



Elsinore Valley Municipal Water District

Title XVI Indirect Potable Reuse Feasibility Study



WaterSMART: Title XVI Reclamation and Reuse Program Feasibility Studies

PREPARED FOR:

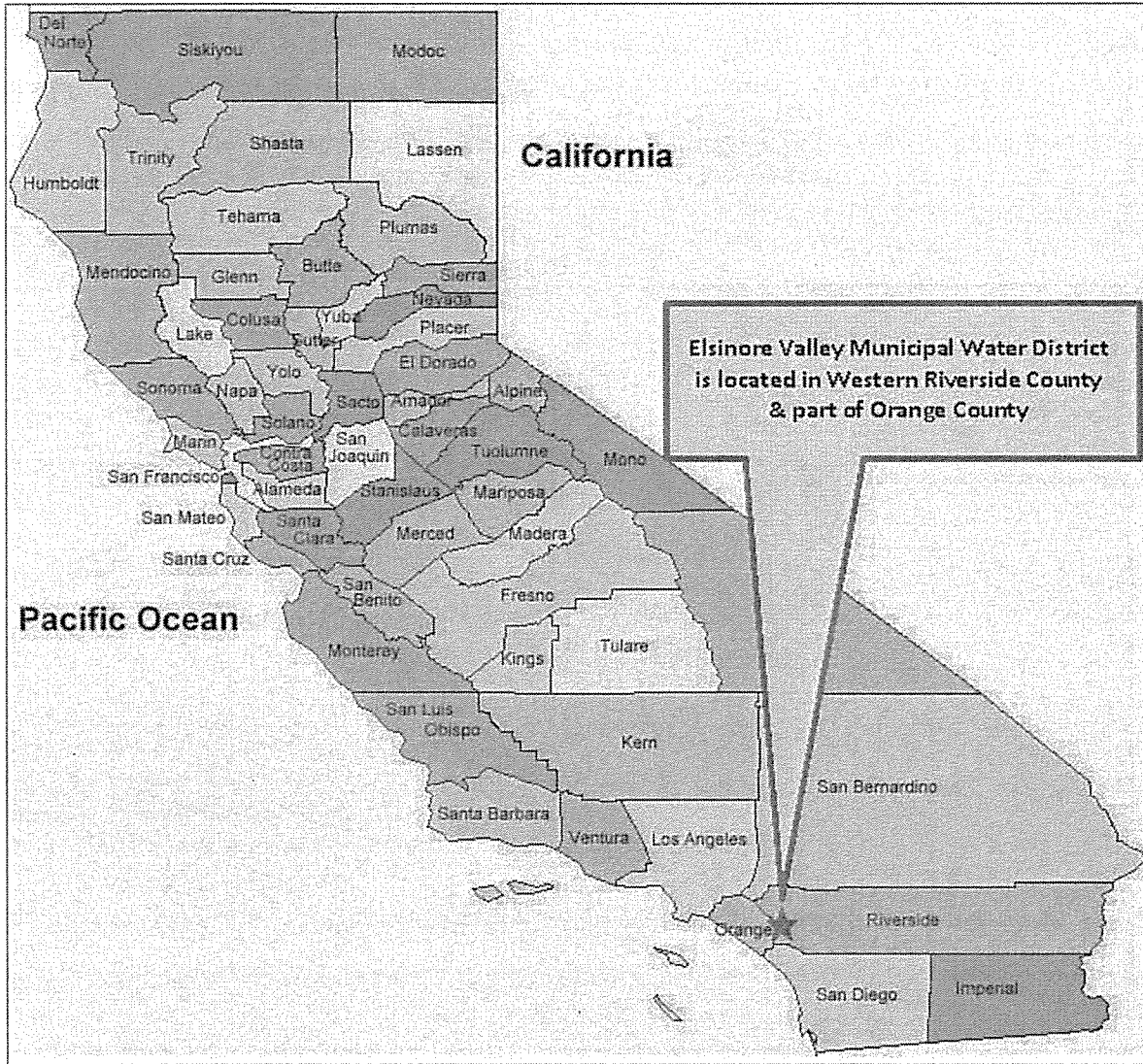
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March 3, 2015

Elsinore Valley Municipal Water District
Title XVI Indirect Potable Reuse Feasibility Study



The Elsinore Valley Municipal Water District Board of Directors will approve the application for the WaterSMART: Title XVI Reclamation and Reuse Program Feasibility Studies on March 12, 2015.

Phil Williams, President ▪ Harvey K. Ryan, Vice President ▪ Andy Morris, Treasurer
George Cambero, Director ▪ Nancy Horton, Director

John Vega, General Manager

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SECTION 1
Technical Proposal

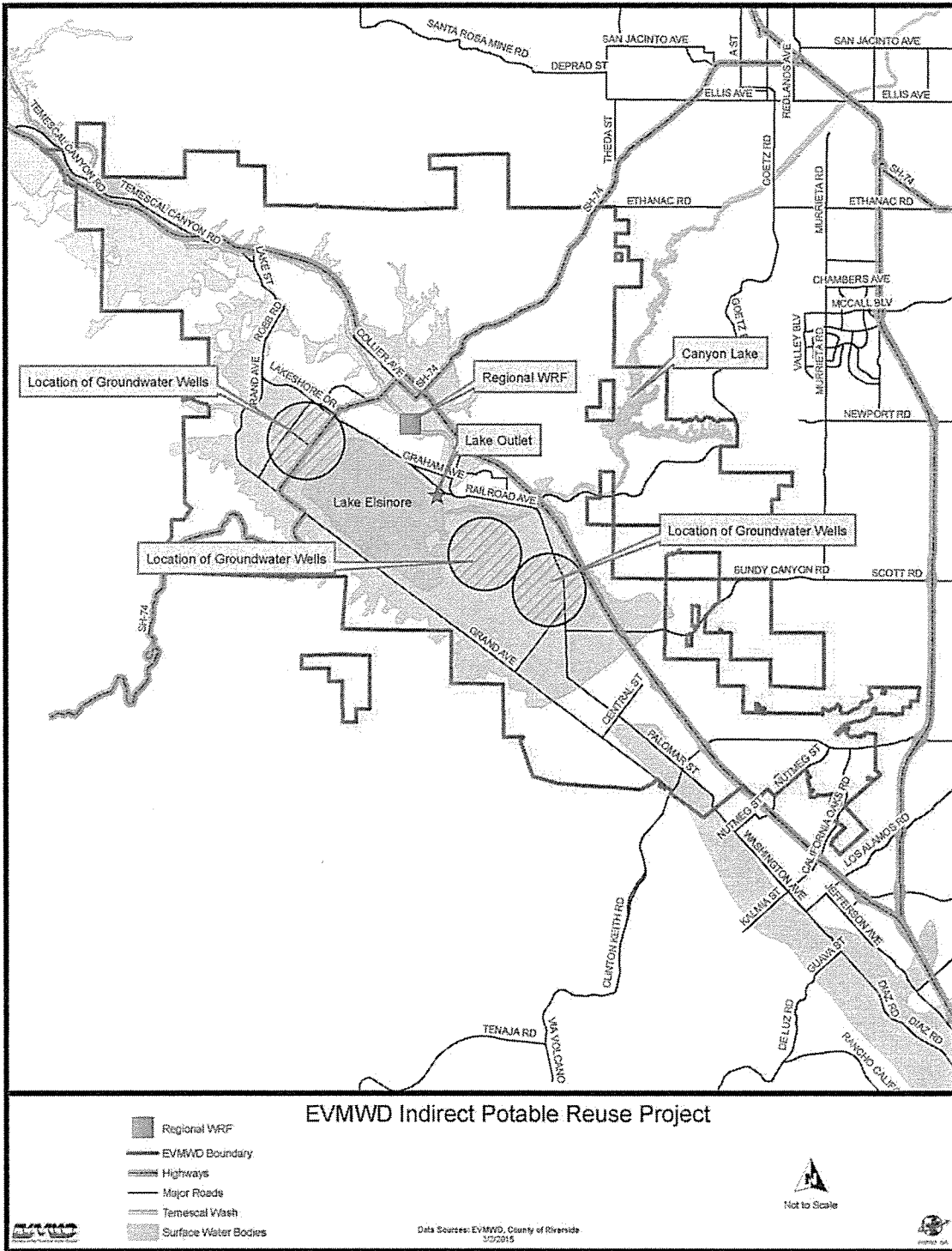
A. Technical Proposal: Executive Summary

Date: March 3, 2015
Applicant Name: Elsinore Valley Municipal Water District
City: Lake Elsinore
County: Riverside County
State: California

Elsinore Valley Municipal Water District (EVMWD) proposes to conduct a feasibility study of indirect potable reuse (IPR) to determine the most cost-effective alternative for local groundwater recharge using treated effluent from the Regional Water Reclamation Facility (RWRF). The study will include, but not be limited to, an analysis of treatment and conveyance options and the identification of preferred locations for groundwater recharge. The total Project cost is estimated at \$316,292. EVMWD is requesting \$150,000 (47%) from the Bureau of Reclamation, with the District contributing \$166,292 (53%). The feasibility study is anticipated to take approximately 18 months to complete upon execution of a grant agreement (expected by September 30, 2015). It is estimated that all work will be completed by March 31, 2017, assuming an October 1, 2015 start date. EVMWD is a multi-county water district serving a 96-square mile area in Riverside and Orange Counties along the eastern foothills of the Santa Ana Mountains. It is made up of two divisions: Elsinore and Temescal. Elsinore serves the vast majority of the area while Temescal is isolated to the northwest and covers only 2.5 square miles. Total areas served include the Cities of Lake Elsinore, Canyon Lake, Wildomar, Murrieta, and pockets of unincorporated areas including the Farm, Cleveland Ranch, Meadowbrook, Lakeland Village, Rancho Capistrano – El Cariso Village, Horsethief Canyon, and Temescal Canyon. See Exhibit 1 for a map of our service area.

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Exhibit 1
EVMWD Service Area and Facilities



B. Technical Proposal: Technical Study Description

Background

As a part of a 2014 Water, Sewer, and Recycled Water Master Plan process, EVMWD conducted an initial study to determine the feasibility of indirect potable reuse (IPR) using tertiary treated effluent from the Regional Water Reclamation Facility (RWRF) for groundwater recharge. Treated effluent from EVMWD's RWRF is currently utilized for environmental enhancement to replenish Lake Elsinore and to maintain riparian habitat along Temescal Creek. See Figure 1. The initial study determined that beyond 2020, any effluent generated is reliably available for IPR purposes for deep aquifer storage in the Elsinore Basin.

Study components included a review of potential yield, regulatory and legal constraints, IPR regulations, surface application (spreading), subsurface application (injection), basin plan salt and nutrient requirements, water quality and treatment, Project facilities, estimated costs for each option, and recommendations for next steps.

Based on a preliminary review of potential recharge sites and methods, the following options were considered in the initial study:

- Surface recharge with recycled water;
- Surface recharge with Advanced Wastewater Treated (AWT) recycled water at Leach and McVicker Canyons;
- Injection at Back Basin with AWT recycled water;
- Injection in Warm Springs Valley with AWT recycled water; and
- No action.

EVMWD proposes to further explore these options and establish a sampling program to begin collecting background data at the RWRF to evaluate needed treatment processes and prepare an engineering report on an IPR Project as required by State regulations.

IPR Feasibility Study

The IPR Feasibility Study proposed herein will continue to develop the project elements from the initial study and will be completed approximately 18 months after the United States Bureau of Reclamation (USBR) contract is executed. A preliminary list of tasks that will be performed as part of the IPR Feasibility Study is presented below.

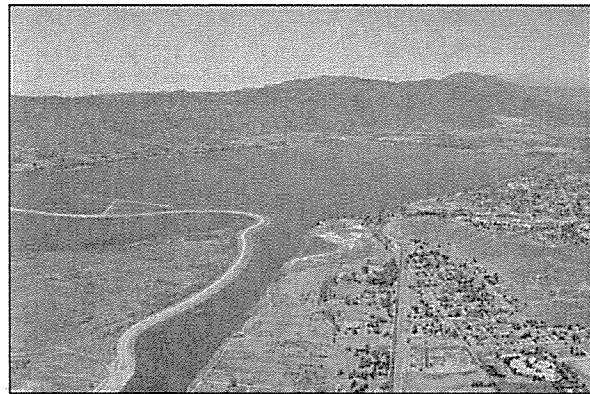


Figure 1. Lake Elsinore is replenished with treated effluent from EVMWD's RWRF.

Task 1 – Develop Treatment and Conveyance Alternatives

In Task 1, EVMWD will further evaluate the treatment and conveyance options discussed in the initial study. Each treatment and conveyance option will be evaluated for criteria such as Project yield, unit cost, effluent water quality, ease of implementation, public acceptance, environmental impacts, and other factors. Alternatives with fatal flaws will be eliminated. A ranking matrix will be developed and the preferred alternative for implementation will be identified. EVMWD will select the recommended alternative for implementation. This task will also consider the evaluation of several brine disposal alternatives which has been a major challenge in many recycling and IPR Projects.

Task 2 – Groundwater Modeling

Task 2 will involve performing groundwater simulations to support discussions with the California Department of Drinking Water (CDDW) and the Regional Water Quality Control Board (RWQCB) to advance regulatory approval. Groundwater modeling will also be critical in refining the IPR concept and the magnitude of spreading diluent water in the selected recharge areas. The groundwater modeling will be conducted to further evaluate the following elements: the direction of flow in the aquifers and the retention time to the nearest wells; potential existing potable supply wells that may be affected due to the retention time requirements; the impacts both to EVMWD as well as other stakeholders (City of Lake Elsinore, etc.), and the location of areas for potential replacement wells if needed; preliminary locations and depths for monitoring wells as required by regulations; and the extent of the “mixing zone.” In addition, a geochemical analysis to evaluate interactions between RWRF water and recharge areas will be performed.

Task 3 – Permitting and Regulatory Compliance

All permitting and regulatory aspects¹ will be considered as part of this feasibility study including:

- Compliance with the 2014 California Department of Public Health (now State Water Resources Control Board Division of Drinking Water, DDW) regulations for groundwater replenishment reuse Projects;
- Compliance with Regional Board basin planning requirements for salt and nutrients; and
- Consistency with EVMWD water rights filings.

Meetings will be held with regulatory agencies on an as-needed basis. Task 3 will also include regulatory coordination and updates, a review of CEQA and NEPA requirements, and permitting strategy improvements.

Task 4 – Draft Feasibility Study

¹ The pilot testing effort is not included in the Title XVI Feasibility Study grant application.

A draft Title XVI Feasibility Study will be prepared for the IPR Project. It will incorporate information and analysis developed by EVMWD through a number of sources including the initial study, financial information from EVMWD, and other relevant documents. The draft Title XVI Feasibility Study will address all required elements delineated in Directives and Standards WTR 11-01, including: introductory information; statement of problem and needs; water reclamation and reuse opportunities; description of alternatives; economic analysis; selection of the proposed Project; environmental consideration and potential effects; legal and institutional requirements; financial capability of the Project sponsor; and research needs.

Task 5 – Final Feasibility Report

The Final Feasibility Report, comprised of the work completed in Tasks 1 through 4, will be developed. This report will also present a construction cost estimate (*Association for the Advancement of Cost Engineering, Level 5 estimate*) along with a schedule for the implementation of the recommended IPR Project. Financing mechanisms such as State/Federal grants, State Revolving Fund loans, etc. will also be considered for the implementation of the IPR Project and will be discussed in the Final Feasibility Report.

Task 6 – Project Management

A series of technical meetings and workshops will be held throughout the Feasibility Study to discuss the Project progress and findings and receive input from a variety of EVMWD staff. The workshops will be structured to identify key decisions and questions that need to be resolved to advance the work in the Feasibility Study.

C. Technical Proposal: Evaluation Criteria

1) Statement of Problems and Needs – 10 Points

EVMWD was formed in 1950 under the Municipal Water District Act of 1911. Serving a 96-square mile area, EVMWD provides water, recycled water, and wastewater services to the cities of Lake Elsinore, Canyon Lake, Wildomar, and Murrieta. In addition, EVMWD serves the unincorporated communities of the Farm, Cleveland Ranch, Meadowbrook, Lakeland Village, Rancho Capistrano – El Cariso Village, Horsethief Canyon, and Temescal Canyon.

The population within EVMWD's service area is expected to increase from approximately 133,400 to approximately 221,100 in the next 20 years. This represents a 66 percent increase from existing (2015) conditions. This is highlighted in Figure 2. Consequently, water demand is expected to increase from 29,400 acre-feet per year (AFY) to 47,400 AFY during the same time period. In addition, build-out demands are estimated to be approximately 84,000 acre-feet per year (AFY). The projected growth estimates will put a considerable strain on EVMWD's local and imported water supply sources.

Approximately 20 percent of EVMWD's current water supply comes from local groundwater sources (both potable), 10 percent from local surface water supply, and the remaining 65 percent includes both treated and raw imported water supplied by the Metropolitan Water District of Southern California (MWD). EVMWD's supplies from MWD include water from the Colorado River via the Colorado River Aqueduct (CRA) (a Federal water source), and water from Northern California via the State Water Project (SWP).

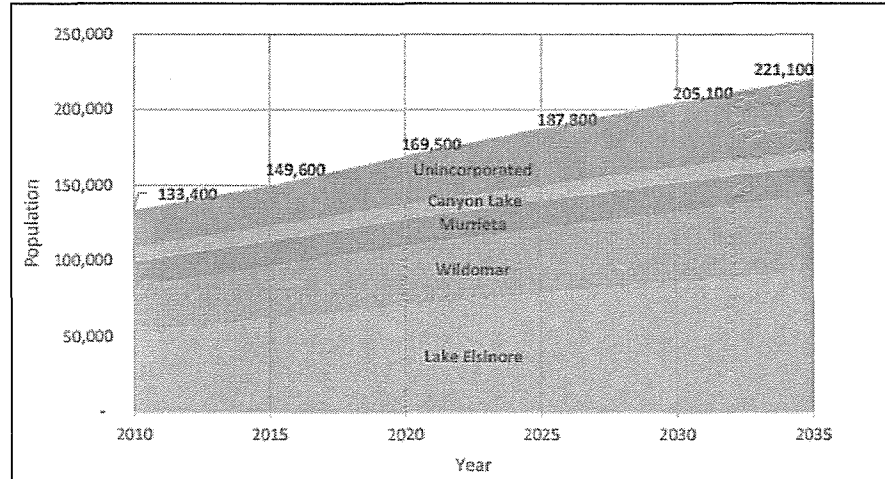


Figure 2. Population Projections for the EVMWD Service Area.

EVMWD currently produces approximately 7,500 AFY of recycled water, which is used for landscape irrigation and for the purposes of environmental enhancement. Water levels in Lake Elsinore, a key natural and economic resource for the local community, are maintained by discharging tertiary treated recycled water into the lake. In addition, riparian habitat along the Temescal Wash is sustained by maintaining a steady discharge of tertiary treated recycled water along the wash.

MAJOR CHALLENGES

- *POPULATION INCREASE*
- *SEVERE DROUGHT*
- *SEISMIC EVENTS*
- *ENVIRONMENTAL FLOW RESTRICTIONS*
- *SALINITY*
- *INCREASED WATER COSTS*

EVMWD faces a number of challenges stemming from its reliance on imported water, with uncertain long-term reliability challenges associated with drought shortages, climate change, seismic events, environmental flow restrictions in the Sacramento-San Joaquin Delta (Delta), which is the area of pumping origin for the SWP, and salinity of Colorado River supplies. We also face a potential financial challenge because of the necessary investments being made by MWD to improve supply and system reliability. Imported water costs are expected to increase significantly into the foreseeable future.

EVMWD's local groundwater resources are also constrained and pumping is restricted to the safe-yield of the basin to arrest declining groundwater levels. Groundwater is also contaminated by the presence of arsenic which poses operational constraints. Regulatory challenges to protect

the water quality objectives of the groundwater basins limit the use of existing supply sources and can potentially require the construction of expensive desalination facilities.

With California facing one of the most severe droughts on record, Governor Brown declared a drought State of Emergency in January and directed state officials to take all necessary actions to prepare for water shortages. EVMWD is now under more pressure than ever to stretch and develop more local water sources.

In light of these challenges for local and regional water supplies, EVMWD is developing an Integrated Resources Plan (to be completed by August 2015) to develop a long-term strategy to meet the following objectives:

- Create "New Water;"
- Decrease Reliance on Imported Supply;
- Improve Supply Reliability;
- Improve Water Quality;
- Improve Salt And Nutrient Management;
- Improve Supply Cost Efficiency; and
- Improve Groundwater Management.

The Integrated Resources Plan will place great emphasis on adaptive management and will be flexible to address the dynamic nature of EVMWD's local and regional challenges. The Integrated Resources Plan will include a long-term strategy for the development of water supply, implementation of key facilities, and execution of inter-agency agreements needed to expand and operate EVMWD's water, recycled water, and wastewater systems.

As part of the Integrated Resources Plan, EVMWD has discussed the development of an Indirect Potable Reuse (IPR) Project at its Regional Water Reclamation Facility (RWRF). An initial study has been conducted to evaluate expansion of RWRF to accommodate increasing wastewater flows. It is expected that the expansion of the RWRF from its current 8 million gallons per day (mgd) capacity will occur in two phases. Phase 1 will expand the capacity to 12 mgd and Phase 2 will increase the capacity to 16 mgd. It is expected that the Phase 1 expansion will be complete by year 2020 and Phase 2 by year 2040. After about 2020, wastewater flows exceeding 9.5 mgd would be available for IPR use at all times. It is expected that an additional 7.5 mgd (8,400 AFY) will be available for IPR by 2040.

IPR supports many of the evaluation objectives established by the Integrated Resources Plan, most specifically the objectives of creating new water and improving salinity management. In addition, IPR will provide:

- Long-term sustainable water supply at a reasonable cost;
- Increased water supply reliability (droughts and emergencies);

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- Maximum sustainability and management of local water resources including groundwater and surface water; and
- Improved Regional salinity management for the Elsinore Basin.

The Table below summarizes IPR activities completed, in progress, and requested from BOR in this proposal:

Table 1
IPR Evaluation Activities Completed/In Progress/Requested

2014 Completed	2015 In Progress	2015/2016 BOR Request
Water, Sewer & Recycled Water Master Plan	Integrated Resources Plan	IPR Feasibility Study
↓	↓	↓
Included <u>Initial Study</u> for Indirect Potable Reuse for Groundwater Recharge	Addresses Seven Objectives	Build on 2014 Initial Study
↓	↓	↓
Initial Study concluded after 2020 - effluent reliability for IPR for Deep Aquifer Storage	Expansion of RWRf under Evaluation	1. Treatment & Conveyance 2. Groundwater Modeling 3. Permitting & Regulatory Compliance 4. Feasibility Study
↓	↓	↓
Five Options Developed	Additional Wastewater Flows Available for IPR	Recommended Action

2) Water Reclamation and Reuse Opportunities – 15 points

(1) Describe how the feasibility study will investigate potential uses for reclaimed water (e.g., environmental restoration, fish and wildlife, groundwater recharge, municipal, domestic, industrial, agricultural, power generation, and recreation.)

Approximately 7,500 AFY of recycled water is currently being used in EVMWD's service area to meet non-potable demands and for environmental enhancement. Municipal customers use recycled water for landscape irrigation. The majority of the existing use within EVMWD's service area is for environmental enhancement in the form of protecting riparian habitat along the Temescal Wash and maintaining water levels in Lake Elsinore, which is a very vital natural and economic resource in the Elsinore Valley.

The IPR Project will be used to recharge the Elsinore Basin which is a key local water supply resource for EVMWD. By recharging the Elsinore Basin, IPR supports many of the evaluation objectives established by the Integrated Resources Plan, most specifically the objectives of

creating new water and improving salinity management in the Elsinore Basin. The proposed approach for the IPR Project is to deliver a reliable, drought-proof, sustainable, local supply of recycled water to replenish groundwater basins by the use of deep injection wells. EVMWD has previously conducted studies to assess the feasibility of injection at multiple locations and identified strategic locations in the Elsinore Basin.

The IPR Project will also enhance the quality of the water currently used for environmental enhancement. Highly treated effluent will be utilized to maintain water levels in Lake Elsinore. This will reduce salt and nutrient loading entering the lake and will enhance its water quality. Similarly, highly treated effluent will be discharged along the Temescal Wash to maintain riparian habitat. This will improve groundwater quality in the Temescal Valley.

(2) Describe the potential water market available to use any recycled water that might be produced upon completion of a water reuse Project, as well as methods to stimulate recycled water demand and methods to eliminate obstacles for use of reclaimed water.

EVMWD could make use of additional water supply for potable uses through its potable retail water supply system. No additional methods are needed to stimulate recycled water demand because there already is a significant demand for potable water within EVMWD’s service area. This is highlighted in Table 2 shown below. Using recycled water for an IPR and then distributing the water via the potable system eliminates any constraints or obstacles in the use of recycled water.

**Table 2
 Water Demand Projections (2015 – 2035)**

Summary of Demand Projections

Year	Population-Based Method		Will Serve ⁽¹⁾ (AFY)
	Method 1 (AFY)	Method 2 (AFY)	
2015	29,200	29,400	
2020	32,900	34,400	30,000
2025	36,500	38,800	34,700
2030	39,700	43,200	36,600
2035	42,800	47,400	38,800
Build-Out (land use)		84,000	

(3) Describe the sources of water that will be investigated for potential reclamation, including impaired surface and ground waters.

EVMWD’s RWRF will be the main source of water supply investigated for the IPR Project. Flows at the RWRF are expected to increase to approximately 30 mgd (33,000 AFY) as build-out approaches. This is depicted in the Figure 3 below.

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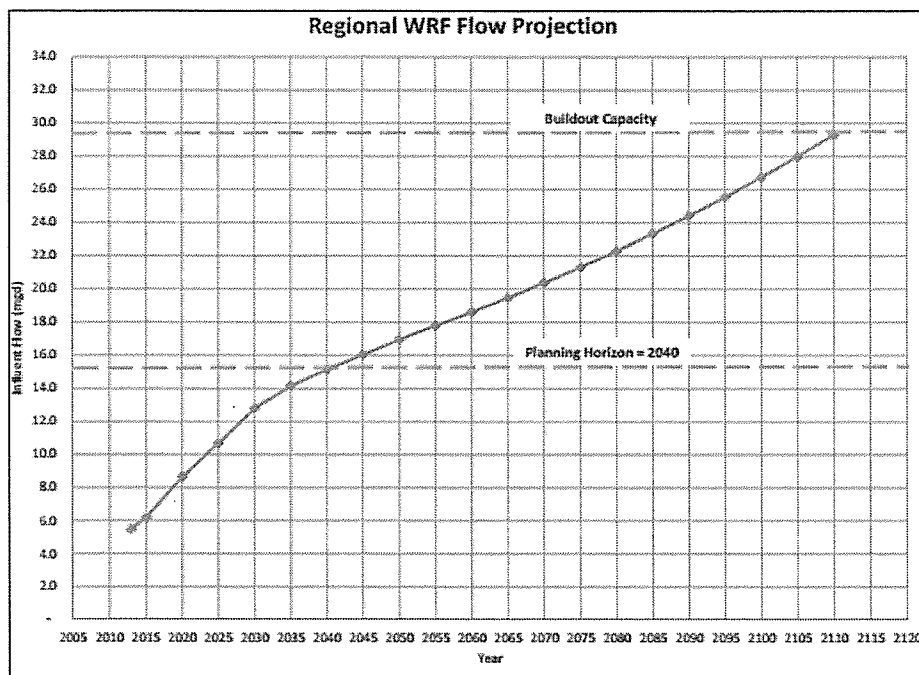


Figure 3. Regional WRF Flow Projection

Reserving approximately 10,600 AFY to protect riparian habitat and environmental enhancement, approximately 4,500 AFY will be available for IPR in 2030, 8,400 AFY will be available in 2040 and 20,000 AFY of recycled water will be available for IPR by build-out in 2110. See Table 3 below for comparison.

Table 3
Water Available for IPR

	2030	2040	2110
	Phase I	Phase II	Build-Out
Flows & RWRF (AFY)	13.5 mgd (15,100 AFY)	17 mgd (19,000 AFY)	30 mgd (33,000 AFY)
Less Set-Aside for Riparian & Environmental Enhancement	10,600AFY	10,600AFY	10,600 AFY
Total Available for IPR	4 mgd (4,500 AFY)	7.5 mgd (8,400 AFY)	18 mgd (20,000 AFY)

3) Description of Potential Alternatives – 15 points

(1) Describe the objectives that all alternatives will be designed to meet. What other water supply alternatives will be investigated as part of the feasibility study?

As mentioned earlier, EVMWD is currently developing an Integrated Resources Plan (to be completed by August 2015) to develop a long-term strategy to meet the following objectives:

- Ability to Create "New Water;"
- Decrease Reliance on Imported Supply;
- Improve Supply Reliability;
- Improve Water Quality;
- Improve Salt And Nutrient Management;
- Improve Supply Cost Efficiency; and
- Improve Groundwater Management.

IPR supports many of the evaluation objectives established by the Integrated Resources Plan, most specifically the objectives of creating new water and improving salinity management. In addition, the Project will also provide:

- Long-term sustainable water supply at a reasonable cost;
- Increased water supply reliability (droughts and emergencies);
- Maximum sustainability and management of local water resources including groundwater and surface water; and
- Improved Regional salinity management for the Elsinore Basin.

Water supply alternatives are already being analyzed via our IRP planning process and will not be re-evaluated in the BOR Feasibility Study request. For information only, water supply alternatives we are studying include:

- Water Conservation
 - Promote indoor water-use efficiency by providing incentives for replacing fixtures.
 - Minimizing outdoor water use by promoting water-efficient landscaping.
- Urban Stormwater Capture
 - Capturing urban runoff by promoting low-impact development.
 - Capturing urban runoff in recharge basins.
- Groundwater Supply (including brackish water desalination)
 - Utilizing groundwater from the Warm Springs Subbasin which has total dissolved solids in excess of 1,200 mg/L.
- Water Transfers
 - Efficiently utilizing stranded assets by partnering with agencies to develop multi-beneficial Projects.
- Water Banking
 - Storing imported water during wet months for use in dry years through recharge ponds or injection wells.
- Increased Imported Water from MWD
 - Purchasing additional imported water from MWD.
- No Action
 - A no action alternative indicates maintaining the status quo and not developing new supply sources beyond the existing groundwater and imported water sources. This

would have serious consequences. For example, EVMWD will have to increase groundwater production, which will impose an additional burden on already-strained groundwater basins. Increasing production significantly to meet future demands will cause a rapid decline in groundwater levels and may lead to groundwater subsidence in some areas. Declining groundwater levels tend to worsen groundwater quality and it is likely that contaminants such as arsenic will be encountered in the deeper aquifers of the Elsinore Groundwater Basin. Pumping from greater depths will also increase greenhouse gas emissions and EVMWD's overall carbon footprint. EVMWD will also have to increase its dependence on imported water (SWP and the CRA); the availability of imported water is limited and very uncertain during droughts.

(2) Provide a general description of the proposed Project that will be the subject of a feasibility study.

The proposed project that is the subject of the IPR Feasibility Study is an IPR that will convey recycled water from the RWRF for injection in the Elsinore Basin for potable use.

An IPR Project at the RWRF will likely involve the following components:

- Advanced treatment (typically microfiltration, reverse osmosis, UV/peroxide oxidation, and stabilization) following conventional secondary treatment and tertiary filtration;
- Brine disposal to the Inland Empire Brine Line (formerly Santa Ana Regional Interceptor or SARI);
- Conveyance facilities (pipelines and pumping stations) to the replenishment site;
- Replenishment facilities (recharge basins or injection wells);
- Recovery facilities (extraction wells); and
- Monitoring wells.

The RWRF recycled water may receive additional treatment at an Advanced Water Treatment Facility (AWTF). The capacity of the IPR Project will be phased over time, with an ultimate capacity of 20,000 AFY.

(3) Describe alternative measures or technologies for water reclamation, distribution, and reuse that will be investigated as part of the feasibility study.

Various options are available for treating recycled water intended for groundwater injection. Some of the technologies will result in better water quality and better value in terms of improvements in water quality relative to unit capital cost, which must be weighed with the potential for greater cost of Operations and Maintenance (O&M) and the potential for environmental impact caused by higher energy requirements, waste product disposal, and material usages.

The following treatment options will be investigated as part of the feasibility study:

Option 1: Percolation of disinfected tertiary effluent.

- Meet Basin Plan Objective by blending with treated SWP water from the Temescal Valley Pipeline (TVP) – Maximum recycled water contribution (RWC) would be 45 percent to meet total dissolved solids (TDS) objective of 480 mg/L.
- If RWC is limited to 20 percent, 4 mgd of diluent water is needed per mgd of recycled water.
- Ability to meet total organic carbon (TOC) requirements is uncertain due to lack of data.

Option 2: Percolation of disinfected tertiary effluent with partial desalination.

- Desalt a split stream of recycled water to meet Basin Plan Objective.
- Assuming 700 milligram per liter (mg/L) effluent TDS, need to desalt approximately 38 percent of flow to produce 480 mg/L, 8 percent lost to brine.
- Assuming 2 mg/L total inorganic nitrogen effluent, no additional treatment is required.
- If RWC is limited to 20 percent, 4 mgd of diluent water is needed per mgd of recycled water.
- Ability to meet TOC requirements is uncertain.

Option 3: Percolation or injection of advanced treated recycled water.

- Advanced treatment includes microfiltration, reverse osmosis and UV-peroxide.
- TDS and nitrogen in percolated water is essentially zero (minimum 99% removal) 15-20% lost to brine.
- Dilution water not required if TOC is less than 0.5 mg/L and approved by State Water Resources Control Board, Division of Drinking Water.

4) Stretching Water Supplies – 15 points

(1) Describe the potential for the Project to reduce, postpone, or eliminate the development of new or expanded water supplies. Include description of any specific issues that will be investigated or information that will be developed as part of the feasibility study.

By pursuing an IPR Project, EVMWD is working to improve local and regional water supply reliability. As mentioned previously, approximately 20 percent of EVMWD's current water supply comes from local groundwater sources, 10 percent from local surface water supply, and the remaining 65-70 percent includes both treated and raw imported water supplied by the Metropolitan Water District of Southern California (MWD). EVMWD's supplies from MWD include water from the Colorado River via the Colorado River Aqueduct (CRA) (a Federal water source), and water from Northern California via the State Water Project (SWP).

The IPR Project will provide 8,400 AFY by 2040 and up to 20,000 AFY of recycled water for potable uses in 2110. This new source will increase local groundwater storage, reduce imported water purchases, and eliminate the need for additional imported purchases to meet projected demands. Expansions to the Temescal Valley Pipeline (TVP) Pump Station may be postponed with the implementation of the IPR Project. In addition, the construction of expensive desalination facilities for the Elsinore Basin may be eliminated.

If this Project is not implemented, EVMWD will be required to increase groundwater production, which will impose an additional burden on the already-strained groundwater basins. Increasing production significantly to meet future demands will cause a rapid decline in groundwater levels and may lead to groundwater subsidence in some areas. Declining groundwater levels tend to worsen groundwater quality and it is likely that contaminants such as arsenic will be encountered in the deeper aquifers of the Elsinore Groundwater Basin. Pumping from greater depths will also increase greenhouse gas emissions and EVMWD's overall carbon footprint. EVMWD will also have to increase its dependence on imported water (SWP and the CRA), which is **not** a viable option in the face of the continuing drought in California.

(2) Describe the potential for the Project to reduce or eliminate the use of existing diversions from natural watercourses or withdrawals from aquifers. Include description of any specific issues that will be investigated or information that will be developed as part of the feasibility study.

The IPR Project will provide up to 20,000 AFY of recycled water for potable uses. This supply will reduce EVMWD's reliance on imported water by 20,000 AFY from the natural watercourses of the Colorado River, and the Feather River and Delta, which feed SWP supplies. EVMWD receives imported water from Western Municipal Water District (WMWD) by way of MWD (wholesaler of imported water). MWD receives water delivered under State Water Contract provisions including Table A contract supplies and use of carryover storage in San Luis Reservoir (DWR). MWD also owns and manages surface water storage reservoirs including Diamond Valley Lake, Lake Mathews, and Lake Skinner, and uses flexible storage available in DWR's Castaic Lake and Lake Perris. MWD also participates in various storage programs within the California Central Valley. As stated above, EVMWD's IPR Project will reduce the need for diversion and storage of surface water in MWD's system by 20,000 AFY. The IPR Feasibility Study will develop an implementation plan that will identify the phasing and supply developed over time.

(3) Describe the potential for the Project to reduce the demand on existing Federal water supply facilities. Include description of any specific issues that will be investigated or information that will be developed as part of the feasibility study.

Over 65 percent of EVMWD's water supply is provided by MWD's imported surface water from the Colorado River via the CRA and the Delta via the SWP. The IPR Project has an ultimate capacity of a 20,000 AFY. The IPR Project Feasibility Study will develop an implementation plan that will lay out the phasing and supply developed over time.

MWD's CRA delivers water from the Colorado River that is stored in Lake Havasu, part of the Bureau of Reclamation's Parker-Davis Project. The IPR Project will reduce EVMWD's reliance on Federal water supplies from the Colorado River, easing some of the competing demands on this water source. The SWP pumps water from the Delta in Northern California, which is also the pumping location for the Bureau of Reclamation's Central Valley Project (CVP). The CVP is operated in coordination with the SWP as the two Projects use the Sacramento River and Delta as common conveyance facilities. The IPR Project will reduce EVMWD's reliance on SWP water supplies from the Delta, thereby relieving some of the competing demands on the SWP system and leaving more surface water for other uses. This will also benefit the CVP as changes in demands for Delta water from one Project benefit the other due to their shared operation.

5) Environment and Water Quality – 15 points

(1) Describe the potential for the Project to improve the quality of surface or groundwater, including description of any specific issues that will be investigated or information that will be developed as part of the feasibility study.

Injection of advanced treated recycled water effluent in the Elsinore Basin will reduce total dissolved solids (TDS) concentrations in the Elsinore Basin and will improve overall groundwater quality in the Elsinore Basin. As part of the IPR Feasibility Study, EVMWD will perform model simulations that quantify the benefit of performing an IPR on TDS and nitrogen concentrations in the Elsinore Basin.

The water quality objective for total dissolved solids (TDS) for the Elsinore Basin is 480 milligrams per liter (mg/L). The triennial ambient water quality evaluation for the Elsinore Basin estimates the current ambient water quality in the Elsinore Basin to be approximately 490 mg/L. As such, the results indicate that there is no assimilative capacity in the Elsinore Basin for TDS.

(2) Describe the potential for the Project to improve flow conditions in a natural stream channel, including a description of any specific issues that will be investigated or information that will be developed as part of the feasibility study.



Figure 4. California Bay Delta supplies a portion of EVMWD's imported water through the SWP.

The proposed IPR Project, if implemented, will improve the flow conditions of the California Bay Delta by reducing EVMWD's reliance on imported water. As mentioned previously, over 65 percent of EVMWD's water supply is provided by MWD's imported surface water from the Colorado River via the CRA and the Delta via the SWP. From its original state, the Delta has been altered by a system of manmade levees, reservoirs, and dredged waterways constructed to support farming and urban development. See Figure 4. Furthermore, the natural flows in the Delta also are altered by

operation of the State Water Project (SWP) and Central Valley Project (CVP). The IPR Project has an ultimate capacity of a 20,000 AFY. The IPR Project will reduce EVMWD's reliance on CRA water supplies from the Colorado River and SWP water supplies from the Delta, thereby relieving some of the competing demands on the CRA and SWP systems and leaving more surface water for other uses. This will also benefit the CVP as changes in demands for Delta water from one Project benefit the other due to their shared operation.

Additionally, implementation of this Project will improve the water quality along the Temescal Wash and will reduce salt and nutrient loadings to the underlying groundwater basins. As mentioned previously, riparian habitat along the Temescal Wash is sustained by maintaining a steady discharge of tertiary treated recycled water along the wash. Temescal Wash, also known as Temescal Creek, is a 29-mile-long watercourse that connects Lake Elsinore with the Santa Ana River. It drains the eastern slopes of the Santa Ana Mountains and the western slopes of the Temescal Mountains.

(3) Describe the potential for the Project to provide water or habitat for federally listed threatened or endangered species, including description of any specific issues that will be investigated or information that will be developed as part of the feasibility study.

The IPR Project will reduce imported water demands and consequently reduce the need to draw fresh water supplies from the Delta. By allowing more fresh water to take its natural course, water quality (salinity) in the Delta can support habitat for threatened or endangered species such as the Delta smelt. The feasibility study will also evaluate where Project facilities may affect critical habitat for species in the local area. Examples of locally endangered species include (but are not limited to) the Least Bell's vireo, a small bird that resides in riparian habitat, and the Southwestern willow flycatcher, which resides in riparian woodlands along rivers and streams. The CEQA/NEPA analysis will be conducted following the IPR Feasibility Study and will evaluate potential effects, in depth, on all listed species in the Project area.



Figure 5. The Delta smelt is an endangered species located in the Bay-Delta.

6) Legal and Institutional Requirements – 10 Points

The IPR Feasibility Study will evaluate all regulatory, legal, and institutional requirements for the implementation of the IPR Project, including:

- Compliance with the 2014 California Department of Public Health (now State Water Resources Control Board Division of Drinking Water, DDW) regulations for groundwater replenishment reuse Projects.

In June 2014, the State of California adopted regulations for groundwater replenishment using recycled water. The regulations apply to the planned use of recycled municipal wastewater that is operated for the purpose of replenishing a groundwater basin designated in the Water Quality Control Plan for use as a source of municipal and domestic water supply. The regulations specify requirements for source control, treatment, dilution, monitoring, and other factors that protect public health when recycled water is introduced into the water supply. Regulations are quite detailed as they apply to surface (spreading) and subsurface (injection) applications of recycled water for groundwater replenishment. The feasibility study will review all of the necessary requirements to apply for surface (spreading), and subsurface (injection) applications.

- Compliance with Regional Board basin planning requirements for salt and nutrients.

The Water Quality Control Plan for the Santa Ana River Basin (also known as the Basin Plan) specifies water quality objectives for most groundwater basins. Water quality objectives for total dissolved solids (TDS) and total nitrogen (as N) are established for the Elsinore Groundwater Management Zone (GMZ) at 480 mg/L and 1.0 mg/L, respectively. No water quality objectives have been established for the Warm Springs Valley GMZ; however, EVMWD is working with Eastern MWD to prepare a salt and nutrient management plan including water quality objectives for groundwater basins in the Temescal Valley. The Basin Plan permits waste discharges that exceed the water quality objectives if an approved salt offset program is implemented.

The development of an IPR Project would have significant advantages related to salt and nutrient management planning. Implementation of an IPR Project that utilizes reverse osmosis to treat all or part of the flow would meet potential discharge requirements and could provide a salt offset for other Projects where recycled water exceeds the permit water quality requirements. Post-treatment constituent levels are typically well below Basin Plan water quality objectives. This benefit will allow EVMWD to work with the Regional Water Quality Control Board regarding any outstanding salt credit requirements and potential flexibility with preparation of NPDES permits.

- Consistency with EVMWD water rights filings.

EVMWD has a water rights permit (No. 21165) to divert and use water from Temescal Creek and treated wastewater from the RWRF for replenishment and recreation in Lake Elsinore, and for fish and wildlife protection and enhancement, water quality, industrial, and irrigation uses within the EVMWD boundary and Corona Colony. An amendment to this permit may be required to include groundwater storage and domestic use as these uses are not listed in the water rights permit.

7) Renewable Energy and Energy Efficiency – 10 points

Opportunities for energy efficiency measures to help power the IPR Project will be evaluated as part of the feasibility study. During design of the IPR Project, facility components that may be considered for energy savings opportunities include variable speed pumps and energy recovery devices.

Implementation of the IPR Project will, by itself, lead to a significant amount of energy and cost savings. As mentioned earlier, implementation of the IPR Project will reduce the need to import SWP and/or CRA water by approximately 20,000 AFY by build out. On average, the energy intensity associated with each acre-foot of water imported is 3,179 kWh. By reducing imported water by 20,000 AFY, the IPR Project will save approximately, 63,586,971 kWh annually. These are substantial cost savings estimated at \$8,418,915. The energy intensity and savings calculations are presented below:

**Table 4
 Estimate of Energy Savings**

	Column 1	Column 2	Column 3	Column 4
Pumping Plant for Imported Water	DWR kWh/MG	kWh/AF	Percent EVMWD Water	Energy Intensity for Imported Water (kWh/AF)
Colorado River	6,066	1,976	0.51	1,008
Pearblossom (SWP)	13,606	4,432	0.49	2,172
Total				3,179
		Annual Energy Savings	= 20,000 AFY x 3,179 kWh/AF	63,586,971 kWh

Notes:

Column 2 = Column 1 divided by 3.07 (conversion from Kwh/MG to kWh/AF)

Column 3 represents the percentage of SWP and CRA water used in EVMWD's system

Column 4 = Column 2 times Column 3 (energy intensity of imported water in EVMWD's system)

According to the U.S. Energy Information Administration Form EIA-361 Annual Electric Power Industry Report, 2009, average California energy costs are estimated at .1324 per kWh.

Therefore, we can calculate:

$$\text{\$0.1324} \times 63,586,971 \text{ kWh} = \text{\$8,418,915 Energy Savings for Imported Water}$$

The energy benefits to the SWP/CRA systems due to the implementation of EVMWD's IPR Project are significant over the long-term.

8) Watershed Perspective – 10 points

EVMWD's IPR Project not only provides local benefits to the cities of Lake Elsinore, Canyon Lake, Wildomar, Murrieta, the unincorporated communities of the Farm, Cleveland Ranch, Meadowbrook, Lakeland Village, Rancho Capistrano – El Cariso Village, Horsethief Canyon, and Temescal Canyon, but also provides benefits at a regional scale.

EVMWD is located in the San Jacinto River Watershed region which is tributary to the Santa Ana River Watershed. By improving groundwater quality in the Elsinore Basin, the IPR Project will benefit the entire Santa Ana River Watershed. EVMWD will also work in coordination with other water management efforts within the San Jacinto River and Santa Ana River Watersheds. See Figure 7 on the next page.

The following water supply alternatives will also promote and apply a watershed perspective.

- Water Conservation;
- Urban Stormwater Capture;
- Groundwater Supply (including brackish water desalination);
- Water Transfers;
- Water Banking; and
- Increased Imported Water from MWD.

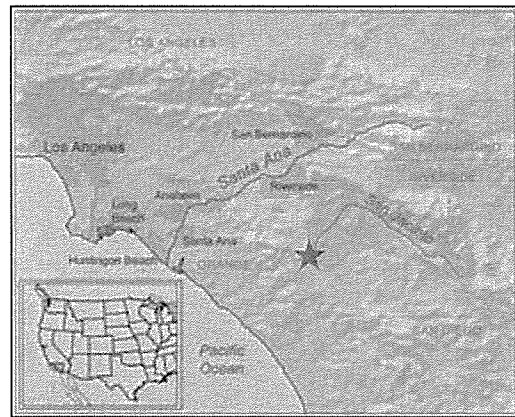


Figure 7. Santa Ana Watershed with the San Jacinto sub-basin highlighted in orange.

As mentioned earlier, over 65 percent of EVMWD's water supply is provided by MWD's imported surface water from the Colorado River via the CRA and the Delta via the SWP. The IPR Project has an ultimate capacity of a 20,000 AFY. The IPR Project will reduce EVMWD's reliance on SWP water supplies from the Delta, thereby relieving some of the competing demands on the SWP system and leaving more surface water for other uses. This will also benefit the CVP as changes in demands for Delta water from one Project benefit the other due to their shared operation.

SECTION 2
Required Permits or Approvals

No permits or approvals are required for development of the feasibility study.

SECTION 3
Funding Plan

How you will make your contribution to the cost share requirement, such as monetary and/or in-kind contributions and source funds contributed by the applicant (e.g., reserve account, tax revenue, and/or assessments).

EVMWD will fund all non-Reclamation share of study costs through district resources. No other sources will be used. EVMWD will provide \$100,000 in cash through its Fund 130 Recycled Water source and another \$66,292 in in-kind services.

(1) Describe any in-kind costs incurred before the anticipated study start date that you seek to include as study costs. Include:

Although prior in-kind costs have been incurred, EVMWD does not intend to seek funding for them.

(2) Provide the identity and amount of funding to be provided by funding partners, as well as the required letters of commitment.

EVMWD has no funding partners.

(3) Describe any funding requested or received from other Federal partners. Note: Other sources of Federal funding may not be counted towards the applicant's 50 percent cost share unless otherwise allowed by statute.

EVMWD has not requested nor received other Federal funds.

(4) Describe any pending funding requests that have not yet been approved, and explain how the study will be affected if such funding is denied.

EVMWD has no pending funding requests for the IPR study.

Table 5
Summary of Non-Federal and Federal Funding Sources

Funding Sources	Funding Amount
Non-Federal Entities	
1. EVMWD	\$ 100,000
2. EVMWD* in-kind funding	\$ 66,292
<i>Non-Federal Subtotal (53%):</i>	\$ 166,292
Other Federal Entities	
1. Not Applicable	\$ 0
<i>Other Federal Subtotal:</i>	\$ 0
<i>Requested Reclamation Funding (47%):</i>	\$ 150,000
<i>Total Study Funding:</i>	\$ 316,292

SECTION 4
Letters of Commitment

Not applicable. EVMWD is not requesting funding from any potential partners to perform the Feasibility Study so no letters of commitment are needed.

SECTION 5

Draft Resolution

(Official Resolution will be signed on 3/12/15)

RESOLUTION NO. 15-01-XX

RESOLUTION OF THE BOARD OF DIRECTORS OF THE
ELSINORE VALLEY MUNICIPAL WATER DISTRICT
APPOINTING AND AUTHORIZING JOHN D. VEGA TO FILE AN
APPLICATION WITH THE UNITED STATES DEPARTMENT OF
INTERIOR, BUREAU OF RECLAMATION'S TITLE XVI WATER
RECLAMATION AND REUSE PROGRAM FOR THE INDIRECT POTABLE
REUSE FEASIBILITY STUDY OF ELSINORE VALLEY MUNICIPAL
WATER DISTRICT'S SERVICE AREA OF RIVERSIDE COUNTY

WHEREAS, the Elsinore Valley Municipal Water District has the authority to conduct the Indirect Potable Reuse Feasibility Study (the "Project") in the service area of Elsinore Valley Municipal Water District of Riverside County; and

WHEREAS, the Elsinore Valley Municipal Water District will adopt the necessary budget and be capable of providing the amount of funding and/or in-kind contributions specified in the funding plan for the Project with a total Project cost amount not to exceed \$316,292.

WHEREAS, the Elsinore Valley Municipal Water District intends to finance the cost of the Project or portions of the Project with moneys provided by the U.S. Bureau of Reclamation ("Reclamation").

BE IT RESOLVED by the Elsinore Valley Municipal Water District that, pursuant and subject to all of the terms and provisions of the Title XVI Water Reclamation and Reuse application be made to Reclamation for funding; and

BE IT FURTHER RESOLVED that John D. Vega, General Manager ("Authorized Representative") of the Elsinore Valley Municipal Water District or his designee is hereby authorized and directed to cause the necessary data to be prepared, and grant application to be signed and filed for a Title XVI Water Reclamation and Reuse Program with Reclamation; and

BE IT FURTHER RESOLVED that the Elsinore Valley Municipal Water District will work with Reclamation to meet established deadlines for entering into a cooperative agreement.

PASSED and ADOPTED this 12th day of March, 2015.

Elsinore Valley Municipal Water District
Title XVI Indirect Potable Reuse Feasibility Study

Harvey Ryan, President of the
Board of Directors of the
Elsinore Valley Municipal Water District

ATTEST:

Terese Quintanar, Secretary to the
Board of Directors of the
Elsinore Valley Municipal Water

Elsinore Valley Municipal Water District
Title XVI Indirect Potable Reuse Feasibility Study

SECTION 6
Project Budget Proposal

Table 6						
Proposed Budget						
Budget Item Description	Computation			Recipient Funding	Reclamation Funding	Total Cost
	\$/Unit	Unit	Quantity			
<i>Salaries and Wages</i>						
Ganesh Krishnamurthy, Water Resources Manager (10% for 18 months)	\$ 73.07	Hour	156	\$ 11,399	\$ -	\$ 11,399
Brian Dickinson, Director of Operations (10% for 18 months)	\$ 67.87	Hour	156	\$ 10,588		\$ 10,588
Sudhir Mohleji, Senior Civil Engineer (10% for 18 months)	\$ 64.75	Hour	156	\$ 10,101		\$ 10,101
Accountant III (5% for 18 months)	\$ 43.40	Hour	78	\$ 3,385		\$ 3,385
Sub Total Salaries				\$ 35,473		\$ 35,473
<i>Fringe Benefits</i>						
Ganesh Krishnamurthy, Water Resources Manager	75%	Percent	\$ 8,549	\$ 8,549		\$ 8,549
Brian Dickinson, Director of Operations	75%	Percent	\$ 7,941	\$ 7,941		\$ 7,941
Sudhir Mohleji, Senior Civil Engineer	75%	Percent	\$ 7,576	\$ 7,576		\$ 7,576
Accountant III (ND)	75%	Percent	\$ 2,539	\$ 2,539		\$ 2,539
Subtotal Fringe				\$ 26,605		\$ 26,605
<i>Travel</i>						
Not Applicable						\$ -
<i>Equipment (per unit cost greater than \$5,000)</i>						
Not Applicable						\$ -
<i>Materials and Supplies</i>						
Not Applicable						\$ -
<i>Contractual</i>						
Consulting Services (Engineering & Design) - Estimated Feasibility Study Consulting Costs	\$250,000	Lump sum	1	\$100,000	\$150,000	\$250,000
Subtotal Contractual				\$100,000	\$150,000	\$250,000
<i>Reporting</i>						
Reporting	\$ 4,215	Lump sum	1	\$4,215		\$4,215
<i>Other</i>						
Not Applicable						\$0
<i>Indirect</i>						
Not Applicable						\$0
Total Project Costs				\$ 166,292	\$ 150,000	\$ 316,292
Percentage Contribution by Funding Source				53%	47%	100%

A. Budget Narrative

1) Salaries and Wages

Salaries and wages are estimated at \$35,473. Key EVMWD personnel responsible for the study include the following:

1. **Ganesh Krishnamurthy, Water Resources Manager (Engineer).** It is estimated that Mr. Krishnamurthy will spend 10% of his time on this Project for 18 months. He will be responsible for management of all IPR Study aspects, including coordinating activities with the approved consultant. Hourly wage is $\$73.07 \times 156 \text{ hours} = \$11,399$.
2. **Brian Dickinson, Director of Operations.** It is estimated that Mr. Dickinson will spend 10% of his time on this Project for 18 months. He will be responsible for managing the operations side of this Project as it relates to the various tasks associated with wastewater collection and treatment operations and source control program. Hourly wage is $\$67.87 \times 156 = \$10,588$.
3. **Sudhir Mohleji, Senior Civil Engineer.** It is estimated that Mr. Mohleji will spend 10% of his time on this Project for 18 months. He will be responsible for all wastewater analyses and recycled management activities associated with tasks required to accomplish the IPR study. Hourly wage is $\$64.75 \times 156 = \$10,101$.
4. **Accountant III.** It is estimated that an Accountant III will spend 5% of his time on this Project for 18 months. He will be responsible for all financial reporting, vendor payments and invoicing associated with the Project. Hourly wage is $\$43.40 \times 78 = \$3,385$.

2) Fringe Benefits

Fringe benefits for Project staff identified above are estimated at 75 percent of salary, for a total of \$26,605. This rate is fixed. Fringe includes retirement, vacation, sick leave, health and life insurance, disability, workman's comp, etc. Fringe benefits for each individual on the Project team are noted below:

1. Ganesh Krishnamurthy, Water Resources Manager = \$8,549.
2. Brian Dickinson, Director of Operations = \$7,941.
3. Sudhir Mohleji, Senior Civil Engineer = \$7,576.
4. Accountant III = \$2,539.

3) Travel

Not Applicable. No travel costs are anticipated.

4) Equipment

Not Applicable. No equipment costs are anticipated.

5) Materials and Supplies

Not Applicable. No materials and supplies are anticipated.

6) Contractual

EVMWD will develop an RFP and go out to bid for a consultant to develop the IPR study, estimated to cost approximately \$250,000. We anticipate that tasks will be broken down as follows with associated estimated costs:

- 1. Task 1 – Development of Treatment and Conveyance Alternatives – Estimated at \$100,000.** Task 1 will include further evaluation of treatment and conveyance options discussed in the initial study for Project yield, unit cost, effluent water quality, ease of implementation, public acceptance, environmental impacts, and other factors. Alternatives with fatal flaws will be eliminated. A ranking matrix will be developed and the preferred alternative for implementation will be identified. EVMWD will select the recommended alternative for implementation. This task will also consider the evaluation of several brine disposal alternatives which has been a major challenge in many recycling and IPR Projects.
- 2. Task 2 – Groundwater Modeling – Estimated at \$50,000.** Task 2 will involve performing groundwater simulations to support discussions with the California Department of Drinking Water (CDDW) and the Regional Water Quality Control Board (RWQCB) to advance regulatory approval. Groundwater modeling will also be critical in refining the IPR concept and the magnitude of spreading diluent water in the selected recharge areas. The groundwater modeling will be conducted to further evaluate the following elements: the direction of flow in the aquifers and the retention time to the nearest wells; potential existing potable supply wells that may be affected due to the retention time requirements; the impacts both to EVMWD as well as other stakeholders (City of Lake Elsinore, etc.), and the location of areas for potential replacement wells if needed; preliminary locations and depths for monitoring wells as required by regulations; and the extent of the “mixing zone”. In addition, a geochemical analysis to evaluate interactions between RWRF water and recharge areas will be performed.
- 3. Task 3 – Permitting and Regulatory Compliance – Estimated at \$15,000.** Task 3 will include all permitting and regulatory aspects including 1) Compliance with the 2014 California Department of Public Health (now State Water Resources Control Board Division of Drinking Water, DDW) regulations for groundwater replenishment reuse Projects; 2) Compliance with Regional Board basin planning requirements for salt and nutrients; and 3) Consistency with EVMWD water rights filings. Meetings will be held with regulatory agencies on an as-needed basis. Task 3 will also include regulatory

coordination and updates, a review of CEQA and NEPA requirements, and permitting strategy improvements.

4. **Task 4 – Draft Feasibility Study - Estimated at \$40,000.** Task 4 will include preparation of the Draft Title XVI Feasibility Study. It will incorporate information and analysis developed by EVMWD through a number of sources including the initial study, the IPR Project Feasibility Study, financial information from EVMWD, and other relevant documents. The Title XVI Feasibility Study will address all required elements delineated in Directives and Standards WTR 11-01, including: introductory information; statement of problem and needs; water reclamation and reuse opportunities; description of alternatives; economic analysis; selection of the proposed Title XVI Project; environmental consideration and potential effects; legal and institutional requirements; financial capability of the Project sponsor; and research needs.
5. **Task 5 – Final Feasibility Report – Estimated at \$20,000.** Task 5 will include preparation of the Final Title XVI Feasibility Study comprised of work completed in Tasks 1 through 4. This report will also present a construction cost estimate (*Association for the Advancement of Cost Engineering, Level 5 estimate*) along with a schedule for the implementation of the IPR Project. Financing mechanisms such as State/Federal grants, State Revolving Fund loans, etc. will also be considered for the implementation of the IPR Project and will be discussed in the technical report.
6. **Task 6 – Project Management – Estimated at \$25,000.** Task 6 will involve a series of technical meetings and workshops, which will be held throughout the Feasibility Study to discuss the Project progress and findings and receive input from EVMWD staff. The workshops will be structured to identify key decisions and questions that need to be resolved to advance the work in the Feasibility Study.

7) Reporting

Reporting is estimated to cost \$4,215 and will be prepared and submitted in accordance to Section. VI.C. Reporting Requirements and Distribution. These costs are based on the Water Resource Manager and Accountant III hourly salary plus fringe using the following assumptions:

1. Development of three (3) Financial Reports (SF 425) over the life of the Project. Billed at a total of five (5) hours (or approximately 1.67 hours per report) at the Accountant III rate of \$43.40 per hour plus \$32.55 fringe = \$75.95 x 5 hours = \$379.75.
2. Development of two (2) Progress Reports over the life of the Project. Billed at 20 hours total (or 10 hours per report) using the Water Resource Manager rate of \$73.07 per hour plus \$54.77 fringe = \$127.84 x 20 hours = \$2,556.80.
3. Development of one (1) Final Report over the life of the Project. Billed at 10 hours total using the Water Resource Manager rate of \$73.07 per hour plus \$54.77 fringe = \$127.84 x 10 hours = \$1,278.40.

8) Other

Not Applicable. No other costs are anticipated.

9) Indirect Costs

Not Applicable. No indirect costs will be billed.

10) Total Cost

Total feasibility study cost is anticipated to be \$316,292.

B. Budget Form

SF-424A under separate cover.