East Bay Dischargers Authority

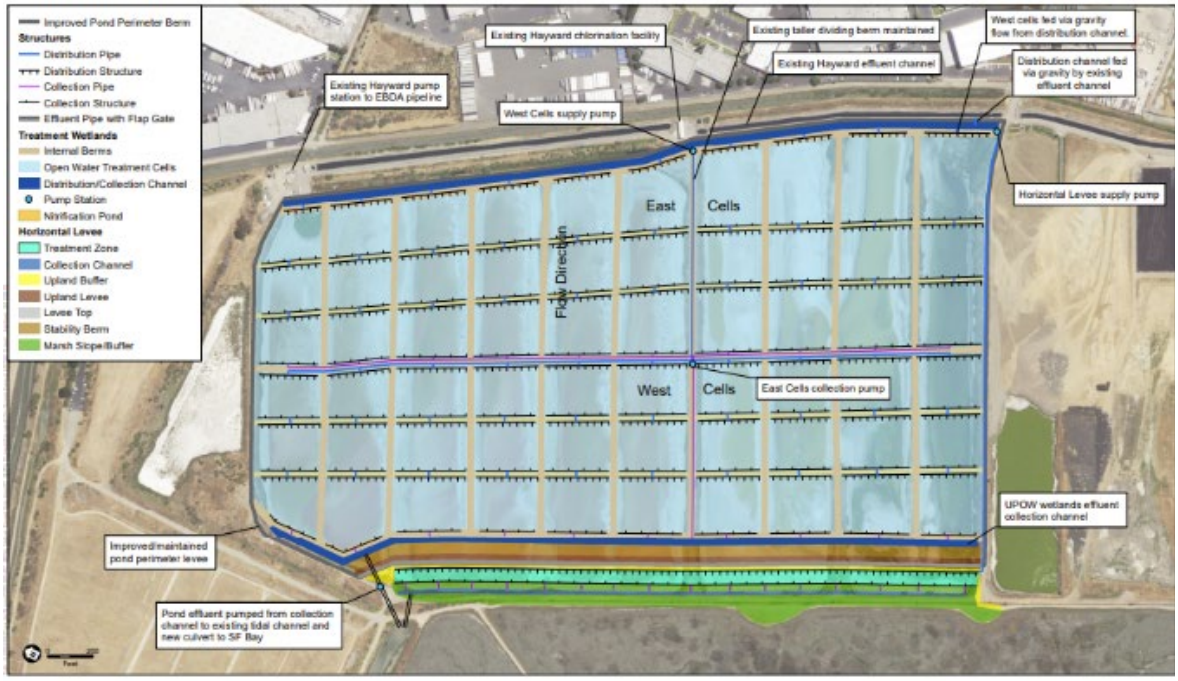
Hayward Nature-Based Solutions Feasibility Study

Location
Hayward, CA

Project Budget
$50,000

Schedule
- Feasibility Study: 2022

Sponsors
- East Bay Dischargers Authority
- City of Hayward
- San Francisco Estuary Partnership



Project Goals Objectives

- Evaluate feasibility of a nature-based system (NbS) that increases sea level rise resilience of the Hayward shoreline fronting the Hayward Water Pollution Control Facility (WPCF) and maintains the wet weather storage function of oxidation ponds
- Determine treatment levels possible with NbS within former oxidation ponds
- Compare treatment potential of different NbS configurations
- Develop estimate of probable engineering costs to construct and maintain NbS

Project Goals

- Increase resilience of Hayward shoreline to sea level rise.
- Maintain wet weather storage function in former oxidation ponds
- Examine the potential for nature-based treatment options at Hayward WPCF

Project Overview

In July 2022, the Nature-Based Solutions Feasibility Study (Study) was prepared to evaluate the potential of converting a portion of the existing ponds and levee at the Hayward WPCF to nature-based treatment systems to reduce nitrogen and other contaminants of emerging concern in wastewater effluent. The proposed NbS concept utilizes a combination of unit-process open water (UPOW) wetlands and a horizontal ecotone levee to improve flood protection and provide sea level rise resiliency/adaption while polishing wastewater effluent within the footprint of former oxidation ponds at the WPCF. Polished wastewater produced by the system would be discharged to the treatment zone of the horizontal levee and directly to an open water channel during the highest tides where the polished wastewater would mix with saline water from the adjacent tidal Cogswell Marsh. In addition to the contamination-removal and storage benefits, transforming the existing shoreline using a NbS approach could create benefits of enhanced habitat using treated wastewater, flood protection from sea level rise and demonstration of green infrastructure for educational opportunities.

The project is part of a system of sea level rise adaptation measures identified in the Hayward Shoreline Adaptation Master Plan adopted by the Hayward Area Shoreline Planning Agency (HASPA) in 2021.

Anticipated Project Benefits

A horizontal levee would increase the Hayward WPCF resilience to sea level rise, contributing to the overall vision of the Hayward Shoreline 2021 Master Plan. The use of these natural treatment systems to achieve nutrient reduction goals during the dry season would allow Hayward continued use of the former oxidation ponds for wet weather storage.

Hayward is currently planning a nutrient upgrade project for the WPCF. The proposed nature-based concept could augment or complement certain upgrades by addressing a portion of the denitrification goals of the proposed treatment plant upgrade.

Regulatory Permitting Considerations

The concept includes the following efforts to reduce environmental impacts:

- the proposed UPOW wetlands and horizontal levee would be located in existing oxidation ponds that are part of the WPCF treatment process and not expected to be deemed jurisdictional or subject to regulation as waters/wetlands, and are not currently occupied by or provide habitat for sensitive species;
- permanent ‘loss’ or adverse wetland impacts from the project are expected to be minor (quantitatively and qualitatively), and primarily result from small water control structures that may be placed in the Bay or its tributary(ies); and

- the project would likely result in net long-term environmental benefits or 'lift' to several ecosystem functions and services (including water quality, habitat diversity as provided on the levee slope, and sea level rise resiliency).

More detailed study of existing resources and evaluation of potential effects due to the final project design, construction plan, and operations and management plan are forthcoming.

The following topics should be discussed with the regulatory agency team to inform the project design and implementation plans:

- What are the permitting and long-term project management implications of adding a freshwater discharge (i.e., treated wastewater) through the channel to Cogswell Marsh and the San Francisco Bay Estuary (including mixing zone considerations, disinfection requirements, and total suspended solids concentrations) and potential habitat type conversions effects?
- The horizontal levee and UPOW will require periodic maintenance as part of the adaptive management plan. What permit streamlining opportunities are available to cover ongoing maintenance and adaptive management needs?

Conclusions and Next Steps

Next steps to further advance the nature-based treatment concept:

- Additional study and evaluation of existing conditions including, analyze Hayward ponds soil to determine suitability for construction; detailed topographic survey; and survey habitat types including wetlands.
- Refine the design concept hydraulic assumptions and treatment potential, including integration with the planned WPCF upgrade.
- Develop preliminary engineering designs for a nature-based treatment concept at Hayward WPCF ponds, including sea level rise assumptions and adaptation plan.
- Develop life cycle costs for the horizontal levee considering potential maintenance actions to maintain flow through capacity.
- Environmental compliance documentation, including CEQA/NEPA compliance and regulatory permitting.