



**LOS ANGELES COUNTY
SANITATION DISTRICTS**

Converting Waste Into Resources

PUBLIC REVIEW DRAFT

EPA Brownfields Cleanup Grant Application and
Draft Analysis of Brownfield Cleanup Alternatives
Fletcher Oil and Refining Company Brownfield Site
(SCP NO. 0451A, SITE ID NO. 2040074)

October 27, 2022



Narrative Information Sheet

1. Applicant Identification:
County Sanitation District No. 2 of Los Angeles County
1955 Workman Mill Road, Whittier, CA 90601-1400
Mailing Address: P.O. Box 4998, Whittier, CA 90607-4998
2. Funding Requested
 - a. Grant Title: Brownfields Cleanup Grant
 - b. Federal Funding Requested: \$1,751,875
3. Location: City of Carson, Los Angeles County, California
4. Property Information: The former Fletcher Oil and Refining Company (FORCO) site is located at 24721 S. Main Street, City of Carson CA 90745
5. Contacts:
 - a. Project Director: Sam Shammas P.E. (civil), Supervising Engineer. [sshrammas@lacsd.org](mailto:sshammas@lacsd.org) – (562) 699-7411, ext. 2716 – P.O. Box 4998, Whittier, CA 90607-4998
 - b. Chief Executive: Robert C. Ferrante, Chief Engineer and General Manager. rferrante@lacsd.org – (562) 699-7411 – P.O. Box 4998, Whittier, CA 90607-4998
6. Population:
Los Angeles County Sanitation Districts serve approximately 5.5 million people across Los Angeles County. According to the U.S. Census July 1, 2021 population estimate, the population of the City of Carson is 93,535.
7. Other Factors:
The reuse strategy or project reuse of the proposed site considers climate adaptation measures: Narrative Pages 2 and 4.
8. Releasing Copies of Applications: N/A

Los Angeles County Sanitation Districts
EPA Brownfields Cleanup Grant Narrative Application
Fletcher Oil and Refining Company (FORCO) Brownfield Site (SCP NO. 0451A, SITE ID NO. 2040074)

1. Project Area Description and Plans for Revitalization

a.i. Target Area and Brownfields: Background and Description of Target Area

Target Area Description: The Los Angeles County Sanitation Districts (Sanitation Districts) provide wastewater and solid waste management services to approximately 5.5 million people in 78 cities and unincorporated areas of Los Angeles County. Our wastewater system includes about 1,410 miles of sewer, 49 pumping plants and 11 wastewater treatment plants, as well as nearly 10,000 miles of sewers owned by the 78 cities and Los Angeles County that are tributary to our wastewater collection system. The Sanitation Districts are remediating petroleum contamination at the former Fletcher Oil and Refining Company (FORCO) refinery site in Carson, California. Remediation of the FORCO site aims to clean up decades of petroleum contamination in the soil and groundwater. This will allow future beneficial development of the site as part of the Joint Water Pollution Control Plant (JWPCP), the Sanitation Districts' largest and oldest wastewater treatment plant which treats approximately 250 million gallons of wastewater per day, serving approximately 5 million people. The requested Brownfields Cleanup Grant would be used for the FORCO site's next phase of remediation, which will focus on deep soil and groundwater.

Setting: The City of Carson (City) was largely industrial dating back to the mid-20th Century, and Carson is home to 17 former landfills and land use patterns in which industry is often found near residential neighborhoods.¹ The historical industrial base unfortunately led to many contaminated sites, which has been of ongoing concern to City officials. Current efforts to improve conditions in the community include formation of an Enhanced Infrastructure Financing District aimed at cleaning some of the many brownfields that continue to be a challenge for the City. Furthermore, this site is in what is known as the Torrance Oil Field, a region with a substantial history of oil and gas well drilling and extraction. There are five oil refineries in and around this region. The mixed land use that led to industrial operations near residential neighborhoods has meant that oil drilling and refining operations can frequently be found adjacent to homes and schools. The resulting air pollution and toxic releases are reflected in the community's CalEnviroScreen scores and increased cancer and respiratory illness threats for residents.

a. ii. Description of the Brownfield Site

This brownfield site is a former oil refinery located on approximately 36 acres at 24721 South Main Street, City of Carson, California. FORCO operated the refinery at the site from 1939 to 1992, at which time it was decommissioned, and all aboveground structures were subsequently demolished. Operations at the site consisted of refining and storing petroleum products including crude oil, light distillates such as gasoline and naphtha, and intermediate and heavier distillates such as diesel fuel, heavy fuel oils, and asphalt. The area of the refinery was reconfigured several times over the course of historical operations, which included the addition, removal, and replacement of aboveground storage tanks, vessels, and equipment. The last major expansion occurred in 1980. In addition to the refinery operations, dairy farming was conducted on the northern end of the site until the property was redeveloped in 1979.²

Due to the historical refinery operations, soil and groundwater are impacted at the site by petroleum hydrocarbons (PHCs). The most prevalent contaminants are total petroleum hydrocarbons in the gasoline

¹ EPA Brownfields Assessment Demonstration Pilot fact sheet, 1999.

² The Earth Technology Corporation [TETC] 1985.

range (TPHg), benzene and light non-aqueous phase liquid (LNAPL). Groundwater impacts extend off-site to the east of the property. The project focuses on the cleanup of these contaminants in deep soil (more than 30 feet below ground) and groundwater beneath the site. The Los Angeles Regional Water Quality Control Board (Regional Water Board) granted a no further action (NFA) determination for the surface and shallow soil (top 30 feet) at the site in 2021. Off-property groundwater remediation is being addressed by the Sanitation Districts, but that scope of work is not a part of this grant application and, therefore, not further discussed herein.

b. i. Revitalization of the Target Area: Reuse Strategy and Alignment with Revitalization Plans

The Sanitation Districts are currently pursuing bifurcated (two phase) closure for the site to facilitate the potential future redevelopment of the FORCO property. Phase 1 closure for surface and shallow soil (top 30 feet) was achieved by the Sanitation Districts in 2021 upon issuance of the NFA letter by the Regional Water Board. This grant application is intended to fund the Sanitation Districts' proposed Phase 2 remediation of deep soil (more than 30 feet below ground) and groundwater beneath the site.

Under current plans, the FORCO site will potentially be used to support a critical component of the region's water resiliency strategy designed to address climate change-driven droughts and water shortages by hosting the Advanced Water Treatment (AWT) Facility that is the cornerstone of the multi-billion-dollar Pure Water Southern California (Pure Water) program that the Sanitation Districts are pursuing with the Metropolitan Water District of Southern California (Metropolitan). As proposed, this program would purify up to 150 million gallons of recycled water each day, providing a critically important, major new source of sustainable water that will assist not only this region but the Colorado River watershed, which is suffering from extreme drought conditions, in becoming more climate resilient.

b. ii. Outcomes and Benefits of Reuse Strategy

As noted above, Pure Water would beneficially reuse cleaned wastewater that currently is being discharged to the Pacific Ocean from the JWPCP in the City of Carson. The cleaned wastewater would be purified through the proposed AWT Facility which will potentially be constructed on the former FORCO property within the boundaries of the JWPCP. The proposed AWT Facility would produce approximately nearly 155,000 acre-feet per year of sustainable, high-quality water, predominantly for indirect and direct potable reuse. Pure Water would help reduce the region's dependence on imported water and would assist the region in addressing potential disruptions or reductions to imported water supplies. This purified water would not only provide a more diversified water supply to Southern California, it also would enhance operational resilience, reliability, and flexibility in the face of ongoing challenges including long-term drought and climate change. According to a 2021 analysis prepared by the Los Angeles County Economic Development Corporation, Pure Water would bring enormous economic development benefits to the City of Carson and the region.³ Construction is estimated to catalyze the direct and indirect creation of nearly 50,000 jobs, \$8.7 billion in economic output, nearly \$3.5 billion in labor income, and over \$400 million in state and local taxes. Operation of Pure Water is estimated to generate over \$300 million in annual economic output, 220 direct jobs, and 820 additional jobs.

a. i. Strategy for Leveraging Resources: Resources Needed for Site Characterization

Historical characterization and assessments for this site have already been performed and were funded with ratepayer funds. The Sanitation Districts will provide voluntary cost-sharing funding for all costs not covered by any grant that is awarded. Furthermore, the Sanitation Districts will continue to monitor the site and work with the Regional Water Board to ensure effective remediation of the site. If any further

³ Los Angeles County Economic Development Commission, Institute for Applied Economics, "Metropolitan Water District: Regional Recycled Water Program – An Economic Impact Study," August 2021.
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site characterization or assessment is required, the Sanitation Districts will fund these efforts using agency resources. Our revenue sources and financial capability are described in the “Leveraging” section below. This section highlights our ability to fund projects and ensure that all steps necessary for effective remediation of the FORCO site can be completed.

c. ii. Resources Needed for Site Remediation

The cost estimate for the next phase of remediation of the site is approximately \$6 million. To help fund site remediation, we are pursuing a \$1.8 million Brownfields Cleanup Grant. We will also potentially pursue an Equitable Community Revitalization Grant from the California Department of Toxic Substances Control (DTSC) to fund some or all of the remaining remediation cost. The Sanitation Districts will fund any costs not covered by EPA or DTSC grants with agency revenues. As described in the “Leveraging” section below, the Sanitation Districts have the financial capacity to support this project through ratepayer-funded wastewater revenue and/or other miscellaneous sources of revenue.

c. iii. Resources Needed for Site Reuse

Pure Water is anticipated to cost at least \$4 billion. Project components include the AWT Facility, other upgrades at JWPCP, a network of conveyance pipelines, and other facilities needed to facilitate indirect and potentially direct potable reuse of the purified water. The Sanitation Districts and Metropolitan have secured \$80 million in funding through the California State Budget (FY2023) for the development of Pure Water and will be seeking other state and federal funding opportunities over the next few years through agencies such as the State Water Resources Control Board, U.S. Bureau of Reclamation and U.S. EPA, as well as other potential project partners. Any costs not covered by external funding sources will be paid for by Metropolitan or its partners (including the Sanitation Districts), subject to governing board approval.

c. iv. Use of Existing Infrastructure

Significant effort has been invested in investigation and remediation activities over the past 30 years. This includes excavation, landfarming, reuse or disposal of surficial impacted materials, and recovery of hydrocarbons using an air-sparge/soil vapor extraction (AS/VE) system. Due to these efforts, the FORCO site already houses remediation-related infrastructure including VE, AS, and groundwater monitoring wells as well as aboveground conveyance piping and a small building housing the VE and AS treatment systems. We will continue utilizing this equipment in addition to building out the necessary structures for the remaining remediation efforts.

To the west and north of the site, the Sanitation Districts operate the JWPCP, a major regional wastewater treatment facility. The existing infrastructure at JWPCP is critical to the potential development of the Pure Water AWT Facility and an important reason why the FORCO site is under consideration as the location for the AWT Facility.

2. Community Need and Community Engagement

a. i. Community Need: Need for Funding

The Sanitation Districts derive revenue primarily from our ratepayers. We serve a diverse population of 5.5 million people that spans a broad socioeconomic spectrum. However, we are statutorily prohibited from charging our ratepayers differently based on their income or financial means. This means that increased costs or investments to improve our services can have a regressive or disproportionate impact on lower income ratepayers.

All of Southern California, including the Sanitation Districts’ service area, is currently in the midst of a historic drought. Water is becoming scarcer as sources such as the California Water Project and the

Colorado River experience ongoing demand for substantially reduced flows. The projected continued aridification of the region due to climate change necessitates increased sustainability measures such as water recycling and reuse. The partnership between the Sanitation Districts and Metropolitan to potentially build the AWT Facility at the FORCO site is a critically important response to the difficult challenge presented by climate change.

This phase of the cleanup is estimated to cost up to \$6 million. Securing grant funding for this project will help alleviate the cost burden on ratepayers, which is particularly important for the sizeable number of the Sanitation Districts’ ratepayers that are low-income, and will help us maintain affordable rates. We are pursuing EPA Brownfields Cleanup Grant funding for this purpose, while also providing the local community with the benefits of a remediated brownfield site, a sustainable source of water, and local economic development and jobs.

a. ii. Threats to Sensitive Populations

The Sanitation Districts utilized CalEnviroScreen (Version 3.0) to analyze the pollution burdens on communities surrounding the JWPCP and determine if the JWPCP is located in an area categorized as a Disadvantaged Community (DAC). CalEnviroScreen (CES) is an environmental justice mapping tool that leverages environmental, health, and socioeconomic factors to identify California communities most impacted by pollution and its effects. CES ranks California communities based on these burdens from a score of 0-100, showing higher scores for communities with greater burdens, and communities with fewer pollution burdens showing lower scores. Utilizing CES highlights communities that bear the largest pollution burdens and where people are most vulnerable to the related impacts. Communities with a CES score in the 70th percentile or greater qualify as DACs.

In analyzing JWPCP and the surrounding communities, the Sanitation Districts found that the area qualifies as a DAC with census tract CES scores ranging from 60 to 85 percent, with most being above 75 percent. The JWPCP is in a census tract scoring 75-80 on CES. This analysis also found that these census tracts scored very highly in the Toxic Release percentiles, ranging from 96 to 99, and Pollution Burden percentiles, ranging from 64 to 88. Additionally, the population of these census tracts had between 8 and 18 percent children under the age of 10, and between 12 and 17 percent elderly adults over the age of 65. The population is also majority minority, with less than nine percent of the population being non-Hispanic white. Meanwhile, the Hispanic population in these census tracts ranges from 41 to 90 percent.

The Sanitation Districts also conducted a Human Health Risk Assessment to assess potential human health risks to current and potential future workers on the FORCO site. This assessment found that residual contamination in surface and subsurface soils and soil vapors is within acceptable levels with proper mitigation measures and are expected to continue to decline due to ongoing remediation efforts. It concluded that offsite occupants (residents, commercial workers, and construction workers) do not appear to be adversely impacted. Groundwater contamination at the site does not pose a threat to drinking water since the local shallow groundwater is not used for drinking water and administrative controls are in place to prevent a water supply well from being installed on the site. The closest drinking water supply wells are cross gradient to the site (not located in the direction of groundwater flow from the site) and located in much deeper aquifers that were determined not to be in hydraulic communication with the impacted groundwater at the site.

b. i./ii. Project Involvement and Project Roles

Name of Organization/Group	Point of Contact	Specific Involvement in the Project or Assistance Provided
Metropolitan Water District of Southern California	Bruce Chalmers, Program Manager	Partner in the potential development of the Pure Water

		Southern California Advanced Water Treatment Plant
JWPCP Citizens Advisory Committee	Sharon Shipman Mirabal, Chairperson	Disseminating information to members of the community and communicating project progress
North Wilmington Neighborhood Watch Group	Jasmine Mora, Member Linda Rios, Member	Disseminate information to community members
Carson Coalition	Dianne Thomas	Disseminate information to community members
Coalition for a Safe Environment	Jesse Marquez, Board Member	Disseminate information to community members
Wilmington Boys & Girls Club – Los Angeles Harbor	Sonia Espinoza, Director	Disseminate information to community members

b. iii. Incorporating Community Input

In 2021, the Regional Water Board notified interested parties, stakeholders, and the public regarding its intent to issue a “no further action/closure” (NFA) letter to the Sanitation Districts for the surface and shallow soil (top 30 feet) at the FORCO site and solicited comments on the cleanup plan and action. This notification provided information regarding the history of the site, the contamination present, ongoing mitigation efforts, findings from the Human Health Risk Assessment, proposed reuse for a potential AWT Facility, and the Remediation Action Plan, prepared by the Sanitation Districts and approved by the Regional Water Board in 2020, to be implemented for remediation of the deep soil (more than 30 feet below ground) and groundwater beneath the site. The Regional Water Board accepted comments from the public for 30 days. After receiving no comments during that time period, the Regional Water Board issued the NFA letter for the surface and shallow soil (top 30 feet) at the FORCO site. In that letter, the Regional Water Board found that remediation at the FORCO site since 2009 has resulted in the cleanup or abatement of the wastes in shallow soil (surface to 30 feet below ground) to assure protection of human health and groundwater for its beneficial uses.

The Sanitation Districts will publicly post this draft Brownfields Cleanup Grant application and draft Analysis of Brownfield Cleanup Alternatives, solicit community feedback regarding the application, answer questions regarding the application and the site remediation plan, and hold a community meeting for public presentation and discussion of the application. All comments received will be considered, and a comment summary and a response to comments will be prepared.

Metropolitan and the Sanitation Districts are also conducting robust community outreach for the Pure Water program, including presentations to many organizations in the community and comment opportunities. For instance, the Notice of Preparation (a step in the California Environmental Quality Act (CEQA) process) was released on September 30, 2022 and comments are due on November 14, 2022. Four virtual scoping meetings were held during this period, and comment cards were made available at a number of additional community events. The public will have additional opportunities to comment on the potential reuse of the FORCO site for the AWT Facility during the CEQA review process. Further information about the project and about community involvement opportunities is available at www.mwdh2o.com/purewater.

3. Task Descriptions, Cost Estimates, and Measuring Progress

a. Proposed Plan for On-Property Cleanup

Implementation of the proposed Phase 2 cleanup at the site will be consistent with the Remedial Action Plan approved by the Regional Water Board in 2020 for remediation of the deep soil (more than 30 feet below ground) and groundwater beneath the site. The draft Analysis of Brownfield Cleanup Alternatives (attached) provides a summary of the cleanup alternatives considered in the Feasibility Study and Remedial Action Plan. The project will involve continued operation and expansion of the AS/VE system within areas of significant LNAPL accumulations and the TPHg and benzene hotspot areas using an Adaptive Site Management approach. Adaptive application of AS/VE will require close performance monitoring of the remediation system to maximize PHC mass removal. As the progress of the remediation program proceeds and is closely monitored, changes will be implemented quickly to optimize the AS injection rates, injection depths, and well locations as well as SVE well locations. Rapid screening subsurface sampling techniques will be performed on a routine basis to assess cleanup progress in the subsurface. The cleanup objective is to maximize the recovery of PHCs. The expansion of the AS/VE system will include a AS/VE barrier installed along a portion of the eastern property boundary at Main Street to intercept and mitigate groundwater migrating offsite. This will also greatly reduce contaminant migration to areas downgradient of the Property boundary, thereby accelerating concentration reductions in these areas. The Sanitation Districts will systematically assess and modify remediation strategies in response to remedy performance.

i. Description of Tasks/Activities and Outputs: Project Implementation

The Scope of Work for the Phase 2 site cleanup will focus on implementation of the recommended remedial technology for the site in order to clean up deep soil (more than 30 feet below ground) and groundwater, which consists of an expanded AS/VE system including installation/operation of a barrier along a portion of the eastern boundary of the site. Grant-funded and non-grant-funded tasks include the following.

EPA Grant-funded Tasks:

Task 1: Acquisition of equipment. Major system components are anticipated to include additional AS/VE wells, the air sparge unit(s) with trailer, Catalytic Oxidation SVE Unit(s), electrical connection, an additional equipment compound, piping manifolds, including pipe, hoses and fittings to connect the blower and wells, and process controls for functional safety and delivery and monitoring of the injection process.

Task 2: Setup and Installation of Field Operations. This includes obtaining operational permits, clearing underground utilities, AS and VE well drilling and installation (including continued site assessment to refine the remediation system), and operation and optimization of the expanded system.

Non-Grant Funded Activities:

A number of tasks will be carried out in support of Project Completion that will be necessary for the implementation of the remedial technology for the site. These tasks will be funded either by the Sanitation Districts or by external sources, such as an Equitable Community Revitalization Grant from the California Department of Toxic Substances Control.

Task A: Selection of Contractor

Task B: Design, Work Plans and Permit Acquisition

Task C: AS/VE Adaptive System Optimization

Task D: Progress Sampling Investigations

Task E: Site Closure Investigation

TaskF: Operations and Maintenance of the Adaptive Site Management (ASM) AS/VE system (includes utilities, Operations & Maintenance, Permitting and Compliance, Sampling and Reporting, and equipment replacement costs)

TaskG: Management of Consultant and Contractor

TaskH: Project Management of EPA Grant

b. ii. Anticipated Project Schedule

Task	Start Date	End Date
Task 1 – Acquisition of Equipment	September 2023	September 2027
Task 2 – Setup and Installation of Field Operations	September 2023	September 2027

b. iii. Task/Activity Lead

Task 1: Acquisition of equipment -- A contractor will be hired to implement this task. The Sanitation Districts’ project manager and its remediation consultant will oversee the activities of the contractor.

Task 2: Setup and installation of field operations -- The contractor will implement this task. The Sanitation Districts’ project manager and its remediation consultant will oversee the activities of the contractor.

b. iv. Outputs

The current AS/VE system will be significantly expanded to maximize LNAPL and dissolved PHC removal. The EPA-funded tasks will cover the costs of the necessary equipment and installation costs. Together with the non-grant funded tasks outlined above, the project outputs are anticipated to be:

- reduced PHC concentrations in deeper soil;
- significant removal of LNAPL;
- prevention/control of PHC groundwater plume migration on the site; and
- prevention/control of further PHC groundwater plume migration off-site (to the east).

c. Cost Estimates*

Budget Categories		Project Tasks (\$)		
		Task1	Task2	Total
Direct Costs	Personnel	0	0	0
	Fringe Benefits	0	0	0
	Travel	0	0	0
	Equipment	0	0	0
	Supplies	0	0	0
	Contractual	\$1,517,500	\$234,375	\$1,751,875
	Other (include subawards) (specify type)	0	0	0
Total Direct Costs		\$1,517,500	\$234,375	\$1,751,875
Indirect Costs		0	0	0
Total Budget		\$1,517,500	\$234,375	\$1,751,875

*Costs per unit, by task:

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Task 1 – Acquisition of Equipment

Equipment	Unit Price	Unit	Quantity	Total
System Acquisition and Project Management	\$180	Hour	100	\$18,000
Additional Air Sparge Well Installation	\$5,625	Each	76	\$427,500
Additional SVE Wells	\$3,750	Each	50	\$187,500
Catalytic Oxidation SVE Unit(s)	\$218,750	Each	1	\$218,750
Air Sparge Unit(s) with Trailer	\$75,000	Lump Sum	1	\$75,000
Additional Equipment Compound	\$62,500	Lump Sum	1	\$62,500
Additional Utility Connections (Gas/Electrical)	\$93,750	Lump Sum	1	\$93,750
Conveyance Piping	\$62.50	Foot	3,000	\$187,500
Control Valves	\$125	Well	126	\$15,750
Drilling IDW Disposal	\$437.50	Cubic Yard	400	\$175,000
Field Supplies	\$375	Day	150	\$56,250
Total for Task 1				\$1,517,500

Task 2: Setup and Installation of Field Operations

Activity	Unit Price	Unit	Quantity	Total
Drilling and Well Installation	\$156.25	Hour	1,000	\$156,250
System and Piping Installation	\$156.25	Hour	500	\$78,125
Total for Task 2				\$234,375

d. Measuring Environmental Results

Existing AS/VE wells and existing groundwater monitoring wells will be used for remedy performance monitoring and demonstrating achievement of the Remedial Action Objectives. Additional monitoring wells may be installed as necessary. The remedy performance monitoring schedule will be on a monthly basis so that rapid modifications to the remediation system can be implemented optimizing removal of PHCs. Monthly progress reports will be provided internally that will capture activities performed for that month and provide recommendations for near term modifications to the ASM approach. These monthly reports will be combined with the semi-annual reporting as appropriate.

AS/VE performance monitoring will be performed in accordance with the Regional Water Board-approved 1999 CAP and 2011 CAP Addendum and augmented to include assessment of groundwater and LNAPL conditions. The cumulative PHC mass removed will be calculated based upon the average PHC mass removal rate and the length of time elapsed between each monitoring event. The mass of PHC biodegraded will also be calculated. LNAPL thicknesses and groundwater quality data will be obtained from groundwater monitoring wells and from rapid screening of subsurface conditions using tools such as hydropunch, CPT and UVOST. Analytical results, engineering analysis, and recommendations for modification to the ASM AS/VE program will be reported semi-annually along with semi-annual groundwater monitoring data.

4. Programmatic Capability and Past Performance

a.i/ii. Organizational Structure & Key Staff

Overview: The Brownfields Cleanup Grant will be administered by the Sanitation Districts' Financial Management Department, which has extensive experience managing government grants and loans, and implementation of the cleanup project will be managed by the Sanitation Districts' Facilities Planning Department, which has over 20 years' experience with the remediation of the FORCO site, including 13 years as the lead agency. Both departments operate under the leadership and supervision of Robert C. Ferrante, Chief Engineer and General Manager, and Martha Tremblay, Assistant Chief Engineer and Assistant General Manager.

Project Management: The Sanitation Districts' Facilities Planning Department oversees the FORCO site remediation project and has done so since the acquisition of the FORCO property in 2000. The Sanitation Districts have successfully overseen the cleanup of the surface and shallow soil, resulting in the NFA determination by the Regional Water Board. The Project Director/Project Manager for this grant is Sam Shammass P.E. (civil), Supervising Engineer in the Facilities Planning Department, who has 23 years of experience at the Sanitation Districts, including over 5 years of experience managing cleanup of the FORCO site. Project Engineer for this grant is Cynthia Shen P.E. (civil), Project Engineer in the Facilities Planning Department, who has 16 years of experience working on site assessment and remediation programs. Work on this project will be overseen by Stan Pegadiotes P.E. (civil), who has 24 years of experience at the Sanitation Districts, including over 3 years of experience overseeing the Sanitation Districts' efforts to cleanup the FORCO site.

Technical Advisory Services: The Sanitation Districts have also contracted GSI Environmental Inc. (GSI), an experienced and reputable environmental consulting firm, to provide technical advisory services for remediation on this project. GSI team brings perspective and insights from decades of working on complex redevelopment projects and has the technical capabilities to assist the Sanitation Districts.

Grant Administration: The Brownfields Cleanup Grant will be administered by the Sanitation Districts' Budget and Finance Section within the Financial Management Department. The Sanitation Districts' Budget and Finance team has administered five California Department of Water Resources (DWR) Grants, one Clean Water Revolving Fund Loan Fund Grant, seven Clean Water Revolving Fund Loans, and one WIFIA Loan in the past five years and is very familiar with the processes and procedures necessary to successfully expend funds and fulfill the technical, financial, and administrative requirements of funding agreements and construction projects. To successfully implement the Brownfields Cleanup Grant, Budget and Finance staff will work closely with other groups at the Sanitation Districts, including Accounting, Facilities Planning, and Purchasing. The key Budget and Finance staff that will work together to successfully administer the grant include: Navnit Padival P.E. (civil/environmental), Supervising Engineer, who has 31 years of experience at the Sanitation Districts; Matt Copeland P.E. (civil/environmental), Senior Engineer, who has 15 years of experience at the Sanitation Districts; and Carol Chiang, Budget Analyst, with 19 years of Accounting experience.

a.iii. Acquiring Additional Resources

The Sanitation Districts are able to obtain assistance from its FORCO site remediation technical advisory consultant, GSI, as necessary. If additional expertise and resources are needed, the Sanitation Districts can obtain those services by issuance of a Request for Qualifications, Request for Proposals, or Request for Bid. The Sanitation Districts have a very active infrastructure capital investment program, and typically oversee about \$200 million or more per year of construction projects. These factors demonstrate our proven ability to procure and secure any additional expertise or resources necessary to implement the Grant and successfully complete the project.

b. Past Performance and Accomplishments

The Sanitation Districts have not previously received an EPA Brownfields Grant but have received other Federal and Non-Federal (State) Assistance. Two recent examples are described below.

Proposition 1 Water Recycling Funding Program Grant - In January 2018, the Sanitation Districts were awarded a grant from the California State Water Resources Control Board through the Clean Water Revolving Loan Fund for the San Jose Creek Water Reclamation Plant Flow Equalization (FE) Facilities Phase 1 project in the amount of \$14,445,130. The project consisted of the construction of two 4-million-gallon FE tanks, a pump station to drain the FE tanks, an odor control system, and modifications to the existing primary effluent channel. The project increased the capacity of the plant to produce recycled water. The project was completed on time and under budget, and all grant requirements were met. The California Department of Finance Office of State Audits and Evaluations recently conducted an audit of the grant and reported that the Sanitation Districts successfully implemented the grant. The project exceeded the intended goal of increasing recycled water deliveries by 9,000 AF per year, achieving an increase of 11,760 AF in 2021 as reported in the 2021 Recycled Water Report required by the assistance agreement.

Proposition Round 1 Integrated Regional Water Management Implementation Grant - In September 2020, the Sanitation Districts were awarded a grant from the Department of Water Resources for the Valencia Water Reclamation Plant Advanced Water Treatment (AWT) Facility Enhanced Membrane System (EMS) project in the amount of \$3 million. The project consisted of the construction of a new AWT facility at the plant to remove chloride from the effluent to achieve permit requirements. The grant scope was limited to the furnishing and startup/commissioning services for the EMS equipment. The project is still in construction and has not yet been placed in operation. The grant amount and required cost share have been expended. To date, all the grant conditions and reporting requirements have been met. Construction has been delayed due to COVID-19, supply chain and other issues. However, the Sanitation Districts have taken a proactive role in employing mitigative efforts to minimize schedule impacts.

IV. F. Leveraging

The Sanitation Districts are committed to successfully implementing our Phase 2 remediation in order to cleanup the petroleum hydrocarbon contamination in the deep soil (more than 30 feet below ground) and groundwater beneath the FORCO site. For this project, we are applying for \$1.8 million in EPA Brownfields Cleanup Grant funding for contractual costs as described above. We may also apply for an Equitable Community Revitalization Grant from the California Department of Toxic Substance Control for some or all of the remaining costs of the Phase 2 remediation project.

For any remaining project costs not covered by secured grant funding, the Sanitation Districts intend to leverage agency wastewater revenue funds. We have the authority to adopt ordinances to establish fees and charges for services provided by our wastewater systems. The Sanitation Districts receive wastewater revenues from user charges (service charges), contracts, and connection fees. We also adopt ordinances regarding industrial users and prescribes rates used to determine annual user charges (surcharges) for dischargers of industrial wastewater. The surcharge is intended to recover our cost of providing services to an industrial user based on the actual burden that is placed on our system by that user. The Sanitation Districts' wastewater revenue sources also include a pro-rata share of ad valorem property taxes. Our total agency wastewater budget for fiscal year 2022-23 was \$891 million. We have the demonstrated financial capacity – as well as the authority to raise revenues as is necessary to meet our operational and capital needs – to ensure the FORCO site Phase 2 remediation is completed.

Attachment A

Draft Analysis of Brownfield Cleanup Alternatives
Fletcher Oil and Refining Company Brownfield Site
(SCP NO. 0451A, SITE ID NO. 2040074)

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Fletcher Oil and Refining Company (FORCO) Brownfield Site (SCP NO. 0451A, SITE ID NO. 2040074)

I. Introduction and Background

- a. Site Location – The site is located at 24721 S. Main Street, City of Carson CA 90745. This site is in the Dominguez Channel watershed and overlies the West Coast Groundwater Basin. The site is in a census tract designated by the State of California as a disadvantaged community, using the CalEnviroScreen 3.0 tool. The site and the surrounding communities have been disproportionately impacted by toxic chemical releases and pollution. Historical Site Use – The former Fletcher Oil and Refining Company (FORCO) site is located within the Torrance Oil Field and is approximately 36 acres in area. A refinery operated at the site from 1939 through October 1992, with various facility expansions throughout the years of operation; the last major expansion occurred in 1980. Operations at the FORCO facility consisted of refining and storing petroleum products including crude oil, light distillates such as gasoline and naphtha, and intermediate and heavier distillates such as diesel fuel, heavy fuel oils, and asphalt. A dairy reportedly occupied the northern portion of the site until approximately 1979. The site is currently vacant, and the surface structures have been demolished.
- b. Site Assessment Findings – Historical refinery operations at the property resulted in the release of petroleum hydrocarbons (PHCs) to soil and groundwater beneath the site. The most prevalent are total petroleum hydrocarbons in the gasoline range (TPHg), benzene and light non-aqueous phase liquid (LNAPL). Groundwater impacts extend off-site to the east of the property. The project focuses on the cleanup of these contaminants in deeper soil and groundwater beneath the site. The Los Angeles Regional Water Quality Control Board (Regional Water Board) granted a no further action (NFA) determination for the top 30 feet of soil at the site in 2021.
- c. Status of Remediation Activities – The Los Angeles County Sanitation Districts (Sanitation Districts) purchased the site in 2000 from Street Environmental, LLC, which earlier that same year purchased the site from FORCO and agreed to remediate the site as part of the sale to the Sanitation Districts. The Sanitation Districts purchased the property, which is immediately adjacent to the Joint Water Pollution Control Plant (JWPCP), owned and operated by the Sanitation Districts, to provide space for future expansion of the JWPCP and to act as a buffer between existing operations and the community. Following the bankruptcy of Street Environmental, LLC in 2009, the Sanitation Districts assumed responsibility for cleanup and have been actively remediating the site in accordance with the Corrective Action Plan (CAP), which was approved in 1999 and updated in 2001. The site is enrolled in the State’s voluntary cleanup program. A significant level of effort has been invested in investigative and remediation activities over the past 30 years. This includes excavation and landfarming or disposal of surficial impacted materials, and recovery of hydrocarbons using an air-sparge/soil vapor extraction (AS/VE) system. Soil excavations removed more than 11,000 cubic yards (cy) of PHC-impacted soil from depths up to 10 feet below ground surface (bgs) and as of December 2021, 1.68 million pounds of hydrocarbons had been recovered and destroyed by the AS/VE system. Major accomplishments to date include completion of Phase I and Phase II assessments, implementation of the Phase I cleanup, issuance of a NFA letter by the Regional Water Board for the top 30 feet of soil at the site, completion of a Human Health Risk Assessment, submittal and approval of a Remedial Action Plan for Phase II cleanup, and submittal of a Data Gap Investigation Report. In the December 2021 NFA letter, the Regional Water Board found that “[r]emediation at the Site since 2009 has resulted in the cleanup or abatement of the wastes in shallow soil (0-30 ft bgs) to assure protection of human health and groundwater for its beneficial uses.” The Sanitation Districts continue to

remediate residual contamination in deeper soil (greater than 30 feet) and groundwater (Phase II remediation).

- d. Project Goal – The long-term goals of the project are to clean up the site sufficiently to allow reuse of the property, and to protect the designated beneficial uses of the groundwater basin.
 - i. The Remedial Action Objectives for the on-property scope of work are as follows:
 1. Reduce PHC concentrations in deeper soil to the extent practicable.
 2. Remove LNAPL to the extent practicable.
 3. Prevent or control further PHC groundwater plume migration on-Property.
 4. Prevent or control further PHC groundwater plume migration off-Property.
 - ii. Cleanup of the FORCO site utilizes an Adaptive Site Management remedial approach, which means remediation will be continually monitored, interpreted, and then modified to reflect new site information. As previously stated, groundwater impacts extend off-site to the east of the property. However, off-property remediation scope of work is not a part of this grant application and, therefore, not further discussed herein.

II. Applicable Regulations and Cleanup Standards

- a. Laws and Regulations Applicable to the Cleanup – The State Water Resources Control Board and nine Regional Water Quality Control Boards implement the Site Cleanup Program, which regulates and oversees the investigation and cleanup of non-federally owned sites where recent or historical unauthorized releases of pollutants to the environment, including soil, groundwater, surface water, and sediment, have occurred. This program is operated under authority of the California Water Code, Division 7 and various State and Regional Board Plans and Policies.
- b. Cleanup Oversight Responsibility – This site is regulated under the State Water Resources Control Board's Site Cleanup Program and is under the oversight of the Los Angeles Regional Water Quality Control Board (Regional Water Board). All documents prepared for this site are submitted to the Regional Water Board via Geotracker under SCP NO. 0451A, SITE ID NO. 2040074 and can be accessed [here](#).
- c. Cleanup Standards for major contaminants –The long-term goals for the FORCO site are to protect the designated beneficial uses of groundwater as described in the current Basin Plan and to comply with the State Water Resources Control Board Resolution 92-49. The above objectives may be adjusted based on the feasibility of remediation to the objectives, technical limitations of remedial technologies that are revealed after implementation, changes in risk exposure scenarios, or changes in land use at the site.

III. Cleanup Alternatives Considered

The Feasibility Study built on the technology review process that was previously conducted in 1999 for the CAP by revisiting and adding groundwater remedial technologies for evaluation.

- a. No Action Alternative – The “No Action” alternative was considered as a baseline condition for comparison with other alternatives. Under this alternative, the existing Vapor Extraction and Air Sparging remediation activities would cease and no additional remediation activities would be undertaken. All groundwater monitoring would be terminated as well as any other environmental response costs. There are no costs associated with the No Action Alternative. This alternative would not be acceptable by the Regional Water Board, however, as source mitigation is required to the extent practical to achieve long-term reduction in plume concentrations over time.
- b. Surfactant Enhanced Product Recovery (SEPR) – SEPR is a remedial technology to remove LNAPL from the saturated zone using chemical surfactants to mobilize contaminants and allow recovery using conventional groundwater extraction. Surfactants are surface active agents that have two different chemically active parts, a hydrophilic head and a hydrophobic tail. Thus, they exhibit solubility in both water and oil. Implementation of SEPR requires the delivery of a surfactant solution to the LNAPL zone via injection wells and the subsequent flow of the surfactant solution through the LNAPL zone, followed by the recovery of surfactant solution and solubilized LNAPL via extraction wells.
- c. In-Situ Chemical Oxidation (ISCO) – ISCO employs the injection of chemical oxidants directly into the aquifer to react with and destroy dissolved-phase organic constituents. Chemical oxidants commonly employed in ISCO include hydrogen peroxide, ozone, permanganates, and persulfates. Subsurface

injection is generally performed using a network of permanent injection wells or temporary direct-push injection points (DPIPs).

- d. Electrical Resistive Heating (ERH) – ERH is an in-situ thermal remediation (ISTR) technology that is aggressive and capable of rapidly reducing LNAPL and PHCs in soils and groundwater. The ERH system uses in situ resistance heating and steam stripping treatment, in which electricity is supplied by a 3-phase electrical power source that is connected to a power control unit (PCU). The PCU directs 3-phase electricity to electrodes that are placed in the subsurface throughout the remediation area using standard drilling or pile driving techniques.
- e. Adaptive AS/VE – AS involves the injection of air into an aquifer through vertical or horizontal AS wells. It is often paired with a VE system to collect the vapors emanating from the soil and water table during the sparging process. These vapors are typically treated above-ground in an air treatment system. AS/VE have successfully been implemented for LNAPL source mitigation, to reduce the mass of dissolved contaminants, and to provide a barrier to mitigate the off-site migration of dissolved phase contaminants off-site. The method is ideally suited for volatile, aerobically biodegradable hydrocarbons, such as fuels, as many of the compounds that comprise PHCs, such as benzene.
- f. Pump and Treat (P&T) – The groundwater pump and treat (P&T) technology involves the physical extraction of PHC-impacted groundwater via extraction wells or trenches, ex-situ treatment and off-site disposal or re-injection of the treated water. P&T is best used for contaminant plume control and not as the primary method for groundwater remediation.
- g. Enhanced In-Situ Bioremediation (Biobarrier) – Enhanced in-situ bioremediation (EISB) can be used to fully biodegrade PHCs by supplying additional electron acceptors to the subsurface. In both aerobic and anaerobic conditions, oxidation is the primary metabolic pathway by which PHCs are biodegraded. A PHC is oxidized when an electron moves from the PHC, an electron donor, to another compound known as an electron acceptor. Aerobic oxidation occurs when oxygen is the electron acceptor; anaerobic oxidation occurs when compounds such as sulfate, nitrate, manganese, ferric iron, or carbon dioxide act as the electron acceptors. The availability of electron acceptors is often the limiting factor in the naturally occurring biodegradation of PHCs. However, it is possible to enhance the rate of natural biodegradation by supplying additional electron acceptors to the subsurface microbial community. Enhanced aerobic bioremediation, occurs when a cleanup technology supplies oxygen. Enhanced anaerobic bioremediation occurs when a cleanup technology supplies an electron acceptor other than oxygen.

- IV. Evaluation of Cleanup Alternatives – Remedial technologies were evaluated based on effectiveness, implementability, and cost. A technology is considered effective if it is proven capable of or there is relatively low technical uncertainty associated with performance of the technology. A technology is considered implementable if proven capable of being constructed and deployed in the type of media at the required depths below ground surface and operating at the necessary scale. The technology also must not interfere with other technologies if it does not address all the contaminated volume and must not pose potentially significant administrative issues (e.g., use of potentially unacceptable reagents). Relative cost is evaluated on the technologies that passed the screening for effectiveness and implementability. The relative cost is considered by assessing whether the cost for a technology can be reasonably estimated, and whether high-cost factors for a technology render it grossly more expensive than other technologies with similar effectiveness and implementability.

Table 1: Evaluation of Cleanup Alternatives

Technology	Effectiveness	Implementability	Cost²
No Action	Not effective	Not applicable	No cost
SEPR	High for LNAPL removal; low for dissolved-phase plume treatment.	Moderate to high	Moderate - \$2.0 million
ISCO	Moderate to high for dissolved-phase contamination; low for sorbed contaminants and source zone NAPLs.	Moderate to high	High - \$10.5 million

Technology	Effectiveness	Implementability	Cost ²
ERH	High for both NAPL removal and reduction of dissolved-phase PHC concentrations.	Low to moderate	Very high - \$27.7 million
AS/VE	Moderate to high for NAPL removal and reduction of dissolved-phase PHC concentrations.	Moderate to high	Moderate - \$4.5 million
P&T ¹	High for controlling migration but ineffective for mass removal.	High	Low to moderate - \$1.0 million
Biobarrier ¹	Moderate to high	Moderate to high	Low - \$0.9 million

Notes:

1. P&T and biobarrier alternatives were evaluated for containment at the downgradient property boundary. If selected, these alternatives would likely need to be combined with remedies that reduce source area PHCs.
2. Costs in 2019 dollar.

- a. Consideration of Extreme Weather Impacts – In July 2022, Climate Change Vulnerability Assessment and Management Plans were completed for JWPCP and other facilities in the Sanitation Districts' collection system and interconnected wastewater system upstream of JWPCP (collectively known as the Joint Outfall System). The analysis for JWPCP is most applicable to this project, since the FORCO site is part of the JWPCP complex. This analysis examined climate-related natural hazards (including flood, sea level rise, drought, extreme temperatures, wind and wildfire) and made recommendations for additional resilience measures. The main types of hazards that are relevant to this analysis are flooding (due to increased occurrences of atmospheric rivers) or extreme heat days. The analysis indicates that flooding due to potential increased occurrences of atmospheric rivers is likely to increase the possibility of flooding in the lowest elevation portions of the treatment facility located on the west side of Figueroa Street, well away from the FORCO site; therefore, these impacts are unlikely to affect the site or cleanup efforts. These extreme weather scenarios evaluated are not projected to have adverse impacts on the site cleanup alternatives SEPR, ISCO, ERH, AS/VE, and biobarrier. P&T alternative involves extraction of groundwater, a valuable resource. Therefore, it could be impacted by drought conditions.
- b. Recommended Cleanup Alternative – Continued operation and expansion of the AS/VE system will be implemented within areas of significant LNAPL accumulations and the TPHg and benzene hotspot areas using an Adaptive Site Management approach. Adaptive application of AS/VE will require close performance monitoring of the remediation system to maximize PHC mass removal. As the progress of the remediation program proceeds and is closely monitored, changes will be implemented quickly to optimize the AS injection rates, injection depths, and well locations as well as SVE well locations. Rapid screening subsurface sampling techniques will be performed on a routine basis to assess cleanup progress in the subsurface. The cleanup objective is to maximize the recovery of PHCs.
- c. Green and Sustainable Remediation Measures for Selected Alternative – The selected remedy is to continue operation and expansion of the AS/VE system within hotspot areas, including along the downgradient property boundary where elevated PHCs are identified. This remedy is low-energy, low-emissions, and low-water intensive compared with the other alternatives. It utilizes existing remediation infrastructures and minimizes additional construction and potential impacts to the local community. It is less energy intensive compared with ERH and P&T and utilizes power supplied by Southern California Edison (SCE). As of 2021, 35.8% of energy supplied by SCE comes from renewable sources. The selected remedy is an in-situ cleanup method and minimizes off-site transportation of contaminated materials. It uses less water compared with SEPR, ISCO, and biobarrier alternatives. In addition, P&T and biobarrier alternatives would only be effective as boundary control remedies that would need to be paired with additional onsite remedial measures for source area treatment. The Sanitation Districts have and will continue to notify stakeholders and engaged community leaders to obtain input on site development.