIENCY FOCUS (OPTION B)

The cost efficiency emphasis Option B is designed to prioritize mitigation strategies with the lowest cost with highest pollutant removal benefits. The approach results in prioritization of seven Watershed Nonstructural and three Watershed Structural strategies which require the lowest capital investment throughout project lifecycles.

Phase 1 of implementation for Option B will primarily consist of Watershed Nonstructural strategy implementation. The cost efficiency approach prioritizes three low-cost agricultural runoff treatment system Watershed Structural projects**.** It should be noted that implementation of the Watershed Structural agricultural runoff treatment systems is anticipated require partnership with appropriate landowners and development of agreements for liability, maintenance, and other implementation components. Given the emphasis on Watershed Nonstructural strategy implementation in this approach, robust post-implementation monitoring is needed to provide geospatial data and pollutant load reduction effectiveness information. This information can be used to inform the adaptive management approach are refine prioritization of Phase 2 projects.

Agricultural runoff treatment Watershed Nonstructural strategies are prioritized Weighting Option due to their low costs, high pollutant load reductions, and estimated implementation feasibility.



Cost Efficiency Focus – Option B

★	Targeted Nutrient/Pesticide Source Control- Agricultural Coordination (NS)
★	Targeted Nutrient/Pesticide Source Control- Outreach and Training (NS)
★	Targeted Bacteria Source Control - Animal Waste Management (NS)
★	Targeted Nutrient/Pesticide Source Control- Illicit Discharge Detection and Elimination (NS)
★	Trash Reduction - Source Reduction Strategies (NS)
★	Trash Reduction - Mechanical Filtration (NS)
★	Municipal Operations Enhancement Source Control - Street Sweeping and Catch Basin Cleaning (CBC) Optimization (NS)
	Doris Drain Outfall Agricultural Runoff Treatment System (S)
	W 5th St Drain Outfall Agricultural Runoff Treatment System (S)
	Marathon Drain Outfall Agricultural Runoff Treatment System (S)

TOTAL SCORE: 192.9

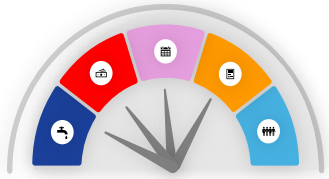
Consistently Prioritized Project = ★

BALANCED APPROACH (OPTION C)

The balanced approach Option C is designed to include representation of a holistic look at project attributes and prioritize projects with the maximum water quality/circulation benefits balanced with other cost, implementation, and schedule attributes. The balanced approach results in prioritization of seven Watershed Nonstructural and three Watershed Structural strategies that exhibit the maximum pollutant load reduction effectiveness at the lowest cost and fastest schedule.

Initial concurrent Watershed Structural project planning processes may be considered to vet feasibility and implementation approaches. A staggered implementation approach may be applied to pilot Watershed Structural project implementation to optimize project development, implementation, and long-term maintenance processes. Given the emphasis on the Watershed Nonstructural strategy implementation and inclusion of specific infiltration and filtration Watershed Structural strategies in this approach, robust post-implementation monitoring is needed to provide geographically- and project specific-oriented data and pollutant load reduction effectiveness information. This information can be used to inform the adaptive management approach and refine prioritization of Phase 2 projects.

As in Options A and B, Watershed Nonstructural strategies are prioritized in this Weighting Option due to their low costs, high pollutant load reductions, and feasibility for implementation. Watershed Structural strategies that score highly under this weighting scenario include the Wilson Park Infiltration BMP, which exhibits high potential for pollutant load reductions and associated cost-effectiveness.



Balanced Approach – Option C

★	Targeted Nutrient/Pesticide Source Control- Agricultural Coordination (NS)
★	Targeted Nutrient/Pesticide Source Control- Outreach and Training (NS)
★	Targeted Bacteria Source Control - Animal Waste Management (NS)
★	Municipal Operations Enhancement Source Control - Street Sweeping and Catch Basin Cleaning (CBC) Optimization (NS)
★	Targeted Nutrient/Pesticide Source Control- Illicit Discharge Detection and Elimination (NS)
★	Trash Reduction - Source Reduction Strategies (NS)
★	Trash Reduction - Mechanical Filtration (NS)
	Oliveira Plaza Parking Lot Infiltration BMP (S)
	Wilson Park Infiltration BMP (S)
	Campus Park Infiltration BMP (S)

TOTAL SCORE: 180.9

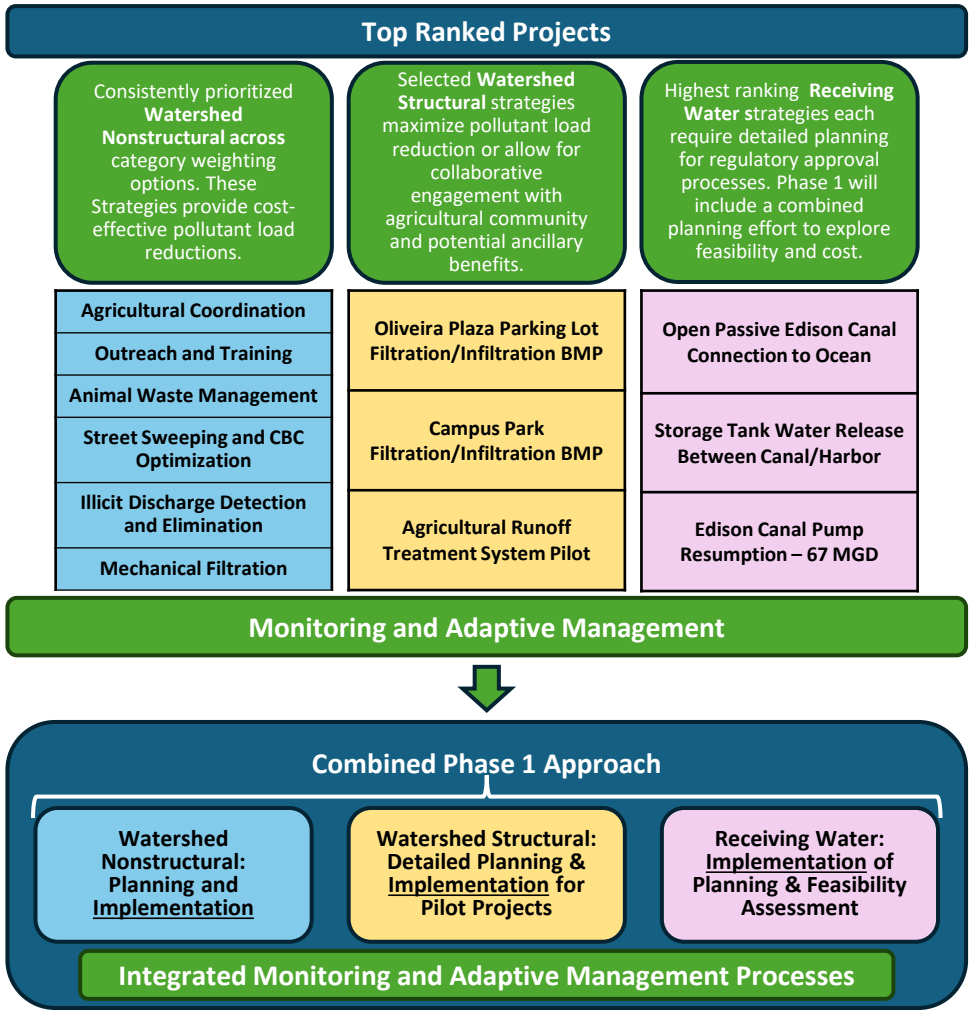
Consistently Prioritized Project = ★

PROPOSED PHASE 1 APPROACH

Based on the weighted category evaluation approach results, a strategic Phase 1 implementation approach is recommended. Key elements of this approach include:

1. The Category Weight Options that emphasize maximizing water circulation/quality, cost efficiency, and a balanced approach demonstrate that a suite of Watershed Nonstructural mitigation strategies are prioritized even with changes applied to the different Project Evaluation Category weight values. This is primarily attributable to the general water quality improvement, cost-efficiency, and relative ease of implementation attributes of these strategies.
2. For Watershed Structural projects, it is recommended that the projects prioritized by water quality benefit be included in Phase 1 implementation. Structural projects included as part of the recommended Phase 1 approach were selected from the highest-ranking options based on their magnitude of water quality benefits and multi-benefit project potential. Additionally, a 'pilot' project that initiates collaborative planning and coordination with the agricultural community for a group of or individual runoff treatment systems in Phase 1 may lead to other gains such as relationship-building for future efforts or responsiveness to potential enhanced outreach and training programs.
3. Initiate a comprehensive combined planning process for the highest-ranking Receiving Water strategies that further explores planning, design, and permitting processes. The recommended approach is to develop preliminary concept plans, technical specifications, and cost information such that project proponents can engage in preliminary consultations with regulatory agencies responsible for permitting. Consultation is expected to vet potential implementation feasibility and additional planning, special study, and/or mitigation costs to further refine potential selection of a single Receiving Water strategy for later-phase implementation.

Activities for Phase 1 specific to each individual mitigation strategy can be found in ***Appendix B – Detailed Phased Implementation*** Plan. Phase 1 monitoring and adaptive management will be used to assess.



PHASE 1 OPPORTUNITIES & CONSTRAINTS

Phase 1 project groups and individual strategies present potential opportunities and constraints throughout Phase 1 (**Table 4**). Advancing a multi-pronged implementation approach in Phase 1 enables the concurrent implementation and advanced development of strategies to comprehensively and cost-efficiently address project goals in a timely and adaptive manner. Nonstructural strategies generally allow for feasible, cost-effective options under local control to be implemented, making them optimal to initiate and begin advancement towards water quality improvement goals. Structural and Receiving Water strategies generally require longer planning timeframes but can oftentimes provide considerable pollutant load reductions. These projects also generally have more involved planning and permitting effort and require engineering design and long-term O&M planning to implement. Due to the potential environmental impacts associated with Receiving Water strategies, these potential projects require the highest level of coordination, design, and permitting effort as well as the longest planning timeframes. These projects however may yield significant improvements to overall water circulation if proven feasible and aligned with available funding.

Table 4: Phase 1 Implementation Opportunities and Constraints

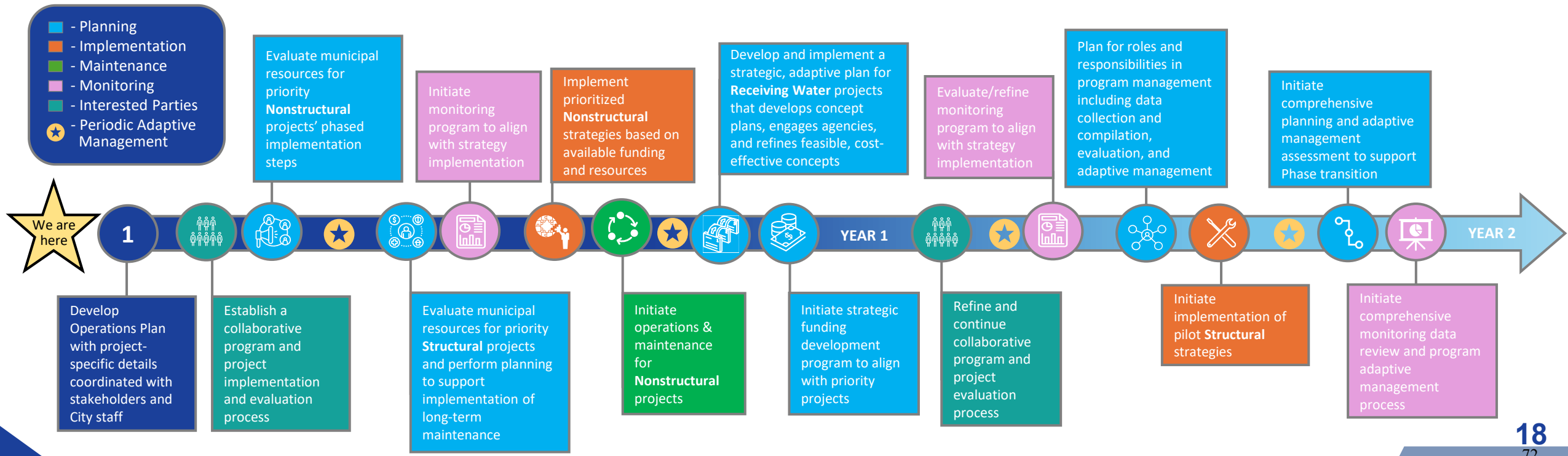
Strategy Type	Opportunities	Constraints
Nonstructural	✓ Short planning period ✓ Allow for early implementation; generally implemented within City jurisdiction ✓ Generally part of or integrated with existing programs ✓ Relatively Low capital costs and permitting requirements ✓ Can positively impact other projects with paired education programs	▪ Generally leverage existing municipal programs/resources that may require reprogramming ▪ Potentially require additional operational or fiscal resources ▪ Potential need for interdepartmental and/or interagency coordination ▪ Modifying existing programs (e.g. street sweeping) may require contract modifications with longer lead times
Structural	✓ Implementation pilot projects may inform future analogous efforts ✓ Allow for early collaborative engagement with agricultural/other communities ✓ Potential for ancillary community benefits ✓ Potential to obtain grant funding to support design and implementation ✓ Certain locations may provide education & outreach multi-benefits	▪ Potentially require up-front investment to fund design and permitting to allow for future implementation/construction grant funding ▪ Likely 2–5-year planning timeline to allow for detailed feasibility study, design, permitting, and long-term O&M planning processes ▪ Establishing long-term O&M roles and responsibilities may require resource planning and funding programming
Receiving Water	✓ Opportunity to explore feasibility and potential permitting conditions for consolidated suite of potential circulation improvement mitigation strategies ✓ Phase 1 outcomes will inform subsequent implementation efforts ✓ Multi-pronged Watershed Nonstructural and Structural project implementation approach allows for optimized strategy to consult with regulatory agency staff and decision-makers ✓ Early consultation in Phase 1 allows for extended planning and design timeframe to coincide with potential funding opportunity development	▪ Anticipated extended environmental permitting effort needed ▪ Potential consultation coordination need with private landowners, City departments responsible for long-term O&M, other interested parties ▪ Potential need for in-depth/costly feasibility assessment(s) and/or studies ▪ Potential for significant funding need across project lifecycle ▪ Some options may require detailed O&M planning, coordination, and funding

NEXT STEPS: NEAR TERM

Below is a flexible **proposed preliminary** timeline outlining near-term planning, implementation, maintenance, and monitoring efforts for Phase 1. Early actions will focus on advancing Watershed Nonstructural strategies, initiating feasibility assessment and coordination for Structural and Receiving Water projects, and establishing funding and monitoring frameworks to guide adaptive, resource-based implementation.

The planned initial Operations Plan step will provide a road map towards effective and efficient Phase 1 activities for selected mitigation strategies. This will include implementation efforts for Nonstructural projects, as well as identification of specific planning and design activities for selected Phase 1 Structural and Receiving Water projects.

Recommended Phase 1 Steps



CITY OF OXNARD NEXT STEPS

Next steps for the City of Oxnard in Phase 1 include collaboration and/or implementation of a suite of Watershed Nonstructural, Watershed Structural, and Receiving Water strategy-related activities. Implementation requires administrative, operational, and technical effort.

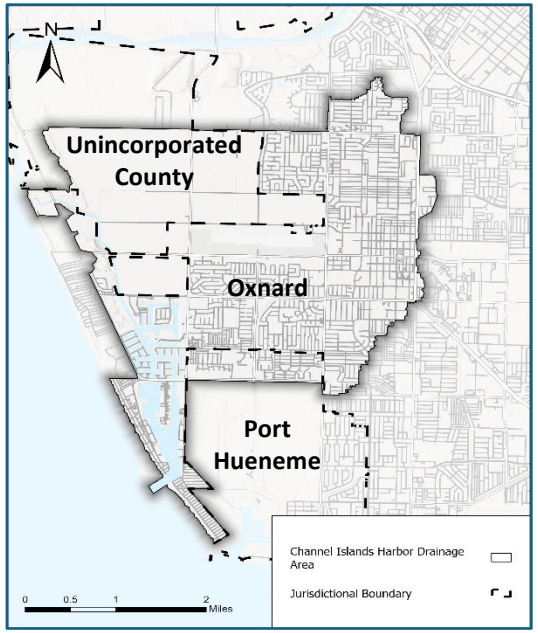


Figure 4: Jurisdictional boundaries in and around the Harbor

Applied Watershed Nonstructural strategy next steps include planning, coordination, and implementation activities for the priority strategies. These Watershed Nonstructural strategies will both reduce pollutant loading to the Harbor and serve to educate and inform watershed residents and visitors. Additionally, timely implementation and tracking will support future efforts to plan, fund, permit, and operate additional later phase strategies with more challenging implementation considerations.

Applied next steps for Watershed Structural strategies include focused feasibility assessment and project development for one or more infiltration or filtration projects to treat dry or wet weather urban and/or stormwater runoff. Two potential project development options are proposed, allowing the City flexibility in the level of investment needed to advance these projects. This will include detailed planning, including promotion of the selected project(s) as part of a City-led demonstration project to reduce pollutants and improve Harbor water quality. The implementation approach will support future demonstration of a programmatic, inter-connected approach to addressing the challenging Harbor water quality and circulation issues.

Applied next steps for Receiving Water strategies include participation in development of a planning-level project feasibility assessment, preliminary design, and environmental permit scoping program. This initial planning, in coordination with initiation of the Watershed Nonstructural and Structural projects in this first phase will support future Receiving Water strategy funding request(s), environmental permitting efforts, and capital and operations planning needs.

Watershed Nonstructural

Phase 1 implementation reduces pollutant loading and supports future phase effort to plan, fund, permit, and operate advanced strategies.

Watershed Structural

Refined feasibility assessment and project development can support both broadening of potential funding opportunities and demonstration of the City's programmatic approach.

Receiving Water

Participation in planning-level project feasibility assessment, preliminary design, and environmental permit scoping program to support future planning, funding, and permitting needs.

CITY NEXT STEPS: WATERSHED NONSTRUCTURAL STRATEGIES

Watershed Nonstructural Strategies

Table 5 details some of the most relevant Phase 1 considerations for Watershed Nonstructural strategies, including low- and high-end projections for each strategy's first year planning and implementation costs. It is recommended that the City – as part of Phase 1 implementation activities – evaluates the administrative, operational, and technical needs for each Watershed Nonstructural strategy.

Table 5: City of Oxnard next steps for implementation of Watershed Nonstructural strategies

Strategy	Additive Percent Load Reduction (%)	Estimated City Staff Effort	Estimated Costs				Cost Details
			Planning		Implementation		
			Low	High	Low	High	
Agricultural Coordination	**62%**	**1-2 hours/week**	$10K	$20K	$10K	$25K	**Planning:** Program administration[1] **Implementation:** Materials production, conduct meetings, attend and participate in appropriate events- assume 4-6 per year
Outreach & Training	**77%**	**1-4 hours/week**	$10K	$30K	$20K	$100K	**Planning:** Administration; development of targeted material leveraging existing outreach/training programs **Implementation:** Paid media purchase, conduct meetings, attend and participate in appropriate events- assume 4-6 per year, assumes 2 hours of training annually
Animal Waste Management	**51%**	**1-4 hours/week**	$25K	$50K	$25K	$50K	**Planning:** Administration; analysis of key locations for potential implementation, review of signage content, coordination with HOAs and parks staff **Implementation:** Installation of sign postings, enforcement of sign posting regulations, contracted ongoing waste container maintenance; assumes 5 target locations
Street Sweeping & CBC Optimization	**49%**	**4-8 hours/week**	$50K	$100K	$250K	$500K	**Planning:** Administration; sweeping route analysis & optimization, geo-located data capture & analysis, planning and coordination of 'no parking' signage locations **Implementation:** Contracted vehicle operations, physical CBC, debris disposal, sign postings and parking regulation enforcement
Illicit Discharge Detection & Elimination	**27%**	**2-6 hours/week**	$25K	$100K	$25K	$100K	**Planning:** Administration; report hotline development, workforce training, establishment of response & documentation protocols **Implementation:** Equipment costs, transportation, on-the-ground ID investigation & elimination costs
Mechanical Filtration*	**11%**	**1-4 hours/week**	$25K	$200K	$100K	$1M	**Planning:** Administration; includes drainage study, vendor-assisted design plans, and O&M coordination; assumes planning costs ~$2.5K-$20K per location (10) **Implementation:** Assumes 10 mechanical filtration locations priced at ~$1K-$50K each; capital projects to install, quarterly maintenance efforts, staff and equipment resources
Post-Implementation Monitoring[2]	**6%**	**1-4 hours/week**	$25K	$50K	$200K	$600K	**Planning:** Administration; includes coordination for comprehensive nonstructural project data compilation, water quality monitoring protocol development, data collection, laboratory analysis, trend analysis, reporting **Implementation:** Assumes quarterly sampling as a cost-efficient baseline; includes costs for contracted sampling, analysis, reporting; assumes 8-20 monitoring sites
		TOTAL Costs	**$170K**	**$550K**	**$630K**	**$2.4M**	

[1] Administration refers to: Planning, coordination, program development, and tracking.
[2] Though presented as such, Post-Implementation Monitoring is not a unique mitigation strategy. It is treated as an independent program through which the City can evaluate the efficacy of other implemented strategies.

CITY NEXT STEPS: WATERSHED STRUCTURAL STRATEGIES

Watershed Structural Strategies

Watershed Structural strategies require careful planning, coordination, and funding for both design and permitting. City Phase 1 recommended activities include advancing development of Watershed Structural strategies within City jurisdiction along two potential pathways. An initial diversification strategy is recommended to advance feasibility planning for the highest-ranking Watershed Structural strategies concurrently. As the projects are further developed, site constraints or other factors may limit feasibility or cost effectiveness. **Table 6** depicts the highly ranked Watershed Structural strategies recommended for advancement in Phase 1. This includes project opportunities which were selected for their high ranks within the Category Weighting Approach. As some projects are anticipated to drop out as a result of Phase 1 feasibility assessment efforts, additional potential Watershed Structural are presented for potential Phase 1 advancement.

Table 6: Recommended Watershed Structural projects based on Pollutant Load Reduction and Cost-Effectiveness

Project Name	Additive Percent Load Reduction (%)	Capital Cost[1]	Annual O&M Cost	Key Implementation Considerations
Oliveira Plaza Parking Lot Infiltration BMP	27%	$25,020,000	$200,000	• Site-specific permitting details • Need for Geotechnical analysis, land surveys • Parcel ownership • Long-term O&M responsibilities • Underground utilities assessments
Oliveira Plaza Parking Lot Filtration BMP	21%	$26,130,000	$300,000	
Campus Park Infiltration BMP	19%	$25,020,000	$200,000	
Campus Park Filtration BMP	15%	$22,790,000	$300,000	
Oxnard Airport East Filtration BMP	25%	$24,460,000	$300,000	
Oxnard Airport East Infiltration BMP	24%	$25,020,000	$200,000	
Agricultural Runoff Treatment System Pilot[2]	1%	$120,000	$24,000	

[1]Capital cost refers to the total estimated upfront investment required to plan, design, permit, and construct a project or implement a mitigation strategy. Watershed Structural strategy capital cost estimates utilize best-estimate construction cost estimates.

[2]The Proposed Agricultural Runoff Treatment System Pilot includes systems at priority discharge points to Edison Canal (Marathon & Doris Drain Outfalls, W. 5th St. Outfall; see **Figure 5**)

The selected Watershed Structural project locations **(Figure 4)** were chosen for their water quality benefit magnitude and multi-benefit project potential. As a result of proximity to important public facilities (e.g., schools and parks), there are potential ancillary muti-benefit opportunities for education, outreach, climate resilience and other benefits.

Capital cost estimates utilize best-available information on construction material and labor costs for similar projects in Southern California. Future detailed planning and analytics work can be used to refine annual O&M and project lifecycle cost estimates. Current estimated project lifecycle cost estimates utilize planning-level methods where asset renewal and/or replacement costs are assumed equal to upfront capital costs, and do not include depreciation.

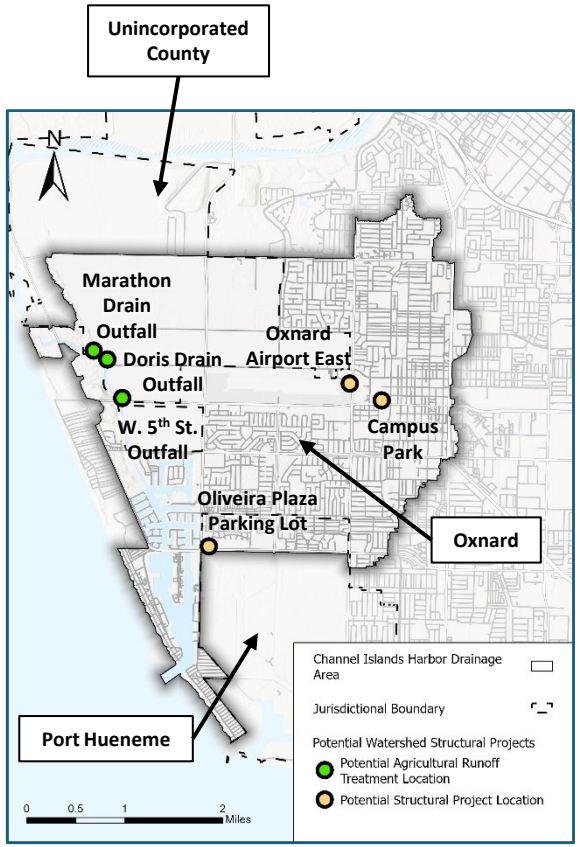


Figure 5: Phase 1 Watershed Structural project locations

CITY NEXT STEPS: WATERSHED STRUCTURAL STRATEGIES

Watershed Structural Strategies

The two-pathway approach including either development of concept-level designs or full development of construction-ready design development can be applied based on available City administrative capacity and/or funding **(Table 7)**. The concept-level design approach limits initial City costs and allows for deferral of engineering design costs and/or potential solicitation of planning grants or loans to complete design. Preparation of construction-ready designs requires higher initial investment to advance project(s) to the 100% design and permit status but allows for projects to be "shovel-ready" and eligible for future construction/implementation-type grant or loan funding opportunities. The recommended Agricultural Runoff Treatment System pilot project is included as a third option for Phase 1 Watershed Structural strategy advancement that is external to the two-pathway approach.

Table 7: Recommended Phase 1 Watershed Structural project advancement strategies

Strategy	Estimated Staff Effort	Estimated Costs	Cost Explanation
Concept- Level Structural Strategy Development	**2-6 hours/week for 26 weeks**	$25,000 - $50,000	• Conduct preliminary feasibility assessment(s) • Prepare concept level designs (3 projects)- assumes contracted design services • Evaluate potential permitting pathways
Construction-Ready Structural Strategy Development	**2-16 hours/week for 24-36 months**	$200,000 - $500,000	• Assumes contracted design services • Geotechnical analysis, land surveys, assess underground utilities • Design services level of effort dependent on City participation and site-specific planning and design requirements
Agricultural Runoff Treatment System Pilot Project	**2-6 hours/week for 12-24 months**	$50,000 - $150,000	• Coordinate with agricultural landowners • Seek and leverage design and construction funding • Assumes contracted design and construction services

Figure 6: Example infiltration strategy concept in mixed land use location (Salinas, CA)

Figure 7: Bioretention cell

Figure 8: Infiltration basin

CITY NEXT STEPS: RECEIVING WATER STRATEGIES

Receiving Water Strategies

Advancement of prioritized Receiving Water strategies requires comprehensive feasibility assessment efforts. Receiving Water strategies require coordination and technical services to address challenging regulatory, financial, and technical issues. Phase 1 activities include a comprehensive combined planning process for the highest-ranking Receiving Water strategies that further explores planning, design, and permitting processes. The recommended Phase 1 approach is to develop preliminary concept plans, technical specifications, and cost information such that the City and project proponents can engage in preliminary consultations with regulatory agencies responsible for permitting **(Table 8)**. Consultation is expected to evaluate the concept designs to inform ongoing design refinements, assess implementation feasibility, and identify any additional planning, special study, or mitigation costs needed to support the potential selection of a single Receiving Water strategy for later-phase implementation. Depicted in **Table 9** are the top three ranking Receiving Water strategies that are recommended for inclusion in the Phase 1 planning-level Receiving Water project.

Table 9: Top-ranked Receiving Water projects

Project Name	Percent RT Reduction (%)	Capital Cost	Annual O&M Cost	Key Implementation Considerations
Open Passive Edison Canal Connection to Ocean	73%	$82,030,000	$790,000	• High permitting effort • Long-term timeline • Intensive long-term O&M
Storage Tank Water Release between Canal/Harbor	45%	$9,200,000	$410,000	• High permitting effort • Long-term timeline • Specialized staff for operation
Edison Canal Pump Resumption – 67 MGD	46%	$36,900,000	$1,150,000	• High permitting efforts • Mid-term timeline • Likely need for fish entrainment mitigation

Table 8: Phase 1 Receiving Water project planning

Strategy	Estimated Staff Effort	Estimated Costs	Cost Explanation
Planning-Level Receiving Water Project	**4-16 hours/week for 24 months**	$250,000 - $750,000	• Assumes contracted preliminary concept design and regulatory permitting services • Design services level of effort dependent on City participation and site-specific planning and design requirements • Planning efforts intended to explore potentially viable pathways to implementation

Recommended Phase 1 Receiving Water strategy activities primarily include a comprehensive planning-level project exploring regulatory permitting, financial, construction, and long-term maintenance considerations. The planning process is intended to evaluate pathways and costs for implementation of circulation improvement project(s). Preliminary regulatory feedback has indicated initiation of Watershed Nonstructural and Structural strategy-related activities is recommended as a prerequisite for Receiving Water strategy advancement.

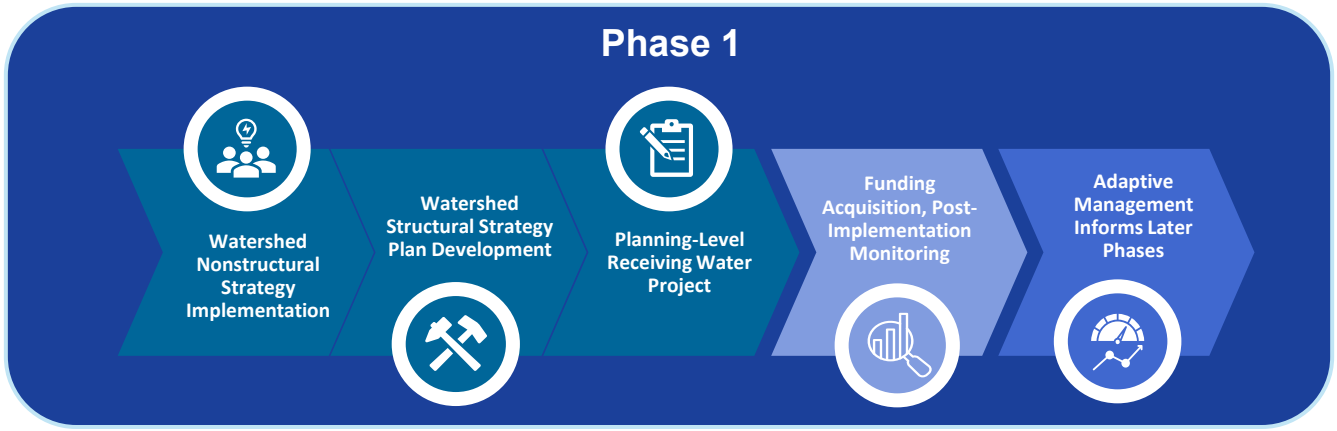
SUMMARIZED PHASE 1 RECOMMENDATION

Recommended next steps for the City of Oxnard include initiating the phased implementation approach with specific planning/implementation efforts for prioritized Watershed Nonstructural, Watershed Structural, and Receiving Water strategies. As planning and implementation progress, it is recommended that the City track and periodically evaluate the administrative, operational, and technical needs of strategy types and individual strategies within Phase 1. Outcomes will inform adaptive management of Phase 1 implementation and support planning and budgeting for implementation in future phases.

As part of Phase 1, it is recommended a comprehensive post-implementation monitoring program be implemented. The monitoring program should be focused on evaluating strategy effectiveness and water quality relative to Study goals & objectives and overall expectations. Monitoring parameters may include, but are not limited to: estimates of pollutant load reduction and multi-benefit parameters for Watershed Nonstructural strategies, administrative effort and other costs, scheduled water quality characterization monitoring in the Harbor, and as-needed discharge and/or special studies for to address project- or location-specific characterization needs. Monitoring program lessons learned will inform ongoing adaptive management processes that will refine strategies and the phased implementation approach.

Additionally, it is recommended that Phase 1 activities include identification and pursuit of specific outside funding opportunities to supplement City-funded work. Development of concept designs and/or construction-ready plans for Watershed Structural strategies positions the City to leverage federal, state, and local grants to implement projects and programs designed to achieve the goals & objectives of this Study. Outcomes of the Phase 1 planning-level Receiving Water project is also anticipated to inform later phase funding acquisition efforts.

Finally, it is recommended that Phase 1 includes collaboration with partner organizations to further evaluate the feasibility, technical specifications, and cost information of Receiving Water strategies such that the City and project proponents can engage in preliminary consultations with regulatory permitting responsible agencies. Further, the integrated and concurrent Watershed Nonstructural and Watershed Structural project-planning and implementation approach outlined in this plan will help advance discussions with regulatory and funding agencies and will support long-term efforts to improve water quality and circulation within the Harbor. Phases 2 and 3 will leverage outcomes and lessons learned from all Phase 1 activities to refine and optimize implementation, planning, and eventual maintenance of implemented strategies.



PROPOSED CITY BUDGET PLAN- PHASE 1 (YEAR 1)

The proposed preliminary budget plan is intended to facilitate near-term environmental outcomes by establishing a structured framework for City-led program management during the first year of Phase 1 implementation **(Table 10)**. The recommended approach includes initiating Phase 1 project development activities, developing a concurrent preliminary monitoring program to evaluate strategy feasibility and effectiveness, and pursuing coordinated funding acquisition efforts to support long-term program implementation advancement and stability.

The proposed budget plan is designed to align City-held ARPA[1] funds ($1 million in Year 1) with anticipated expenditures and to sequence initial Phase 1 investments in support of Study goals & objectives. Results from early implementation and monitoring will inform ongoing project development, implementation, and funding allocation processes. Lessons learned through monitoring and adaptive management will guide future investment strategies - including the proposed allocation for the second year of Phase 1.

Table 10: Phase 1 Budget Plan

Strategy Type	Strategy	Proposed Allocation[2]	Total Cost[3]	Cost Details
Watershed Nonstructural	Agricultural Coordination	$50,000	$75,000	Attend/conduct collaboration meetings; develop and produce appropriate materials
	Outreach & Training	$50,000	$467,500	Training curriculum development; conduct meetings
	Animal Waste Management	$75,000	$425,000	Signage postings; bag dispenser deployment; on-the-ground waste cleanup
	Street Sweeping & CBC Optimization	$200,000	$3,937,500	Analysis & optimization of sweeping routes and CBC work plan; technological upgrades; contract enhancements
	Illicit Discharge Detection & Elimination	$75,000	$300,000	Development of work plan and protocols; rapid response pilot project
Watershed Structural	Concept-Level Design Development for 2 Structural Strategies	$150,000	**Dependent on Selected Projects**	Conduct project-level feasibility assessment(s); prepare concept-level designs – assumes contracted design services; evaluate permitting needs
	Agricultural Runoff Treatment System Pilot Project Initiation	$50,000	$240,000	Coordination with agricultural landowners; seek and leverage design and construction funding – assumes contracted services; address key discharges at Marathon, Doris or W. 5th Street discharge
Receiving Water	Planning-Level Receiving Water	$175,000	**Dependent on Selected Project(s)**	Preliminary concept design(s) plan development and regulatory agency consultation
Other	Funding Identification & Grant Planning/Submittals	$75,000	$325,000	Initiate funding acquisition planning; research and pursue appropriate opportunities to supplement available City funds
	Post-Implementation Monitoring	$100,000	$500,000	Development of monitoring work plan and protocols
	TOTAL	**$1,000,000**	**$6,270,000+**	--

[1] American Rescue Plan Act (ARPA): A $350 billion federal stimulus program from 2021 providing relief for COVID-19 impacts, funding public health, economic recovery, essential workers, and infrastructure such as water, sewer, and stormwater projects.
[2] Proposed allocations are indicative of the first year of implementation and may not reflect a given project's entire cost of implementation.
[3] Total costs presented here are a sum of estimated capital costs and 5 years of estimated annual costs.

NEXT STEPS: FUNDING ACQUISITION

A key component of near-to-mid-term next steps during and following Phase 1 is the development of a comprehensive approach to acquisition of funding for selected mitigation strategies. A diverse suite of potential grant or loan funding programs are available and appropriate to support various mitigation strategy types in Phase 1 **(Table 11).**

Development of a structured framework to help the City and other interested parties to identify and prioritize projects best positioned will assist in obtaining competitive grant or loan funding and in diversification of funding sources for priority projects. Grant opportunities aligning with the program goals to improve circulation and water quality can be identified, tracked, and followed through on. Projects can then be matched with suitable funding sources in order to strategically enhance the City's potential for successful implementation.

This approach reduces reliance on local funds while maximizing benefits to the community and environment. Potentially suitable funding opportunities for each mitigation strategy are further presented in the Project Fact Sheets in ***Appendix A – Mitigation Strategies Analysis Report & Appendices***.

Table 11: Potential grant opportunities from *Appendix A – Mitigation Strategies Analysis Report & Appendices.*

Funding Program	Funding Amount	Dates/Deadline
Coastal Conservancy Grants	No min/max: Anticipated grant $200K – $5M.	Rolling
Nonpoint Source (NPS) 319 Program	$50K - $1M	Rolling
Stream Flow Enhancement	$30M available	Rolling
Agricultural Drainage Management Loan Program[1]	$100K - $5M	Rolling
Replacing, Removing, or Upgrading Underground Storage Tanks (RUST) Program[1]	$3K - $70K	Rolling
Water Infrastructure Finance and Innovation Act (WIFIA)[1,2]	$6.5B available	Rolling
Port Infrastructure Development Program	$1M - $125M	Due February 28, 2026
F25AS00188 Coastal Program FY25	Up to 500K	Rolling
Small Surface Water and Groundwater Storage Projects (Small Storage Program)[2]	Up to $30M	Due April 17, 2026
Community Development Block Grant (CDBG)	$3B available annually	Applications currently closed as of November 2025
Transformative Climate Communities (TCC) Program	$300K - $29.5M	Applications due Fall 2026
Community Resilience Centers (CRC) Program	$100K - $10M	Deadlines announced mid-2026
Climate Smart Agriculture Technical Assistance Grants	Up to $150K	Anticipated to open in 2026
Healthy Soils Block Grant Program	$2M - $5M	Anticipated to open in mid-2026
Regional Source Reduction Assistance Grant	7-27 awards with $40K – $240K	Anticipated to open February 2026
National Wetland Program Development Grants	$25K – $500K	Anticipated to open May 2026
Environmental Enhancement & Mitigation	$750K – $1.5M; $7M available	Anticipated to open May 2026
Encampment Resolution Funding (ERF) Program	$1.5M - $45M	Anticipated to be due June 30, 2026
FY 2026-27 Wildfire Prevention Grants	$135M available	Anticipated to open June 2026
Land and Water Conservation Fund[2]	Up to $6M	Anticipated to open mid 2026
EJ4 Climate Grant Program	Up to $175K	Anticipated Fall 2026
California Proposition 4	Dependent on specific program; $10B available in total	Dependent on specific program

[1]Loan program
[2]Requires funding match from program applicant

NEXT STEPS: MONITORING

As planning and implementation efforts move forward, a comprehensive water quality monitoring program is proposed (see ***Appendix A – Mitigation Strategies Analysis Report & Appendices***) to evaluate the effectiveness of mitigation strategies and support ongoing adaptive management. A robust baseline monitoring program is recommended to generate consistent, defensible data to track mitigation strategy performance, long-term Harbor water quality trends, assess pollutant discharges, and guide future investments. Baseline water quality monitoring will measure key parameters such as conventional, metals, and pesticide pollutant concentrations, dissolved oxygen, salinity, temperature, turbidity, and to evaluate progress toward Water Quality Objectives and beneficial use standards.

The proposed monitoring framework builds on existing open-source monitoring data and existing datasets from the City, County, Farm Bureau, and regional programs. It is intended to expand existing monitoring coverage across Harbor, Canal, and watershed sites. Quarterly sampling is recommended as a cost-effective baseline, with the potential to increase to a monthly frequency as funding permits. Sampling during both dry- and wet-weather events will capture seasonal and event-driven variability, providing a complete picture of in-Harbor conditions.

Separate monitoring approaches are proposed for Watershed Nonstructural and Structural mitigation strategies. Watershed Nonstructural programs will include both qualitative and quantitative tracking centered around metrics such as debris removal, street sweeping coverage, and outreach participation to evaluate efficiency and cost-effectiveness. Structural strategy monitoring will focus on pollutant load reduction and operational cost, level-of-effort, and resource needs following implementation.

Collected data will be compiled into a centralized database for trend and performance analysis, summarized and communicated in annual reports, and used to adaptively refine program actions. Data gaps identified within collected monitoring program data will be flagged for supplemental monitoring efforts. Ultimately, the monitoring program functions as a feedback mechanism for ongoing management, directly linking project results to decision-making. Adaptive management will allow these efforts to evolve and strengthen over the three phases of implementation. By measuring outcomes, comparing costs and benefits, facilitating interagency coordination, and communicating results, the program will ensure continuous improvement in water quality, circulation, and ecological resilience throughout the Harbor system.

- Track Long-Term Trends
- Assess Pollutant Discharges
- Guide Adaptive Management and Future Investments

Phase 1

- Baseline data monitoring
- Set sampling frequency
- Identify funding opportunities

Phase 2

- Evaluate monitoring datasets
- Refine tracking and monitoring

Phase 3

- Implement updated maintenance and monitoring needs based on outcomes of previous phases

CONCLUSION

The Channel Islands Harbor Implementation Plan provides a structured, adaptive roadmap to restore and improve water quality and circulation within the Harbor. Built on the foundation of the overall Water Quality Feasibility Study's previous efforts, this Plan integrates technical analysis, prioritization scoring, and interested party coordination to develop a prioritized guide for Phase 1 of a three-phased approach to the implementation of Watershed and Receiving Water strategies. Each phase includes concurrent planning, implementation, maintenance, monitoring, and adaptive management elements.

Moving forward, successful strategy implementation will depend on collaboration amongst the City, community partners, regulatory and funding agencies, and other interested parties. Initial efforts focus on prioritizing top-ranked strategies, securing funding, and commencing early implementation efforts. Continuous monitoring and adaptive management will ensure that results inform future actions, maintaining progress toward the long-term goals of improving water quality, enhancing circulation, and strengthening ecological resilience across the Harbor system.

Figure 9: Recreators kayaking in the Harbor

Figure 10: The Harbor connection to the ocean

FIGURES, TABLES, & APPENDICES

Figures

Tables

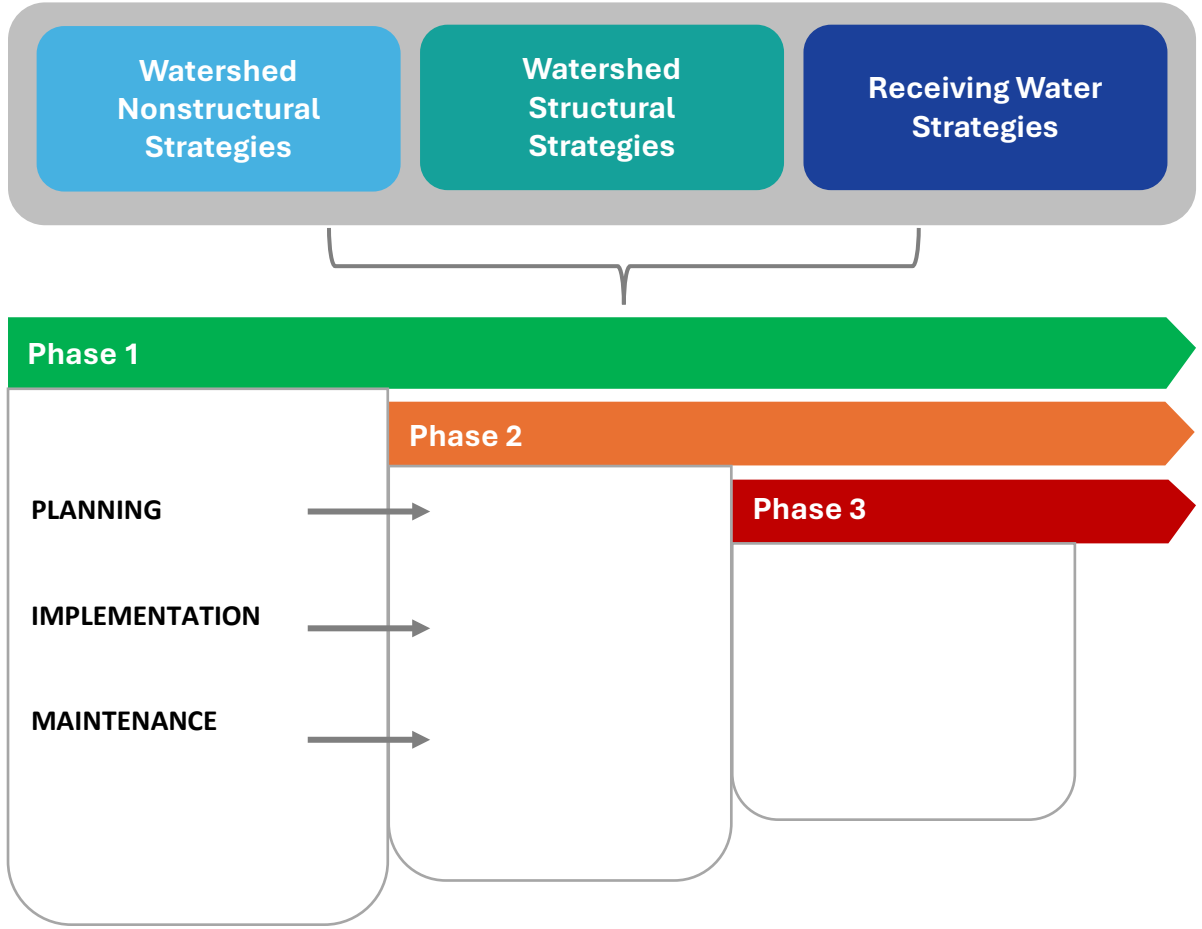
Appendices

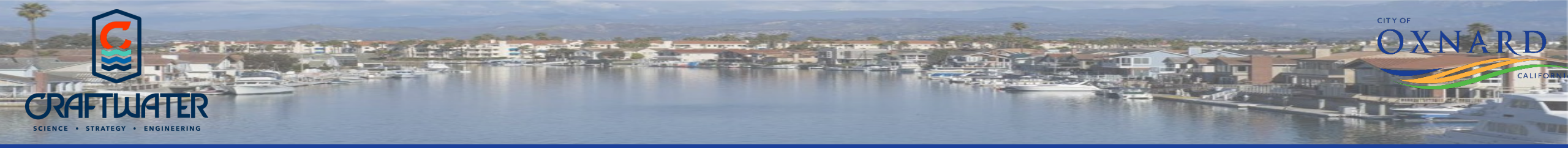
Implementation Plan
Channel Islands Harbor
Oxnard, CA
March 2026

CRAFTWATER
SCIENCE • STRATEGY • ENGINEERING

INTRODUCTION

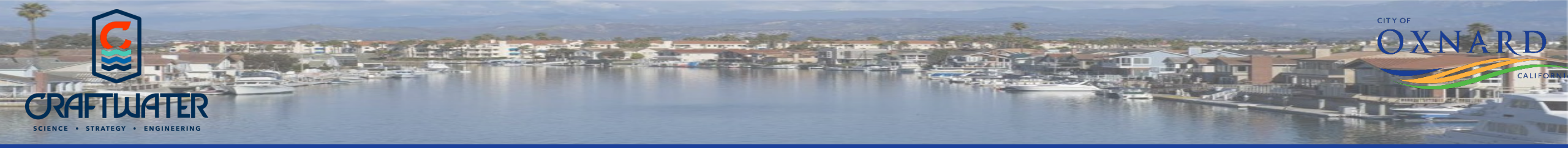
This phased Implementation Plan establishes a clear and adaptable roadmap for advancing Watershed and Receiving Water strategies, ensuring measurable progress toward improving in-Harbor water quality, reducing pollutant loads, and enhancing circulation. By moving through structured phases, each strategy can evolve from early concept to full-scale implementation using data-driven adaptive management, allowing real-time refinements for greater efficiency and impact. This approach also strengthens coordination among regulatory agencies, municipalities, and community partners while aligning project timelines with funding opportunities to maximize resource leverage. The following slides present phased plans tailored to each strategy type – Watershed Nonstructural, Watershed Structural, and Receiving Water – recognizing that differences in scale, readiness, cost, and community involvement shape the specific activities within each phase.





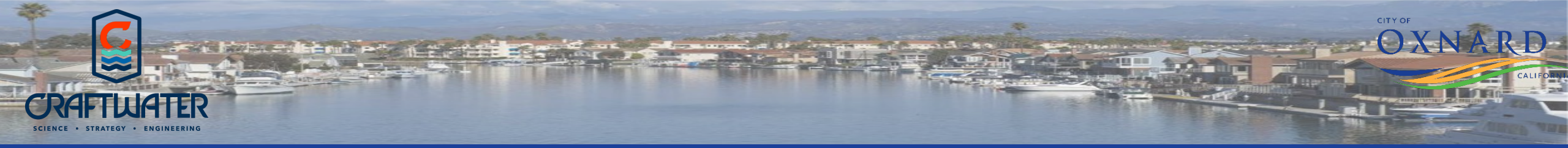
PHASED APPROACH: WATERSHED NONSTRUCTURAL

Watershed Nonstructural Strategy	Category	Phase 1	Phase 2	Phase 3
Outreach & Training	**Planning**	• Develop curriculum and outreach resources • Identify priority outreach target(s) • Conduct baseline BMP adoption survey • Coordinate with Farm Bureau • Develop cost estimates and pursue initial funding opportunities • Natural Resources Conservation Service (NRCS); secure startup grants (Prop 1, 319h) • Meet with City departments and interested parties to coordinate on scope and budget	• Refine materials from Phase 1 feedback • Expand modules to new audiences • Apply for multi-year funding opportunities • Formalize interagency agreements	TBD
	Implementation	• Pilot 3–5 bilingual BMP workshops (Farm Bureau, University of California (UC) Extension) • Distribute BMP material kits and conduct field demonstrations	• Expand workshops to regionwide scale • Integrate BMP training into homeowners associations (HOAs) and grower groups	TBD
	Maintenance & Monitoring	• Track participation and BMP adoption rates pre-/post-surveys	• Assess BMP adoption rates • Refine program activities	TBD
Illicit Discharge Detection & Elimination (IDDE)	**Planning**	• Map outfalls and baseline pollutant testing • Establish reporting procedures • Coordinate with Regional Water Quality Control Board (RWQCB) • Develop cost estimates and pursue initial funding opportunities	• Refine GIS/stormwater models and prioritize sites • Formalize interagency response protocols • Develop Memoranda of Understanding (MOUs)	TBD
	Implementation	• Conduct pilot inspections at hotspot outfalls • Develop framework to train staff and “citizen inspectors”	• Expand inspections to additional outfalls • Potential development of electronic log system • Pursue stronger enforcement efforts	TBD
	Maintenance & Monitoring	• Track reports/inspections in pilot database	• Review annual IDDE report and refine inspection and response protocols	TBD



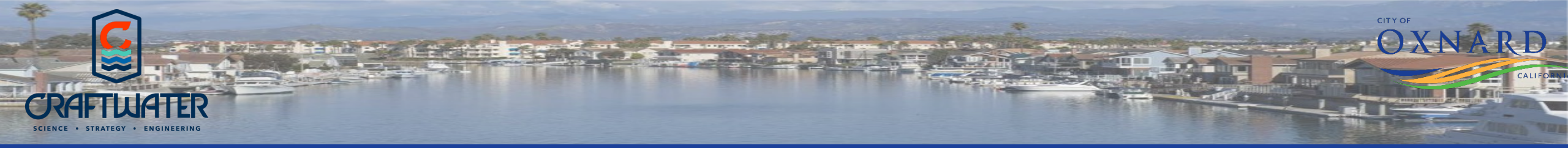
PHASED APPROACH: WATERSHED NONSTRUCTURAL

Watershed Nonstructural Strategy	Category	Phase 1	Phase 2	Phase 3
Agricultural Coordination	**Planning**	• Map high-risk agricultural discharges • Conduct grower roundtable discussions • Coordinate with Farm Bureau/agricultural community on development of potential data-sharing procedures • Develop cost estimates and pursue initial funding opportunities	• Refine BMPs based on Phase 1 outcomes • Expand agreements with Farm Bureau/agricultural community • Align plans with Ventura County Agricultural Irrigated Lands Group's (VCAILG) Water Quality Management Plan (WQMP)	TBD
	Implementation	• Pilot BMPs (drip irrigation, reduced pesticides, rotation) on agricultural land	• Expand BMPs to larger acreage • Add vegetative buffer components	TBD
	Maintenance & Monitoring	• Monitor pilot BMPs for nutrient/pesticide reduction impacts	• Expand water sampling efforts • Perform adaptive BMP adjustments	TBD
Sewer System Maintenance	**Planning**	• Develop sewer asset risk assessment map • Coordinate w/ City Public Works Department and Ventura County • Secure Capital Improvement Plan (CIP) funding	• Expand sewer system mapping & prioritization • Establish interagency agreements for joint sewer upgrades	TBD
	Implementation	• Pilot smoke testing and closed-circuit television (CCTV) in 2 neighborhoods; repair small leaks	• Expand repair/lining projects across multiple zones	TBD
	Maintenance & Monitoring	• Pilot maintenance logs; track leak repairs	• Expanded sewer system asset monitoring and database	TBD



PHASED APPROACH: WATERSHED NONSTRUCTURAL

Watershed Nonstructural Strategy	Category	Phase 1	Phase 2	Phase 3
Homeless Encampment Management	**Planning**	• Map encampments near waterways • Identify priority management areas • Coordinate with Housing Department, Police Department, non-governmental organizations (NGOs)	• Update mapping and prioritization annually; integrate with housing data • Develop formal cleanup/response protocol	TBD
	Implementation	• Pilot cleanup/response protocol at hotspot locations • Construct temporary waste stations	• Expand program to Harbor-adjacent encampments	TBD
	Maintenance & Monitoring	• Track cleanup volumes; monitor bacteria hotspots	• Expand database and monitoring procedures	TBD
Animal Waste Management	**Planning**	• Survey hotspots (dog parks, waterfronts, walking trails) • Baseline bacteria testing near dog-use areas • Coordinate with NGOs and HOAs • Pursue initial funding opportunities	• Expand program to Harbor-adjacent locations • Develop formal cleanup/response protocol • Partner with HOAs for cost-sharing opportunities	TBD
	Implementation	• Identify priority management areas • Begin development of public outreach campaign • Install pet waste stations in identified hotspot areas	• Update mapping & prioritization annually • Expand pet waste station network	TBD
	Maintenance & Monitoring	• Track cleanup volumes; monitor bacteria hotspots	• Expand maintenance and monitoring procedures	TBD



PHASED APPROACH: WATERSHED NONSTRUCTURAL

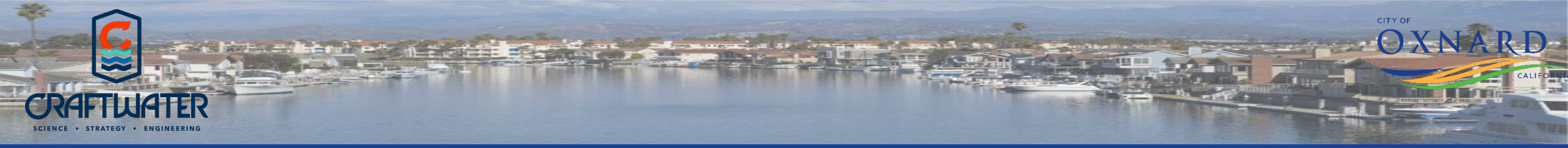
Watershed Nonstructural Strategy	Category	Phase 1	Phase 2	Phase 3
Street Sweeping and Catch Basin Cleaning Optimization	**Planning**	• Collect baseline curbside solids data • Identify high priority catch basins and street sweeping routes • Develop asset management plan • Coordinate with Public Works Department • Assess cost estimates and current funding adjustments	• Fully integrate new routes with enhanced frequency • Review prioritization outcomes • Secure future funding for program, including operations & maintenance (O&M) funding	TBD
	Implementation	• Pilot optimized street sweeping in identified hotspot neighborhoods • Increase cleaning frequency in storm season/after storm events	• Implement catch basin cleaning and street sweeping routes schedule with enhanced consistency and efficiency	TBD
	Maintenance & Monitoring	• Evaluate current programs • Collect monitoring data to inform later phases	• Continuous predictive monitoring and maintenance demonstrating effectiveness	TBD
Stormwater System Maintenance	**Planning**	• Develop stormwater asset management inventory • Prioritize high-risk assets for cleaning and/or maintenance • Develop standardized inspection protocols • Integrate asset management inventory with GIS • Coordinate with City/County agencies • Apply for Prop 1 and MS4 compliance funding • Develop shared O&M responsibilities and align with flood control planning	• Expand asset inventory and scheduling across system • Secure long-term interagency agreements	TBD
	Implementation	• Pilot proactive cleaning of MS4 channels • Inspect stormwater conveyance features • Train staff on proactive O&M practices	• Expand proactive O&M to all Harbor storm drains and channels	TBD
	Maintenance & Monitoring	• Document pilot cleaning data • Track debris/volume removed • Adjust maintenance cycles	• Expand proactive O&M scheduling tools	TBD

PHASED APPROACH: WATERSHED NONSTRUCTURAL

Watershed Nonstructural Strategy	Category	Phase 1	Phase 2	Phase 3
Mechanical Filtration	**Planning**	• Identify priority outfalls with high debris loading • Develop pilot monitoring plan • Assess O&M requirements; Establish O&M cost estimations and budget line • Develop concrete technical specifications • Secure Prop 1/Prop 68 grant funding • Coordinate with NGOs for pilot sites • Engage with contractors and vendors	• Refine siting and device selection • Integrate procurement and replacement activities into City O&M budget	TBD
	Implementation	• Install 5–10 catch basin inserts at priority debris-prone sites • Monitor clogging and pollutant removal • Conduct maintenance frequency trials • Evaluate performance of different insert device models	• Expand to 20–30 priority outfalls with proven device types	TBD
	Maintenance & Monitoring	• Track pollutant removal from pilot units and document clogging frequency • Adjust device designs accordingly • Communicate results with regulators	• Expand monitoring and adaptive O&M efforts	TBD
Trash Source Reduction Strategies	**Planning**	• Conduct baseline trash audits at Harbor and marinas • Identify debris-prone commercial nodes • Develop standardized monitoring methodology • Pilot debris hotspot mapping • Partner with City Council, NGOs, and Chambers of Commerce • Draft local ordinance language • Apply for waste reduction grant funding • Coordinate enforcement staff training	• Expand auditing efforts • Adopt ordinance and integrate into City policy	TBD
	Implementation	• Organize public cleanup events • Launch educational campaign with signage and social media components • Provide incentives for businesses adopting alternatives	• Expand ordinances Citywide with enforcement provisions	TBD
	Maintenance & Monitoring	• Document volume of debris collected at cleanups • Review annual litter audit reports • Monitor debris load reductions	• Expand tracking into MS4 permit reporting	TBD

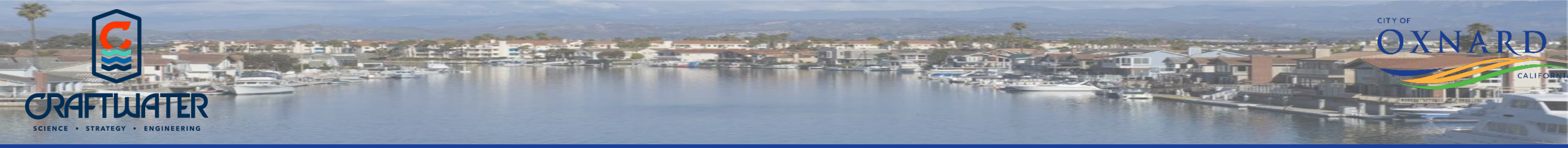
PHASED APPROACH: WATERSHED STRUCTURAL

Watershed Structural Strategy	Category	Phase 1	Phase 2	Phase 3
Filtration BMPs	**Planning**	• Identify priority storm drain sites; conduct feasibility and conceptual design • Conduct feasibility studies at multiple outfalls; Develop conceptual design alternatives • Perform baseline monitoring of inflow/outflow water quality • Prioritize sites with highest pollutant loads • Secure site access and landowner approvals • Apply for Prop 1/Prop 68 stormwater funding • Coordinate with RWQCB for compliance approval • Prepare permitting documentation (CEQA, Section 401 Certification)	• Advance detailed design and permitting for selected BMP sites • Submit permits and finalize interagency agreements	TBD
	Implementation	• Construct 1 pilot filtration BMP (e.g., Campus Park) at a priority outfall • Test pollutant removal efficiencies (nutrients, metals, bacteria) • Engage community volunteers in BMP planting and maintenance	• Expand BMP installation to 2–3 additional priority outfalls	TBD
	Maintenance & Monitoring	• Monitor inflow/outflow water quality monthly • Track sediment removal capacity • Document O&M costs and staff hours; Develop long-term O&M manual	• Incorporate BMP monitoring into Citywide stormwater reporting	TBD
Infiltration BMPs	**Planning**	• Identify suitable parcels with >0.5 in/hr infiltration rate • Conduct geotechnical testing • Develop conceptual design for 1 pilot infiltration basin • Secure parcel use agreements • Apply for Prop 68 and groundwater recharge funding • Coordinate with Ventura County Flood Control District • Develop initial O&M guidelines	• Advance preliminary design and permitting for priority sites • Develop Citywide infiltration BMP implementation program	TBD
	Implementation	• Construct a pilot infiltration basin or trench on a City-owned parcel • Test infiltration rates under seasonal conditions • Plant native vegetation to stabilize soils • Monitor for groundwater mounding and performance	• Expand infiltration practices to multiple municipal parcels	TBD
	Maintenance & Monitoring	• Monitor infiltration rates monthly • Inspect vegetation establishment • Document clogging issues and track sediment accumulation	• Expand O&M schedule and refine infiltration BMP manual	TBD



PHASED APPROACH: WATERSHED STRUCTURAL

Watershed Structural Strategy	Category	Phase 1	Phase 2	Phase 3
Agricultural Runoff Treatment Systems	**Planning**	• Partner with Farm Bureau, NRCS, and growers • Apply for Environmental Quality Incentives Program (EQIP)/Prop 68 grants • Secure farm cooperation agreements • Develop permitting pathway for wetlands • Engage farms to pilot vegetated filter strips or constructed wetlands • Monitor nitrogen (N), phosphorus (P), pesticide reductions • Identify agricultural drains with high pollutant loading • Conduct baseline sampling of nutrients/pesticides • Develop conceptual treatment designs	• Refine treatment designs for broader implementation • Secure multi-farm cost-share programs and funding	TBD
	Implementation	• Construct a vegetated filter strip or treatment wetland adjacent to an agricultural drainage canal • Engage agricultural community in program • Monitor reductions in N, P, pesticides	• Expand installations to additional agricultural drainage sites	TBD
	Maintenance & Monitoring	• Monitor pollutant reduction quarterly • Track vegetation health and maintenance needs • Document O&M labor costs • Adjust designs based on performance	• Expand monitoring efforts across additional treatment systems	TBD

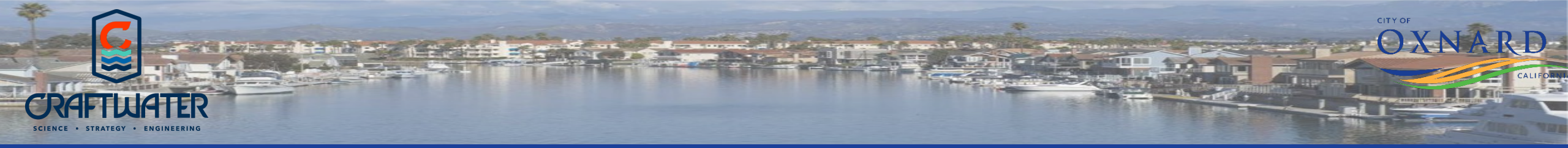


PHASED APPROACH: RECEIVING WATER

Receiving Water Strategy	Category	Phase 1	Phase 2	Phase 3
Edison Canal Pump Resumption (4.3 OR 67 MGD)	**Planning**	• Compile baseline dissolved oxygen (DO) and residence time data • Conduct fish entrainment risk evaluation • Develop preliminary design alternatives • Conduct meetings with RWQCB and Coastal Commission • Pursue state/federal grant opportunities • Identify long-term lead O&M agency	• Finalize engineering design and O&M plan • Apply for major infrastructure funding and permits	TBD
	Implementation	• Conduct feasibility study for pump rehabilitation • Inspect existing pump infrastructure • Review hydrodynamic models; compare with/without pumping • Estimate operational costs and staff requirements	• Begin detailed engineering design and permitting for pump rehabilitation	TBD
	Maintenance & Monitoring	• Review current circulation baseline in canal • Develop O&M cost estimates • Track initial monitoring results for adaptive design	• Establish permanent O&M program tied to water quality monitoring	TBD
Canal Decommissioned & Converted	**Planning**	• Conduct alternatives analysis (canal decommission vs. storage tank vs. hybrid) • Evaluate habitat restoration opportunities • Identify parcels for potential conversion • Convene stakeholder workshops (residents, NGOs, regulators) • Coordinate with Coastal Commission, U.S. Army Corps of Engineers (USACE), RWQCB; establish interagency working group • Seek Prop 1 wetland restoration and other funding options	• Complete engineering design and CEQA documentation • Submit major permits and pursue construction funding	TBD
	Implementation	• Develop conceptual design for conversion of canal into wetlands and/or water storage • Review past and present baseline habitat and circulation data • Evaluate modeled circulation benefits under different configurations	• Potential advancement of full wetland/storage design and permitting	TBD
	Maintenance & Monitoring	• Begin pre-construction water quality and habitat monitoring • Develop adaptive wetland O&M guidelines	• Expand to long-term monitoring of habitat and circulation post-construction	TBD

PHASED APPROACH: WATERSHED STRUCTURAL

Receiving Water Strategy	Category	Phase 1	Phase 2	Phase 3
Passive Circulation Enhancements	**Planning**	• Review and evaluate circulation and DO baseline studies • Assess Harbor bottlenecks and stagnation zones • Prepare preliminary engineering concepts • Engage stakeholders and coordinate with USACE, RWQCB, Coastal Commission • Identify funding programs for coastal circulation improvements • Develop partnerships with marina owners	• Complete detailed design and environmental review efforts • Apply for permits and construction grants	TBD
	Implementation	• Identify feasible culvert sites for improved tidal exchange • Review hydrodynamic models of culvert scenarios • Develop cost estimates	• Advance culvert design and permitting for priority sites	TBD
	Maintenance & Monitoring	• Track past and present baseline DO/residence time levels • Develop culvert O&M and inspection guidelines • Establish cost estimates for cleaning and repairs	• Expand monitoring and incorporate into long-term O&M program	TBD
Passive Edison Canal Connection	**Planning**	• Review and evaluate circulation benefits of inlet alternatives • Identify potential jetty or riprap stabilization needs • Begin pre-application meetings with USACE, Coastal Commission, California Department of Fish & Wildlife (CDFW) • Develop funding strategy (state/federal grants) • Coordinate with Harbor District and local municipalities	• Complete environmental review and final design • Finalize and submit permit applications and funding requests	TBD
	Implementation	• Develop conceptual alternatives for second ocean inlet • Conduct baseline hydrodynamic and ecological surveys • Estimate construction costs and potential impacts	• Advance engineering design and permitting of preferred inlet alternative	TBD
	Maintenance & Monitoring	• Compile past/present baseline DO and residence time data • Develop inlet monitoring framework • Track modeling outputs to inform design • Draft adaptive management plan	• Establish monitoring protocol for long-term inlet performance	TBD



PHASED APPROACH: WATERSHED STRUCTURAL

Receiving Water Strategy	Category	Phase 1	Phase 2	Phase 3
Storage Tank Water Release	**Planning**	• Review and evaluate modeled circulation benefits from controlled releases • Identify seasonal operation schedules • Evaluate potential engineering constraints • Coordinate with Harbor District and Public Works Department • Identify long-term lead O&M agency • Apply for Prop 1 recycled water/flood management funds • Establish interagency MOU	• Complete engineering design and permit applications • Secure funding and finalize O&M responsibilities	TBD
	Implementation	• Pilot small-scale storage tank connected to Harbor system • Test controlled-release flows into Harbor/Canal • Conduct water quality monitoring during release events • Develop preliminary engineering designs	• Advance detailed design and permitting of larger release tank(s)	TBD
	Maintenance & Monitoring	• Conduct release event monitoring (DO, residence time) • Track operational costs • Develop draft adaptive release guidelines	• Establish ongoing monitoring protocol for expanded system	TBD
Canal Decommissioned & Storage Tank	**Planning**	• Assess siting constraints and infrastructure tie-ins • Estimate capital and O&M costs • Prepare concept-level engineering plans • Convene stakeholder workshops on hybrid approach • Coordinate with Coastal Commission, USACE, RWQCB • Apply for state/federal infrastructure and habitat grants • Identify long-term lead O&M agency	• Finalize preferred hybrid design for permitting • Submit permits and pursue hybrid system funding	TBD
	Implementation	• Develop conceptual design combining canal decommissioning with new storage tanks • Model circulation and storage benefits under different flow parameters • Collect baseline hydrodynamic and ecological data	• Advance hybrid wetland + storage tank design and environmental review	TBD
	Maintenance & Monitoring	• Pilot hybrid system monitoring (water quality, habitat performance) • Develop adaptive O&M guidelines • Track costs and compare to standalone wetland/tank options • Communicate findings with agencies	• Establish long-term monitoring plan for hybrid system performance	TBD

Project Type/Name				Costs			Implementation Considerations			Community Benefits					
	Average Residence Time (RT) (Days)	Additive Aggregate Percent Load Reduction (Upstream) or Percent RT Reduction (RW) (%)	Cost-Effectiveness ($/% Aggregate Load Reduction)	Capital Cost ($)	Annual O&M Cost ($)	30-yr Lifecycle Cost ($)	Parcel Ownership	Crosses Jurisdictional Boundaries?	Permitting Difficulty	Aesthetic Improvements	Trash Reduction	CB Proportion	DAC Benefits	Contributes to Maintenance of Rec-2 Std	Contributes to WQ Commensurate with Rec-1 Std
Targeted Nutrient/Pesticide Source Control- Outreach and Training (NS)	N/A	77%	$ 34,665	$ 30,000	$ 87,500	$ 2,685,000	Mixed	No	Low	No	No	0.65	Yes	Yes	Yes
Targeted Nutrient/Pesticide Source Control- Illicit Discharge Detection and Elimination (NS)	N/A	27%	$ 60,073	$ 50,000	$ 50,000	$ 1,600,000	Mixed	No	Low	Partial	Partial	0.55	Yes	Yes	Yes
Targeted Nutrient/Pesticide Source Control- Agricultural Coordination (NS)	N/A	62%	$ 5,300	$ 15,000	$ 10,000	$ 330,000	Mixed	Partial	Low	No	No	0.65	Yes	Yes	Yes
Targeted Bacteria Source Control - Sewer System Maintenance (NS)	N/A	11%	$ 9,995,621	$ 262,500	$ 3,762,500	$ 113,400,000	Mixed	No	Low	No	No	0.5	Partial	Yes	Yes
Targeted Bacteria Source Control - Homeless Encampment Management (NS)	N/A	18%	$ 8,444,541	$ 250,000	$ 5,000,000	$ 150,500,000	Mixed	Partial	Low	Partial	Yes	0.55	Yes	Yes	Yes
Targeted Bacteria Source Control - Animal Waste Management (NS)	N/A	51%	$ 45,962	$ 50,000	$ 75,000	$ 2,350,000	Mixed	No	Low	No	No	0.65	Partial	Yes	Yes
Municipal Operations Enhancement Source Control - Street Sweeping and Catch Basin Cleaning (CBC) Optimization (NS)	N/A	49%	$ 478,054	$ -	$ 787,500	$ 23,625,000	Mixed	No	Low	Partial	Yes	0.65	Partial	Yes	Yes
Non-Structural Operational Stormwater Programs - Stormwater System Maintenance (NS)	N/A	6%	$ 17,744,075	$ 262,500	$ 3,762,500	$ 113,400,000	Mixed	No	Low	No	No	0.55	Yes	Yes	Yes
Trash Reduction - Mechanical Filtration (NS)	N/A	11%	$ 1,122,898	$ 3,000,000	$ 200,000	$ 12,000,000	Mixed	No	Low	Partial	Yes	0.6	Partial	Yes	Yes
Trash Reduction - Source Reduction Strategies (NS)	N/A	6%	$ 645,649	$ 193,750	$ 125,000	$ 4,137,500	Mixed	No	Low	Partial	Yes	0.95	Yes	Yes	Yes
Wilson Park Filtration BMP (S)	N/A	10%	$ 3,575,943	$ 12,585,000	$ 300,000	$ 34,170,000	City	No	Medium	Partial	Partial	0.9	No	Yes	No
Driffill Elementary Basketball Courts Filtration BMP (S)	N/A	2%	$ 17,443,468	$ 12,015,000	$ 300,000	$ 33,030,000	School District	Yes	Medium	Partial	Partial	0.7	No	Yes	No
Mariner's Place Green Streets Filtration BMP (S)	N/A	5%	$ 4,364,557	$ 6,675,000	$ 300,000	$ 22,350,000	Private	Yes	Medium	Partial	Partial	0.5	No	Yes	No
Southwest Community Park Filtration BMP (S)	N/A	1%	$ 18,824,813	$ 3,545,000	$ 300,000	$ 16,090,000	City	No	Medium	Partial	Partial	0.6	No	Yes	No
Chesapeak Drive Filtration BMP (S)	N/A	0.3%	$ 98,185,854	$ 10,290,000	$ 300,000	$ 29,580,000	Public	Yes	Medium	Partial	Partial	0.3	No	Yes	No
Seabridge Planter East Filtration BMP (S)	N/A	5%	$ 5,867,920	$ 11,440,000	$ 300,000	$ 31,880,000	City	No	Medium	Partial	Partial	0.2	No	Yes	No
Dunkirk Park Filtration BMP (S)	N/A	0.4%	$ 47,535,256	$ 4,845,000	$ 300,000	$ 18,690,000	City	No	Medium	Partial	Partial	0.4	No	Yes	No
Campus Park Filtration BMP (S)	N/A	15%	$ 3,546,360	$ 22,790,000	$ 300,000	$ 54,580,000	City	No	Medium	Partial	Partial	0.7	No	Yes	No
Oxnard Airport Central Filtration BMP (S)	N/A	1%	$ 20,386,318	$ 3,545,000	$ 300,000	$ 16,090,000	County	Partial	Medium	Partial	Partial	0.4	Yes	Yes	No
Oxnard School District Administration Parking Lot Filtration BMP (S)	N/A	3%	$ 6,872,142	$ 6,675,000	$ 300,000	$ 22,350,000	School District	Yes	Medium	Partial	Partial	0.6	No	Yes	No
Marina West Park Filtration BMP (S)	N/A	5%	$ 4,518,103	$ 6,675,000	$ 300,000	$ 22,350,000	City	No	Medium	Partial	Partial	0.4	No	Yes	No
N Patterson Rd Green Streets Filtration BMP (S)	N/A	7%	$ 4,320,617	$ 10,290,000	$ 300,000	$ 29,580,000	Public	Yes	Medium	Partial	Partial	0.5	Yes	Yes	No
Seabridge Planter West Filtration BMP (S)	N/A	1%	$ 34,028,582	$ 7,860,000	$ 300,000	$ 24,720,000	City	No	Medium	Partial	Partial	0.2	No	Yes	No
S Victoria Ave Green Streets Filtration BMP (S)	N/A	5%	$ 4,489,204	$ 6,675,000	$ 300,000	$ 22,350,000	Public	Yes	Medium	Partial	Partial	0.3	No	Yes	No
Edison Doris East Filtration BMP (S)	N/A	6%	$ 8,055,754	$ 19,435,000	$ 300,000	$ 47,870,000	Utility	Partial	Medium	Partial	Partial	0.4	Yes	Yes	No
Oxnard High Filtration BMP (S)	N/A	2%	$ 17,539,539	$ 12,585,000	$ 300,000	$ 34,170,000	School District	Yes	Medium	Partial	Partial	0.5	Yes	Yes	No
Kiddie Beach ROW Filtration BMP (S)	N/A	1%	$ 15,649,542	$ 4,210,000	$ 300,000	$ 17,420,000	Private	Yes	Medium	Partial	Partial	0.2	No	Yes	No
Doris Drain Outfall Filtration BMP (S)	N/A	2%	$ 5,355,968	$ 4,340,000	$ 150,000	$ 13,180,000	County	Partial	Medium	Partial	Partial	0.4	Yes	Yes	No
Edison Doris West Filtration BMP (S)	N/A	3%	$ 16,657,056	$ 20,555,000	$ 300,000	$ 50,110,000	Utility	Partial	Medium	Partial	Partial	0.4	Yes	Yes	No
Kellner Doris Ag Field Filtration BMP (S)	N/A	2%	$ 10,245,911	$ 4,845,000	$ 300,000	$ 18,690,000	Private	Yes	Medium	Partial	Partial	0.4	Yes	Yes	No
Oxnard Airport Southwest Filtration BMP (S)	N/A	3%	$ 9,900,279	$ 10,190,000	$ 300,000	$ 29,380,000	County	Partial	Medium	Partial	Partial	0.5	Yes	Yes	No
Oxnard Airport Northwest Filtration BMP (S)	N/A	2%	$ 10,033,059	$ 4,210,000	$ 300,000	$ 17,420,000	County	Partial	Medium	Partial	Partial	0.5	Yes	Yes	No
Sea Air Park Filtration BMP (S)	N/A	3%	$ 6,886,328	$ 6,675,000	$ 300,000	$ 22,350,000	City	No	Medium	Partial	Partial	0.6	No	Yes	No
W 5th St Drain Outfall Filtration BMP (S)	N/A	1%	$ 10,999,731	$ 4,340,000	$ 150,000	$ 13,180,000	Private	Partial	Medium	Partial	Partial	0.4	Yes	Yes	No
W Wooley Rd Drain Outfall Filtration BMP (S)	N/A	0.1%	$ 144,131,478	$ 4,340,000	$ 150,000	$ 13,180,000	Private	Yes	Medium	Partial	Partial	0.2	No	Yes	No
Edison Hemlock Drain North Filtration BMP (S)	N/A	5%	$ 4,216,268	$ 6,675,000	$ 300,000	$ 22,350,000	Utility	Partial	Medium	Partial	Partial	0.1	No	Yes	No
Marathon Drain Outfall Filtration BMP (S)	N/A	1%	$ 12,009,503	$ 4,340,000	$ 150,000	$ 13,180,000	Private	Partial	Medium	Partial	Partial	0.4	Yes	Yes	No
Oliveira Development Filtration BMP (S)	N/A	2%	$ 11,661,243	$ 4,845,000	$ 300,000	$ 18,690,000	Private	Yes	Medium	Partial	Partial	0.4	No	Yes	No
Seabridge Elementary Filtration BMP (S)	N/A	1%	$ 56,337,358	$ 14,360,000	$ 300,000	$ 37,720,000	School District	Yes	Medium	Partial	Partial	0.3	No	Yes	No
Marathon W 5th St Ag Field Filtration BMP (S)	N/A	1%	$ 12,979,446	$ 3,545,000	$ 300,000	$ 16,090,000	Private	Partial	Medium	Partial	Partial	0.4	Yes	Yes	No
HHR W 5th St Ag Field Filtration BMP (S)	N/A	2%	$ 8,186,433	$ 3,545,000	$ 300,000	$ 16,090,000	Private	Yes	Medium	Partial	Partial	0.4	Yes	Yes	No
Diacos Private Ag Field Drain Outfall Filtration BMP (S)	N/A	0.4%	$ 30,984,887	$ 3,900,000	$ 150,000	$ 12,300,000	Private	Yes	Medium	Partial	Partial	0.1	No	Yes	No
Mangeon W 5th St Ag Field Filtration BMP (S)	N/A	4%	$ 3,995,002	$ 3,545,000	$ 300,000	$ 16,090,000	Private	Yes	Medium	Partial	Partial	0.5	Yes	Yes	No
Oxnard Airport East Filtration BMP (S)	N/A	25%	$ 2,327,652	$ 24,460,000	$ 300,000	$ 57,920,000	County	Partial	Medium	Partial	Partial	0.5	Yes	Yes	No
County Parcel S Ventura Filtration BMP (S)	N/A	12%	$ 4,745,938	$ 24,460,000	$ 300,000	$ 57,920,000	County	Partial	Medium	Partial	Partial	0.4	No	Yes	No

Project Type/Name				Costs			Implementation Considerations			Community Benefits					
	Average Residence Time (RT) (Days)	Additive Aggregate Percent Load Reduction (Upstream) or Percent RT Reduction (RW) (%)	Cost-Effectiveness ($/% Aggregate Load Reduction)	Capital Cost ($)	Annual O&M Cost ($)	30-yr Lifecycle Cost ($)	Parcel Ownership	Crosses Jurisdictional Boundaries?	Permitting Difficulty	Aesthetic Improvements	Trash Reduction	CB Proportion	DAC Benefits	Contributes to Maintenance of Rec-2 Std	Contributes to WQ Commensurate with Rec-1 Std
Borchard Doris Drain Ag Field Filtration BMP (S)	N/A	3%	$ 8,009,935	$ 6,075,000	$ 300,000	$ 21,150,000	Private	Yes	Medium	Partial	Partial	0.4	Yes	Yes	No
Driffill Elementary Baseball Field Filtration BMP (S)	N/A	1%	$ 18,994,195	$ 9,610,000	$ 300,000	$ 28,220,000	School District	Yes	Medium	Partial	Partial	0.7	No	Yes	No
Faith Community Church Filtration BMP (S)	N/A	3%	$ 8,652,355	$ 6,675,000	$ 300,000	$ 22,350,000	Private	Yes	Medium	Partial	Partial	0.5	No	Yes	No
Plaza Park Filtration BMP (S)	N/A	2%	$ 7,208,195	$ 4,210,000	$ 300,000	$ 17,420,000	City	No	Medium	Partial	Partial	0.8	No	Yes	No
Oliveira Plaza Parking Lot Filtration BMP (S)	N/A	21%	$ 2,964,011	$ 26,130,000	$ 300,000	$ 61,260,000	Private	Yes	Medium	Partial	Partial	0.5	No	Yes	No
Teal Club Filtration BMP (S)	N/A	1%	$ 41,999,189	$ 11,400,000	$ 300,000	$ 31,800,000	School District	Yes	Medium	Partial	Partial	0.5	Yes	Yes	No
Wilson Park Infiltration BMP (S)	N/A	13%	$ 3,528,380	$ 19,445,000	$ 200,000	$ 44,890,000	City	No	Medium	Partial	Partial	0.9	No	Yes	Yes
Driffill Elementary Basketball Courts Infiltration BMP (S)	N/A	4%	$ 10,919,669	$ 19,445,000	$ 200,000	$ 44,890,000	School District	Yes	Medium	Partial	Partial	0.7	No	Yes	Yes
Mariner's Place Green Streets Infiltration BMP (S)	N/A	6%	$ 4,235,187	$ 10,295,000	$ 200,000	$ 26,590,000	Private	Yes	Medium	Partial	Partial	0.5	No	Yes	Yes
Southwest Community Park Infiltration BMP (S)	N/A	1%	$ 15,014,843	$ 6,815,000	$ 200,000	$ 19,630,000	City	No	Medium	Partial	Partial	0.6	No	Yes	Yes
Chesapeak Drive Infiltration BMP (S)	N/A	0.4%	$ 68,027,239	$ 12,010,000	$ 200,000	$ 30,020,000	Public	Yes	Medium	Partial	Partial	0.3	No	Yes	Yes
Seabridge Planter East Infiltration BMP (S)	N/A	9%	$ 4,658,362	$ 18,325,000	$ 200,000	$ 42,650,000	City	No	Medium	Partial	Partial	0.2	No	Yes	Yes
Dunkirk Park Infiltration BMP (S)	N/A	1%	$ 38,151,142	$ 9,720,000	$ 200,000	$ 25,440,000	City	No	Medium	Partial	Partial	0.4	No	Yes	Yes
Campus Park Infiltration BMP (S)	N/A	19%	$ 2,882,848	$ 25,020,000	$ 200,000	$ 56,040,000	City	No	Medium	Partial	Partial	0.7	No	Yes	Yes
Oxnard Airport Central Infiltration BMP (S)	N/A	1%	$ 16,079,243	$ 6,815,000	$ 200,000	$ 19,630,000	County	Partial	Medium	Partial	Partial	0.4	Yes	Yes	Yes
Oxnard School District Administration Parking Lot Infiltration BMP (S)	N/A	4%	$ 5,768,072	$ 9,720,000	$ 200,000	$ 25,440,000	School District	Yes	Medium	Partial	Partial	0.6	No	Yes	Yes
Marina West Park Infiltration BMP (S)	N/A	6%	$ 4,325,362	$ 10,295,000	$ 200,000	$ 26,590,000	City	No	Medium	Partial	Partial	0.4	No	Yes	Yes
N Patterson Rd Green Streets Infiltration BMP (S)	N/A	9%	$ 4,284,384	$ 16,075,000	$ 200,000	$ 38,150,000	Public	Yes	Medium	Partial	Partial	0.5	Yes	Yes	Yes
Seabridge Planter West Infiltration BMP (S)	N/A	1%	$ 21,083,014	$ 10,865,000	$ 200,000	$ 27,730,000	City	No	Medium	Partial	Partial	0.2	No	Yes	Yes
S Victoria Ave Green Streets Infiltration BMP (S)	N/A	5%	$ 4,267,483	$ 8,565,000	$ 200,000	$ 23,130,000	Public	Yes	Medium	Partial	Partial	0.3	No	Yes	Yes
Edison Doris East Infiltration BMP (S)	N/A	11%	$ 5,234,972	$ 25,020,000	$ 200,000	$ 56,040,000	Utility	Partial	Medium	Partial	Partial	0.4	Yes	Yes	Yes
Oxnard High Infiltration BMP (S)	N/A	4%	$ 14,717,072	$ 25,085,000	$ 200,000	$ 56,170,000	School District	Yes	Medium	Partial	Partial	0.5	Yes	Yes	Yes
Kiddie Beach ROW Infiltration BMP (S)	N/A	1%	$ 14,622,822	$ 3,800,000	$ 200,000	$ 13,600,000	Private	Yes	Medium	Partial	Partial	0.2	No	Yes	Yes
Doris Drain Outfall Infiltration BMP (S)	N/A	1%	$ 12,081,897	$ 3,295,000	$ 100,000	$ 9,590,000	County	Partial	Medium	Partial	Partial	0.4	Yes	Yes	Yes
Edison Doris West Infiltration BMP (S)	N/A	6%	$ 9,857,782	$ 25,020,000	$ 200,000	$ 56,040,000	Utility	Partial	Medium	Partial	Partial	0.4	Yes	Yes	Yes
Kellner Doris Ag Field Infiltration BMP (S)	N/A	3%	$ 9,293,050	$ 9,720,000	$ 200,000	$ 25,440,000	Private	Yes	Medium	Partial	Partial	0.4	Yes	Yes	Yes
Oxnard Airport Southwest Infiltration BMP (S)	N/A	8%	$ 5,379,217	$ 18,885,000	$ 200,000	$ 43,770,000	County	Partial	Medium	Partial	Partial	0.5	Yes	Yes	Yes
Oxnard Airport Northwest Infiltration BMP (S)	N/A	3%	$ 10,185,771	$ 10,295,000	$ 200,000	$ 26,590,000	County	Partial	Medium	Partial	Partial	0.5	Yes	Yes	Yes
Sea Air Park Infiltration BMP (S)	N/A	4%	$ 5,779,403	$ 9,720,000	$ 200,000	$ 25,440,000	City	No	Medium	Partial	Partial	0.6	No	Yes	Yes
W 5th St Drain Outfall Infiltration BMP (S)	N/A	1%	$ 10,720,267	$ 3,295,000	$ 100,000	$ 9,590,000	Private	Partial	Medium	Partial	Partial	0.4	Yes	Yes	Yes
W Wooley Rd Drain Outfall Infiltration BMP (S)	N/A	0.1%	$ 72,108,455	$ 3,295,000	$ 100,000	$ 9,590,000	Private	Yes	Medium	Partial	Partial	0.2	No	Yes	Yes
Edison Hemlock Drain North Infiltration BMP (S)	N/A	6%	$ 3,917,269	$ 8,565,000	$ 200,000	$ 23,130,000	Utility	Partial	Medium	Partial	Partial	0.1	No	Yes	Yes
Marathon Drain Outfall Infiltration BMP (S)	N/A	1%	$ 10,980,906	$ 3,295,000	$ 100,000	$ 9,590,000	Private	Yes	Medium	Partial	Partial	0.4	Yes	Yes	Yes
Oliveira Development Infiltration BMP (S)	N/A	2%	$ 8,919,264	$ 6,815,000	$ 200,000	$ 19,630,000	Private	Yes	Medium	Partial	Partial	0.4	No	Yes	Yes
Seabridge Elementary Infiltration BMP (S)	N/A	1%	$ 36,815,130	$ 22,300,000	$ 200,000	$ 50,600,000	School District	Yes	Medium	Partial	Partial	0.3	No	Yes	Yes
Marathon W 5th St Ag Field Infiltration BMP (S)	N/A	2%	$ 7,775,594	$ 5,025,000	$ 200,000	$ 16,050,000	Private	Partial	Medium	Partial	Partial	0.4	Yes	Yes	Yes
HHR W 5th St Ag Field Infiltration BMP (S)	N/A	2%	$ 8,298,248	$ 5,025,000	$ 200,000	$ 16,050,000	Private	Yes	Medium	Partial	Partial	0.4	Yes	Yes	Yes
Diacos Private Ag Field Drain Outfall Infiltration BMP (S)	N/A	0.5%	$ 18,345,617	$ 2,850,000	$ 100,000	$ 8,700,000	Private	Yes	Medium	Partial	Partial	0.1	No	Yes	Yes
Mangeon W 5th St Ag Field Infiltration BMP (S)	N/A	2%	$ 8,013,679	$ 5,025,000	$ 200,000	$ 16,050,000	Private	Yes	Medium	Partial	Partial	0.5	Yes	Yes	Yes
Oxnard Airport East Infiltration BMP (S)	N/A	24%	$ 2,290,818	$ 25,020,000	$ 200,000	$ 56,040,000	County	Partial	Medium	Partial	Partial	0.5	Yes	Yes	Yes
County Parcel S Ventura Infiltration BMP (S)	N/A	17%	$ 3,267,732	$ 25,020,000	$ 200,000	$ 56,040,000	County	Partial	Medium	Partial	Partial	0.4	No	Yes	Yes
Borchard Doris Drain Ag Field Infiltration BMP (S)	N/A	2%	$ 7,115,944	$ 5,025,000	$ 200,000	$ 16,050,000	Private	Yes	Medium	Partial	Partial	0.4	Yes	Yes	Yes
Driffill Elementary Baseball Field Infiltration BMP (S)	N/A	2%	$ 17,282,173	$ 15,510,000	$ 200,000	$ 37,020,000	School District	Yes	Medium	Partial	Partial	0.7	No	Yes	Yes
Faith Community Church Infiltration BMP (S)	N/A	4%	$ 7,216,623	$ 11,440,000	$ 200,000	$ 28,880,000	Private	Yes	Medium	Partial	Partial	0.5	No	Yes	Yes
Plaza Park Infiltration BMP (S)	N/A	3%	$ 6,145,911	$ 7,400,000	$ 200,000	$ 20,800,000	City	No	Medium	Partial	Partial	0.8	No	Yes	Yes
Oliveira Plaza Parking Lot Infiltration BMP (S)	N/A	27%	$ 2,065,112	$ 25,020,000	$ 200,000	$ 56,040,000	Private	Yes	Medium	Partial	Partial	0.5	No	Yes	Yes
Teal Club Infiltration BMP (S)	N/A	2%	$ 16,761,791	$ 17,170,000	$ 200,000	$ 40,340,000	School District	Yes	Medium	Partial	Partial	0.5	Yes	Yes	Yes
Doris Drain Outfall Agricultural Runoff Treatment System (S)	N/A	0.4%	$ 867,206	$ 40,000	$ 8,000	$ 320,000	County	Partial	Medium	Partial	Partial	0.4	Yes	Yes	No
W 5th St Drain Outfall Agricultural Runoff Treatment System (S)	N/A	0.3%	$ 979,415	$ 40,000	$ 8,000	$ 320,000	Private	Partial	Medium	Partial	Partial	0.4	Yes	Yes	No
Marathon Drain Outfall Agricultural Runoff Treatment System (S)	N/A	0.2%	$ 2,062,473	$ 40,000	$ 8,000	$ 320,000	Private	Partial	Medium	Partial	Partial	0.4	Yes	Yes	No
Diacos Private Ag Field Drain Outfall Agricultural Runoff Treatment System (S)	N/A	0.01%	$ 46,933,450	$ 40,000	$ 8,000	$ 320,000	Private	Yes	Medium	Partial	Partial	0.1	No	Yes	No

Project Type/Name				Costs			Implementation Considerations			Community Benefits					
	Average Residence Time (RT) (Days)	Additive Aggregate Percent Load Reduction (Upstream) or Percent RT Reduction (RW) (%)	Cost-Effectiveness ($/% Aggregate Load Reduction)	Capital Cost ($)	Annual O&M Cost ($)	30-yr Lifecycle Cost ($)	Parcel Ownership	Crosses Jurisdictional Boundaries?	Permitting Difficulty	Aesthetic Improvements	Trash Reduction	CB Proportion	DAC Benefits	Contributes to Maintenance of Rec-2 Std	Contributes to WQ Commensurate with Rec-1 Std
Edison Canal Pump Resumption- 67 MGD (RW)	12	46%	$ 2,328,924	$ 36,900,000	$ 1,144,066	$ 108,121,980	Mixed	Yes	High	Partial	No	0.3	No	Yes	Yes
Decommission Canal/Convert to Engineered Wetlands & Potential Water Storage (RW)	13	40%	$ 8,209,095	$ 103,000,000	$ 4,049,244	$ 327,477,320	Mixed	Yes	High	Partial	No	0.45	Partial	Yes	Yes
Passive Circulation Enhancements (RW)	12	45%	$ 1,127,925	$ 25,100,000	$ 6,608	$ 50,398,240	Mixed	Partial	High	Partial	No	0.4	No	Yes	Yes
Open Passive Edison Canal Connection to Ocean (RW)	6	73%	$ 2,571,000	$ 82,030,000	$ 789,514	$ 187,745,420	Mixed	Yes	High	Yes	No	0.45	Partial	Yes	Yes
Storage Tank Water Release between Canal/Harbor (RW)	12	45%	$ 677,170	$ 9,200,000	$ 410,131	$ 30,703,930	Mixed	Yes	High	Partial	No	0.3	No	Yes	Yes
Decommission Canal/Storage Tank (RW)	13	39%	$ 9,164,061	$ 112,200,000	$ 4,459,376	$ 358,181,280	Mixed	Yes	High	Partial	No	5.5	Partial	Yes	Yes
Edison Canal Pump Resumption- 4.3 MGD (RW)	19	14%	$ 6,278,393	$ 29,520,000	$ 915,253	$ 86,497,590	Mixed	Yes	High	No	No	0.3	No	No	No

Channel Islands Harbor Weighted Prioritization Project Matrix Guide

The Weighted Prioritization Project Matrix integrates both qualitative and quantitative data to evaluate the characteristics and performance of all potential Watershed (WS) and Receiving Water (RW) mitigation strategies designed to enhance water quality and circulation within the Channel Islands Harbor (Harbor). While a broad range of parameters were reviewed during evaluation, only a focused set of key criteria are applied for scoring and ranking. These Project Evaluation Categories include water quality benefits and circulation improvements, costs/cost-effectiveness, anticipated project scheduling, and implementation considerations, each having a set of underlying criteria. Community benefits have been evaluated and presented as an additional Project Evaluation Category. These are recorded for potential use in filtering, future prioritization, and/or funding decisions but are currently not factored into the scoring or ranking processes.

This scoring framework serves as a decision-making tool for the strategic selection and grouping of mitigation strategies. The ultimate intent is to combine strategies that collectively present the most anticipated effectiveness in achieving priority objectives. Mitigation strategies were assigned point values based on the following five categories and their underlying criteria:

1. **Water Quality Benefits (WS)/ Water Quality Circulation Improvements (RW)**
    - Additive % Load Reduction/ Percent RT Reduction (%)
2. **Cost**
    - Cost-Effectiveness
    - Capital Cost
    - O&M Cost
    - Lifecycle Cost
3. **Timeline**
    - Planning/Permitting Timeline
    - Post-Planning Implementation Timeline
4. **Implementation Considerations**
    - Parcel Ownership
    - Crosses Jurisdictional Boundaries
    - Permitting Difficulty
5. **Community Benefits**
    - Trash Reduction
    - Community Benefits Proportions
    - DAC Benefits
    - Contributes to Maintenance of REC-2 Std
    - Contributes to WQ Commensurate with REC-1 Std
    - Aesthetic Improvements

All categories apart from Timeline were previously developed as part of the Project Scoring Matrix effort within development of the Mitigation Strategies Analysis Report. For scoring projects, the Project Evaluation Categories were normalized in point intervals of five, ranging from 0 to 25

potential points for each category. Project Evaluation Categories and associated scoring criteria are described and presented in the sections and tables below.

Water Quality Benefits

Additive Aggregate Pollutant Load Reduction or **Percent RT Reduction (%):** Calculated metric synthesizing the **cumulative modeled pollutant-specific load reductions** for WS strategies and the **reduction in Harbor residence time** (RT) for RW strategies. For WS strategies, this metric assumes mitigation strategies that cumulatively reduce pollutant loading across multiple pollutant types provide a greater overall water quality benefit than strategies with less overall pollutant load reduction benefit. Recent research indicates addressing multiple pollutants through integrated strategies assists in achieving holistic water quality improvements, especially in complex and urbanized watersheds (Strokal et al 2018). Note – this metric is dependent on strategy type. For WS strategies, this metric depicts the total percent reduction in pollutant loads for all modeled pollutants (i.e. bifenthrin, permethrin, nitrogen, phosphorus, copper, bacteria, dissolved oxygen). For RW strategies, this metric depicts the percent reduction in average water parcel residence time throughout the nine Harbor zones.

Points	Percent RT Reduction (RW) (%)	Additive % Load Reduction (WS)
0	0%	0%
5	10%	1%
10	25%	5%
15	40%	10%
20	50%	30%
25	75%	77.5%

Table 1: All Water Quality and Water Circulation criteria normalized ranges.

Costs

Cost criteria include capital, annual O&M, and 30-year lifecycle cost parameters, as well as a calculated cost-effectiveness metric.

Cost-Effectiveness: Calculated metric that **combines Additive Aggregate Percent Load Reduction or Percent RT Reduction** with estimated **30-yr Lifecycle Cost** (see below) to obtain a cost-per-unit load/RT reduction cost-effectiveness measure.

Capital Cost: The total estimated upfront investment required to plan, design, permit, and construct a project or implement a mitigation strategy. It includes all expenditures necessary to bring a project from concept to operational readiness, excluding ongoing operational or maintenance-related expenses. For the purposes of this report, additional description of strategy type-specific capital costs is as follows:

- Watershed Nonstructural strategy capital costs utilized a combination of best available data and professional judgment based on project implementation efforts conducted by similar Phase I Municipal Separate Storm Sewer System (MS4) programs in Southern California and city-specific feedback from City of Oxnard staff. Most outreach and training costs assume mitigation strategy implementation integration with existing ongoing related programs.
- Watershed Structural strategy capital costs utilized engineer best-estimate construction cost estimates based on regression and other analysis of line-item project construction cost estimates derived from projects in the Los Angeles basin 2022-2024.
- Receiving Water strategy capital costs utilized engineer best-estimate construction cost estimates based on general requirements, site preparation, and new construction costs.

Annual O&M Cost: Estimated recurring expenses required to operate, monitor, and maintain a project or mitigation strategy over its useful life. For the purposes of this report, calculation of **Annual O&M Cost** utilized similar additional description information as **Capital Cost** (see above).

30-yr Lifecycle Cost: Calculated metric consisting of: **Capital Cost** + (30 * **Annual O&M Cost**) + Replacement Cost (assumed to be equal to **Capital Cost**).

Project **Capital** and **O&M Costs** are estimates and subject to change. Additional study is needed to refine receiving water strategy permitting costs following conceptual design development, consultation with regulatory permitting agencies, and coordination with other interested parties.

Points	Cost-Effectiveness	Capital Cost	O&M Cost	Lifecycle Cost
0	> $18,594,799	> $22,554,800	> $1,000,000	> $56,040,000
5	$18,594,799	$22,554,800	$1,000,000	$56,040,000
10	$10,241,099	$10,295,000	$600,000	$29,984,800
15	$6,959,805	$6,675,000	$300,000	$22,350,000
20	$3,973,237	$3,728,600	$200,000	$16,050,000
25	$5,300	$15,000	$100,000	$320,000

Table 2: All Cost criteria normalized ranges.

Timeline

Nonstructural Watershed Strategies (NS):

Nonstructural Watershed strategies are typically associated with approximate planning/permitting timelines of 1 – 2 years due to their need for coordination across multiple agencies, funding approvals, permit acquisition, and stakeholder engagement and program design. These efforts often involve developing effective behavior-change messaging, establishing relevant performance metrics, and ensuring compliance with stormwater management regulations or MS4 permit requirements. The implementation phase can generally be completed in about 0.5 – 1 year and focuses on outreach delivery, staff training, and equipment deployment. This shorter timeline reflects the relatively low level of physical construction and the scalable nature of Nonstructural BMPs compared to Structural infrastructure projects.

Structural Watershed Strategies (S):

Structural Watershed strategies typically require about 3 years for planning and permitting efforts due to the complexity of site selection, detailed engineering design, hydraulic and hydrologic modeling, and regulatory review processes. These projects often involve land acquisition, utility coordination, and environmental impact assessments, all of which lengthen the pre-construction timeline. Once approved, implementation generally takes about 1 year, as construction, inspection, and system commissioning are relatively straightforward compared to the design phase. However, these timelines can vary substantially based on factors such as project scale, permitting jurisdiction, site constraints, and funding availability, which have the potential to accelerate or delay both planning and implementation.

Receiving Water Strategies (RW):

Receiving Water strategies are the most complex projects in terms of planning, permitting, and implementation, with this fact reflected by their associated schedules. Like Watershed Structural strategies, these projects often involve highly complex permitting requirements and processes, engineering design, hydraulic and hydrologic modeling, and regulatory review processes as well as land acquisition, utility coordination, and environmental impact assessment efforts. Implementation of Receiving Water strategies generally lasts 3 years or more due to project scale and other factors; construction of these projects is highly intensive relative to other strategy types.

Points	Planning/Permitting Timeline (Years)	Post-Planning Implementation Timeline (Years)
0	-	-
5	10	5
10	8	4
15	6	3
20	4	2
25	2	1

Table 3: All Timeline criteria normalized ranges.

Implementation Considerations

Parcel Ownership: Qualitative parcel ownership attribute related to mitigation strategy implementation. Information derived from County of Ventura GIS information.

Crosses Jurisdictional Boundaries?: Calculated assessment metric related to expected ease of mitigation strategy implementation based on project location and underlying parcel ownership. Evaluated according to the following criteria:

- Project implementation on parcels on parcels with private, multiple other public agencies, or mixed parcel ownership that would expect to require multi-jurisdictional agreements, right-of-entry-permits, and/or other agreements prior to implementation scores 1 point.
- Project implementation requires multi-jurisdictional agreement with at least one other public or private agency scores 0.5 points.
- Project implementation exclusively on City-owned parcels scores 0 points.

Note that certain Watershed Nonstructural mitigation strategies were assumed to be implemented within City jurisdiction only. This reduces the complexity of implementation and allows for explicit implementation control within City jurisdiction.

Permitting Difficulty: Qualitative assessment of anticipated environmental and other permitting requirements necessary to facilitate mitigation strategy implementation. This categorical assessment metric utilized best professional judgement to review anticipated agency coordination and permit complexity.

- **Low**: Anticipated requirements include local agency coordination and/or low effort submittals.
- **Medium**: Anticipated requirements include local/state agency coordination and/or medium effort submittals.
- **High**: Anticipated requirements include local/state/federal agency coordination and/or high effort submittals and/or monitoring/special studies.

Points	Parcel Ownership	Crosses Jurisdictional Boundaries	Permitting Difficulty
0	-	Yes	High
5	-	-	-
10	Mixed	-	-
15	Private	-	Medium
20	Municipal/Public/County	-	-
25	City	No	Low

Table 4: All Implementation Consideration criteria normalized ranges.

Community Benefits

Trash Reduction: Qualitative categorical (Yes/No) assessment of mitigation strategies for potential trash reduction benefits based on comparable municipal program reviews and best professional judgement.

CB Proportion: Assessment metric to synthesize the applicability of ten individual potential community benefits. Individual community benefits are evaluated according to the following criteria:

- Applicable scores 1 point.
- Partially/Potentially Applicable scores 0.5 points.
- Not Applicable scores 0 points.

CB Proportion is the sum of individual community benefit scores / 10.

DAC Benefits: Categorical assessment based on mitigation strategy potential to benefit one or more disadvantaged communities. Evaluated according to the following criteria:

- Mitigation strategy occurs within a disadvantaged community (Yes/1).
- Mitigation strategy occurs adjacent to or partially within a disadvantaged community (Partial/0.5).
- Mitigation strategy occurs outside of a disadvantaged community (No/0).

Contributes to WQ Commensurate with REC-1 Standards: Qualitative categorical (Yes/No) assessment of mitigation strategy for having impacts commensurate with meeting REC-1 beneficial use standards.

Contributes to Maintenance of REC-2 Standards: Qualitative categorical (Yes/No) assessment of mitigation strategy for having impacts commensurate with meeting REC-2 beneficial use standards.

Aesthetic Improvements: Aggregate attribute intended to estimate aesthetic improvements in water quality. For Watershed strategies, trash reduction was used as the primary determinant of anticipated aesthetic benefits. For Receiving Water strategies, average water parcel residence time was used as the primary factor in estimating aesthetic improvements. A literature review was performed to assess potential waterbody residence time thresholds used to determine potential benefits to water quality aesthetics including presence of trash, water clarity, and water quality relative to waterbody beneficial use(s). Generally, a harbor with an average residence time not exceeding 1-2 weeks is considered well-mixed (Uncles et. al 2002). Enclosed harbor or bay residence times that exceed approximately 1-2 weeks generally correspond with increased turbidity and potential water quality issues (Marsooli et. al 2018). Accordingly, for the purposes of this study the following criteria were applied:

- Strategies that reduce average water parcel residence time to less than one week (Yes/1).
- Strategies that reduce average water parcel residence time to between one and two weeks (Partial/0.5).
- Strategies that reduce average water parcel residence time to greater than two weeks or do not reduce average water parcel residence time (No/0).

Points	Trash Reduction	Community Benefits Proportion	DAC Benefits	REC-1	REC-2	Aesthetic Improvements
0	No	0	No	No	No	No
5	-	0.2	-	-	-	-
10	-	0.3	-	-	-	-
15	Partial	0.5	Partial	-	-	Partial
20	-	1.5	-	-	-	-
25	Yes	5.5	Yes	Yes	Yes	Yes

Table 5: All Community Benefits criteria normalized ranges.

Watershed (WS) and Receiving Water (RW) Strategies:

The criteria within each Project Evaluation Category are weighted by a percentage in accordance with predetermined project goals and objectives to emphasize desired outcomes. The Criterion/Category Weights contribute to the factored scores shown in the light green and light blue columns of each strategy (Table 6). The raw scores are the total points gained from the criteria without weight values applied. Total Criterion/Category Score is the final weighted score for the strategy with all categories and criterion considered. In the weighting scenario depicted below, Community Benefits are not weighted and are rather included as supplemental factors which do not contribute to overall score and can be used to filter strategies. Category Weights are designed to allow for manipulation in accordance with existing priorities/preferences.

PROJECT PRIORITZATION GROUP MATRIX						
			Targeted Nutrient/Pesticide Source Control- Outreach and Training (NS)			
EVALUATION *CATEGORY* / CRITERION	CRITERION WEIGHT	CATEGORY WEIGHT	CRITERION RAW SCORE	CRITERION FACTORED SCORE	CATEGORY RAW SCORE	CATEGORY FACTORED SCORE
Water Quality Benefits		65%			25.00	16.25
Additive % Load Reduction	100%		25	25.00		
Criterion / Category Score				**25.00**		**16.25**
Cost		20%			20.50	4.10
Capital Cost	10%		20	2.00		
Annual O&M Cost	10%		25	2.50		
30-yr Lifecycle Cost	30%		20	6.00		
Cost-Effectiveness	50%		20	10.00		
Criterion / Category Score				**20.50**		**4.10**
Timeline		10%			25.00	2.50
Planning/Permitting	50%		25	12.50		
Post-Planning Implementation	50%		25	12.50		
Criterion / Category Score				**25.00**		**2.50**
Implementation Considerations		5%			21.25	1.06
Parcel Ownership	25%		10	2.50		
Crosses Jurisdictional Boundaries?	25%		25	6.25		
Permitting Difficulty	50%		25	12.50		
Criterion / Category Score				**21.25**		**1.06**
Community Benefits		0%			15.25	0.00
Trash Reduction	10%		0	0.00		
Community Benefits Proportion	10%		15	1.50		
DAC Benefits	15%		25	3.75		
Contributes to Maintenance of REC-2 Std	20%		25	5.00		
Contributes to WQ Commensurate with REC-1 Std	20%		25	5.00		
Aesthetic Improvements	25%		0	0.00		
Criterion / Category Score				**15.25**		**0.00**
TOTAL Criterion / Category Score				**107.00**		**23.91**

Table 6: Primary Scoring System for Project Evaluation Categories and Criteria.

Both the Watershed Strategies and Receiving Water Strategies sheets contain a standalone table which depicts all of the specified Category/Criteria Weights that are used in respective scoring. These cells effectively act as dials which can be turned by changing the weight values in accordance with different priorities.

Category / Criteria	Weight
Water Quality Benefits	**65%**
Additive % Load Reduction	100%
Cost	**20%**
Capital Cost	10%
Annual O&M Cost	10%
30-yr Lifecycle Cost	30%
Cost-Effectiveness	50%
Timeline	**10%**
Planning/Permitting	50%
Post-Planning Implementation	50%
Implementation Considerations	**5%**
Parcel Ownership	25%
Crosses Jurisdictional Boundaries?	25%
Permitting Difficulty	50%
Community Benefits	**0%**
Trash Reduction	10%
Community Benefits Proportion	10%
DAC Benefits	15%
Contributes to Maintenance of REC-2 Std	20%
Contributes to WQ Commensurate with REC-1 Std	20%
Aesthetic Improvements	25%

Table 7: Category and Criteria Weights.

The outcomes of the scoring process are the ranked strategies that are presented in the WS Strategy Rankings and RW Strategy Rankings sheets described below. These rankings are ultimately used to sort projects into groups, or 'Category Weight Options'.

<u>Watershed (WS) and Receiving Water (RW) Strategy Rankings</u>:

Using the factored scores from WS Strategies and RW Strategies sheets, projects are ultimately ranked here, where the raw and factored scores for all criteria and categories are presented for each potential mitigation strategy. This sheet can be filtered/sorted to rank the projects based on their scores for any criterion or category in accordance with different sets of preferences or priorities.

Scoring:

This sheet presents the raw scores acquired by each mitigation strategy for the individual criterion within each Project Evaluation Category, based on the Project Scoring Matrix data. Raw scores feed into the main scoring spreadsheets (WS Strategies and RW Strategies) where they are factored by Criterion and Category Weights to generate final factored scores that are used in the ranking process.

Category Weight Options:

Three preliminary Category Weight Options have been developed to reflect different potential approaches to achieving Study goals, each of which having a unique weighting scenario for Project Evaluation Categories. A brief description of these is as follows:

1. **Category Weight Option A** is curated toward **maximizing water circulation** through implementation of Receiving Water strategies. Category Weights are intended to reflect this priority, with Water Circulation Improvements/Water Quality Benefits (pertaining to Receiving Water/Watershed strategies, respectively) accounting for most of the overall scores.
    1. Water Circulation/Water Quality: **65%**
    2. Cost: **20%**
    3. Implementation Considerations: **10%**
    4. Timeline: **5%**
    5. Community Benefits: **0%**
2. **Category Weight Option B** is focused on **minimizing costs**. This weighting scenario was selected to explore a pathway in which feasible and expeditious strategy implementation is being prioritized above other considerations.
    1. Cost: **65%**
    2. Water Quality: **20%**
    3. Implementation Considerations: **10%**
    4. Timeline: **5%**
    5. Community Benefits: **0%**
3. **Category Weight Option C** is based on a more balanced approach: while Water Quality and Cost still account for a substantial proportion of overall Category Weights, this proportion has been reduced to allow added consideration for strategy Timelines and Implementation Considerations. Thus, while Water Quality- and Cost-related factors remain significant, this

Option is intended to present a potential pathway in which the weighting is balanced more evenly across Project Evaluation Categories.

1. Cost: **30%**
2. Water Quality: **30%**
3. Implementation Considerations: **20%**
4. Timeline: **20%**
5. Community Benefits: **0%**

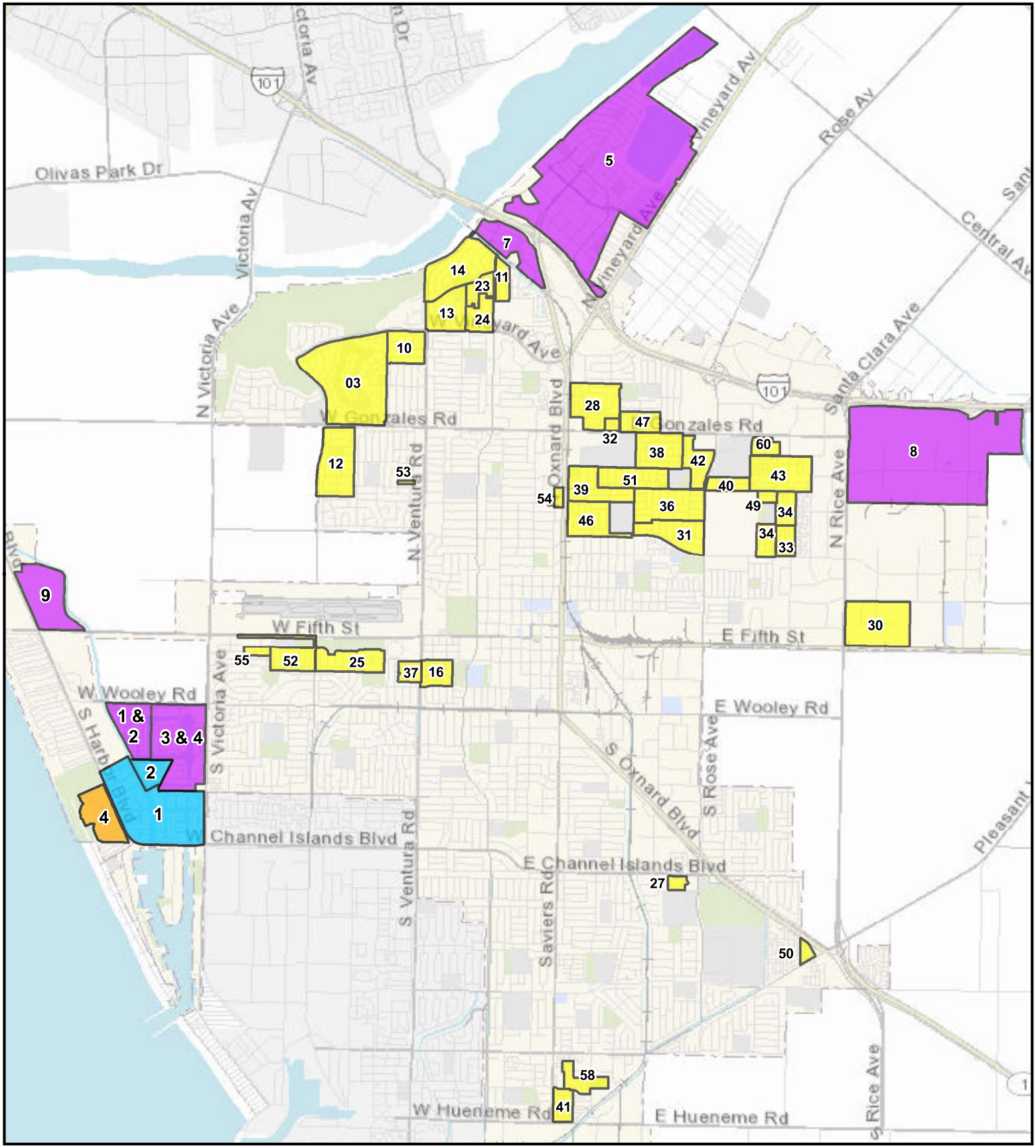
The top ranked projects with the above weighted categories are listed in the Category Weight Options sheet with the total factored scores of each Project Evaluation Category.

Development of the preliminary Category Weight Options demonstrates that mitigation strategies may rise to the top despite alterations to the Project Evaluation Category weight values. This is primarily attributable to the characteristics of these strategies aligning with several different priorities, as is reflected by the different Category Weighting Options. The Category Weight Options that are presented here are preliminary and intended to reflect potentially relevant scenarios. This process is designed to be repeatable as priorities and/or conditions change.

Meeting Date	Meeting Groups	Notes
6/13/2024	SD/CITY/MAC	Bert Perello (City Council) was on mtg
7/8/2024	SD/CRAFTWATER	
8/29/2024	SD/CITY/CRAFTWATER	
9/23/2024	SD/CRAFTWATER	
9/26/2024	SD/CRAFTWATER	
10/8/2024	SD/CRAFTWATER	
10/29/2024	SD/CITY/CRAFTWATER/MAC	
11/8/2024	SD/CRAFTWATER	
12/9/2024	SD/CRAFTWATER/FARMBUREAU	Jodi/Farm, Maureen/Farm
12/12/2024	SD/CRAFTWATER	
1/21/2025	SD/CITY/CRAFTWATER/OWNER_MANDAL	Will Gustafson, Grant Gustafson
1/29/2025	SD/CRAFTWATER	
1/30/2025	SD/CITY/CRAFTWATER/FARMBUREAU/M	
2/24/2025	SD/CRAFTWATER	
3/12/2025	SD/CRAFTWATER	
3/13/2025	SD/CRAFTWATER/OWNER_MANDALAY	Will Gus,Grant Mandalay
3/18/2025	SD/CRAFTWATER/VENTURA CNTY	David Laak, Hayley Luna
3/26/2025	SD/CRAFTWATER/MAC	
4/11/2025	SD/CRAFTWATER/FARMBUREAU	Jodi/Farm, Maureen/Farm
4/17/2025	SD/CRAFTWATER	
4/24/2025	SD/CITY/CRAFTWATER	Esmeralda Garcia, Katie Casey
4/29/2025	SD/CITY/CRAFTWATER	Terrel Harrison, Sandra Diaz
5/1/2025	SD/CITY/CRAFTWATER	Andrew Dickson
5/7/2025	SD/CRAFTWATER	
5/14/2025	SD/CITY/MAC	
5/21/2025	SD/CITY/CRAFTWATER	Timothy Beaman
6/11/2025	SD/CRAFTWATER	
6/18/2025	SD/CRAFTWATER	
7/1/2025	SD/CITY/CRAFTWATER/FARMBUREAU/M	
7/7/2025	SD/CRAFTWATER	
7/9/2025	SD/CRAFTWATER	
7/25/2025	SD/CRAFTWATER	
7/29/2025	SD/CITY/CRAFTWATER/MAC/CALIF	Erik Burres (State of California)
7/31/2025	SD/CITY/CRAFTWATER	
8/11/2025	SD/CITY/CRAFTWATER	
8/13/2025	SD/CRAFTWATER/MAC	Alan (MAC)
8/14/2025	SD/CITY/MAC	Bert Perello (City Council)
8/20/2025	SD/CRAFTWATER	
8/27/2025	SD/CRAFTWATER	
9/3/2025	SD/CITY/CRAFTWATER	
9/11/2025	SD/CRAFTWATER	
9/17/2025	SD/CRAFTWATER	
9/25/2025	SD/CRAFTWATER	

Meeting Date	Meeting Groups	**Notes**
10/1/2025	SD/CRAFTWATER	
10/8/2025	SD/CRAFTWATER	
10/14/2025	SD/CRAFTWATER	
10/15/2025	SD/CRAFTWATER	
10/23/2025	SD/CRAFTWATER	
10/29/2025	SD/CRAFTWATER	
11/5/2025	SD/CRAFTWATER	
11/25/2025	SD/CRAFTWATER	
12/11/2025	SD/CITY/CRAFTWATER/MAC	
12/17/2025	SD/CRAFTWATER	
1/11/2026	SD/CRAFTWATER	
2/25/2026	SD/CITY	Review Final Water Qual Presentatior
3/3/2026	SD/CRAFTWATER	
3/16/2026	SD/CITY	
3/19/2026	SD/CRAFTWATER	

CITY OF OXNARD SPECIAL DISTRICTS



Maintenance Assessment District (District No.)

Community Facilities District (District No.)

Waterway Assessment District (Zone No.)

Landscape Maintenance District (District No.)

Created by:
CITY OF OXNARD
Geographic Information Systems Division
March 2023

3,000 0 3,000 6,000 Feet

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Data Source:
City of Oxnard GIS Division
County of Ventura GIS Program

CITY OF OXNARD – SPECIAL DISTRICTS

LANDSCAPE MAINTENANCE DISTRICT * COMMUNITY FACILITIES DISTRICTS
WATERWAYS ASSESSMENT DISTRICTS * MAINTENANCE ASSESSMENT DISTRICTS

COMMUNITY FACILITIES DISTRICTS	
1 & 2 – Westport at Mandalay Bay	7 – Wagon Wheel
3 & 4 – Seabridge at Mandalay Bay	8 – Sakioka Farms
5 – Riverpark	9 – Northshore at Mandalay Bay

LANDSCAPE MAINTENANCE DISTRICTS	
3 – Riverridge	37 – Pacific Cove
10 – Country Club	38 – Aldea Del Mar
11 – St Tropez	39 – El Sueno Promesa
12 – Standard Pacific	40 – Cantada
13 – Le Village	41 – Pacific Cove
14 – California Cove	42 – Cantabria/Coronado
16 – California Lighthouse	43 – Greenbelt
23 – Greystone	46 – Daily Ranch
24 – Vineyards	47 – Sycamore Place
25 – The Pointe	49 – Cameron Ranch
27 – Rose Island	50 – PV Senior Housing
28 – Harborside	51 – Pfeiler
30 – Haas Automation	52 – Wingfield
31 – Rancho De La Rosa	53 – Huff Court
32 – Oak Park	54 – Meadowcrest
33 – El Paseo	55 – Wingfield West
34 – Sunrise Pt/Sunset Cove	58 – Westwind
36 – Villa Santa Cruz	60 – Artisan

MAINTENANCE ASSESSMENT DISTRICT
4 – Mandalay Beach/Colony

WATERWAYS ASSESSEMENT DISTRICTS	
Zone 1 – Mandalay Bay Zone	2 – Harbour Island

Channel Islands Harbor Water Quality Implementation Plan Workshop

Public Works and Transportation Committee
April 14, 2026

Anthony Miller
Special Districts Manager

CITY OF OXNARD CALIFORNIA

RECOMMENDATION

That the Public Works and Transportation Committee review the attached Craftwater Engineering Implementation Plan and Appendices and recommend that the City Council direct staff to proceed with Phase 1 activities of the selected non-structural, structural, and receiving water strategies as outlined in Table 2 of the staff report.

BACKGROUND

- The Channel Islands Harbor is an artificial harbor with abutting commercial and residential developments that include Seabridge CFD, Westport CFD, Mandalay Bay WAD-Zone 1, and Harbour Island WAD-Zone 2.

- The Harbor area north of the Channel Islands Blvd. bridge was created with the development of these neighborhoods.

- Formation of the respective special districts were required to fund costs associated with maintaining and managing the harbor and its water quality.

BACKGROUND

- However, the City Council has previously authorized American Rescue Plan Act ("ARPA") funding, and State grant funds, to fund a report examining feasible options for addressing Harbor water quality conditions.

- Additionally, in 2022, the County of Ventura provided $1.3 million in funding for the implementation of Harbor water quality mitigation measures.

BACKGROUND

- In June 2018, an algal bloom occurred in the Harbor. The bloom was followed by widespread low levels of dissolved oxygen in the water.

BACKGROUND

- Since then, the City of Oxnard ("City"), the County of Ventura ("County"), and residents of the Channel Islands Neighborhood Council's ("CINC") Marine Advisory Committee ("MAC") have organized efforts to address water quality issues in the Harbor.

- Substantial amounts of water quality data has been gathered by MAC volunteers to assist with identifying key contaminants and potential sources of contamination within the Harbor.

- This data gathering effort has provided the foundation to develop a report to examine options for improvements to Harbor water quality conditions and circulation.

BACKGROUND

- On February 24th, 2024, the City Council approved the contract with Craftwater Engineering (Craftwater) for the development of a list of mitigation measures, evaluation of their possible feasibility, and the development of an implementation plan for those measures which were deemed the most effective.

DISCUSSION - Initial Analysis

Channel Islands Harbor Watershed

DISCUSSION - Initial Analysis

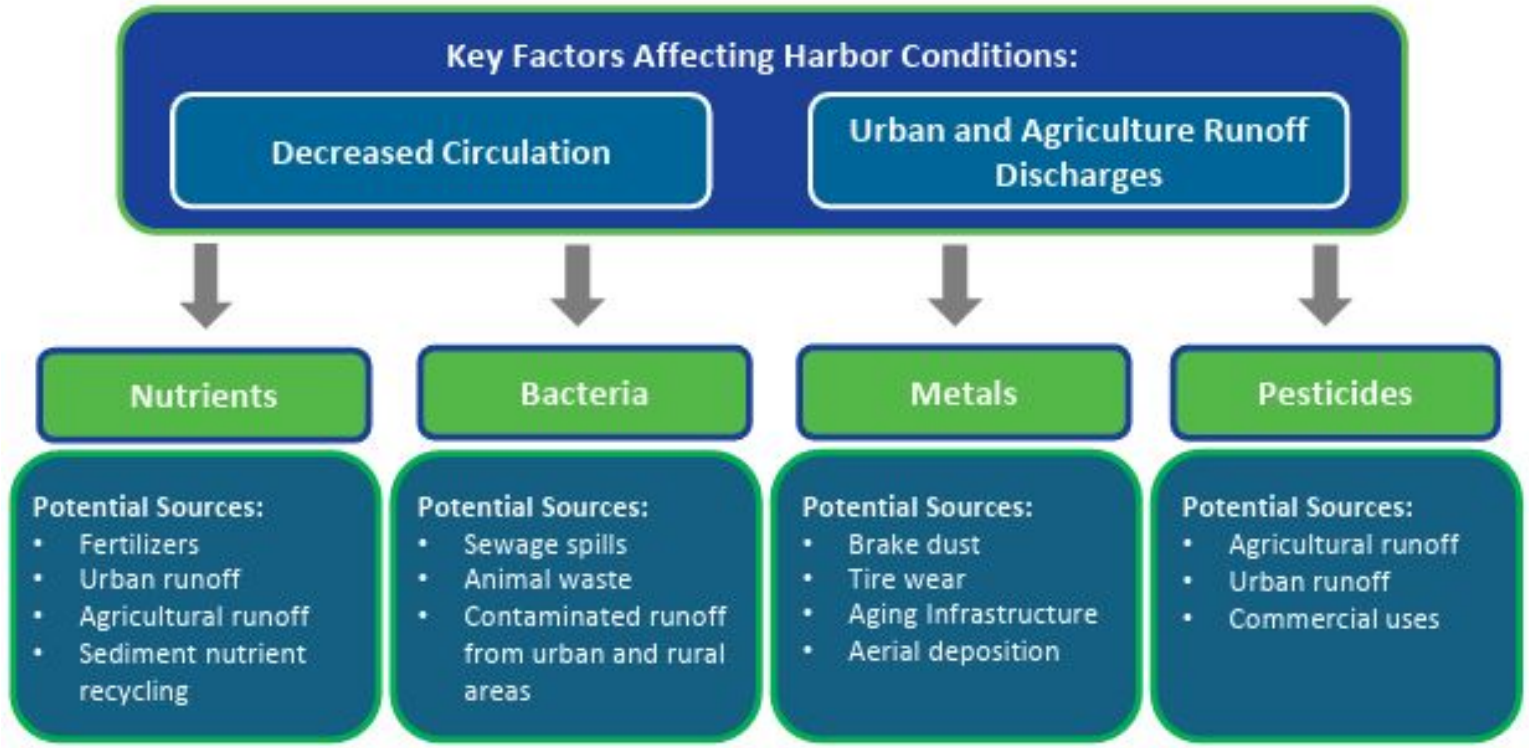
- To understand the recommended approaches within the Implementation Plan, the process through which it was created must be explained

- The Implementation Plan was created after a thorough process involving multiple stakeholders and source material review.

General process and outcomes that inform and support Implementation Plan development

DISCUSSION - Initial Analysis

- Beginning with the Goals and Objective Memo, Craftwater identified key factors affecting harbor water quality



DISCUSSION - Initial Analysis

- Key factors within the Channel Islands Harbor watershed identified the following primary constituents of concern:

Constituent of Concern	Category	Reason for Identification	Potential Sources
Bifenthrin	Pesticide	Magnitude of Exceedances/ Toxicity to Aquatic Wildlife	Agricultural/Landscape Runoff
Permethrin	Pesticide	Magnitude of Exceedences/ Toxicity to Aquatic Wildlife	Agricultural/Landscape Runoff
Copper	Metals	Magnitude of Exceedences/ Toxicity to Aquatic Wildlife	Urban runoff, anti-fouling boat paint, and aerial deposition
Low Dissolved Oxygen	Eutrophic Conditions	Overall indicator of water quality and circulation	Poor Mixing/Circulation

DISCUSSION - Constituents of Concerns & Stakeholder Input [12]

- Identification of potential sources of constituents of concern allowed for the inclusion of additional groups of stakeholders
- The following groups were identified for outreach efforts and included throughout the study
  - Channel Islands Neighborhood Council - Marine Advisory Committee (MAC)
  - Ventura County Farm Bureau
  - Farmers/Agricultural Landowners within the watershed area
  - Mandalay Generating Station and Edison Canal Landowners
  - Non-Special Districts Division City Staff (e.g. Engineering, Wastewater, Environmental Resources)
  - Ventura County Public Works Department Staff

DISCUSSION - Constituents of Concerns & Stakeholder Input [13]

- With stakeholders and constituents of concern identified, mitigation strategies were created and sorted into three categories:
  - **Non-Structural** - education programs and procedural methods that the City may implement through contracts or maintenance efforts.
  - **Structural** - construction of structural "Best Management Practices" (BMPs) at specific points to physically treat runoff.
  - **Receiving Water** - improving water quality through reducing residence time and increasing overall circulation once water has been "received" into the harbor body itself.
- 103 total strategies were considered

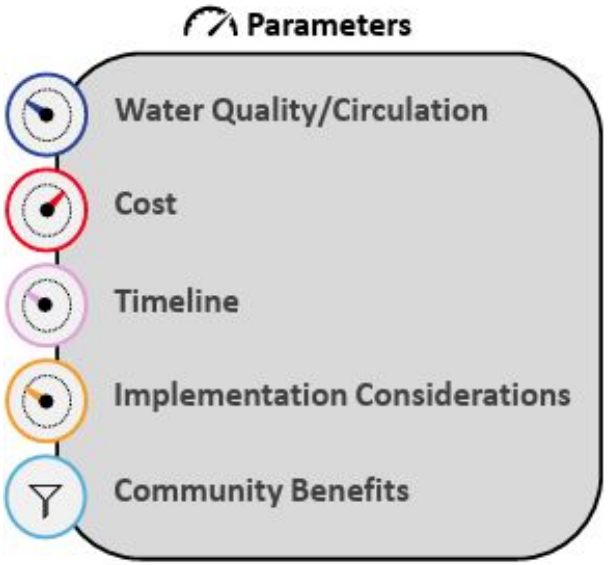
DISCUSSION - Constituents of Concerns & Stakeholder Input 14

- The MAC group provided additional input reiterating that the mitigation strategies that addressed circulation were not being prioritized highly enough.

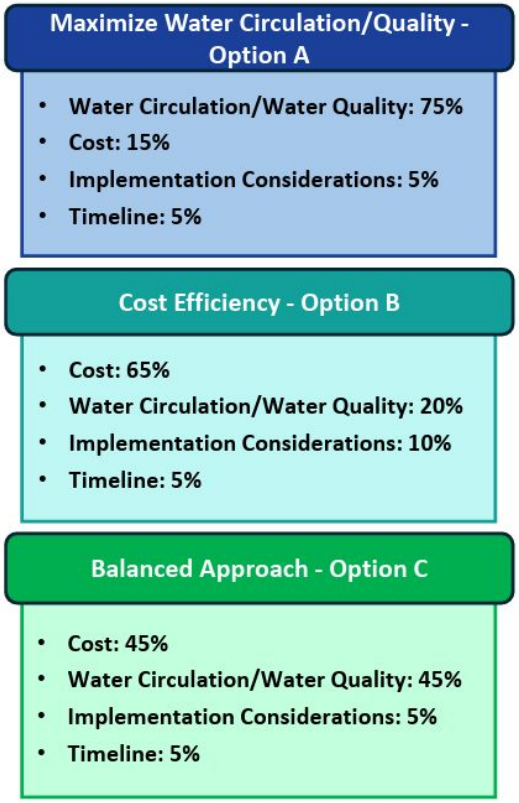
- Craftwater and City staff made direct attempts to address these concerns through the implementation of a weighted category project evaluation approach in collaboration with the MAC group to address these concerns.

DISCUSSION - Approach to Strategy Selection

- To narrow down the total strategies considered for implementation, scoring criteria were created and weighted scores given to each strategy.
- Each strategy was scored on five normalized parameters
- "Community Benefits" were scored but excluded from the overall score totals.
- Instead it was included to be used as a filter to help determine which mitigation strategies could be considered for implementation



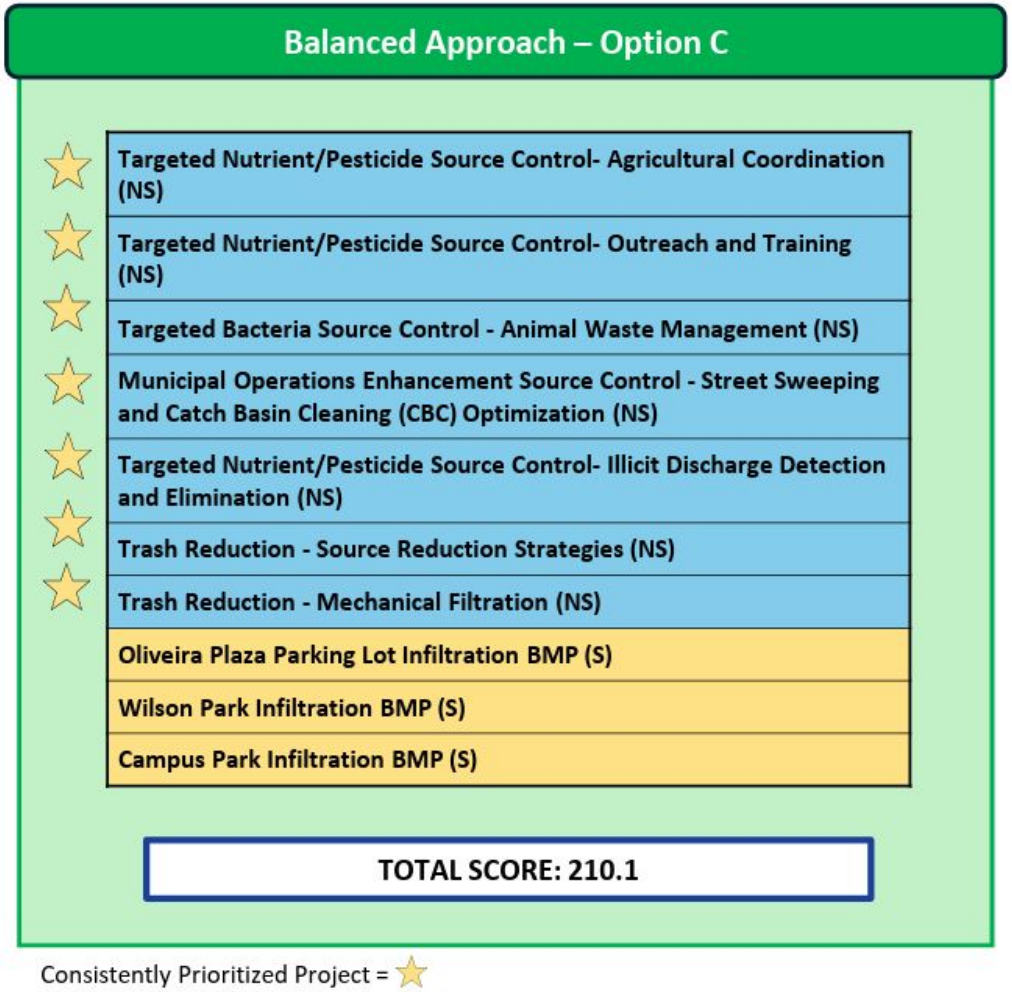
DISCUSSION - Approach to Strategy Selection



- Depending on which parameter is considered the highest priority, different strategies score higher than others
- Three Category Weight Options were considered
  - Maximizing Circulation (Option A)
  - Cost Efficiency (Option B)
  - Balanced Approach (Option C)
- Staff recommendations are sourced from the Balanced Approach weighting option

DISCUSSION - Approach to Strategy Selection

- Top scoring strategies within the Balanced Approach are:



DISCUSSION - Phase I Implementation Recommendations [18]

- Staff recommended strategies include (Table 2):

Non-Structural	Projected Pollutant Load Reduction	Structural	Projected Pollutant Load Reduction	Receiving Water	Projected Residence Time Reduction
Targeted Nutrient/Pesticide Source Control - Agricultural Coordination	62%	Wilson Park Infiltration BMP	10%	Passive Edison Canal Connection	73%
Municipal Operations Enhancement Source Control - Street Sweeping and Catch Basin Cleaning Optimization	49%	Oliveira Plaza Parking Lot Infiltration BMP	27%		
Targeted Nutrient/Pesticide Source Control - Illicit Discharge Detection and Elimination	27%	Agricultural Runoff Treatment System	1%		
Trash Reduction - Mechanical Filtration	11%				

DISCUSSION - Phase I Implementation Recommendations [19]

- In recognition of consistent stakeholder feedback and to address circulation as a constituent of concern, a Receiving Water strategy has been included despite it not being a recommended strategy within the Balanced Approach
- Non-Structural approaches to water quality management are very important to the overall approach as regulatory bodies will require the demonstration of a comprehensive approach to total pollutant load reduction prior to permitting the construction of any large Receiving Water strategy.
- Overall, staff selected strategies from within the balanced approach in order to best balance cost concerns with real-world water quality improvement.

DISCUSSION - Phase 1 Implementation Recommendations [20]

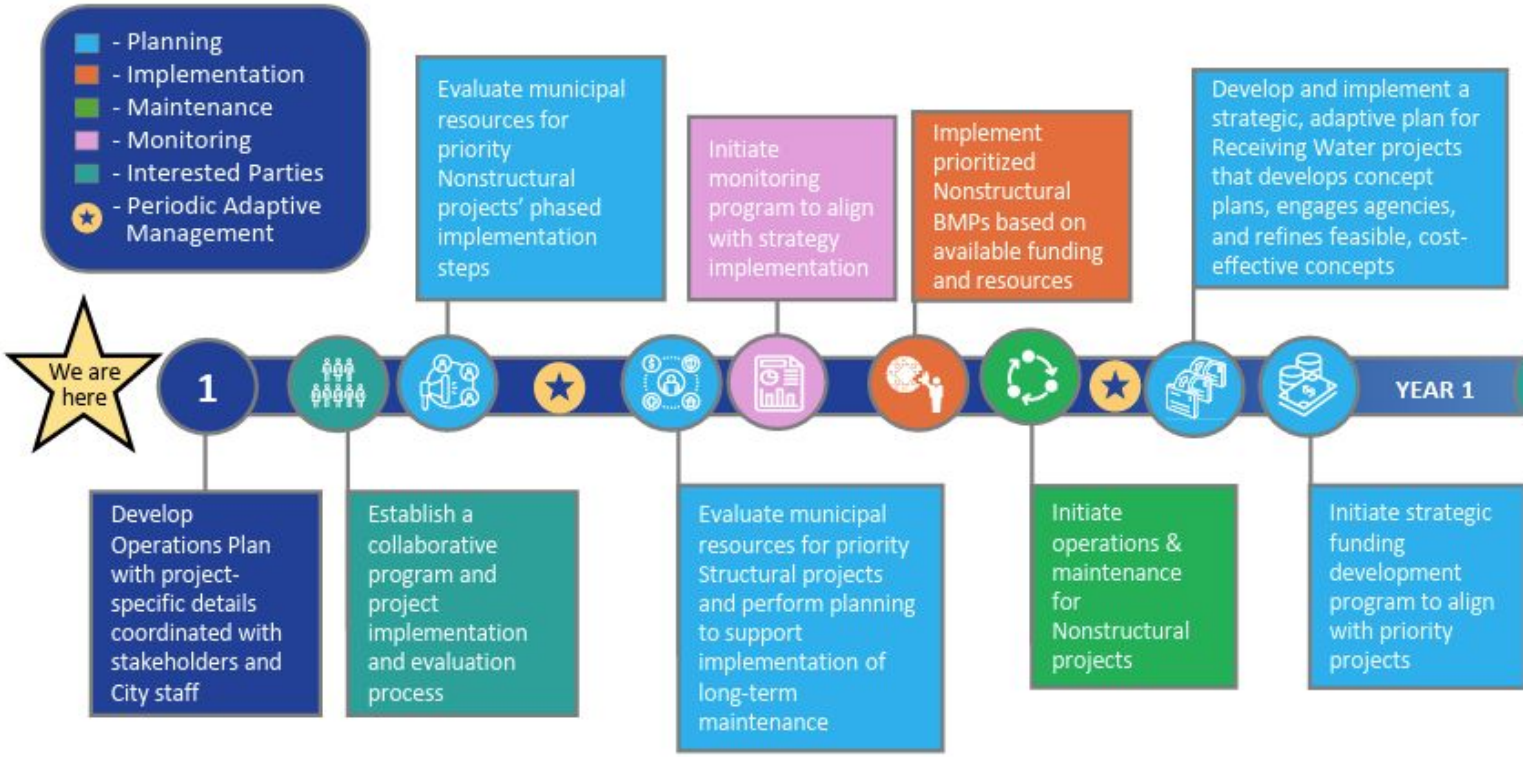
- The Campus Park Infiltration BMP was removed as the current Campus Park Activation CIP project includes infiltration and filtration BMPs within its design.
- Included in place is the Agricultural Runoff Treatment BMP strategy due to low estimated capital and O&M costs (and high cost-efficiency) and anticipated effectiveness in addressing nutrients in agricultural runoff.
- In recognition of continued stakeholder feedback regarding the need for improved residence times, staff is recommending the inclusion of the Passive Edison Canal Connection (Receiving Water strategy) within Phase 1 for further exploration.

DISCUSSION - Phase I Implementation Recommendations [21]

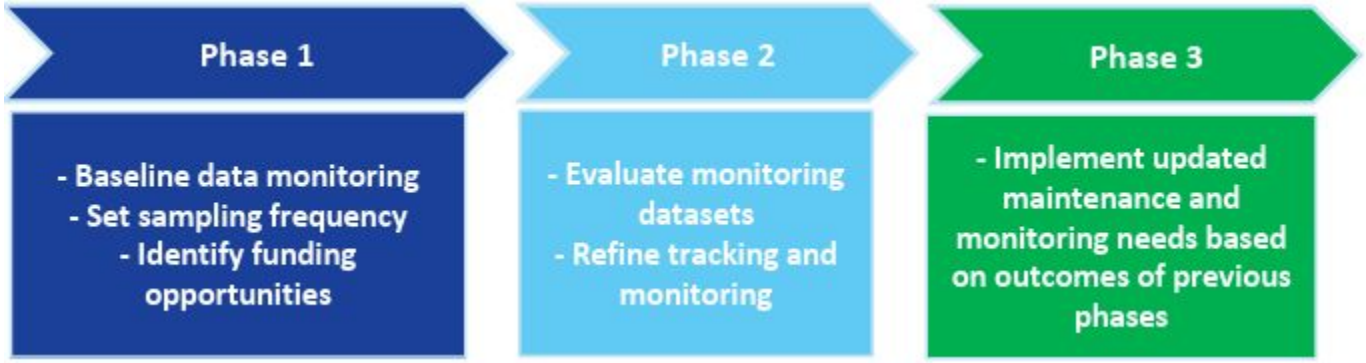
- Next steps for the Phase I implementation are anticipated to occur over the next few years and involve a variety of simultaneous steps.
- Non-Structural strategies are front-loaded within the timeline, as they are anticipated to have the least complex implementation concerns.

DISCUSSION - Phase 1 Implementation Recommendations [22]

- Full implementation is expected to take significant time.
  - Specific strategies may be implemented earlier than others.
  - For example, non-structural strategies are identified as "year 1" implementation items within Craftwater's recommended Phase 1 steps



DISCUSSION - Evaluation and/or Monitoring of Strategies



- An adaptive management plan is recommended for the evaluation of each strategy throughout implementation.
- Key considerations for adaptive management:
  - Constituent Monitoring
  - Funding Acquisition
- Identified strategies can be altered if found to be ineffective or if other funding/regulatory opportunities becomes available.

DISCUSSION - Evaluation and/or Monitoring of Strategies

- The monitoring plan may be limited in order to reduce cost focus on specific constituents of concern:
  - Bifenthren
  - Permethrin
  - Copper
  - Dissolved Oxygen
  - Enterococcus
  - Nutrients
- Outside testing and monitoring resources (Farm Bureau, County) are recommended to be included in the City's approach

DISCUSSION - Evaluation and/or Monitoring of Strategies

- Collected data will be compiled, analyzed for trends and performance, and summarized in regular reporting to inform ongoing program refinement, with data gaps identified for supplemental monitoring as needed.
- This is an early component of the Phase 1 implementation plan, to provide baseline information.
- If a strategy is evaluated as having little impact, it will be recommended for removal or replacement within the plan.
- Additionally, if insurmountable regulatory concerns are raised during initial discussions with permitting agencies, regarding the planned Receiving Water strategy implementation, then the strategy may also need to be removed or replaced.

DISCUSSION - Summary of Next Steps

In summary, Phase 1 of the Implementation Plan as recommended by staff involves the following:

Non Structural Strategy Implementation

- Solicitation of environmental science professional services for:
  - Development of outreach materials for coordination based Non-Structural Strategies
  - Programmatic optimizations and technological upgrades for existing street sweeping and catch basin cleaning efforts
  - Development of work plan and protocols for illicit discharge detection and elimination
- Selection of sites for installation of trash capture devices
  - Solicitation for drainage study and designs per each location

DISCUSSION - Summary of Next Steps

In summary, Phase 1 of the Implementation Plan as recommended by staff involves the following:

Structural Strategy Implementation

- Solicitation for professional planning, engineering and design services for selected Structural BMPs
- Coordination with agricultural landowners at key discharge locations for direct agricultural runoff treatment

DISCUSSION - Summary of Next Steps

In summary, Phase 1 of the Implementation Plan as recommended by staff involves the following:

Receiving Water Strategy Implementation

- Direct MGS landowner engagement
- Solicitation of environmental science professional services for:
  - Regulatory agency consultation and environmental review
  - Preliminary concept design(s) plan development

DISCUSSION - Summary of Next Steps

In summary, Phase 1 of the Implementation Plan as recommended by staff involves the following:

Continued Monitoring/Adaptive Management

- Solicitation for environmental science professional services for:
  - Development of a monitoring program to include comprehensive project data compilation
  - Planning and development of water quality monitoring protocols, data collection mechanism(s), laboratory analysis, long-term data and trend analyses, and reporting.
  - Program planning and adaptive management processes

DISCUSSION - Summary of Next Steps

In summary, Phase 1 of the Implementation Plan as recommended by staff involves the following:

Funding Identification

- Solicitation for funding acquisition services (grant writing and application)
- Identification of additional funding programs which match implementation strategies

DISCUSSION - Summary of Next Steps

- Implementation of staff's recommendation will involve many different divisions and departments in the City.
- It may also require significant staff time and resources.
- Approval of these recommendations will need to be weighed with other existing priorities for City departments/divisions that will participate in the implementation of these recommendations.
- Some of the proposed strategies have on-going General Fund budgeting impacts. For example, construction (e.g. Wilson Park Infiltration BMP) will result in having to maintain and repair/replace the new infrastructure in perpetuity.

FINANCIAL IMPACT

- The Craftwater Feasibility Study and Implementation Plan project has so far been funded entirely by American Rescue Plan Act (ARPA) funds and California Department of Water Resources grant funds.
  - $3.1 million have been secured for water quality related efforts
  - $948,164 has been spent as of March 6, 2026 (this is includes water quality testing, the Feasibility Study and Implementation Plan, and administrative expenses)
- With approximately $2.1 million remaining dedicated to water quality mitigation efforts, staff is proposing an initial $1 million spending plan to support the implementation of the recommended mitigation strategies.

FINANCIAL IMPACT

Strategy Type	Strategy	Proposed Allocation	Cost Details
Non-Structural	Targeted Nutrient/Pesticide Source Control - Agricultural Coordination	$50,000	Develop and produce materials; create outreach schedule
	Municipal Operations Enhancement Source Control - Street Sweeping and Catch Basin Cleaning Optimization	$100,000	Analysis & optimization of sweeping routes and CBC work plan; technological upgrades
	Targeted Nutrient/Pesticide Source Control - Illicit Discharge Detection and Elimination	$50,000	Development of work plan and protocols;
	Trash Reduction - Mechanical Filtration	$100,000	Selection of sites; drainage study, design plans (10 sites)
Structural	Wilson Park Infiltration BMP	$100,000	Conduct project-level feasibility assessment; prepare concept-level designs; evaluate permitting needs
	Oliveira Plaza Parking Lot Infiltration BMP	$150,000	Conduct project-level feasibility assessment; prepare concept-level designs; evaluate permitting needs
	Agricultural Runoff Treatment System Pilot Project	$75,000	Coordination with agricultural landowners; concept-level designs (3 sites)
Receiving Water	Passive Edison Canal Connection	$250,000	Preliminary concept design; regulatory agency consultation
Monitoring	Post-Implementation Monitoring	$50,000+ (annually)	Development of monitoring work plan and protocols
Funding Identification	Funding Identification & Grant Planning/Submission	$75,000	Research and pursue funding opportunities to supplement available funds
	Total	$1,000,000	

FINANCIAL IMPACT

- The proposed spending plan differs slightly from the Craftwater proposed plan in the Implementation Plan report.
- Adjustments were made to reflect expenses more in line with expected costs using current City agreements for similar services.
- There is no impact on the General Fund or any Special District funds.
- Future funding sources may need to include debt financing, special assessments, or other funding sources outside of the City's current resources due to the expected high cost of continued programs, monitoring, structural strategy construction and receiving water strategy implementation.

CITY OF OXNARD CALIFORNIA

QUESTIONS