

**MAIN SAN GABRIEL BASIN WATERMASTER
BASIN WATER MANAGEMENT COMMITTEE**

WHITE PAPER

**TECHNICAL ADVISORY COMMITTEE
ALHAMBRA PUMPING HOLE
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Background

The Main San Gabriel Basin Watermaster's Water Management Committee has formed three Technical Advisory Committees (TACs) to identify, prioritize and develop funding for regional water supply projects. The study area extends beyond the Main San Gabriel Basin to the east and west with the intent of including as many stakeholders with common goals as possible. The three TACs are 1) the Alhambra Pumping Hole (APH TAC) area 2) the area west of the San Gabriel River (Westside TAC) and 3) the area east of the San Gabriel River (Eastside TAC). These three TACs are briefly described below. A location map is shown as Plate 1.

Alhambra Pumping Hole TAC

The APH TAC consists of seven producers from the Alhambra Pumping Hole, namely the City of Alhambra, California American Water Company, Sunny Slope Water Company, Southern California Water Company, San Gabriel County Water District, San Gabriel Country Club, and the City of South Pasadena, along with the Main San Gabriel Basin Watermaster (Watermaster), Upper San Gabriel Valley Municipal Water District (USGVMWD), San Gabriel Valley Municipal Water District (SGVMWD), Raymond Basin Management Board (RBMB), and the Metropolitan Water District of Southern California (MWD). The seven water systems produce water from the westerly portion of the Main San Gabriel Basin and have experienced a significant reduction in groundwater elevations. Although groundwater levels throughout the Main Basin have declined in recent years, levels in the APH have declined at a higher rate and historically have not recovered to the extent that the rest of the Basin does during

normal periods. The continued decline in groundwater elevations results in reduced yield and increased pumping costs in the APH. This problem was identified soon after entering into the Judgment and a local solution was sought. The Cooperative Water Exchange Agreement (CWEA) was developed in 1975 and involves purchase of about 3,000 acre-feet per year of imported supplemental water through USG-5 for in-lieu recharge. Since 1975, increased production and periods of drought have created the need to investigate additional actions to ensure a long-term reliable water supply to the area. The seven producers are within USGVMWD, SGVMWD, and the City of San Marino.

Westside TAC

The Westside TAC consists primarily of water producers that border the Main Basin and the Raymond Basin. These producers share water supply concerns, including decreasing water levels, the need for basin replenishment and groundwater contaminant migration in the Raymond Basin. These water producers are the cities of Alhambra, Sierra Madre, Arcadia, and South Pasadena, San Gabriel County Water District and Sunny Slope Water Company. In addition, water agencies that pump from the Raymond Basin within Foothill Municipal Water District (FMWD) and the City of Pasadena have limited water rights and are interested in alternatives that will reduce reliance on MWD firm deliveries. These producers are all interested in programs that will enhance groundwater recharge, provide for groundwater cleanup and develop new alternative sources of supply. The Westside TAC includes producers that are within USGVMWD, SGVMWD, FMWD, the City of Pasadena and the City of San Marino. With the exception of SGVMWD, all of these agencies are direct members of MWD. The Main San Gabriel Basin Watermaster and RBMB manage the groundwater basins in the area.

Eastside TAC

The East Side TAC consists of water producers from the Main Basin, Six Basins, Chino Basin and the Puente Basin. The Eastside TAC includes producers that have constructed imported water treatment facilities along MWD's Rialto Feeder. These

agencies include Cucamonga Valley Water District (CVWD), Water Facilities Authority (WFA), Three Valleys Municipal Water District (TVMWD) and Fontana Water Company. The MWD Foothill/Rialto Feeder parallels SGVMWD's pipeline from the Devil Canyon power plant afterbay in San Bernardino, to the eastern part of the San Gabriel Valley in San Dimas. These agencies are interested in securing an alternative source of SWP water supply during periods when MWD shuts down the Rialto Feeder. These producers are also interested in reduced reliability on imported water, i.e., increased inter-basin conjunctive use opportunities. This TAC includes producers from USGVMWD, SGVWMD, Inland Empire Utilities Agency (IEUA) and Three Valleys Municipal Water District (TVMWD).

Regional Approach

The three TACs have overlapping water supply issues where potential solutions will have regional benefits. Programs that may have primary benefit to one group of producers often have incidental benefits to other producers. Identifying projects of mutual benefit to multiple producers promotes local cooperation and increases the opportunity to obtain state and federal funding. The Alhambra Pumping Hole primarily impacts producers that are within SGVMMD and USGVMWD/MWD. These regional water agencies could separately or jointly submit public funding requests on behalf of impacted APH producers.

SGVMWD

SGVMWD consists of the cities of Alhambra, Azusa, Monterey Park and Sierra Madre. SGVMWD is a State Water Project contractor and has an entitlement of 28,800 acre-feet per year. Historically SGVMWD has delivered untreated imported water to replace groundwater produced in excess of each member agency's water rights in the Main Basin.

SGVWD owns and operates the Devil Canyon-Azusa pipeline, which begins at the SWP Devil Canyon afterbay and currently terminates in the City of Azusa. San Bernardino Valley Municipal Water District (SBVMWD) jointly owns the section of pipe from Devil Canyon to the Riverside flow control structure. SGVMWD operates its

San Dimas hydroelectric turnout facility from June through September of each year to meet contractual commitments. The pipeline has turnouts to San Dimas Wash, the San Gabriel River and San Gabriel Canyon Spreading Grounds. The SGVMWD facilities are shown on Plate 1.

SGVMWD's member agency, the City of Alhambra, produces water from the Alhambra Pumping Hole and takes water from MWD service connection USG-5 in lieu of pumping about 3,000 acre-feet each year. Watermaster SGVMWD, USGVMWD, and MWD coordinate the accounting and payment for this water under the CWEA.

Upper District

USGVMWD provides supplemental water, as needed, to its subagencies. The City of South Pasadena utilizes service connection USG-2 and Southern California Water Company utilizes service connection USG-1, as shown on Plate 1. USGVMWD participates in the CWEA by collecting funds from Alhambra and the Main San Gabriel Basin Watermaster and reimbursing MWD and SGVMWD for imported water deliveries.

Main San Gabriel Basin Watermaster

The Main San Gabriel Basin Watermaster was created by the Court to oversee the management of the groundwater supplies of the Main Basin. In the Main Basin, groundwater production is not limited, but pumping water in excess of water rights requires the purchase of Replacement Water that is replenished in the Basin. The Main Basin Judgment currently prohibits export of groundwater from the Basin.

Raymond Basin Management Board (RBMB)

Similar to the Main Basin Watermaster, the RBMB was appointed by the Court to manage the groundwater supplies of the Raymond Basin. The Raymond Basin Judgment limits the amount of water that may be pumped, and additional demands must be met through alternative sources of supply, primarily through purchase of treated imported water. However, provisions exist for long-term storage accounts if additional water is available.

APH Issue

Seven water agencies historically have produced water from the APH; their wells are shown on Plate 2. The Safe Yield of the APH has been estimated to be about 24,000 acre-feet per year while current production is about 31,000 acre-feet per year, plus USG-5 deliveries of about 3,000 acre-feet per year. On average about 7,000 acre-feet per year is over-drafted from the APH area. Historic production from the APH is shown on Figure 1. Recently, Stetson modeled the APH to identify impacts under varying scenarios. The results indicated that even under a complete shift of production out of the APH significant additional recharge will be required to return water levels to historic highs. Also, due to the geology in the area of the APH, recharge capabilities are limited. A copy of the technical memorandum with modeling results is attached as Appendix A. Shifting production away from the APH will reduce drawdown and allow for recovery of water levels. Short-term and long-term alternatives are described below.

Discussion of Short-Term Solutions (Reduce pumping by an additional 4,000 AF/Year with implementation in three years or less)

1. Increase CWEA Deliveries through USG-5

Alhambra currently purchases about 3,000 acre-feet per year through USG-5, which is shown on Plate 3. This imported water is purchased in-lieu of pumping groundwater and is considered to be pre-purchased replacement water. Alhambra receives financial assistance for 62.6 percent of total deliveries through USG-5 for costs above the differential cost of full service and seasonal storage service water in excess of \$77 per acre-foot. That amount is currently about \$160 per acre-foot (\$484.23 - \$246.65 - \$77). The \$77 per acre-foot is the agreed upon avoided cost for Alhambra to pump its own groundwater.

The annual funding for 62.6 percent of 3,000 acre-feet is about \$300,000 and is equal to a Watermaster In-lieu Assessment of about \$1.25 per acre-foot on all Basin production of 240,000 acre-feet. Assuming increased deliveries through USG-5 are funded by an In-lieu assessment similar to the CWEA every 1,000 acre-feet per

year delivered through USG-5 would result in an increase of about \$0.42 per acre-foot to the In-lieu Assessment. Therefore, to accomplish a total of 7,000 AF of in-lieu deliveries through USG-5 would cost about \$700,000 per year to fund the In-lieu account (current cost is about \$300,000 per year). The water could be used by Alhambra or could be wheeled to adjacent Upper District producers such as the City of South Pasadena. However, this assumption does not factor in additional costs such as a Tier 2 rate or additional charges associated with increased deliveries through USG-5. Additionally, increased deliveries through USG-5 would require an amendment to the CWEA, which requires Alhambra to take water at a uniform flow, and specifies how the water delivery costs are shared.

From time to time certain parties to the CWEA have expressed concern with certain aspects of the agreement. The CWEA currently has provisions that allow parties to unilaterally terminate the agreement with a one year notice. Consequently, modifying the CWEA may result in increased scrutiny from one or more of the parties; this could endanger the entire agreement. The CWEA also has a provision for MWD to access the unused capacity in SGVMWD's pipeline; this is key to moving forward with some of the regional projects currently under consideration. The SGVMWD would like to have reciprocal access to MWD available capacity in order to wheel its SWP water through MWD to SGVMWD subagencies.

2. Increase Deliveries through other MWD Connections

Southern California Water Company and the City of South Pasadena both have MWD Connections and produce water from the APH, as shown on Plate 3. The estimated cost for these agencies to produce groundwater is about \$100 per acre-foot. The current cost of MWD full service water at \$484.23, less the estimated income from leasing water rights at about \$220 per acre-foot and the pumping cost savings of about \$100 acre-foot results in a net cost of about \$164 for this option. Assuming Basin production of 240,000 acre-feet, the In-lieu Assessment would be about \$0.70 per acre-foot for every 1,000 acre-feet of full service water. Therefore, to accomplish a total of 7,000 AFY through "other" APH MWD connections would cost about \$1,150,000 per year. This option is expensive and does not include costs to mitigate water quality

impacts on distribution systems. Water quality issues and costs would need to be investigated further with individual purveyors. However, this option involves only USGVWMD member agencies and does not require a modification of the CWEA.

3. Spread Imported Water in Eaton Spreading Basin

The MWD Upper Feeder crosses Eaton Wash near Sierra Madre Blvd and New York Drive in northeast Pasadena within the Raymond Basin. Treated imported water could be delivered from a blowoff to Eaton Wash and recharged in the Eaton Spreading Basin in the northeasterly portion of the APH. The cost of treated Replenishment water is about \$325/AF and the estimated cost of producing water is about \$100/AF for a total of \$425/AF. The current cost of treated imported water from Upper District is about \$484/AF. The impacts of recharge water in the Eaton Spreading Basin on the APH should be evaluated, including modeling.

4. MWD In-lieu Replenishment Program

MWD offers an In-lieu Program that encourages producers to shift Groundwater production and take treated water under certain conditions. A relatively simple study could be conducted to evaluate the ability to shift production and what the impact of shifting all 3,000AF (or more) of USG-5 deliveries to an in lieu schedule would be.

Discussion of Long-Term Solutions (more than three years)

1.-SGVMWD/Raymond Basin Feeder

Declining water levels in the Raymond Basin result in reduced outflow from the Raymond Basin into the Main Basin which is generally thought to compound declining levels and slow recovery rates in the APH area of the Main Basin. Shifting groundwater production away from impacted areas and/or providing supplemental sources for groundwater recharge will enhance basin management and reduce impacts on the APH.

The SGVMWD pipeline could be extended into the Raymond Basin to provide replenishment water. Phase 1 would provide water to the Santa Anita and Sierra Madre Spreading Grounds, Phase 2 would provide water to the Eaton Spreading Grounds. If untreated replenishment water were available to the Eaton Spreading Grounds it may also be possible to send water south via Eaton Wash for spreading or injection in and around the Eaton Spreading Basin. Phase 3 of this project would be an extension of the pipeline to the Arroyo Seco Spreading Grounds. It should be noted that the SGVMWD/Raymond Basin Feeder is not practical without the Alostá Connection.

The capital cost of the Raymond Basin Feeder extension (Phase one only) is about \$16,700,000, including the Alostá Connection. Annual repayment over 30 years at 6 percent interest is \$1,210,000.

Because the City of Alhambra also has rights the Raymond Basin it may be possible to restore Raymond Basin production and/or increase production from the Raymond Basin by storing and pumping water delivered through the Raymond Feeder. This would shift some production from the APH and reduce impacts on groundwater levels the area. Further study is required to determine costs, system constraints, and the impacts on subsurface flows.

Further study should also include the option of extending a branch of the Raymond Feeder south to the APH area for direct recharge or injection. It has been suggested that additional spreading along the area of the Eaton Wash and/or use of injection wells may enhance groundwater levels. These two options will require further evaluation including basin modeling. However, the impacts of reduced/no pumping from the APH have been modeled, as shown in Appendix A, and indicate long-term benefits are limited without long-term recharge. Due to dense geologic formations it is believed these two options will not have groundwater level benefits beyond the immediate area of local recharge.

2. Develop Wellfield /Pipeline outside APH

A new wellfield outside the APH could enable selected APH producers to permanently shut off wells in the APH and eliminate reliance on treated MWD water.

Several factors such as availability and cost of land, recharge capabilities, and water quality impacts would need to be considered. As an example, a 10,000-gpm wellfield consisting of four new wells constructed in the vicinity of the Santa Fe Dam, as shown on Plate 4, along with a dedicated transmission pipeline would cost about \$12,000,000 (\$4,000,000 wells + \$8,000,000 pipeline) to construct. Delivery of 10,000 acre-feet per year from the new wellfield into the APH would cost about \$90 per acre-foot, for a capital repayment, assuming 6 percent and 30-year repayment period. Pumping costs are estimated to be about \$100 per acre-foot for a total of about \$190 per acre-foot, or about \$1,900,000 per year.

Alternative facilities could be constructed along Eaton Wash and a similar 10,000 gpm wellfield and transmission pipeline would be about \$8,000,000 (\$4,000,000 for the wellfield and \$4,000,000 for the pipeline). Delivery of 10,000 acre-feet would cost about \$160/AF (\$60/AF for capital repayment and \$100/AF for pumping costs.)

Funding for facilities might be provided by grants from state/federal agencies. USGVMWD/SGVMWD may also be in a position to contribute capital funding for their sub-agencies. If all capital costs could be funded, the O & M costs for this alternative would be about \$100 per AF, or about \$1,000,000 per year. A portion of this annual cost may be offset by producers' existing cost to pump water. In addition, the City of Alhambra currently budgets about \$650,000 per year to purchase MWD water. Those funds could be used to fund a new source of supply outside of the APH.

3. Increase Raymond Basin Production

The City of Alhambra Well 2 in Raymond Basin has a capacity of about 600 gpm. Well 2 has Nitrates that can potentially be blended at an offsite reservoir located 800 feet away. Costs to construct a dedicated pipeline from Well 2 to the reservoir would be comparatively low, but the shift from the APH would only result in about 500 AF per year of reduced production.

San Gabriel County Water District Well 3 in Raymond Basin has a yield of about 750 gpm, but is impacted by VOCs. The estimated cost of a 750 gpm LGAC treatment facility to treat about 1,000 AF per year is about \$150/AF consisting of capital repayment (\$25/AF), pumping costs (\$100/AF) and O & M costs (\$25/AF). Assuming

SGCWD paid the pumping costs, additional costs for the 1,000 AF would be about \$50,000/year. This project could shift about 1,000 AF per year out of the APH. Without recharge in the Raymond Basin the increase in groundwater levels may be minimal.

4. Transport Main Basin Water in Middle Feeder Analysis

An analysis to review the potential to use MWD's Middle Feeder to convey Main Basin water from outside the APH to APH producers could be conducted. Such an analysis would include a discussion of institutional constraints, the cost to produce water/connect to the Middle Feeder, MWD wheeling costs and impacts on producers receiving chloraminated water.

5. Wellfield to Santa Anita Subarea/APH

As mentioned previously, a new wellfield outside the APH could enable selected APH producers to permanently shut off wells in the APH and eliminate reliance on treated MWD water. A pipeline similar to that described in long-term option 2 could be constructed both north to the Santa Anita Subarea and west to the APH. This alternative may become more favorable if the SGVMWD pipeline extension is not constructed.

6. Monterey Park Interconnection

Investigate the potential to construct an interconnection from Monterey Park to adjacent water systems (Alhambra/SGCWD). In the future Monterey Park may have surplus water from its treatment facility which would be used as a means of reducing production from the APH. The potential yield from this alternative would be the difference between Monterey Park's future system demands and the average maximum capacity of their treatment facility. If significant surplus production is identified further study should be done to determine the feasibility of distributing the surplus water to APH producers.

Summary

The APH area groundwater levels are impacted by drought and pumping much more than the central part of the Basin, and therefore groundwater levels are significantly lower than the central portion of the Basin. Reduced demand from the APH of about 7,000 AF per year will aid in recovery of groundwater levels.

1. Over the short-term a combination of (1) continuation of the CWEA (3,000 AF per year), (2) expanded use of treated, imported water at USG-2 (2,500 AF per year), (3) implementing a blending plan at Alhambra Well 2 (500 AF per year), and (4) VOC treatment at SGCWD Well 3 (1,000 AF per year) would result in a reduced production from the APH to about 7,000 AF per year. Total annual cost would be \$300,000 for the CWEA, \$410,000 for expanded use at USG-2 and \$50,000 for VOC treatment at SGCWD Well 3 for a total of \$760,000 per year for the 7,000 AF (costs of a pipeline to Alhambra Well 2 will be comparatively minimal).
2. For the long-term construction of a new wellfield/pipeline will have an annual cost of \$1,900,000 per year for 10,000 AF per year. Excluding the cost of capital repayment, the annual cost will be about \$900,000 per year.