
**Devil's Gate and Eaton
Stormwater Flood Management Project****Devil's Gate and Eaton Stormwater Flood Management Project****Introduction**

The Devil's Gate and Eaton Stormwater Flood Management Project (Project) includes improvement of three existing Los Angeles County Flood Control District facilities and the construction of a new interconnecting pipeline. The existing facilities are the Devil's Gate Dam and Reservoir located within the Arroyo Seco Watershed; and the Eaton Wash Dam, and the Eaton Wash Spreading Grounds located within the Eaton Wash watershed. These facilities, which are operated and maintained by the Los Angeles County Flood Control District (District), serve to control the stormwater runoff from their respective watersheds to prevent downstream flood damage. The facilities within the Eaton Wash watershed also serve to conserve the captured stormwater by recharging it into the underlying Raymond Groundwater Basin (Raymond Basin). The Devil's Gate Dam and Reservoir currently has no associated facilities to conserve captured stormwater. Proposed improvements include restoring reservoir capacity at Devil's Gate Reservoir by removing sediment; improving seismic performance and operational capabilities, and constructing a new toe drain and erosion protection measures at Eaton Wash Dam; and enlarging and enhancing operations of the Eaton Wash Spreading Grounds. The proposed pipeline will provide a connection from the Devil's Gate Dam and Reservoir to the Eaton Wash facilities to enable conservation of stormwater captured at the Devil's Gate Dam and Reservoir.

The Arroyo Seco and Eaton Wash watersheds are both part of the Los Angeles River watershed. The upper watersheds of Arroyo Seco and Eaton Wash are located in the San Gabriel Mountains and drain to the existing Devil's Gate and Eaton Wash Dams and Reservoirs, respectively. The tributary areas to these two dams are largely undeveloped and primarily managed for recreation, watershed protection, and wildlife conservation by the Angeles National Forest. The San Gabriel Mountains are among the most erodible mountains in the world, releasing large amounts of sediment every year. The upper watersheds are susceptible to wildfires, which result in debris flows during subsequent storm events. There are also several fault zones in the vicinity that could result in seismic activity at the District's facilities.

The Raymond Basin, a natural groundwater basin, underlies several communities in the San Gabriel Valley including Pasadena, La Canada Flintridge, Sierra Madre, and unincorporated Los Angeles County. The Raymond Basin covers approximately 40 square miles. It is bounded on the north by the San Gabriel Mountains, on the south and east by the San Gabriel Valley and on the west by the San Rafael Hills. Because of its natural formations and barriers, the Raymond Basin is replenished by surface water flows from the San Gabriel Mountains. It is recharged by percolation in the natural creek beds including the Arroyo Seco, Eaton Wash and Santa Anita Wash, or by diverting flows into a spreading grounds facility for percolation. The Raymond Basin is divided into three subareas: Monk Hill, Pasadena, and Santa Anita. The project area overlies the Pasadena subarea. The Raymond Basin has 16 different water purveyors and supplies over half of the overlying communities' water needs.

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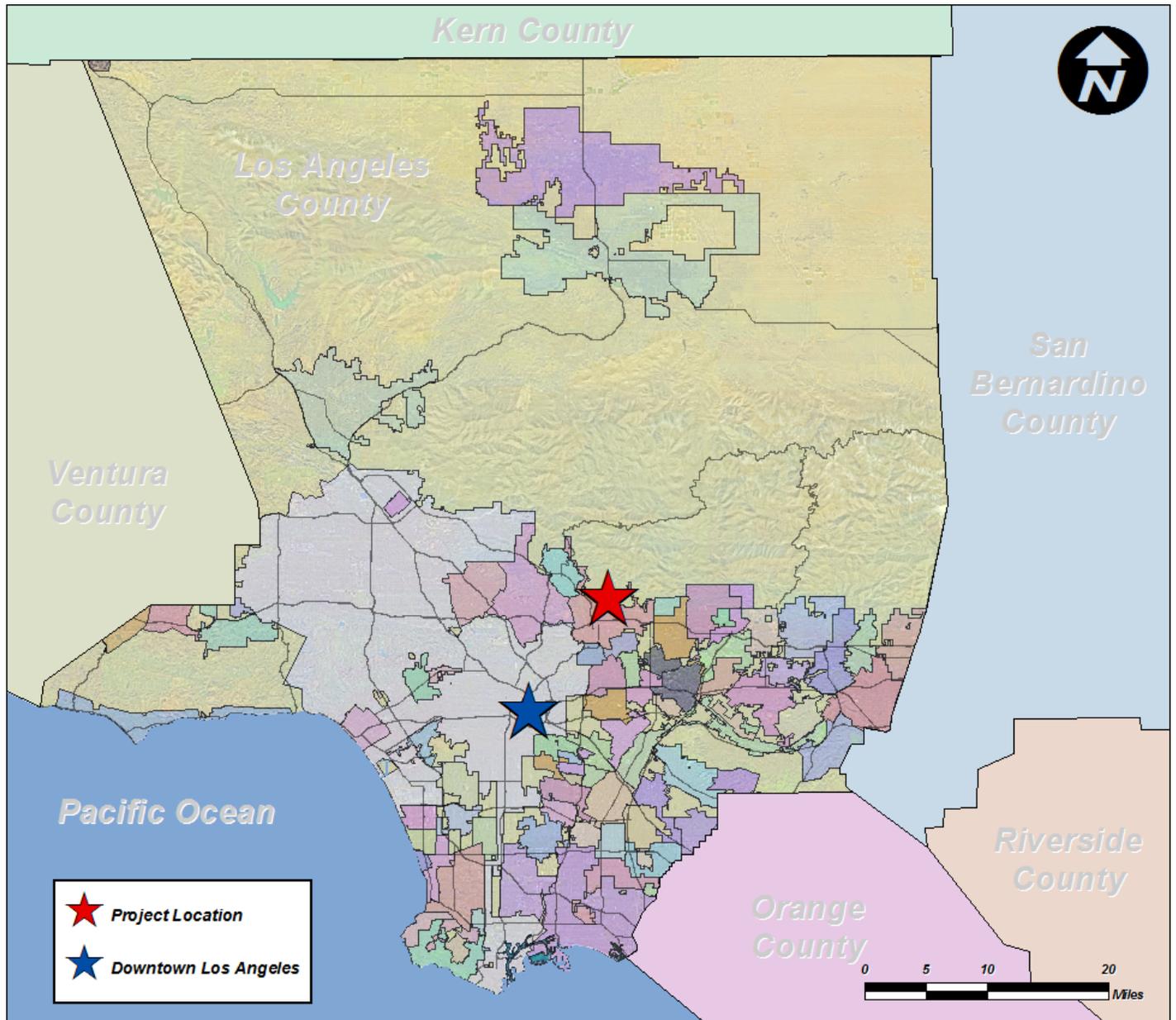


Figure 3.1 – Regional Map

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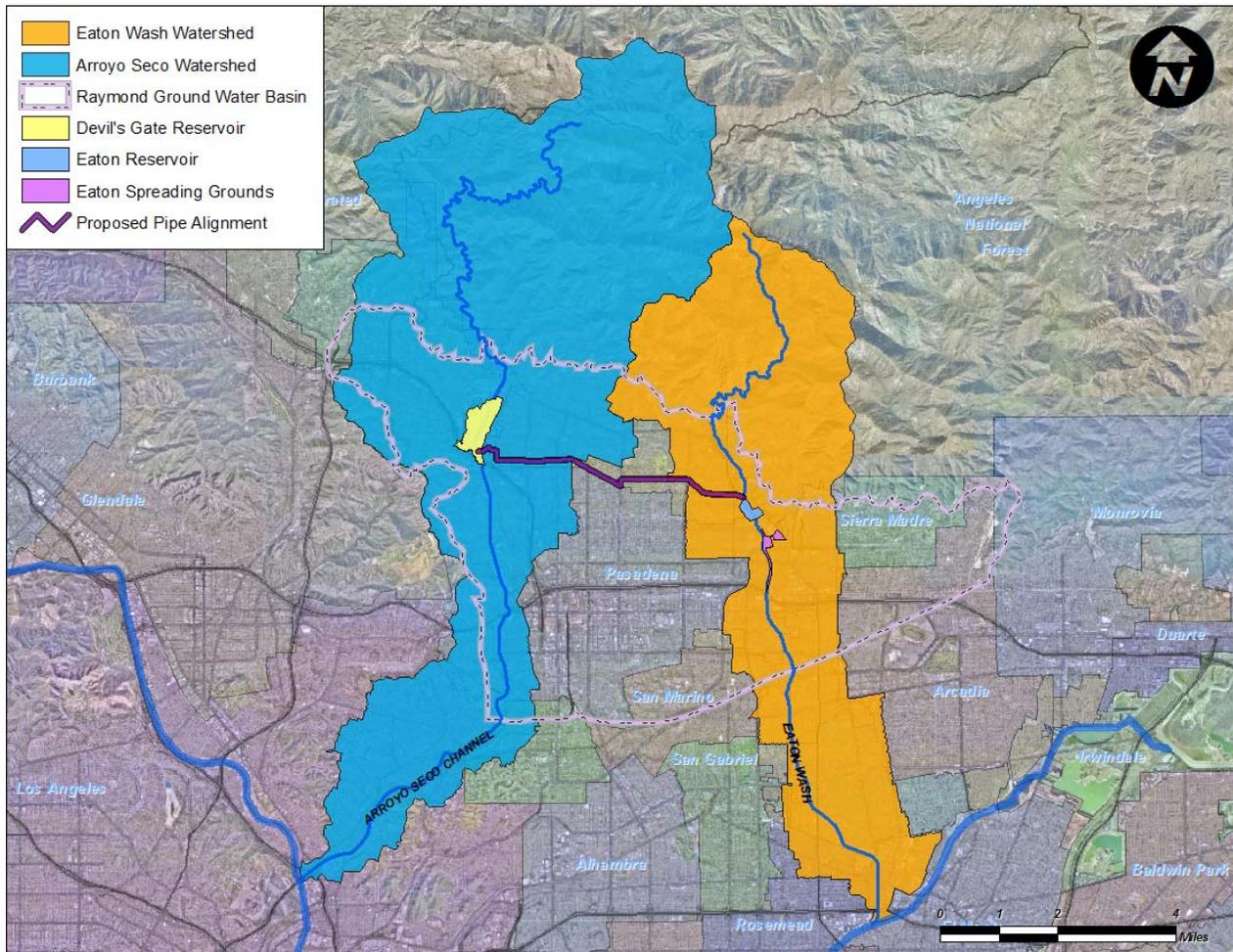


Figure 3.3 – Map of Project Locations, Watersheds, and Groundwater Basin

Goals and Objectives

The Project will improve District facilities to better manage stormwater runoff from the Arroyo Seco and Eaton Wash watersheds and achieve the following goals: 1) reduce the likelihood and extent of flood damage to downstream communities, 2) increase sustainability of local water supply by increasing recharge into the local groundwater basin and, 3) improve public safety by remediating seismic safety issues.

The Greater Los Angeles County Integrated Regional Water Management (IRWM) Plan includes regional objectives to promote an integrated, multi-benefit, inter-regional approach to water management and planning. The Project supports the following objectives in the adopted IRWM Plan: Sustain Infrastructure for Local Communities by maintaining and enhancing public infrastructure related to flood protection, water resources, and water quality; and Improve

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Water Supply by optimizing local water resources to reduce the Greater Los Angeles Region's reliance on imported water.

In addition to supporting objectives to improve infrastructure for flood protection and water resources, the Project is critical to the success of regional efforts to reduce dependence on imported water supplies. Enhancing regional self-reliance looms as an immediate and immense challenge. Underscoring the scale of the challenge, the Metropolitan Water District of Southern California has estimated that Southern California could face a potential gap between demand and supply of up to 1,300,000 acre-feet per year (AFY) by the year 2025 if new water supply projects are not developed. The adopted IRWM Plan estimates a potential water supply gap of 800,000 AFY for the Greater Los Angeles Region.

Purpose and Need

Background/History



Figure 3.2 – Devil's Gate Dam and Reservoir

Devil's Gate Dam and Reservoir

Devil's Gate Dam and Reservoir is a stormwater and flood management facility located in the City of Pasadena, in Los Angeles County approximately 14 miles north of downtown Los Angeles. It is situated immediately north of Interstate Highway 210, near the Rose Bowl Stadium, and south of the San Gabriel Mountains. It is located at the point where the Arroyo Seco stream emerges from the mountains into the alluvial plain. The dam separates the upper

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and lower watersheds of the Arroyo Seco Channel and provides significant storage capacity for stormwater runoff originating from approximately 20,416 acres (31.9 square miles) of mostly undeveloped land north in the San Gabriel Mountains. The Raymond Basin underlies the dam and reservoir area.

Devil's Gate Reservoir area covers approximately 175 acres (0.27 square miles) and has a design storage capacity of 4,600 acre-feet (AF). Devil's Gate Dam is a Concrete Gravity Arch Structure. It is 100 feet high, 310 feet long, and 30 feet wide at its crest and 99 feet wide at its buttress. The dam is under the jurisdiction of the California Department of Water Resources Division of Safety of Dams (DSOD).

Completed in 1920, the Devil's Gate Dam and Reservoir facility was the first flood control facility built by the Los Angeles County Flood Control District to provide flood protection to the Cities of Pasadena, South Pasadena, and Los Angeles. It continues to serve this function today by capturing sediment washed into the reservoir by storm flows, attenuating storm flows, and subsequently controlling water releases to the downstream Arroyo Seco Channel. The Dam protects an inundation area of 1,783 acres including 3,590 parcels, and 10.3 million square-feet of structures. Downstream of Devil's Gate Dam, the lower half of the Arroyo Seco watershed is distinctly different from the upper watershed. The stream is mostly channelized downstream and the watershed is highly urbanized.

Eaton Wash Dam and Reservoir

Eaton Wash Dam and Reservoir is a stormwater and flood management facility located in the City of Pasadena, approximately 15 miles northeast of downtown Los Angeles. The dam separates the upper and lower watersheds of Eaton Wash and provides significant storage capacity for stormwater runoff originating from a drainage area of 7,949 acres (12.4 square miles) of mostly undeveloped land in the upstream San Gabriel Mountains. The Raymond Basin underlies the dam and reservoir area.

Eaton Wash Reservoir has a capacity of 956 AF. Eaton Wash Dam is an Earthfilled Structure with a clay core. The dam is 62 feet high, 1,525 feet long, has a bottom width of 375 feet and a crest width of 15 feet. The dam is under the jurisdiction of DSOD. The Sierra Madre (0.5 miles to the northeast), Raymond Hill (3 miles to the southeast), and San Andreas (21 miles to the northeast) fault zones are all possible sources of seismic activity that could affect Eaton Wash Dam. The dam protects and inundation area of 828 acres including 1,791 parcels, and 8.8 million square-feet of structures.

The United States Army Corps of Engineers finished construction on Eaton Wash Dam in 1937 and ownership of the dam was subsequently transferred to the District. The facility was constructed to provide debris storage, flood control, and water conservation. It continues to

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serve these functions today. The dam has four slide gates which control the releases of water into Eaton Wash. The gates and their controls are located within an outlet tower. The water released thru the gates can then be directed into the nearby Eaton Wash Spreading Grounds. Downstream of the dam, Eaton Wash is channelized to its confluence with Rio Hondo Channel. The downstream watershed is highly urbanized.



Figure 3.4 – Eaton Wash Dam and Reservoir

Eaton Wash Spreading Grounds

The Eaton Wash Spreading Grounds (Spreading Grounds) is a water conservation facility located in the City of Pasadena just downstream of the Eaton Wash Dam and Reservoir. The Spreading Grounds is one of the major recharge facilities that supplies water to the Raymond Basin. The Spreading Grounds covers a 28-acre parcel and extends along Eaton Wash from the dam and reservoir to Interstate 210 Foothill Freeway. The Raymond Basin provides approximately half of the overlying area's water supply.

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The Spreading Grounds function collectively with the Eaton Wash Dam and Reservoir. Stormwater is captured within the reservoir until the Dam Operator releases flows into the Eaton Wash. The water can then be diverted into the Spreading Grounds from Eaton Wash. The Spreading Grounds consisted of 14 basins: 3 deep pits, and 11 shallow basins. The original storage capacity was 525 AF. Its current intake capacity is approximately 40 cubic feet per second (cfs).



Figure 3.5 – Eaton Wash Spreading Grounds

**Devil's Gate and Eaton
Stormwater Flood Management Project***Project Need*

Each of the following four project components discussed below is needed to meet the Project's goals.

Devil's Gate Reservoir

There is a need to remove sediment from the Devil's Gate Reservoir in order to increase reservoir capacity and reduce the flood damage risk to the communities along the Arroyo Seco Channel.

In 2009, the Station Fire burned over 160,000 acres in the San Gabriel Mountains. This was the largest fire in Angeles National Forest recorded history. Approximately 68 percent of the watershed tributary to Devil's Gate Reservoir (approximately 100 percent of the undeveloped portion) was burned, making sediment deposition inevitable during subsequent storm events. Following this unprecedented burn of the watershed, the storms that occurred in the two wet seasons after the fire deposited more than one million cubic yards combined. This major sediment inflow significantly reduced the reservoir's capacity. In its current condition, the reservoir no longer has the capacity to safely contain a design flood event or another major debris event. Additionally, the outlet works are at risk of becoming clogged and inoperable.

The Devil's Gate Dam directly discharges runoff to the Arroyo Seco Wash. The wash is a natural creek for several hundred feet downstream of the Devil's Gate Dam and then becomes an engineered concrete lined flood control channel that was constructed in 1935. The Arroyo Seco Channel continues to flow in a southerly direction through Pasadena, meandering through Brookside Park and around the Rose Bowl Stadium, passing through the Cities of South Pasadena and Los Angeles, and ultimately draining to the Los Angeles River approximately nine miles downstream of Devil's Gate Dam. The Arroyo Seco Channel lower watershed is approximately 95 percent urbanized with a large amount of developed areas located adjacent to the Arroyo Seco Channel.

Hydrologic and hydraulic analyses have been performed for Devil's Gate Dam and Arroyo Seco Channel with the current amount of sediment within the reservoir. Several areas of potential flooding have been identified in these analyses along the Arroyo Seco Channel. While some of these areas consist of natural, undeveloped land, many of these areas contain roads, streets, other urban infrastructure and residential and commercial structures that will be damaged during the department's design storm event (a once in 50 year storm event). The areas of potential flooding include several sections of roadway, of which the 110 Freeway is of particular concern, as well as 443 properties with residential and/or commercial structures that should be evacuated during the Capital Flood Event. The removal of sediment from behind Devil's Gate Dam is critical to flood protection and flood damage reduction for the downstream communities.

**Devil's Gate and Eaton
Stormwater Flood Management Project**Devil's Gate Water Conservation

There is a need to capture and conserve stormwater that flows into the Devils Gate Reservoir.

Stormwater captured in Devil's Gate Reservoir during storm events must be released to the downstream Arroyo Seco since there are no opportunities to divert the flow to spreading grounds. Downstream of Devil's Gate Dam, the options for groundwater recharge are extremely limited since most of Arroyo Seco is channelized with concrete. The Los Angeles River downstream of the Arroyo Seco Channel confluence is lined with concrete to its terminus in the Pacific Ocean. Consequently, all of the water that is captured in Devil's Gate Reservoir and passes through Devil's Gate Dam flows directly to the ocean. Sixty-three years of historical records show that the Devil's Gate Reservoir has an average annual outflow of 6,900 AF. This is a very large amount of water that could otherwise be recharged into the groundwater basin and used as a local water supply.

The Raymond Basin Management Board identified the Pasadena subarea of the underlying Raymond Basin as an area of concern due to apparent significant reductions in stored water. The Pasadena subarea groundwater elevation experienced approximately a 100-foot decrease between 1980 and 2008 and had not shown signs of recovery. Due to the decreasing groundwater levels, a Baseline Study on the Raymond Basin was prepared as of February 2, 2004. The Baseline Study indicated groundwater levels had generally declined in the Pasadena subarea and had not recovered, even during sustained wet periods. Large scale comprehensive solutions, such as this Project, are needed in order for the Pasadena subarea to show any sign of sufficient recovery and to increase the groundwater levels in a meaningful way.

Eaton Wash Dam

There is a need to rehabilitate the dams outlet works, improve downstream embankment erosion, and construct a new toe drain in order to improve the dams performance, seismic safety, and ability to conjunctively manage captured stormwater.

The dam's outlet works (4 gates controlled within an outlet tower) are used to regulate stormflows during storm events, to make controlled releases to the downstream spreading grounds to conserve the captured stormwater, and to make emergency releases in the event of a dam safety incident or emergency. In 1998, the District contracted with Geomatrix Consultants Inc. for seismic analysis of the Eaton Wash Dam based on an updated understanding of the seismic environment in the region. The results of this study indicated that the outlet tower requires rehabilitation to meet State DSOD seismic requirements and will experience damage when subjected to a significant earthquake. Failure or deformation of the outlet tower would render the outlet gates inoperable.

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While the dam embankment is considered structurally adequate for a major earthquake (it meets DSOD standards) and is not expected to fail catastrophically. An earthquake large enough to damage the outlet works could initiate seepage flows or other unusual behavior at the dam that could lead to failure if not otherwise mitigated by dewatering (emptying) the reservoir. DSOD requires that dams have valves and gates capable of emptying the reservoir for such circumstances. Because the outlet tower would likely fail or deform in such an earthquake, Eaton Dam could be susceptible to continued hydrostatic and seepage forces that could lead to failure since the dam could not be emptied. Constructing erosion protection measures on the downstream embankment and installing a toe drain are necessary to further improve the performance and safety of the dam.

Eaton Wash Spreading Grounds

There is a need to increase the intake capacity, surface capacity and performance of the Eaton Wash Spreading Grounds to maximize the volume of stormwater that can be recharged into the Raymond Basin to increase the sustainability of local water supply.

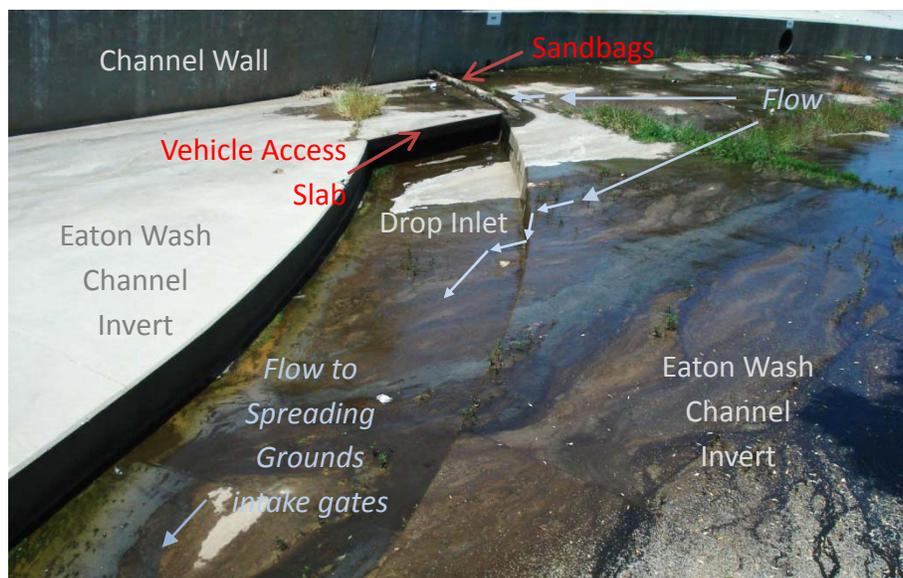


Figure 3.6 – Eaton Wash Channel at Drop Inlet

Although the Spreading Grounds intake was designed to accept 125 cubic feet per second (cfs), the system can only accept a maximum of 40 cfs due to three main reasons. First, the current diversion method from Eaton Wash Channel consists of sandbags and flashboards. The water is diverted to the Spreading Grounds by dropping into a two-foot deep inlet channel that partially (except for a 12-wide section that is used for vehicular maintenance access) spans the width of the wash. The drop inlet leads to the Spreading Grounds intake gates on the channel wall. When the intake gates are open, water can flow into the Spreading Grounds. When the

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intake gates are closed, the water continues through the drop inlet until it ends and then the water flows back into the main wash.

To aid the water diversion into the Spreading Grounds, Flood Maintenance Staff do two things within the wash. First, they place sandbags across the vehicle access slab. This blocks water from flowing across the slab and instead causes it to drop into the inlet channel. Second, they place wooden flashboards across the drop inlet channel, just downstream of the Spreading Grounds intake gates to block water from continuing to the end of the drop inlet. This forces the water to flow into the Spreading Grounds intake gates. The sandbags and flashboards cannot adequately divert flows up to 125 cfs.

Second, the original design of the Spreading Grounds includes a levee (and sewer line) between Basins No. 1 and No. 2. There is significant seepage through the levee from one large basin to the other. Because of this, the inflow into the basins must be constricted and monitored carefully to avoid levee failure.

Third, a corrugated metal pipe that conveys flow from the intake canal to the shallow basins south of Sierra Madre Avenue was heavily damaged and no longer conveys flows to shallow Basins No. 4 through 14. The loss of use of Basins 4 through 14 also limits available storage capacity.

A recent study determined that addressing the three problems indicated would significantly increase overall groundwater recharge based on historical releases from Eaton Dam.

Project List

The Devil's Gate and Eaton Stormwater Flood Management Project is the sole Project being submitted with this proposal. The Project has multiple components that satisfy the program eligibility requirements of the Proposition 1E grant and will meet the goals discussed previously. While each component on its own provides benefits, it is through their linkages and synergies that the benefits are optimized to meet the overall goals and objectives. The Project will be constructed in phases. The following information describes the status of each of the Project's components.

Devil's Gate Reservoir

To restore reservoir capacity to address the post-Station Fire sediment impacts at Devil's Gate Dam, the Devil's Gate Reservoir Sediment Removal and Management Project will remove an estimated 2,000,000 cubic yards of sediment from the reservoir. This will reduce the level of flood risk to downstream communities along the Arroyo Seco. Removal of sediment will enable the reservoir to capture future sediment inflows and attenuate major storm inflows

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The Devil's Gate Reservoir Sediment Removal and Management Project will also establish a reservoir configuration that will be more suitable for future routine maintenance activities including sediment management. This will enable the timely removal of sediment in locations, such as those near the dam's valves that are critical to dam safety.

Devil's Gate Water Conservation

Based on the proposed future configuration of Devil's Gate Reservoir, an estimated 4,500 AF can be captured annually for water conservation by conveying it to the Eaton Wash Spreading Grounds (and possibly to Arroyo Seco Spreading Grounds in the future) for infiltration and recharge to the Raymond Basin.

This proposed Project element includes installing a pump house and intake on the upstream face of Devil's Gate Dam and an outlet in Eaton Wash. Approximately 5 miles of pipeline will be installed through the City of Pasadena and County Unincorporated road rights-of-way. The pipeline will allow water to be directed from the Devil's Gate Reservoir where no downstream recharge facilities exist, to the Eaton Wash Spreading Grounds for conservation. A split valve connected to the pump will also allow for a possible future connection to the upstream Arroyo Seco Spreading Grounds. The Arroyo Seco Spreading Grounds, owned and operated by the City of Pasadena capture limited runoff from the upper Arroyo Seco above the dam, but cannot currently utilize water captured at the dam. All of the facilities in this region recharge the Raymond Basin. This proposed Project element will increase local groundwater supplies in the Raymond Basin and reduce the region's reliance on water imports, without compromising flood control functions of the dams.

Eaton Wash Dam

Remediation of the seismic deficiencies will be completed through the Eaton Wash Dam and Reservoir Rehabilitation Element. This will consist of removing the existing seismically deficient outlet tower, gate control house, trashrack, and the metal footbridge. Once these major components are removed, rehabilitation of the outlet gates, replacement of the debris racks, addition of a hydraulic power system with a shelter building and control systems, and structural modification of the outlet works will be completed. The dam embankment will be improved by installation of erosion protection measures on the downstream face. Also, the risk of a piping failure of the embankment will be reduced by the construction of a toe drain on the downstream face.

Additionally, this Project will improve the water quality of water conservation releases from the dam by constructing a concrete apron from the gate intakes to the upstream wing walls and fifty-feet of rip-rap stone to provide erosion protection. One of the four outlet gates will be sized to match the Spreading Grounds intake capacity and will be raised to take flow from a higher elevation within the reservoir that would be less turbid.

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This element will reduce the flood risk to downstream communities and insure continued water conservation operations compatible with the Spreading Grounds improvements.

Eaton Wash Spreading Grounds

Spreading Grounds improvements will increase the intake and storage capacities, which will ultimately provide additional water conservation benefits and restore operational flexibility to the facility. Two phases of Project construction will occur at the Spreading Grounds. The first phase alleviates the seepage concerns between Basins No. 1 and No. 2 by combining the basins and relocating the sewer line. Without seepage concerns, more water can be directed to the combined spreading basin. Combining the basins also increases the storage capacity of the grounds. The repair of the intake pipe to the shallow basins and construction of interbasin structures in downstream basins are designed to increase the storage capacity and conveyance rates.

The second phase, the Eaton Wash Spreading Grounds Intake Improvement and Basin Enlargement, includes upgrading the intake capacity to 125 cfs by removing a vehicle access slab that currently spans the drop inlet in the Eaton Wash Channel and replacing it with a metal grate. The metal grate will allow all flows to be intercepted by the two-foot deep drop inlet channel that leads to the Spreading Grounds' intake gates. The leaky flashboard system inside of the drop inlet will be replaced with an inflatable gate that will direct flows to the Spreading Grounds' three intake gates. The new intake capacity will be consistent with the new elevated outlet gate at Eaton Wash Dam.

Basin No. 1 will be expanded to increase the capacity of the spreading grounds by approximately 30 AF. This phase also includes landscaping amenities and a decomposed granite walking path along the southern property line on Sierra Madre Boulevard that connects to a walking path and landscaped area along the adjacent Washington Boulevard.

Overall the improvements to the Spreading Grounds is anticipated to result in an average annual increase of 2,070 AF per year.

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Status

The following is a table of the specific Project components that are included in this Proposal. The table includes abstracts of each Project component, the current status of each Project component's percent completion of design, and the implementing agency:

Project Component	Abstract	Status (% Design Completion)	Implementing Agency
<u>Phase I</u> Eaton Wash Spreading Grounds Improvements	Combine spreading basins, repair pipeline, construct interbasin structures	100	District
<u>Phase II</u> Eaton Wash Dam Rehabilitation Project	Seismic remediation and mechanical and control systems upgrades	100	District
<u>Phase III</u> Eaton Wash Spreading Grounds Intake Improvement and Basin Enlargement	Replace diversion structure from channel, expand spreading basin, install landscaping improvements	100	District
<u>Phase IV</u> Devil's Gate Water Conservation	Construction of a pump and pipeline from Devil's Gate Dam to Eaton Wash	30	District
<u>Phase V</u> Devil's Gate Reservoir Sediment Removal and Management	Removal of 2 million cubic yards of sediment, establishment of reservoir configuration	30	District

**Devil's Gate and Eaton
Stormwater Flood Management Project****Integrated Elements of the Project**

The Devil's Gate and Eaton Stormwater Flood Management Project will be implemented through the five phases as described in the previous section. Each component has its own stand-alone benefits, but it is through the combination and linkages of the improvements that the full-scale flood risk reduction and stormwater management benefits are realized. Devil's Gate and Eaton Wash Dams manage flows from the two major watersheds flowing through the City of Pasadena. Combined, the sediment removal project at Devil's Gate Dam and the seismic rehabilitation at Eaton Wash Dam will restore flood protection to the City of Pasadena and its downstream neighbors. This is a significant regional flood protection benefit.

The pipeline connection between the two watersheds will considerably increase the District's ability to manage stormwater between the Arroyo Seco and the Eaton Wash and their respective rehabilitated dams. The cleanout and reservoir configuration at Devil's Gate Dam and Reservoir will directly complement the pipeline's operation. For instance, if there is a storm in the region, the increased/restored capacity at Devil's Gate Reservoir will enable ponding of any excess water from the Arroyo Seco Watershed. This water can be held there until it can be safely and gradually sent down the Arroyo Seco Channel and/or pumped to Eaton Wash when there is capacity in the Eaton Wash Spreading Grounds for groundwater recharge.

The seismic remediation at the Eaton Wash Dam will protect water conservation operations by removing the seismically deficient outlet tower, gate control house, trashrack, and a metal footbridge with new gates, trashracks, and an inlet/outlet works structure. The new structures are designed to withstand major seismic activity and continue to control water conservation releases. One of the new outlet gates will be sized and installed at a higher elevation in order to be compatible with the enhanced intake capacity of the Spreading Grounds while improving the water quality being released above the more turbid flows at the bottom of the reservoir. Water released for diversion into the Eaton Wash Spreading Grounds will enter the facility more quickly due to increased intake capacity at the Spreading Grounds. Due to the increased storage capacity, more water can be stored in the Spreading Grounds while it percolates into the groundwater basin. This not only provides more recharge opportunities for the Eaton Wash Watershed, it also allows the Eaton Reservoir water elevation to be drawn down more quickly to insure better flood protection for downstream communities. Additional recharge capability will be provided by the interconnection between Devil's Gate Dam to the Eaton Wash Spreading Grounds for percolation of storm runoff stored behind Devil's Gate Dam. The synergies of the Project's components will significantly reduce flood damage risk and improve the region's stormwater management.

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Completed Work

Phase I, Eaton Wash Spreading Grounds Improvements construction was initiated in September 2010 and completed in January 2011. Accomplishments of Phase I consist of the combination and enlargement of two of the spreading basins, refurbishment of a conveyance pipeline, and construction of interbasin structures. This increased the Spreading Ground's storage capacity and restored the internal conveyance rates.

Phase II, Eaton Wash Dam Rehabilitation Project construction was initiated in August of 2012 and is scheduled to be completed in November of 2013. The accomplishments to date include downstream erosion control on the Dam and reconstruction of the toe drain.

Phase III, Eaton Wash Spreading Grounds Intake Improvement and Basin Enlargement Project final design was completed in October of 2012. The construction contract advertising package was completed in November 2012, including the CEQA documentation.

Phase IV, Devil's Gate Water Conservation Project: 30 percent design and the cost and benefit analysis were completed in December 2012.

Phase V, Devil's Gate Reservoir Sediment Removal and Management Project: 30 percent design has been completed. The Environmental Impact Report for the project is in progress and is approximately 95 percent completed as of January 2013.

Existing Data and Studies

Several assessments and evaluations of the Project's components have been conducted by the District. The most recent seismic analysis conducted at Eaton Wash Dam was in 1998. The Hazard Warning and Contingency Plan for the Arroyo Seco Channel was completed in 2012. The Devil's Gate Water Conservation project concept report will be completed in 2013.

The preliminary design of the Spreading Grounds and pipeline projects included a detailed hydrologic modeling to determine water conservation benefits of the Project's components. This is discussed in the Economic Analysis for this Project and is located in Attachment 8.

Assessment and Evaluation Submittals	Dates	Appendix
Eaton Wash Dam Geomatrix Seismic Report	1997	3-A
Hazard Warning and Contingency Plan for Arroyo Seco Channel	2012	3-A
<i>Draft</i> Devil's Gate Water Conservation project concept report	2013	3-A

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Project Map

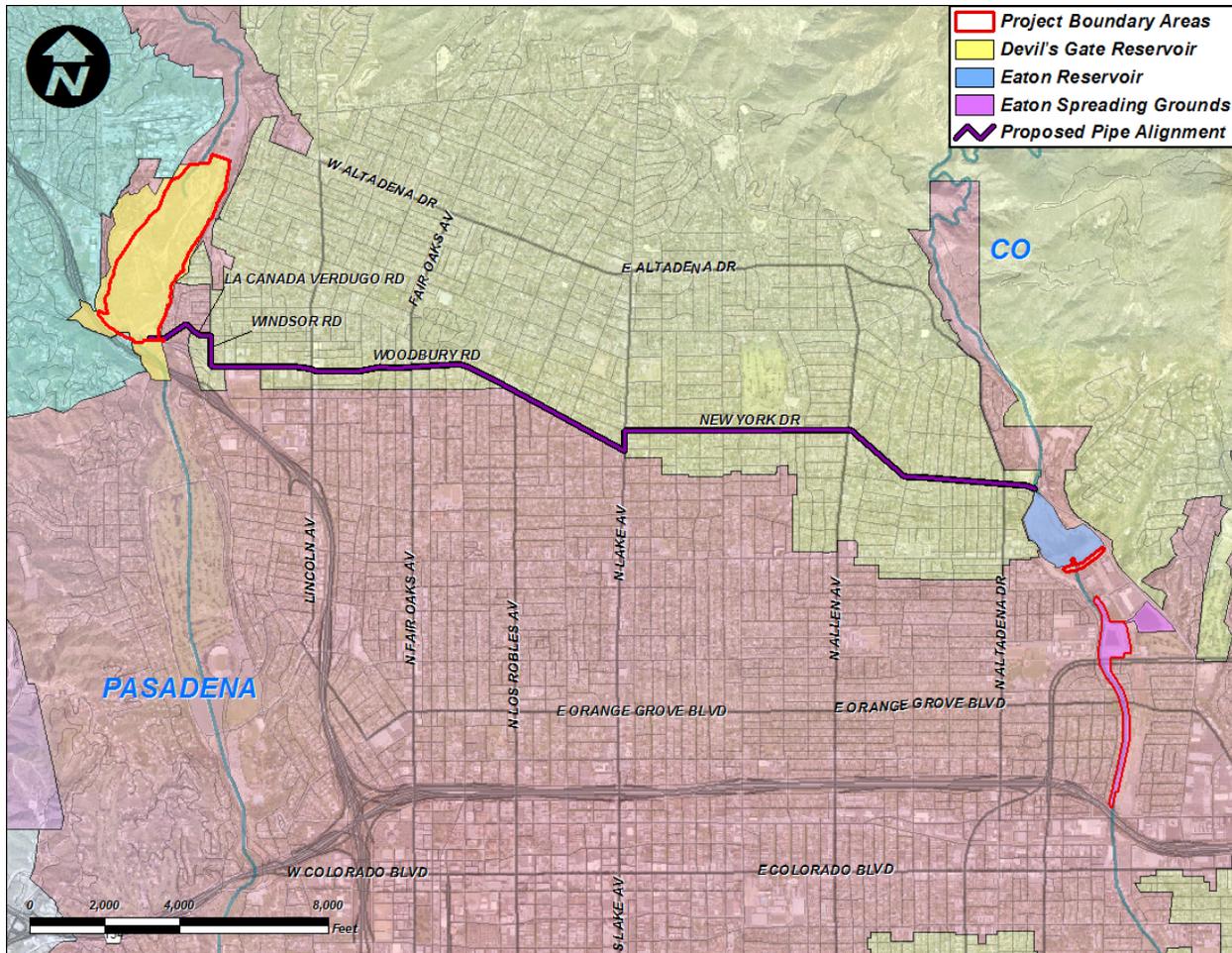


Figure 3.7 - Project Map

Project Specifics

The Project is located within Los Angeles County and has no operations and maintenance liability associated with the Sacramento River and San Joaquin River Flood Control System.

Project Timing and Phasing

The proposed Project is not dependent on the implementation of other projects. The Project can operate on a stand-alone basis, since it will be fully functional without subsequent projects. The Project contains several components that will be implemented in phases. Each component has stand-alone benefits; however, the overall Project is designed to maximize those benefits by integrating the operation and functioning of the components so they work together.

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Phases of the Project are as follows:

Items	Construction Start Date	Construction Completion Date
<u>Phase I</u> Eaton Wash Spreading Grounds Improvements	September 2010	January 2011
<u>Phase II</u> Eaton Wash Dam Rehabilitation Project	August 2012	November 2013
<u>Phase III</u> Eaton Wash Spreading Grounds Intake Improvement and Basin Enlargement	June 2013	December 2013
<u>Phase IV</u> Devil's Gate Water Conservation	August 2014	August 2015
<u>Phase V</u> Devil's Gate Reservoir Sediment Removal and Management	March 2015	June 2020

Proposed Work

This section includes the necessary tasks to implement each Project component, or phase, within this Proposal. The tasks listed in this section are consistent with those in Attachment 4, Budget, and Attachment 5, Schedule.

Work Plan Outline

(a) Direct Project Administration

Task 1: Administration

Work to be completed under this task will be performed by a District Project Manager (PM), an Assistant Project Manager, and up to four reviewers. The administration tasks will consist of managing the planning, environmental compliance, and design efforts; coordinating with District's budgeting personnel; coordinating with the State on grant management, including invoicing and status reports; and resolving any issues that arise. The PM will also be responsible for coordinating with any non-state funding partner agencies through scheduled meetings, phone and electronic mail communications, and memorandums of understanding (MOUs).

The following is a list of the current status of this task per Project component:

- Phase I, Eaton Wash Spreading Grounds Improvements-98% complete

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- Phase II, Eaton Wash Dam Rehabilitation Project-70% complete
- Phase III, Eaton Wash Spreading Grounds Intake Improvement and Basin Enlargement-60% complete
- Phase IV, Devil's Gate Water Conservation-20% complete
- Phase V, Devil's Gate Reservoir Sediment Removal and Management-20% complete

The cost of eligible work performed under this task will be applied as local match.

Task 2: Labor Compliance Program

The District will serve as the construction manager of the Project. The District has an approved Labor Compliance Program (LCP), developed by our consultant, Solis Group. A copy is attached in Appendix 3-B, All future construction contracts to be awarded for the Project will require compliance with the LCP. Solis Group will administer the LCP. If, during the course of Project implementation, changes are required to the LCP or a new administrator is required, the District will engage Solis Group or another qualified firm to update and/or administer the LCP.

The following is a list of the current status of this task per Project component:

- Phase I, Eaton Wash Spreading Grounds Improvements-100% complete
- Phase II, Eaton Wash Dam Rehabilitation Project-30% complete
- Phase III, Eaton Wash Spreading Grounds Intake Improvement and Basin Enlargement-0% complete
- Phase IV, Devil's Gate Water Conservation-0% complete
- Phase V, Devil's Gate Reservoir Sediment Removal and Management-0% complete

Task 3: Reporting

The PM and Assistant PM will submit quarterly, annual, and final reports to the State per Proposition 1E contract requirements.

Following the removal of the Eaton Wash Dam outlet tower to mitigate the seismic deficiencies, DSOD will inspect the dam and prepare an inspection report. The report will provide a conclusion on whether or not the improvements meet seismic requirements. A copy of the inspection report will be submitted to the State.

Following Project completion, the District will measure the total amount of stormwater runoff captured at the Spreading Grounds, the amount of stormwater recharged into the Raymond Basin by the Spreading Grounds, and the amount of runoff discharged downstream into the

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channel, which is not conserved in the Raymond Basin. These measurements will be reported and summarized annually. The measurements will be evaluated to assess performance of the Project. Based on the performance, an adaptive management approach will be implemented to adjust operations and control systems to optimize their efficiency to ensure the highest benefit from the Project.

Reporting Submittals	Due Dates
Quarterly Progress Reports	Quarterly
Annual Reports	Annually
Final Report	After Completion

The following is a list of the current status of this task per Project component:

- Phase I, Eaton Wash Spreading Grounds Improvements-80% complete
- Phase II, Eaton Wash Dam Rehabilitation Project-40% complete
- Phase III, Eaton Wash Spreading Grounds Intake Improvement and Basin Enlargement-40% complete
- Phase IV, Devil's Gate Water Conservation-0% complete
- Phase V, Devil's Gate Reservoir Sediment Removal and Management-10% complete

(b) Land Purchase / Easement

This category is not applicable. The District currently owns all of the land upon which the existing Eaton Wash facilities are located. The District holds construction and maintenance easement for the land upon which the existing Devil's Gate facility is located. The proposed pipeline facility will be entirely within the public right of way, within District owned land, and within the area for which District already holds construction and maintenance easement.

(c) Planning/ Design/ Engineering/ Environmental Documentation

Task 4: Assessment and Evaluation

For Phase V, Devil's Gate Reservoir Sediment Removal and Management Project, technical studies that include sedimentation analysis and traffic studies are being completed to determine the optimal sediment removal method and future reservoir configuration. The studies are being completed and will be finalized with the project's Environmental Impact Report.

**Devil’s Gate and Eaton
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Assessment and Evaluation Submittals	Due Dates
Devil’s Gate Reservoir Sediment Removal and Management Project- <ul style="list-style-type: none"> • Sediment removal alternative study • Reservoir configuration analysis 	December 2013

The following is a list of the current status of this task per Project component:

- Phase I, Eaton Wash Spreading Grounds Improvements-100% complete
- Phase II, Eaton Wash Dam Rehabilitation Project-100% complete
- Phase III, Eaton Wash Spreading Grounds Intake Improvement and Basin Enlargement-100% complete
- Phase IV, Devil’s Gate Water Conservation-20% complete
- Phase V, Devil’s Gate Reservoir Sediment Removal and Management-30% complete

Task 5: Final Design

The District has completed final design plans and specifications for Phases I through III for the Project. Final design plans and specifications for Phase IV are currently 30 percent complete and are scheduled to be finalized by the District in December of 2013. Final design plans and specifications for Phase V, the Devil’s Gate Reservoir Sediment Removal and Management Project, are 30 percent complete. Progress on the design will be made according to the information received through the project’s Environmental Impact Report studies. The final plans and specifications are expected to be completed in June of 2014. Copies of design plans are included as noted in the following table.

Design Submittals	90%	100%	Appendix
<u>Phase I</u> Eaton Wash Spreading Grounds Improvements	Completed	Completed	3-C
<u>Phase II</u> Eaton Wash Dam Rehabilitation Project	Completed	Completed	3-C
<u>Phase III</u> Eaton Wash Spreading Grounds Intake Improvement and Basin Enlargement	Completed	Completed	3-C
<u>Phase IV</u> Devil’s Gate Water Conservation	September 2013	December 2013	3-C
<u>Phase V</u> Devil’s Gate Reservoir Sediment Removal and Management	April 2014	June 2014	NA

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Task 6: Environmental Documentation

The environmental documentation was completed for Phases I through III. The projects qualified for a categorical exemption under CEQA and the associated Notices of Exemption (NOE) were filed. For Phase IV, the environmental documentation process will begin in early 2013. For Phase V, an Environmental Impact Report (EIR) is being prepared and will be completed in December 2013.

Environmental Documentation Submittals	Date
<u>Phase I</u> Eaton Wash Spreading Grounds Improvements-NOE	February 2010
<u>Phase II</u> Eaton Wash Dam Rehabilitation Project-NOE	November 2011
<u>Phase III</u> Eaton Wash Spreading Grounds Intake Improvement and Basin Enlargement-NOE	August 2012
<u>Phase IV</u> Devil's Gate Water Conservation-MND/EIR	December 2013
<u>Phase V</u> Devil's Gate Reservoir Sediment Removal and Management-EIR	December 2013

Task 7: Permitting

The Project components that include work at the dams require the approval of DSOD. The other regulatory permitting agencies and the anticipated/completed permit approval dates are listed below.

Permitting Submittals	USACE	RWQCB	CDFG	DSOD
<u>Phase I</u> Eaton Wash Spreading Grounds Improvements	Not Applicable	Not Applicable	Not Applicable	Not Applicable
<u>Phase II</u> Eaton Wash Dam Rehabilitation Project	July 2012	April 2010	February 2012	April 2010
<u>Phase III</u> Eaton Wash Spreading Grounds Intake Imp./Basin Enlargement	July 2012	April 2010	February 2012	Not Applicable
<u>Phase IV</u> Devil's Gate Water Conservation	December 2013	December 2013	December 2013	December 2013
<u>Phase V</u> Devil's Gate Reservoir Sediment Removal and Management	December 2013	December 2013	December 2013	December 2013

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d) Construction/Implementation

Task 8: Construction Contracting

For Phases I and II, the construction contracting has been completed. The construction contracting for the remaining phases will be handled by District staff in compliance with public contracting code. Prior to bid solicitation, the District's governing body, the Los Angeles County Board of Supervisors (Board), is required to approve the Project and certify the environmental document. Tasks to secure the Contract award include: advertisement for bids, a pre-bid contractors meeting, bid opening, bid evaluation and selection of contractor with lowest responsive bid. The Board will then award of the contract unless it has delegated that authority to the Director of Public Works. A Notice to Proceed is then issued.

Project Component	Date of the Notice to Proceed
<u>Phase I</u> Eaton Wash Spreading Grounds Improvements	September 2010
<u>Phase II</u> Eaton Wash Dam Rehabilitation Project	August 2012
<u>Phase III</u> Eaton Wash Spreading Grounds Intake Improvement and Basin Enlargement	June 2013
<u>Phase IV</u> Devil's Gate Water Conservation	August 2014
<u>Phase V</u> Devil's Gate Reservoir Sediment Removal and Management	March 2015

Task 9: Construction

The following is a list of the current status of this task per Project component:

- Phase I, Eaton Wash Spreading Grounds Improvements-100% complete
- Phase II, Eaton Wash Dam Rehabilitation Project-30% complete
- Phase III, Eaton Wash Spreading Grounds Intake Improvement and Basin Enlargement-0% complete
- Phase IV, Devil's Gate Water Conservation-0% complete
- Phase V, Devil's Gate Reservoir Sediment Removal and Management-0% complete

The construction dates for each Project Component are also listed in the previous Project Timing and Phasing section.

**Devil's Gate and Eaton
Stormwater Flood Management Project****Task 9.1: Mobilization and Site Preparation**

The contractor for the Project will have a construction trailer on-site for the convenience of managing the construction. Temporary utilities will be installed for the contractor. Construction site entrances and exits will be established early in the mobilization phase to efficiently manage construction vehicle and equipment traffic. Safety meetings will be arranged to make all the parties aware of the potential hazards during construction.

Site preparation will entail any necessary rough grading of the site with the aid of preliminary surveys. Dust, erosion, and noise mitigation measures will be implemented to minimize adverse impacts to the neighboring community. Since the work will be done in phases, it is anticipated that work will proceed at one facility at a time.

Task 9.2: Project Construction

The Project construction will consist of modifying three existing facilities: Devil's Gate Dam and Reservoir, Eaton Wash Dam, and the Eaton Wash Spreading Grounds. A new pump, pipeline and outlet structure will also be constructed.

Phase I: Eaton Wash Spreading Grounds Improvements

The project improvements include:

- Combination of groundwater Basins 1 and 2 by removing the dividing levee and relocating City sewer pipeline
- Repairing corrugated metal pipeline to Basins 4 through 14
- Removal of accumulated sediment from basins
- Construction of interbasin spillway structures
- Lining of desilting basin's side slopes and invert with reinforced concrete

Phase II: Eaton Wash Dam Rehabilitation Project

The project improvements include:

- Removal of the existing outlet tower and control house, trashracks, and the metal footbridge
- Constructing new outlet works
- Rehabilitate outlet gates
- Replace trashracks
- Installing a hydraulic power unit and actuators, a remote control panel
- Installing slope erosion protection on the Dam's downstream slope
- Installing new toe drain at downstream toe of dam

**Devil's Gate and Eaton
Stormwater Flood Management Project**Phase III: Eaton Wash Spreading Grounds Intake Improvement and Basin Enlargement

The project improvements include:

- Enlarging Basin 1, grading to repair erosion, and replacing culvert into Basin 1
- Installing landscaping, path, and decorative fencing
- Replacing metal grate on a basin overflow structure to improve safe access
- Replacing pipe and timber structure with a concrete retaining wall to prevent erosion
- Relocating entrance gates to improve driveway entrances
- Replacing in-channel diversion flashboards with inflatable gate to automate operations
- Replacing in-channel access slab over diversion with a metal grate to maintain vehicular access while improving flow conditions

Phase IV: Devil's Gate Water Conservation

The project improvements include:

- Installing a pump to the upstream face of Devil's Gate Dam
- Installing 27,000 feet of 30-inch reinforced concrete pipe within the right of way of public streets from Devil's Gate Dam to Eaton Wash near Eaton Wash Dam and Reservoir
- Installing an outlet structure at Eaton Wash

Phase V: Devil's Gate Reservoir Sediment Removal and Management

- Removing 2 million cubic yards of sediment from the reservoir area by means of either trucking, sluicing, flow assisted sediment transport, or a combination thereof
- Establishing a reservoir configuration more suitable for routine maintenance activities including sediment management

Task 9.3: Performance Testing and Demobilization

During Project construction, elements such as control gates will be shop tested prior to installation. On site testing will include taking concrete cylinders to verify strength. Dowels used to anchor into existing concrete on the Dam will be "pull tested" to verify bond strength. Construction inspectors will review material data sheets and product labels to verify supplied materials match those specified in the design documents.

DSOD will inspect construction work on the Dams to ensure compliance with design.

A construction subtask will include system integration of control systems. The system will be tested upon installation. Gates and the pump will also be tested prior to contractor demobilization. During the following storm seasons, an adaptive management approach will be

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implemented to fine tune the system for optimizing stormwater management and groundwater recharge.

Contractor demobilization will only occur after final inspection and completion of all punch list items identified during final walk through.

e) Environmental Compliance/Mitigation/Enhancement

Task 10: Environmental Compliance/Mitigation/Enhancement

The final construction specifications will include environmental compliance measures as required by the environmental documents and permits. During construction, the District's Construction Division will designate an environmental compliance inspector to ensure the contractor adheres to the required compliance measures. Any required environmental mitigation or enhancement identified in the document or permits, but not a part of Project construction, will be implemented by the District through in-house forces or by a qualified specialist or contractor through a separate contract.

The following is a list of the current status of this task per Project component:

- Phase I, Eaton Wash Spreading Grounds Improvements-100% complete
- Phase II, Eaton Wash Dam Rehabilitation Project-30% complete
- Phase III, Eaton Wash Spreading Grounds Intake Improvement and Basin Enlargement-0% complete
- Phase IV, Devil's Gate Water Conservation-0% complete
- Phase V, Devil's Gate Reservoir Sediment Removal and Management-0% complete

f) Construction Administration

Task 11: Construction Administration

The District has a dedicated Construction Division that administers numerous civil construction projects every year in conformance with the Public Contracting Code. Construction Division Staff will manage the Project construction contract process and implementation. Construction administration activities will include general preparation of construction documents, advertisement for bids, award of construction contracts, construction contract administration, and construction inspection.

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The following is a list of the current status of this task per Project component:

- Phase I, Eaton Wash Spreading Grounds Improvements-100% complete
- Phase II, Eaton Wash Dam Rehabilitation Project-30% complete
- Phase III, Eaton Wash Spreading Grounds Intake Improvement and Basin Enlargement-0% complete
- Phase IV, Devil's Gate Water Conservation-0% complete
- Phase V, Devil's Gate Reservoir Sediment Removal and Management-0% complete