



**SAN LUIS OBISPO COUNTY FLOOD CONTROL AND
WATER CONSERVATION DISTRICT (SLOCFCWD)**

**PASO ROBLES GROUNDWATER BASIN
SUPPLEMENTAL SUPPLY OPTIONS STUDY**

**TECHNICAL MEMORANDUM NO. 2
SUPPLY OPTIONS AND POINTS OF DELIVERY FOR
NACIMIENTO PROJECT WATER**

FINAL
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**SAN LUIS OBISPO COUNTY FLOOD CONTROL AND WATER CONSERVATION
DISTRICT**

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SUPPLY OPTIONS AND POINTS OF DELIVERY FOR NACIMIENTO PROJECT WATER

This technical memorandum (TM) was originally developed in January 2015 and select portions were updated in July 2015. It has been used to inform the Supply Options Team and the San Luis Obispo County Flood Control and Water Conservation District (District, SLOFCWCD) about availability and procurement methods for Nacimiento Water Project Water for the Paso Robles Groundwater Basin (Paso Basin). Since the TM was originally developed, ongoing drought conditions have caused local purveyors to look for opportunities to improve their water supply portfolios. As a result, all available water within the Nacimiento Project has been allocated to various participants. The background information, procurement methods, and overall structure of the Nacimiento Project presented within this TM continue to be representative of the supplemental supply opportunities for the Paso Basin. With respect to water availability, the most updated information can be found in the Paso Robles Groundwater Basin Supplemental Supply Options Feasibility Study.

1.0 PURPOSE

This TM is one of three TMs evaluating supply options in the Paso Basin as part of the Paso Basin Supplemental Water Supply Options Study. The three supply options are: 1) Nacimiento Project Water (TM No. 2); State Water Project (SWP) Water (TM No. 3); and Recycled Water (TM No. 4). The goal of the Supply Options Study is to determine the quantity, quality, cost, and points of transfer of supplemental water options, infrastructure needs at transfer points, and the terms and/or conditions under which a Paso Basin entity¹ could procure it (e.g., contractual issues/negotiations/"transfer terms"). The purpose of this TM is to investigate Nacimiento Project Water (Nacimiento water) opportunities to maximize its use to benefit the Basin. The following is addressed in this TM:

- Existing participant's current and planned use of Nacimiento water.
- Opportunities for the expanded use of Nacimiento water by existing participants or other entities on a temporary or permanent basis.
- Potential challenges of expanded Nacimiento water supply implementation, such as costs, institutional or contractual requirements, or partner or public opposition.

¹ Paso Basin entities are the target audience for this study, and these entities could be, but are not limited to, the ultimate Groundwater Sustainability Agency or Agencies responsible for meeting the requirements of the Sustainable Groundwater Management Act, a Paso Basin Water District, community water system decision makers, individuals within the Basin or any combination thereof.

This TM will evaluate the acquisition mechanism and points of delivery options for increased Nacimiento water use and describe the primary potential end uses of the water for each. The primary goal of increased use of Nacimiento water is to help stabilize and potentially recover groundwater levels in the basin over time. Although the evaluation of the specific end uses within the Paso Basin is beyond the scope of this TM, it is anticipated that the computer model for the basin will be used to quantify the amount of water needed over time to stabilize levels in various parts of the basin. This information can then be used in the next phase of work to compare the proximity of, and quantity and quality of the water available at, each transfer point to develop strategies to achieve the highest benefit. The purpose of the evaluation of options in this TM is to identify which options associated with the use of Nacimiento water should be evaluated in the next phase and which should be deferred in accordance with specific criteria.

The Paso Basin Supply Options Subcommittee and other stakeholders will be able to provide input and comment to the draft TM. A town hall style public meeting will be held to solicit comments and input prior to moving into the next phase of work. During the next phase, additional details will be developed as needed, including further discussions and investigations into contractual, institutional, and environmental issues. Proposed strategies will be compared and ranked resulting in a prioritized list and recommended plan for the procurement of preferred supplemental water supplies. The results of the next phase will then be summarized into a report that will be distributed to the public for comment and eventually be presented to the County Board of Supervisors.

2.0 SUMMARY OF FINDINGS AND RECOMMENDATIONS

The major findings of this TM are as follows:

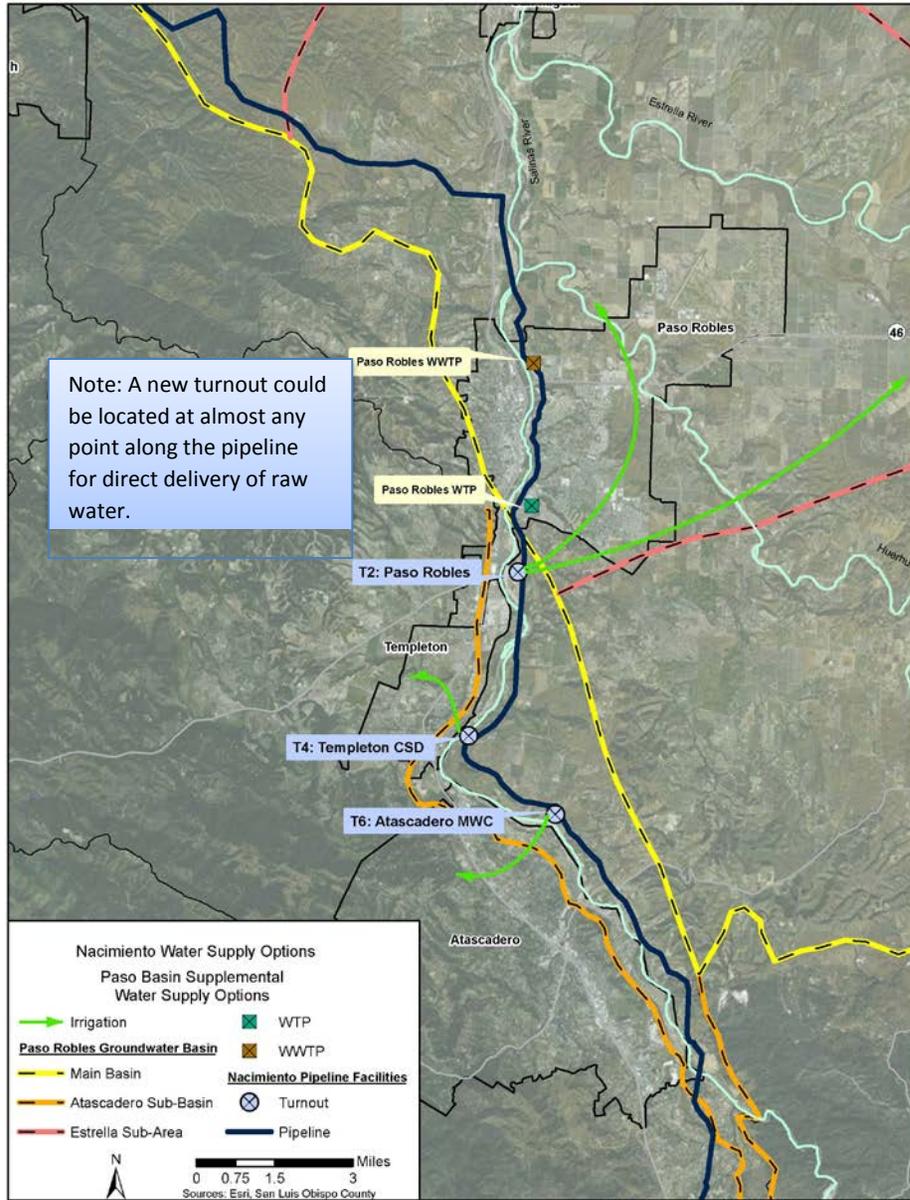
- The amount of the District's Nacimiento water² that is not used in a given year cannot be stored in the lake for the following year. For example, in Water Year (WY) 2013/2014 (WY 13/14) (October 1, 2013 to September 30, 2014), approximately 9,237 acre-feet (AF) was unused and became unavailable to the existing participants in subsequent years.
- Non-participants (i.e., entities not listed in Table 2.1) can only buy unused Nacimiento water for limited terms at a prescribed rate per the Nacimiento contracts. Under current contractual conditions, the cost of unused water (\$1,500 to \$2,2900 per AF in 2014 at an existing turnout) for non-participants is substantially higher than pumping groundwater, therefore the purchase of unused Nacimiento water by individual non-participants is currently uneconomical for those with access to groundwater. This option becomes more feasible when costs are borne by all those who would benefit from the pumping offset and/or basin recharge with additional Nacimiento water.

² San Luis Obispo County (County) holds water rights of 17,500 AFY through a Master Water Agreement with Monterey County Water Resources Agency that was negotiated in 1959. The project is owned and operated by the San Luis Obispo County Flood Control and Water Conservation District (District).

- Nacimiento water is generally the highest cost water for each of the existing participants and, as a result, use is minimized relative to other sources.
- Existing participants and the District are currently negotiating the terms under which the remaining 6,095 acre-feet per year (AFY) of reserve (e.g., unsubscribed) water might be fully subscribed by the existing participants and the District. Fully subscribed water would mean that existing participants have access to a larger entitlement of water but it is anticipated that all of each entitlement would not be used on an annual basis until growth occurs.
- Full subscription results in a lower rate for non-participants to use unused Nacimiento water on a temporary basis (i.e., via annual or longer term contracts) since the price is subject to negotiation between interested parties. Also, temporary use of unused water is a lower cost than purchasing a permanent entitlement of Nacimiento water and becoming a project participant due to the 'buy-in' costs.
- Based on discussions with existing participants and the District, and subject to decisions of the governing bodies of each agency, it is likely that the District and/or existing participants would be interested in leasing a portion of their entitlement to unsubscribed users once 'full subscription' is achieved.
- The options for how an entity that leases the unused entitlement of Nacimiento Water can use the water within the basin are identified in this technical memorandum; however, the evaluation of the options is beyond the scope of this study.
- In summary, over 9,000 AFY of Nacimiento water is currently unused. There are several technically feasible uses of the water; however, the existing water purchase cost is uneconomical for individual non-participants and the District without the costs spread across all beneficiaries. 'Full subscription' would reduce the purchase cost of water on a short-term or temporary basis.

Given the above findings, it is likely that full subscription of the reserve water will be achieved in the short term, and a non-participant after that point would procure Nacimiento water via negotiation with the District and/or one or more participants (depending on the quantity needed) after full subscription for use of any unused Nacimiento water on an annual or longer term basis. Delivery options recommended to be further evaluated are summarized in the following pages on one-page fact sheets. More detailed consideration of those and other options is included in the following sections.

1: Direct Delivery of Raw Water



Basin Benefit Strategy:

Use of raw Nacimiento project water in lieu of groundwater supplies for agricultural or large landscape irrigation to help stabilize levels in the basin and address the supply and demand imbalance. The supply option will be considered for rough screening, therefore the Basin model will be used to evaluate the benefit of this supply option.

Potential to combine with recycled water and/or recharge of raw water.

Potential Yield: Up to 9,000 AFY (in 2014); volume will reduce as planned use increases over time.

Level of Treatment/Water Quality: No additional treatment necessary.

Point of Delivery: New or existing turnout and pipeline to customers.

Suitable End Uses: Landscape or agricultural irrigation.

Cost Components Considerations:

Capital: Infrastructure required for transmittal and delivery of water

Operations and Maintenance: Annual cost of purchasing Nacimiento water and pumping to customers.

Implementation Issues:

Institutional: Determine entities to lead management and funding of planning, design, construction, and operation of water purchase and conveyance system. Need customers willing to use the water at the price to be determined. Seasonal irrigation demand may necessitate including recharge to improve cost effectiveness.

Contractual: Purchase agreements must be secured.

Reliant on completion of other project: Costly infrastructure may be required to deliver water to end users.

Key Partner(s) interest: Several agricultural representatives expressed interest in the use of Nacimiento water, including in combination with recycled water.

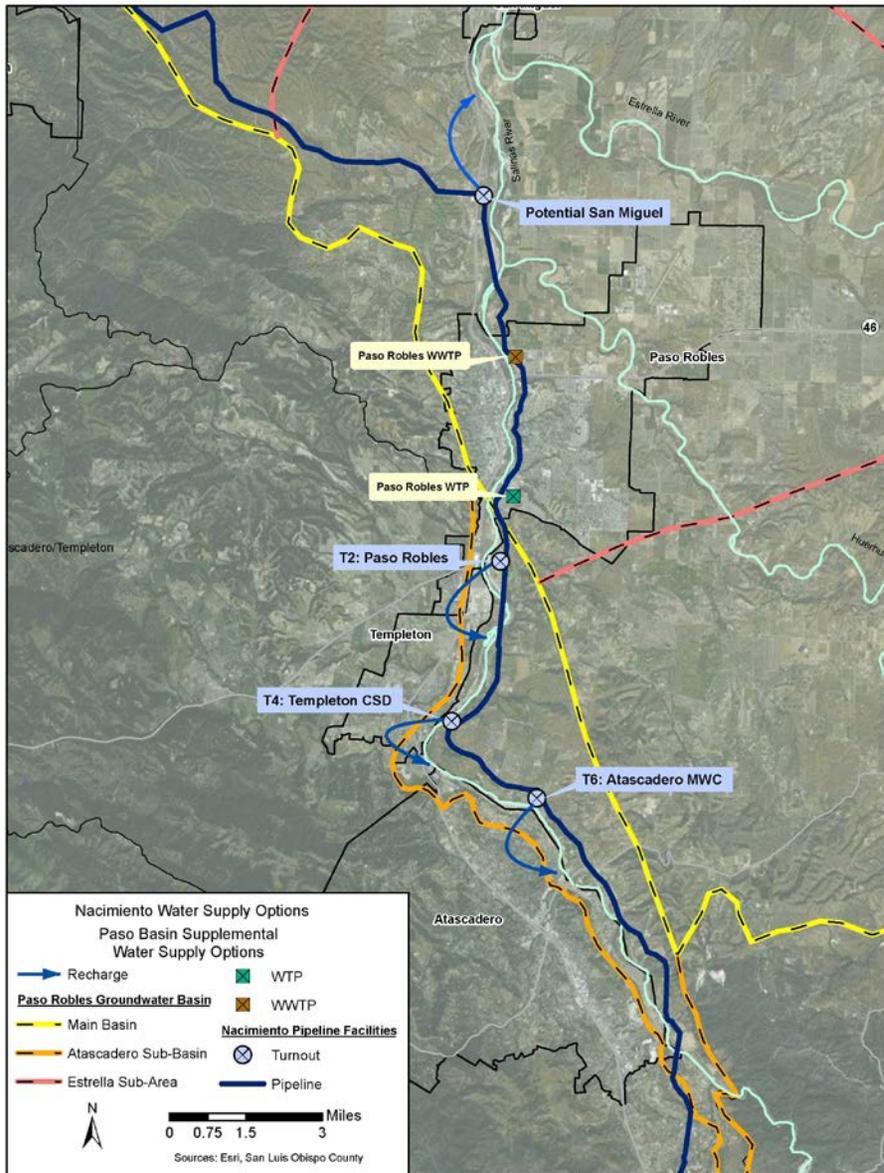
Public acceptance/opposition: None known at this time.

Implementation Duration/Timeline:

Permanent or temporary: Significant investment of infrastructure would require a long term agreement for water supply. Low investment (e.g. an end user near the pipeline) could be temporary.

Mid-Term (5-10 Years): Need to identify interested irrigation customers (at least 2 years). At least three years to plan, design and construct an infrastructure system.

2: Salinas River Recharge



Basin Benefit Strategy:

Increased discharges to the Salinas River to benefit the basin. The supply option will be considered for rough screening, therefore the Basin model will be used to evaluate the benefit of this supply option.

Potential Yield: Up to 9,000 AFY (in 2014); volume will reduce as planned use increases over time.

Level of Treatment/Water Quality: No additional treatment necessary.

Point of Delivery: Existing or new turnout to existing or new Salinas River percolation basins for alluvial recharge for 1) recharge of Paso Robles Formation; or 2) recharge and recovery within alluvial aquifer operation (in lieu of Paso Robles Formation pumping) for direct potable delivery through existing infrastructure or building new recovery and distribution infrastructure.

Suitable End Uses: Any beneficial use after pumping from the aquifer.

Cost Components Considerations:

Capital: May need additional discharge, recovery, and/or conveyance facility capacity, a new turnout and/or a buy-in fee to use existing infrastructure.

Operations and Maintenance: Annual cost of purchasing Nacimiento water and maintaining infrastructure

Implementation Issues:

Institutional: Need to determine degree of benefit and entities to lead management and funding of the project.

Contractual: Purchase agreements must be secured.

Reliant on completion of other project: Expanded or new infrastructure may be needed.

Key Partner(s) interest: Existing participants support the concept but no project partners have been identified.

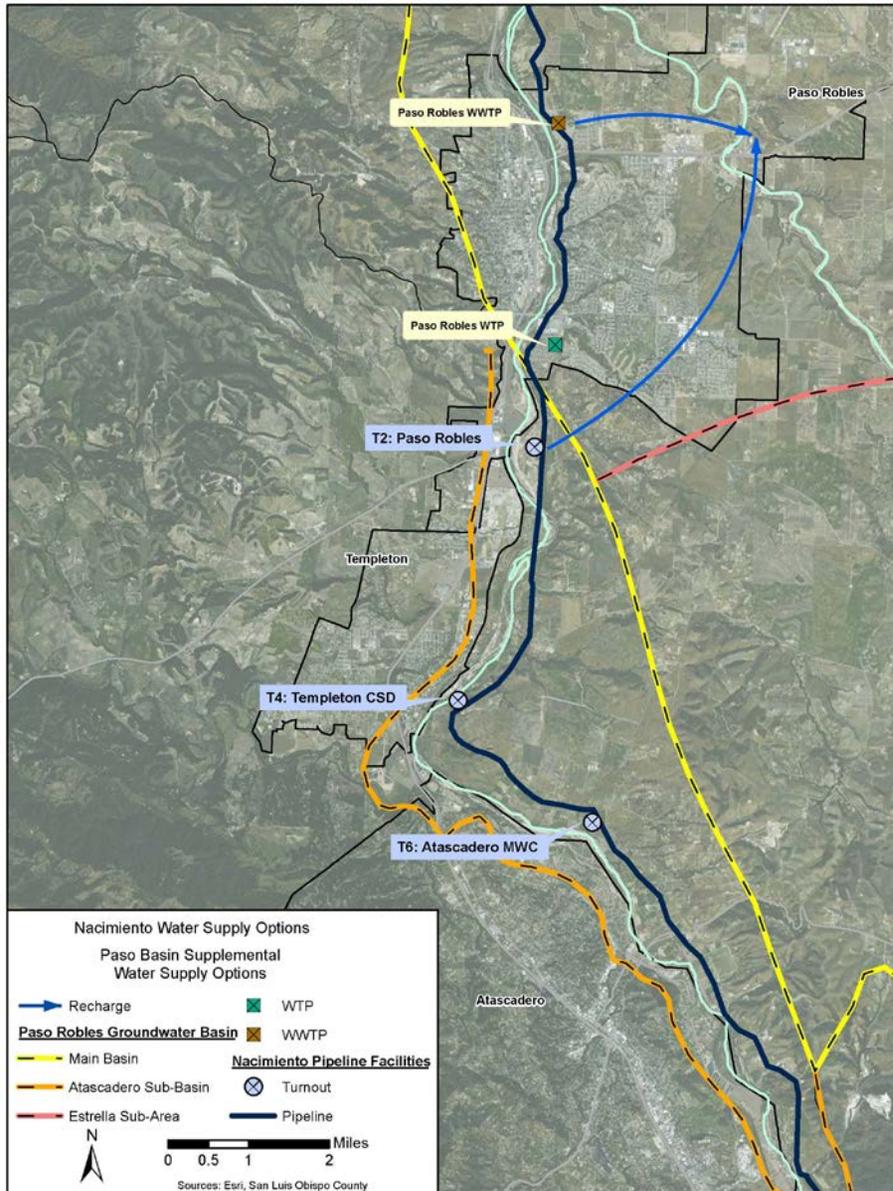
Public acceptance/opposition: None known at this time.

Implementation Duration/Timeline:

Temporary or Permanent: Dependent on contract and water availability.

Short-Term (0 - 5 years): Minimal infrastructure required for discharge to river.

3: Greatest Decline Area Recharge



Basin Benefit Strategy:

Indirect use of Nacimiento project water via alluvial formation recharge and recovery in lieu of Paso Robles Formation pumping and/or Paso Robles Formation recharge via surface discharge. The supply option will be considered for rough screening, therefore the Basin model will be used to evaluate the benefit of this supply option.

Potential to combine with recycled water and/or recharge of raw water.

Potential Yield: Up to 9,000 AFY (in 2014) ; volume will reduce as planned use increases over time.

Level of Treatment/Water Quality: No additional treatment necessary if applied for surface recharge.

Point of Delivery: New turnout to a conveyance pipeline to location(s) for recharge.

Suitable End Uses: Any beneficial use after pumping from the aquifer.

Cost Components Considerations:

Capital: Conveyance system from the Nacimiento pipeline to the recharge location(s) where the most benefit from recharge would occur. If necessary, construction of surface recharge basins, including land purchase.

Operations and Maintenance: Annual cost of purchasing Nacimiento water, maintaining infrastructure, and groundwater monitoring.

Implementation Issues:

Institutional: Determine entities to lead management and funding of planning, design, construction, and operation of water purchase and conveyance system. Need to identify location for most benefit from recharge and to identify how much benefit is achieved – opportunities may be limited (see Banking Feasibility Study).

Contractual: Purchase agreements must be secured.

Reliant on completion of other project: Costly infrastructure may be required to deliver water to recharge locations.

Key Partner(s) interest: No project partners have been identified.

Public acceptance/opposition: None known at this time.

Implementation Duration/Timeline:

Permanent – Significant investment of infrastructure would require a long term agreement for water supply.

Mid-Term (5-10 Years): Significant investment of infrastructure requires significant planning. At least five years to complete hydrogeological studies and plan, design and construct an infrastructure system.

3.0 INTRODUCTION

3.1 Background

The Paso Robles Groundwater Basin (basin) is located in the upper portion of the Salinas River watershed and is the primary water source for North San Luis Obispo County. The basin is approximately 505,000 acres (790 square miles) and all the communities within the basin rely on the basin's groundwater. Cities, CSDs (agencies), rural residences, urban developments, vineyards, and other agricultural uses all pump water from the underground basin to use for potable and non-potable uses. The basin is subdivided into one sub-basin and several sub-areas for study and planning purposes.

The San Luis Obispo County Flood Control and Water Conservation District (District) has spent several years studying the basin hydrogeology and the demand and supply of the basin's groundwater. The various studies have concluded that the groundwater basin is approaching or has reached its perennial yield. The 2014 Basin Computer Model Update has estimated that from 1981 to 2011 annual outflows exceed the inflows of the basin by 2,400 AFY. These exceedances have manifested in groundwater level declines and are depicted in Figure 2.1 for the period 1997-2013. This imbalance is further aggravated under future year simulations, highlighting the need to identify supply alternatives to offset further pumping of the basin groundwater.

3.2 Nacimiento Project Setting

The Nacimiento Water Project (the project) consists of 45 miles of pipeline conveying raw water from Lake Nacimiento, located within the northern portion of San Luis Obispo County, to communities within San Luis Obispo County. Lake Nacimiento is managed by Monterey County Water Resource Agency (MCWRA), and the District holds water rights of 17,500 AFY through a Master Water Agreement with MCWRA that was negotiated in 1959.

The project is owned and operated by the District. The project began operations in 2011. Current participants and allocations are summarized in Table 2.1. The project pipeline and communities served is described in Table 2.2 and illustrated in Figure 2.2.

Figure 2.3 shows historical monthly use by each existing participant compared with the Nacimiento capacity upstream of the Paso Robles turnout. As shown in the figure, significant capacity exists today; however, some of the capacity from June to September is planned for use in the future as part of planned increase in Nacimiento water use. An example of potential monthly use at buildout is shown in Figure 2.4.

Table 2.1 Existing Nacimiento Water Project Participants Paso Robles Groundwater Basin Supplemental Supply Options Study San Luis Obispo County Flood Control and Water Conservation District	
Existing Participants	Entitlement (AFY)
City of Paso Robles	4,000
Templeton Community Services District (TCSD)	250
Atascadero Mutual Water Company (AMWC)	2,000
City of San Luis Obispo (SLO)	3,380
County Service Area (CSA) 10A	25
Existing Subtotal	9,655
Prior Commitment ⁽²⁾	1,750
Unallocated	6,095
Total	17,500
Notes:	
(1) Refer to Figure 2.1 for turnout locations for each participant.	
(2) Permanent allocation to lakeside customers.	

Table 2.2 Existing Nacimiento Water Project Infrastructure and Capacity Elements Paso Robles Groundwater Basin Supplemental Supply Options Study San Luis Obispo County Flood Control and Water Conservation District								
Project Segment⁽¹⁾	Current Entitlement (AFY)	Segment Pipe Diameter	Current Contractual Agreement		Full System Capacity⁽²⁾		Uncontracted Capacity⁽²⁾	
			(cfs)	(AFM)	(cfs)	(AFM)	(cfs)	(AFM)
A, A1, C, C1		36"	23.49	1,425	32.79	1,983	9.30	567
C1		30"	23.49	1,425	32.79	1,983	9.30	567
T2 - Paso Robles	4,000	24" Turnout	9.03	550	12.90	775	3.87	225
B, D		24"	14.46	875	19.89	1,208	5.43	325
T4 - TCSD	250	8" Turnout	1.03	67	1.27	83	0.24	17
T4 to T6		24"	13.43	808	18.62	1,125	5.19	308
T6 - AMWC	2,000	18" Turnout	8.28	500	10.22	617	1.94	117
F, F1, F2, G, G1, G2		18"	5.14	308	8.40	508	3.26	200
H (Cuesta Tunnel)		24"	5.14	308	8.40	508	3.26	200
T11 - SLO/CSA10A ⁽³⁾	3,405	12" Turnout	5.14	308	8.40	508	3.26	200
Total	9,655							
Notes:								
AFM = Acre-feet per month.								
(1) Refer to Figure 2.2 for turnout locations.								
(2) Source: Nacimiento Water Project TM 21: System Expansion and Modifications Conceptual Details and Requirements (Black & Veatch, March 2011).								
(3) CSA 10 portion of SLO entitlement is 25 AFY and 0.04 cfs.								

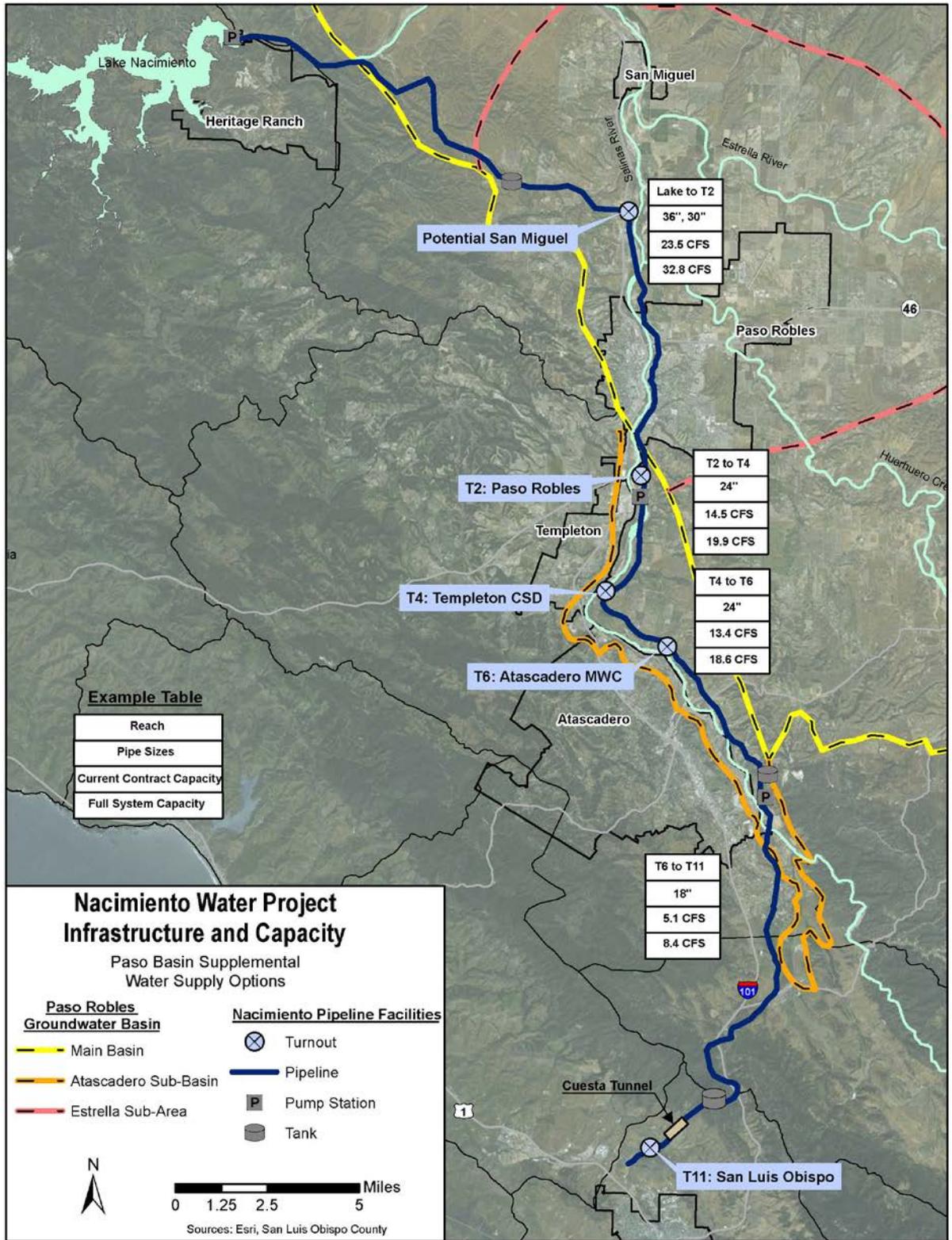


Figure 2.2 Nacimiento Water Project Unit Map

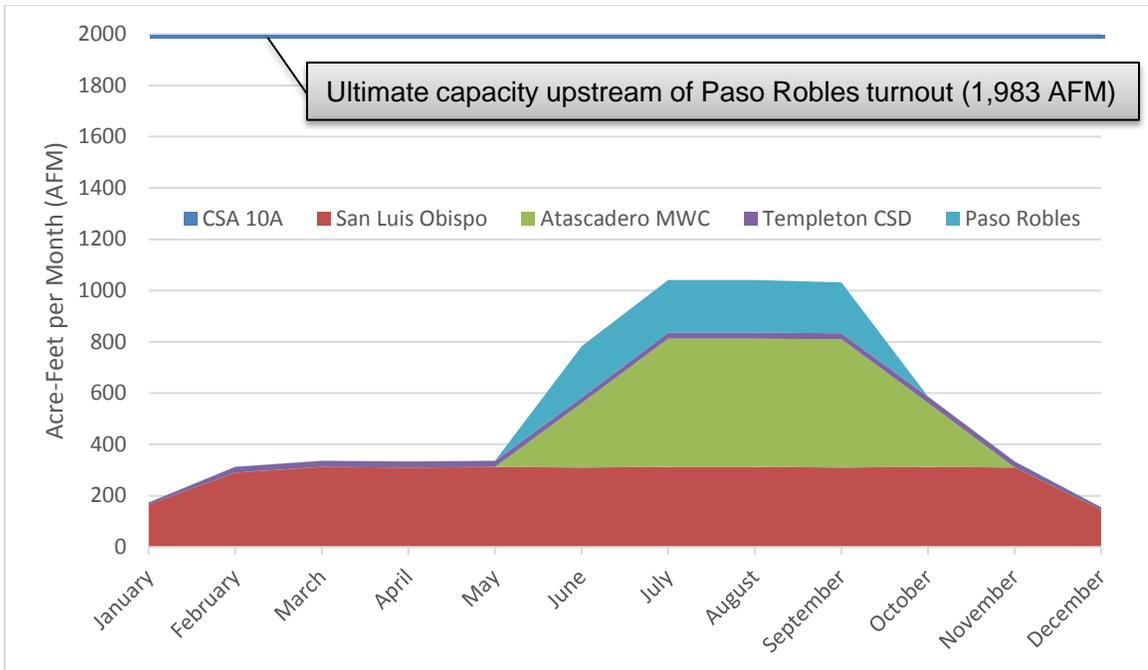


Figure 2.3 Historical Monthly Use Example

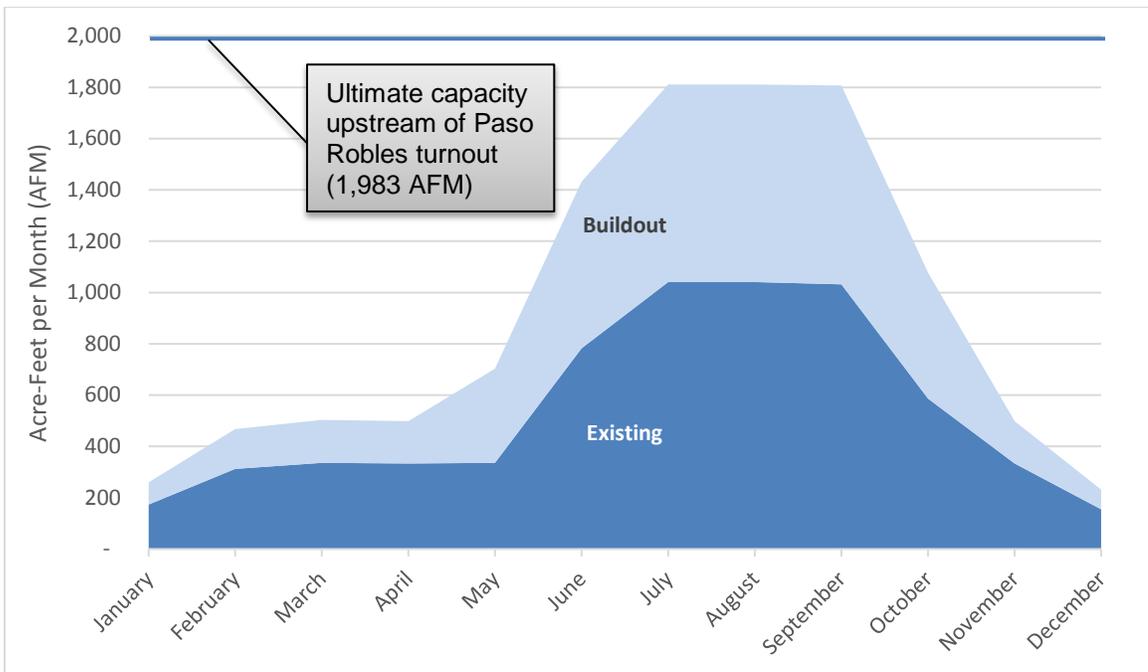


Figure 2.4 Historical Monthly Use with Example Use at Buildout

Nacimiento Project Water provides surface water to customers primarily located within the Salinas River corridor of the Basin who historically relied solely on Salinas River underflow and Paso Robles Formation groundwater supplies. Individual agricultural, residential and commercial entities, and small community systems overlying the Basin currently rely solely on Basin groundwater. Increased use of Nacimiento Project Water can help to stabilize

groundwater levels by offsetting pumping and/or augmenting groundwater supplies. Nacimiento Project Water is currently only 60 percent allocated, leaving unused water available for use in the present day. In addition, the current participants, collectively, have not used their full allocation since the project started operations. Options to utilize the unused water are presented and discussed below.

3.3 Previously Identified Options

3.3.1 Blue Ribbon Steering Committee

As part of implementing the Paso Robles Groundwater Basin Management Plan, a Blue Ribbon Steering Committee (BRC) was formed to provide input into the potential “solutions” for the declining groundwater level problem. The outcome of this effort was a list of Top Ranked Solutions in August 2013. The solutions were divided into categories of management, conservation, supplemental and recycling alternatives. In addition, the solutions were categorized as short, medium, and long-term solutions.

For this supply option study, the management and conservation alternatives or solutions are not applicable. However, the list of supplemental options is applicable. The five top ranked Nacimiento water options are presented in the Table 2.3.

Table 2.3 Summary of Relevant Top Ranked Solutions from BRC, Aug. 2013 Paso Robles Groundwater Basin Supplemental Supply Options Study San Luis Obispo County Flood Control and Water Conservation District			
Category	Timeline	Option	Description
Supplemental	Short Term	ST -12	Exchange or Bank Nacimiento Water with Santa Margarita Lake
		ST -13	Paso Robles to use alluvial water first, Nacimiento second and Paso Basin water last
Supplemental	Med/Long Term	MLT -1	Implement supplemental supplies from State Water, Salinas River, Nacimiento, Santa Margarita
		MLT -2	Explore opportunities with Monterey County including Lake Nacimiento/San Antonio intertie
		MLT -3	Direct delivery of unsubscribed Nacimiento or State Water Project allocations
<u>Notes:</u> (1) From Blue Ribbon Steering Committee Top Ranked Solutions, Aug 21, 2013.			

The options listed in Table 2.3 are relevant to this study and set the framework for starting the effort of evaluating supplemental supply options for the Paso Basin. Top ranked solutions that are already underway noted by the BRC include:

- C-1: Atascadero’s use of its full Nacimiento allocation (2,000 AFY) through use of existing percolation ponds.

- C-9: Templeton’s increased use of existing Nacimiento allocation (250 AFY).

These opportunities and their progress toward implementation are included and summarized in this study.

3.3.2 Options Considered in Kickoff Meeting

During the Supply Options Study kickoff meeting in May 2014, the project team, District staff, and representatives from the City of Paso Robles all brainstormed options that would benefit the Paso Basin. Only those relevant to the scope of this study are shown herein. This list is a starting point for the list of options to be evaluated and incorporated into the study. The list of Nacimiento water options discussed at the kickoff meeting is summarized in Table 2.4 along with how the option will be incorporated into the study. Because this study focuses on supply options and not end uses, the exact user of Nacimiento water supplies will not be determined in this TM; however, discussion of end users is important to ensure the evaluation of supply options is comprehensive.

Table 2.4 Summary of Nacimiento Options Considered at the Kickoff Meeting ⁽¹⁾ Paso Robles Groundwater Basin Supplemental Supply Options Study San Luis Obispo County Flood Control and Water Conservation District		
Option	Timeline /Duration⁽²⁾	Application to Supply Options Study⁽¹⁾
Nacimiento Project Water for in lieu use	M/T or P	Included in this study
Exchange Nacimiento Project Water for Salinas River water with the City of San Luis Obispo	L/T or P	Included in this study
Turnout Nacimiento Project Water to Salinas River for recharge	S/T or P	Included in this study
Negotiate additional Nacimiento water supply with Monterey County Water Resource Agency	M/P	Included in this study
Notes:		
(1) End uses of Nacimiento Project Water not determined by this study.		
(2) Timeline to implement: Short-Term (S) of 0 - 5 years, Mid-Term (M) of 5 - 10 years, or Long-Term (L) of 10 - 15 yrs. Duration of reliable water supply: Temporary (T) or Permanent (P).		

Options were evaluated as to their timeline for implementation. An assignment of short, mid or long-term implementation from planning through construction was used as follows: *Short-Term = 0 - 5 years, Mid-Term = 5 - 10 years, Long-Term = 10 - 15 years.*

Similarly, options were compared based on the duration of reliable water supply in terms of providing either a supply that is temporary (annual or 5-year contract) versus permanent (long term lease or contract).

4.0 NACIMIENTO WATER ACQUISITION OPTIONS

Use of Nacimiento water for the benefit of the basin beyond existing use requires consideration of: 1) water acquisition options; and 2) water delivery options. The former is discussed in this section and the latter is discussed in Section 5, but both are interlinked.

As part of this analysis several Nacimiento acquisition options were considered. All options considered include putting more water from Lake Nacimiento to use than is currently anticipated. The options considered in this TM include:

- Under existing contract conditions, delivering Nacimiento water to various points of delivery.
- Obtaining the full subscription of Nacimiento water entitlement and delivering the water to various points of delivery.
- Obtaining additional Nacimiento water beyond the existing entitlement through an intertie project with San Antonio Reservoir and/or negotiations with MCWRA.

4.1 Existing Nacimiento Participants and Process for Obtaining Additional Nacimiento Water

With respect to the Nacimiento delivery pipeline, the District currently holds contractual agreements with five existing participants for a portion of the water available under the Master Water Agreement with MCWRA. The contracts with the existing participants outline the agreement for the District to serve water to the participant including agreed upon delivery amounts, cost arrangements, payment arrangements and, important to this discussion, the process for allocating unused water.

This section will describe the types of Nacimiento Project Water identified in the contracts, the associated costs for the Project Water, and an overview of the process for acquiring additional Nacimiento water for both an existing participant and a non-participant.

4.1.1 Background

The District's existing entitlement of 17,500 AFY of Nacimiento Reservoir Water can be parsed into three categories whose definition is based on contractual agreements with existing participants. These three categories are as follows:

- Prior Commitment Water (1,750 AFY): This is a permanent allocation to lakeside customers.
- Delivery Entitlement (9,655 AFY): This is the amount of water that is currently allocated to the five existing participants (City of Paso Robles, Templeton CSD, Atascadero MWC, City of San Luis Obispo, and CSA 10A).

- Reserve Water (6,095 AFY): This is the unsubscribed Project Water that is currently available.

Delivery Entitlement and Reserve Water together represent the Nacimiento Project Water (Nacimiento water) evaluated in this study (15,750 AF). Delivery requests from existing participants in WY 14/15 were 8,109 AF; therefore the turn back pool water, which is the difference between delivery entitlements and delivery requests, was 1,546 AF. Total surplus water in WY 13/14, which includes the turn back pool and the reserve water (6,095 AF), was 7,641 AF.

Figure 2.5 illustrates the contractual types of Nacimiento Reservoir Water described above, including values for WY 14/15.

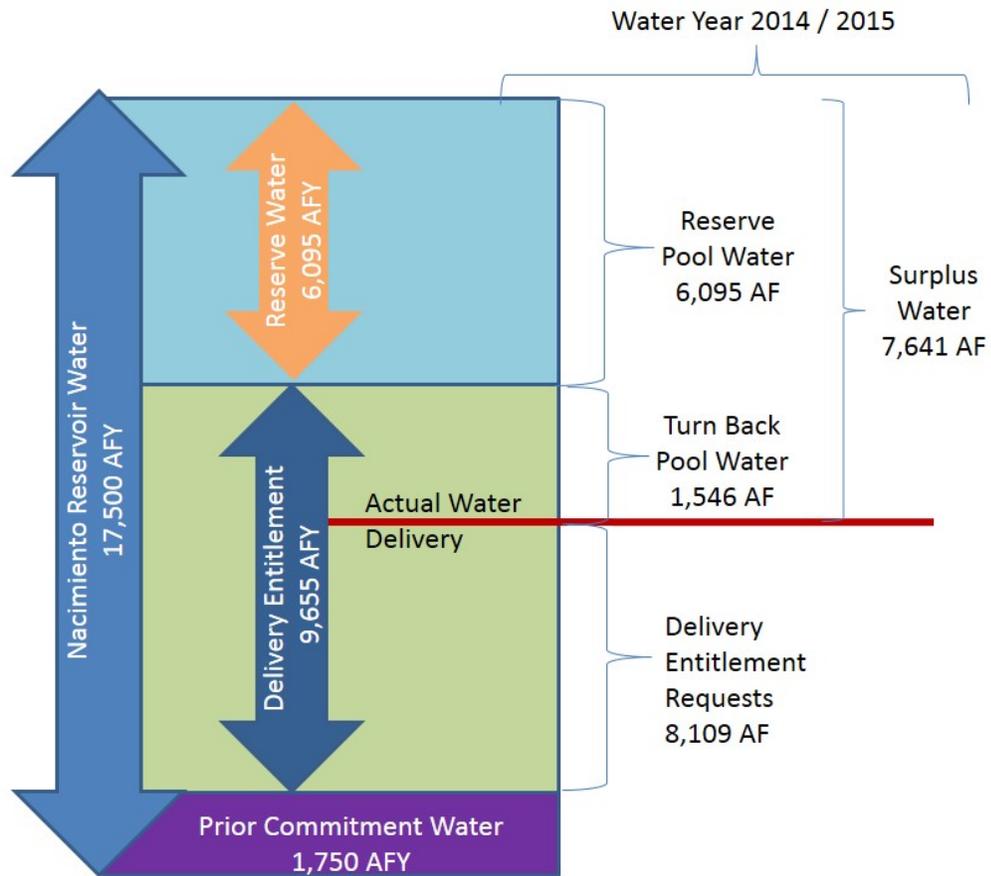


Figure 2.5 Nacimiento Reservoir Water Contractual Categories

The District, through their contractual agreements has established a process for existing participants and others to obtain an additional supply allocation for Nacimiento Project Water, either on a permanent or temporary basis. To obtain more water than their current entitlement, existing participants can:

- Increase their entitlement by contracting for an amount of reserve water.
- Purchase surplus water on an annual basis.

Non-participants have several options:

- Acquire an entitlement from the Reserve Water and become a new participant in the project.
- Purchase surplus water from the District on an annual basis or purchase reserve water from the District for a period of up to five years.
- Once the project is “fully subscribed,” which is when entitlements are contracted for all of the reserve water, the non-participants can purchase water from a project participant on a non-permanent basis (but for an extended period). Individual contracts and contract terms would be developed at that time between the potential purchaser and a project participant.

The District has established a formal notification process for acquisition of water on a temporary basis by existing participants or other entities. The process for each situation is described in Appendix A.

4.1.2 Acquisition Costs

Contractual costs for water differ between existing participants and non-participants for permanent or temporary use of Nacimiento Project Water. Existing participants and the District have been paying for the project since the beginning – primarily in three categories:

- Debt Service (\$12.3M/yr in 2015): For \$190.4 M in capital cost for project construction cost and buy-in cost to MCWRA. Construction costs were allocated to existing participants based on the hybrid model³ and buy-in costs were allocated based on percentage of entitlement.
- Operations and Maintenance (O&M) (\$3.8M/yr in 2015): For ongoing system maintenance and facility replacement. Costs are allocated based on the hybrid model and delivery entitlement.

³ “Hybrid model” refers to allocation of costs based on 50% where the participant falls on the pipeline and 50% based on delivery entitlement share of the project.

- Variable Energy (~\$300/AF): For the cost of energy consumed to deliver water from the lake to the participants. The cost varies dependent on the volume of water delivered and the cost of energy. A historical average value is presented. The cost is applied to existing participants based on actual water delivered.

Existing participants pay the project costs with the exception of approximately \$1.1M/yr from the District for the Reserve Capacity Construction Cost. (See Table 2.5.)

Agency	Entitlement (AFY)	Annual Cost ⁽¹⁾	Unit Cost (\$/AF)⁽¹⁾
City of Paso Robles	4,000	\$5.15M	\$1,288
Templeton CSD	250	\$0.35M	\$1,422
Atascadero MWC	2,000	\$3.30M	\$1,652
City of San Luis Obispo	3,380	\$6.55M	\$1,939
CSA 10	25	\$5,390	\$216
Total	9,655	\$15.36M	
District	6,095 (Reserve Capacity)	\$1.23M	
Total	15,750	\$16.59M	

Notes:

(1) Source: Nacimiento Water Operating Fund Budget for FY 2015-2016. Costs include variable energy costs, which have historically been around \$300/af. Variable energy costs are expected to increase over time.

(2) CSA 10 cost is based on just operation and maintenance costs. They paid the capital in cash up front.

The acquisition of Nacimiento Project Water is dependent on whether the acquisition is on a permanent or temporary basis and the project participant status of the entity. As shown in Table 2.6, the existing contract requires non-participants that want a permanent allocation to pay for some portion of debt service in addition to O&M and variable energy costs. Historically, this cost has proven to be the primary disincentive for non-participants to use Nacimiento Project Water. The requirement for payment of debt service is removed once the project is fully subscribed and water can be sold temporarily by a participant to a non-participant at an agreed upon price.

4.2 Water Acquisition Scenarios

The Nacimiento Project Water supply is not being fully utilized, resulting in lost opportunity to bring Nacimiento supply into the Paso Basin every year. New participants may have been discouraged from acquiring Nacimiento Project Water due to the high buy-in project cost that includes catch-up payment on capital and debt service costs.

Table 2.6 Allocation of Cost to Acquire and Use Nacimiento Project Water ⁽¹⁾ Paso Robles Groundwater Basin Supplemental Supply Options Study San Luis Obispo County Flood Control and Water Conservation District				
Type of Water	Buy-In Debt Service	System Debt Service	Annual O&M	Variable Energy
Existing Participants				
New Entitlement (Permanent)	--	Yes	Yes	Yes
Surplus Water (Temporary)	--	--	Yes	Yes
Non-Participants				
New Entitlement (Permanent)	Yes	Yes	Yes	Yes
Surplus Water from District (Temporary)	--	Yes	Yes	Yes
Water from Participant (Temporary) ⁽²⁾	Negotiated between the two parties (participant selling to a non-participant)			
Notes:				
(1) Refer to Tables 2.9 and 2.10 for specific scenarios.				
(2) Option is only available once Project Water is fully subscribed.				

In 2014, the District was approached by existing participants interested in fully subscribing all the Nacimiento Project Water, including all the reserve water, to accommodate future planned growth within their jurisdictions and to reduce water acquisition costs for non-participants. In response, the District developed scenarios to determine the amount of water that could be delivered to the participant based on their proportionate water right and delivery capacity within the system. The “full subscription” scenarios are described in Section 4.2.1.

Currently reserve water is available and can be utilized to supplement water supplies for existing or non-participants on a temporary basis. Costs for full subscription as compared to temporary water use of reserve water were calculated by the District to provide insight to how increased water entitlements change the cost of water per participant. The “temporary water” scenarios are described in Section 4.2.2.

4.2.1 Full Subscription Scenarios

This option explores the institutional change of fully subscribing Nacimiento project through three scenarios:

- Full Subscription Scenario 1 (FS1): Existing Participants only.
- FS2: Existing Participants and the District.
- FS3: Existing Participants and a New Participant.
- FS4: Existing Participants and a New Participant after Full Subscription with the District.

The distribution of entitlements is summarized in Table 2.7 and costs are provided in Table 2.8. The volume of water for the District (1,294 AFY) is based a recent proposal in front of the Nacimiento Water Commission (February 26, 2015 meeting). The volume of water for a New Participant is not known at this time so the same value assumed for the District in FS2 of 1,294 AFY was assumed for the purposes of this TM.

Table 2.7 Scenarios for Full Subscription Paso Robles Groundwater Basin Supplemental Supply Options Study San Luis Obispo County Flood Control and Water Conservation District				
Agency	Existing Allocation, AFY	FS1 Allocation, AFY	FS2 Allocation, AFY	FS3 & FS4 Allocation, AFY
City of Paso Robles	4,000	6,525	5,989	5,989
Templeton CSD	250	408	374	374
Atascadero MWC	2,000	3,262	2,995	2,995
City of SLO	3,380	5,514	5,061	5,061
CSA 10	25	41	37	37
Reserve Capacity	6,095	0	0	0
District	0	0	1,294 ⁽¹⁾	0
New Participant	0	0	0	1,294 ⁽²⁾
Total	15,750	15,750	15,750	15,750
Notes:				
(1) Based on proposed allocation presented at Nacimiento Project Commission meeting on February 26, 2015.				
(2) The volume of water requested by a New Participant is not known at this time so the same value assumed for the District in FS2 of 1,294 AFY was assumed for the purposes of this TM.				

The distinction between FS1 and FS2 is in the District's participation. While the governing board of the District has not deliberated on its participation in a full subscription scenario, its participation would presumably be to reserve permanent allocation for future interested parties and/or a minimum volume of water for emergency needs in the county. Also, it should be noted that several existing participants may be willing to lease a portion of their unused entitlement on a long-term basis. The assumed⁴ difference in cost between the two scenarios is that the District would continue to pay a percentage of the \$1.1M/yr for reserve capacity. Under Scenario FS1, the existing participants would need to pay their proportional share of the \$1.1M/yr of debt service that the District is currently paying.

⁴ Terms of these scenarios are subject to negotiation.

**Table 2.8 Costs for Full Subscription Scenarios
Paso Robles Groundwater Basin Supplemental Supply Options Study
San Luis Obispo County Flood Control and Water Conservation District**

Turnout	Allocation Holder	FS1: Existing Participants Only ⁽¹⁾			FS2: Existing Participants and District ⁽¹⁾⁽²⁾			FS3: Existing Participants and New Participant ⁽¹⁾⁽³⁾⁽⁴⁾			FS4: Existing Participants and New Participant after FS2: Full Allocation by District ⁽¹⁾⁽³⁾⁽⁵⁾		
		AFY	Annual Cost	Unit Cost (\$/AF)	AFY	Annual Cost	Unit Cost (\$/AF)	AFY	Annual Cost	Unit Cost (\$/AF)	AFY	Annual Cost	Unit Cost (\$/AF)
T-2	Paso Robles	6,525	\$5.66M	\$1,056	5,989	\$5.24M	\$875	5,989	\$5.13M	\$858	5,989	\$5.13M	\$858
T-4	Templeton	408	\$0.38M	\$1,089	374	\$0.36M	\$965	374	\$0.35M	\$939	374	\$0.35M	\$939
T-6	Atascadero	3,262	\$3.55M	\$1,236	2,995	\$3.34M	\$1,118	2,995	\$3.27M	\$1,095	2,995	\$3.27M	\$1,095
T-11	San Luis Obispo	5,514	\$6.98M	\$1,431	5,061	\$6.62M	\$1,310	5,061	\$6.49M	\$1,283	5,061	\$6.49M	\$1,283
	& CSA-10	41	\$8,575	\$607	37	\$2,856	\$77	37	\$2.463	\$67	37	\$2.463	\$67
N/A	District				1,294	\$1.01M	\$783						
	Subtotal	15,750	\$16.59M		15,750	\$16.59M		14,456	\$15.26M		14,456	\$15.26M	
T-2	New Participant												
	Annual Payment							1,294	\$0.32M	\$247	1,294	\$1.33M	\$1,028
	Annual Total	15,750	\$16.59M					15,750	\$15.58M		15,750	\$16.59M	
	One-Time Payment								\$27.57M			\$7.99M	
	Variable Energy								\$1.8M/yr	\$1,386		\$0.5M/yr	\$401
	Approximate New Participant Total									\$1,933			\$1,729

Notes:

(1) Costs are based on FY 2015-2016 budget. Costs include turnout costs and variable energy. Variable energy costs historically are roughly \$300/AF.

(2) The District's allocation is based on proposed allocation presented at Nacimiento Project Commission meeting on February 26, 2015.

(3) The volume of water to be requested by a New Participant is not known at this time so the same value assumed for the District in FS2 of 1,294 AFY was assumed for the purposes of this TM. For purposes of developing these cost estimates, the assumed location of delivery is at the City of Paso Robles Turnout (T-2) and assumed buy in date of 7/1/2017. Changes to either assumption impacts costs.

(4) A new Participant under existing conditions would need to pay the one time "Buy-in-Fee" in the amount of **\$27,565,110** at the time of buy-in. The annualized cost of the buy-in fee is **\$1.8M** per year based on a financing rate of 5% over 30 years. In addition, annual operation and maintenance project costs for the new participant would be approximately **\$0.32M** per year. The annual O&M estimate does not include variable energy, which has historically been roughly **\$300/AF**.

(5) After full allocation is completed, a new Participant would need to pay the one time "Buy-in-Fee" in the amount of **\$7,985,000**, which is based on historic debt payments by the District, at the time of buy-in. The annualized cost of the buy-in fee is **\$0.5M** per year based on a financing rate of 5% over 30 years. In addition, the New Participant would take over the District's annual debt payment of **\$1.01M** per year and annual operation and maintenance project costs for the new participant would be approximately **\$0.32M** per year for a total of **\$1.33M**. The annual O&M estimate does not include variable energy, which has historically been roughly **\$300/AF**.

The distinction between FS2 and FS3 is primarily the initial buy-in cost of a new participant compared with continued payments by the District. Under FS3, a non-participant would be able to become a new participant by purchasing all or a portion of the 1,294 AF (or more if there is a willing seller). FS4 is the same scenario as FS3 but assumes that full subscription with the District (Scenario FS2) is first completed. Under FS4, a non-participant would be able to become a new participant by purchasing all or a portion of the District's 1,294 AF.

The existing participants have stated that their preferred plan is to reach full subscription through FS2, subject to the decisions of the governing bodies of those agencies. Scenario FS1 is not preferred because existing participants would need to pay their proportional share of the \$1.1M/yr of debt service that the District is currently paying. FS3 is less likely to be implemented due to the relatively high cost for a new participant to buy into the project. Scenario FS4 still allows for an interested party, such as a new water district, to become a new participant through the purchase of a portion of the District's or another willing participants' entitlement.

Under all full subscription scenarios, a non-participant can purchase water on a temporary basis at a lower cost than the current cost for surplus water. (Temporary purchase options are discussed in the next section.) FS2 appears to offer the quickest and most convenient plan to reach full subscription, which allows for faster availability of surplus water to non-participants at a more acceptable price.

For permanent allocations of water, full subscription with existing participants with or without the District is more likely over a new participant due to the high cost for a new participant to buy into the project. However, a new participant will always have the option to buy into the project at any point in the future. If the District becomes an allocation holder under the full subscription scenario, the District would likely have the first right to sell its unused allocation on a permanent basis or via an annual or multi-year contract.

4.2.2 Temporary Water Scenarios

Water can be purchased by existing participants or non-participants to increase their supply amounts on a temporary basis as additional water is needed. Three scenarios to provide Nacimiento Project Water temporarily are defined for comparison.

- Temporary Scenario 1 - Annually: the quantity of surplus water is announced by the District each water year after participant water requests have been received in October.
- Temporary Scenario 2 - Five year commitment contract: The District can enter into an agreement to deliver water for up to a five year commitment.

- Temporary Scenario 3 – Long-term (20 year) contract: Under a fully subscribed scenario, a participant could enter into a long-term agreement to supply water. 20 years was assumed.

Table 2.9 provides the water costs for the three temporary scenarios.

Table 2.9 Temporary Water Scenario Costs					
Paso Robles Groundwater Basin Supplemental Supply Options Study					
San Luis Obispo County Flood Control and Water Conservation District					
Turnout	Existing Participants	Temporary Scenario 1 & 2		Temporary Scenario 3	
		Existing Participant	Non-Participant from Participant's Turnout	Existing Participant	Non-Participant
T-2	Paso Robles	\$408	\$1,514	\$408	To be negotiated
T-4	Templeton	\$491	\$2,203	\$491	
T-6	Atascadero	\$463	\$1,783	\$463	
T-11	San Luis Obispo & CSA-10	\$501	\$2,077	\$501	

Notes:
 (1) Costs from Nacimiento Project Commission Packet, November 20, 2014. These costs include variable energy costs, which were estimated at \$300/AF.

Temporary Scenarios 1 and 2 differ in regards to the accessibility of the water. In dry years, surplus water may not be available if it is needed by existing participants. Although, this may also be true for Temporary Scenario 2 in dry years, having a five-year contract provides a standing allocation contract that may allow for a portion of the temporary water entitled rather than none at all. For Temporary Scenarios 1 and 2, which involves water purchased through the District, the contract outlines the steps required of the District to offer the surplus water. This process is illustrated in Appendix B.

In all temporary water scenarios, the water cannot be sold for a reduced price than what is currently contracted for with existing participants. Although, in Temporary Scenario 3, the negotiations would be between the participant and non-participant only, allowing flexibility with the price of water in exchange for other potential benefits such as investments in infrastructure.

For temporary contractual arrangements, full subscription is preferred since this contractual situation lowers the cost for temporary use of Nacimiento water. It is not likely that the annual temporary water available will be put to use completely until the cost is more economical and/or is borne by all those that would benefit.

To encourage water use in the Paso Basin for non-participants, Temporary Scenario 3 is favored as long as full subscription can be achieved.

4.2.3 Water Acquisition Preferences

4.2.3.1 *Existing Participants*

Two primary options for increased Nacimiento Project Water use by existing participants were discussed in Section 4.2.1 and 4.2.2:

- Increase their entitlement with Reserve Water to full subscription.
- Purchase surplus water on an annual basis.

Based on discussions with the existing participants, they have stated that their preferred plan is to reach full subscription through increasing their own entitlements along with having the District become an allocation holder, although this must be confirmed by the governing bodies of each agency. The first option (FS1) is not preferred by the existing participants because existing participants would need to pay their proportional share of the \$1.1M/yr of debt service that the District is currently paying.

Having the District hold an allocation under full subscription, which is the second option (FS2), may simplify the process for new participants to join the project since negotiations between the existing participants under that scenario and the new participant would be allowed and the current relevant contract provisions would no longer be applicable. Full subscription - regardless of whether the District becomes an allocation holder - may provide a more cost effective means for new participants to participate as existing participants under a full subscription scenario could negotiate their own terms rather than being tied to the existing contracting requirements. Additionally, full subscription also allows a new participant (or non-participant) to purchase water on a temporary basis at a lower cost than the current cost for surplus water.

4.2.3.2 *Non-Participants*

Three options for non-participants to acquire water were described in section 4.2.1 and 2:

- Acquire an entitlement from the Reserve Water, or from the District or a participant after full subscription, and become a new participant in the project.
- Purchase surplus water from the District on an annual basis or purchase reserve water from the District for a period of up to five years under the current contract procedures.
- Purchase water from a project participant on a non-permanent basis once the project is “fully subscribed.”

Under existing conditions, it is cheaper to temporarily purchase surplus water rather than becoming a full participant. But temporary purchases still have hurdles for water acquisition that include following the current contract process of notifying, contract negotiations and competition for the water from existing participants, and are more expensive than

groundwater pumping. Therefore, there is little incentive for temporary purchase of surplus water under existing conditions.

Interest by non-participants has revealed that the steep buy in price to become a new participant is a stumbling block. Continuing with this option is not preferred over purchasing temporary water from an existing participant under full subscription, as cost for temporary water after full subscription would likely be reduced.

For non-participants, direct Nacimiento Water acquisition via purchasing long-term contracted temporary water from an existing participant (once full subscription is reached) will likely be the most cost-effective and least complicated option. Non-participants could negotiate terms directly with an existing participant rather than through current contract processes and pricing, allowing for a quicker turn around and the ability to set up wheeling opportunities.

4.2.4 Exchange Potential

The Nacimiento water exchange options are based on the premise that an entity in the Paso Basin could invest in a water supply project for another entity in exchange for an equitable amount of Nacimiento supply from the entity benefiting from the water supply project. For example, a portion of the City of San Luis Obispo's Nacimiento water entitlement could be used within the Paso Basin in exchange for increased recycled water use by the City. (Of course, the appropriate ratio of water exchange and cost must be negotiated).

Exchange opportunities with Nacimiento Project Water would involve increased use of Nacimiento Project Water and decreased use of other water sources in the Paso Basin with the idea that leaving water in Paso Basin extends the water supply within the region.

Exchange opportunities with Nacimiento Project Water include exchange with:

- Santa Margarita Reservoir.
- Recycled Water.

Santa Margarita Reservoir is operated by the District under agreement with the Army Corp of Engineers for the benefit of the City of San Luis Obispo, who utilizes the water for domestic supply, and in accordance with State Water Rights Permit 5882 requirements. For exchange opportunities to be most beneficial, Santa Margarita Reservoir expansion would be needed to allow for additional storage. To expand storage in Santa Margarita Reservoir, the dam would need to undergo structural improvements. Also, the rights for expansion, originally with the City of San Luis Obispo, would need to be granted to the project beneficiaries by the State Water Resources Control Board. According to the City of San Luis Obispo, Santa Margarita reservoir is already being used to the maximum extent possible, and the expansion potential including the structural improvements is assumed to

be cost prohibitive due to seismic retrofit requirements. Therefore, the cost required to modify the Santa Margarita dam and water rights issues inhibits this exchange supply option from being viable.

Exchange opportunities with recycled water are detailed in TM No. 4 (Recycled Water). Preliminary findings indicate that the options to acquire Nacimiento water described in this TM are lower cost than the recycled water exchange scenario.

4.2.5 San Antonio Intertie

The District has been notified by MCWRA that they are considering connection of the San Antonio Reservoir with Nacimiento Lake Reservoir through a 10,000 linear foot intertie to provide an additional 10,937 AFY of water on average (MCWRA, 10/22/14⁵). If negotiations were pursued and successful, there is the potential to increase the quantity of Nacimiento water available to entities in San Luis Obispo County via increased allocation and/or carryover storage rights. The District is currently evaluating whether and how to participate in the project. However, it is unclear the position officials in Monterey County will take in considering a cooperative project implementation approach with outside agencies. Costs for the project are estimated at over \$3,000/af. Discussions need to evolve further to determine if this is a viable supply option to pursue. Additional factors to consider are whether there are interested buyers, how the project will be financed, and potential restrictions on delivery within the existing Nacimiento delivery system.

4.3 Summary of Water Acquisition Options

See Table 2.10 for a summary of water acquisition options.

The following findings were made regarding Nacimiento water acquisition options:

- Existing Participants: Based on discussions with the existing participants, and subject to the decisions of the governing bodies of those agencies, their preferred plan is to reach full subscription through increasing their own entitlements along with having the District (and/or others) become an allocation holder. Until full subscription process is completed, only existing participants are in a position to access surplus Nacimiento water at a rate competitive with other sources of supply.
- Non-Participants: The more viable option for non-participants is purchasing long-term contracted temporary water from an existing participant once full subscription is reached due to the high cost of “buying in” to the project for a permanent allocation.
- Santa Margarita Exchange: The cost required to modify the Santa Margarita dam and other institutional processes inhibit this exchange supply option from being viable and further evaluation in this study should be deferred.

⁵ Presentation, “Remaining water available for suite of future projects”, Additional Beneficial Water Supply slide)

**Table 2.10 Summary of Water Acquisition Options
Paso Robles Groundwater Basin Supplemental Supply Options Study
San Luis Obispo County Flood Control and Water Conservation District**

	Water Acquisition Option	Estimated Supply (AFY)	Point of Delivery	Brief Description	Timeline/Duration⁽²⁾
A	Temporary Agreements (Existing Contracts)	Up to ~9,000 ⁽¹⁾	Existing or New Turnouts	Unused water acquired by existing or non-participants under existing contractual setting.	S/T
B	Temporary Agreements (Full Subscription)	Up to ~9,000 ⁽¹⁾	Existing or New Turnouts	Unused water acquired by existing or non-participants.	S/T
C	Permanent Allocation; Full Subscription	Up to 6,095	Existing or New Turnouts	Acquired by existing participants, the District, non-participants or any combination thereof.	S/P
D	Exchanges	Varies	Varies	Gain Nacimiento water allocation through exchange by increasing alternative water supply source yield.	M/P
E	San Antonio Intertie	A portion of 11,000	Nacimiento system	MCWRA to create intertie with reservoirs to capture otherwise released water and increase yield from Nacimiento.	L/P

Notes:

- (1) Supplies under temporary agreements are dependent on the amount of water requested by each participant in a given year.
(2) Short-term (S), Mid-term (M), or Long-term (L); Temporary (T) or Permanent (P).

- Recycled Water Exchange: Options to acquire Nacimiento water described in this TM are lower cost than the recycled water exchange scenario, therefore further evaluation of this option is recommended to be deferred.
- San Antonio Intertie: Discussions need to evolve further to determine if this is a viable supply option to pursue, therefore further evaluation of the this option in this study is recommended to be deferred. The District is in ongoing discussions with MCWRA on this project.

Based on these conclusions, the following water acquisition options were carried forward for preliminary evaluation in combination with water use options:

- Temporary Agreements (Existing Setting).
- Temporary Agreements (Full Subscription).
- Permanent Allocation (Full Subscription).

5.0 ADDITIONAL NACIMIENTO WATER DELIVERY OPTIONS

The primary goal of increased use of Nacimiento water is to help stabilize and potentially recover groundwater levels in the basin over time. The 2014 Basin Computer Model Update has estimated that from 1981 to 2011 annual outflows exceeded the inflows of the basin by 2,400 AFY. This imbalance is further aggravated under future year simulations, highlighting the need to identify supply alternatives to offset further pumping of the basin groundwater. Options for using Nacimiento water to stabilize the basin mainly consist of transferring the raw Nacimiento water via a turnout on the main pipeline for:

- Direct recharge of the Paso Robles Formation,
- Discharge to alluvial formations and recovery in lieu of Paso Robles Formation pumping, and
- Direct use of raw or treated water in lieu of Paso Robles Formation pumping.

This section describes the points of delivery for Nacimiento Project Water use beyond existing plans for use by existing participants and briefly describes the primary potential end uses of the water for each participant. Although the evaluation of the specific end uses within the Paso Basin is beyond the scope of this TM, it is anticipated that the computer model for the basin will be used to quantify the amount of water needed over time to stabilize levels in various parts of the basin. This information can then be used in the more detailed strategy development to compare the proximity of, and quantity and quality of the water available at each transfer point to prioritize the options.

5.1 Overview of Existing, Planned, and Potential Uses

5.1.1 Existing Participants

Nacimiento Project Water is currently being used for potable consumption through direct and indirect means. Direct distribution to domestic water users of Nacimiento Project Water requires treatment through a water treatment plant (WTP) . Currently, the cities of Paso Robles and San Luis Obispo are equipped to directly treat and distribute Nacimiento Project Water. Increased direct potable use would require additional treatment plant capacity within the Paso Basin. The City of Paso Robles is currently constructing a WTP for Nacimiento water and has plans for future expansion of the plant to accommodate future increases in demand for Nacimiento water within its service area. Templeton CSD has considered implementation of a new WTP and Atascadero MWC does not have any plans for a WTP.

Existing participants also currently use Nacimiento water to meet potable water demands through recharge of the Salinas River underflow and subsequent pumping by downgradient wells. This indirect means of putting Nacimiento water to use is limited by associated hydrogeologic and infrastructure capacity. As such, expanding the use of the Salinas River underflow for recharge operations may require infrastructure such as new recovery wells or

percolation ponds. Future increased use of these facilities has been identified for some existing participants and plans are being debated on how to best accomplish additional recharge for domestic use. Atascadero MWC believes its existing Nacimiento recharge basin capacity is sufficient for future uses. Templeton CSD will require additional capacity and is currently evaluating its options. The City of Paso Robles discharges directly to the river and is constrained by aquifer production capacity within its Salinas River underflow well field.

In addition, groundwater production from the underflow can decrease during dry years. Discharge of Nacimiento water to the Salinas River could be increased during dry years when underflow water levels are low and there is capacity for additional water to be recharged and eventually pumped. Existing extraction capacity would likely be used since these facilities would be underutilized during dry years due to low water levels. The City of Paso Robles uses this approach during dry years. Additional discharge and/or percolation capacity may be needed.

Each of the existing participants has plans for how to use their Nacimiento entitlement. The plans are summarized in Table 2.11.

Table 2.11 Existing Participant Planned Water Deliveries (2015-2040) Paso Robles Groundwater Basin Supplemental Supply Options Study San Luis Obispo County Flood Control and Water Conservation District			
Paso Robles	Templeton CSD	Atascadero MWC	SLO WTP
<u>2015-2024</u> UR: 166 AFY WTP: 1,105 AFY			
<u>2025-2034</u> UR: 166 AFY WTP: 4,000 AFY	<u>2015-2040</u> PP: 250 AFY	<u>2015-2040</u> PP: 2,000 AFY	<u>2015-2040</u> WTP: 3,380 AFY
<u>2035-2040</u> UR: 166 AFY WTP: 5,400 AFY			
Notes:			
(1) Based on Table 27 from <i>Paso Robles Groundwater Basin Model Update</i> (Geoscience, 2014).			
(2) Indicates method of water delivery: "PP" for percolation pond, "WTP" for water treatment plant, and "UR" for underflow recharge.			

5.1.2 Non- or New Participants

Potential uses of raw or treated Nacimiento Water by non-participants or new participants include the following:

- Direct Delivery to:
 - Non-Potable: Large Landscape and Agricultural Irrigation.

- Potable: Municipal and Industrial, including rural residential.
- Recharge the Paso Robles Formation ultimately for potable or non-potable uses.

Direct use of the raw water by irrigation customers requires a distribution system to deliver the water to the end users. Use of Nacimiento for potable use requires treatment or recharge and recovery. Treatment could occur through expansion of an existing participant’s WTP and wheeling to the non-participant or construction of a new WTP. Recharge for eventual recovery allows avoidance of WTP but efficiency of Paso Robles Formation recharge must be further investigated. Potential for recharge of the Paso Robles Formation will be evaluated with the Basin model.

Based on the potential delivery and use options described above, five delivery options were identified for evaluation, as summarized in Table 2.12. Each is discussed further in the following sections.

Table 2.12 Introduction of Nacimiento Delivery Options Paso Robles Groundwater Basin Supplemental Supply Options Study San Luis Obispo County Flood Control and Water Conservation District	
Point of Delivery	Basin Benefit Strategy
Raw Water (Existing or New Turnout)	
Direct Delivery	Direct delivery of untreated water to offset groundwater pumping.
Salinas River Recharge	Alluvial Formation recharge and recovery to offset Paso Robles Formation use. Paso Robles Formation Recharge via Surface Discharge. ⁽¹⁾
Areas of Greatest Decline Recharge	Alluvial Formation recharge and recovery to offset Paso Robles Formation use. Paso Robles Formation Recharge via Surface Discharge. ⁽¹⁾
Treated Water (Water Treatment Plant)	
City of Paso Robles WTP Expansion	Direct delivery of treated water to offset groundwater pumping (e.g. Jardine area) or directly inject.
New WTP	Direct delivery of treated water to offset groundwater pumping or directly inject.
<u>Notes:</u>	
(1) The portion of water recharging the Alluvial Formation that reaches the Paso Robles Formation cannot be quantified at this time and will be evaluated by the basin computer model.	

5.2 Raw Water Delivery (Existing or New Turnout)

Depending on the location of the end use, a raw water turnout can be built on the main pipe line. The further north on the line the turnout is built, the more capacity is available in the pipeline, as shown in Figure 2.1. Use of raw Nacimiento Project Water in lieu of groundwater supplies or to recharge the basin will extend the Paso Basin groundwater

supply. For example, using raw water for irrigation of crops by agricultural users will extend the Paso Basin groundwater supply as the Nacimiento Project Water would be used when available to preserve groundwater for years when it is not available. Infrastructure would be required to transmit and deliver the water to the user. Another option for using the raw water is to develop surface discharge facilities in the alluvium of creek systems or recharge basins. These options are described further below.

5.2.1 Direct Delivery

Direct delivery of raw water limits the end use to non-potable uses, such as landscape and agricultural irrigation. However, there is a large irrigation water demand from the Paso Basin and the use of raw water for irrigation has a high basin benefit potential. The affordability and fair distribution of the costs associated with providing water for direct delivery to customers, such as the cost of the water and distribution infrastructure, would need to be addressed for the option to be feasible. Entities in the vicinity of the existing Nacimiento pipeline that currently utilize water from the Paso Robles Formation and have a large irrigation demand are the best potential partners for a cost effective project.

5.2.2 Salinas River Recharge

Recharge into the Salinas River provides additional drinking water that can be pumped and distributed for domestic supply. All existing in-basin participants currently utilize this method to increase water in the Salinas River underflow for later extraction and domestic distribution. To increase recharge into the Salinas River, additional percolation basins and recovery wells may be required. Some of the infrastructure needed is already being considered and planned for by existing in-basin participants to meet their future demand.

To benefit the Paso Robles Formation from additional discharge of Nacimiento water to the Salinas River, the water must either: 1) percolate to that formation; or 2) be pumped by an entity in lieu of pumping Paso Basin Formation water. The computer model of the Basin will be used to evaluate the extent to which these alternatives benefit the Basin.

If there is not a significant benefit to the Paso Robles Formation from Salinas River recharge, under the percolation approach entities adjacent to the river that utilize water from both the Alluvial and Paso Robles Formations may be the best potential partners for this basin benefit option, assuming cost and water rights⁶ issues could be addressed.

5.2.3 Areas of Greatest Decline Recharge

Another method to help stabilize levels in the basin under the raw water option is to deliver unused Nacimiento water to a recharge facility or creek recharge location in the areas of

⁶ Any substitution of Nacimiento water supplies for groundwater by the existing pumper would be at the discretion of the existing pumper. This option is provided to illustrate one of several "substitution" options that would expand the water supply portfolio available to the basin as a whole, though any participant would have to evaluate potential impacts to overlying or prescriptive groundwater rights. It should be noted, however, that the new SGMA will require all basin water purveyors to cooperatively address current unsustainable uses of the groundwater basin. The current and historic use of groundwater – whether as an overlying right or through prescription – will be an important consideration in future sustainability actions.

greatest decline. The computer model of the Basin will be used to evaluate the extent to which these alternatives benefit the Basin.

If there is not a significant benefit to the Paso Robles Formation from recharge facilities alone, entities adjacent to a creek recharge area that utilize water from both the Alluvial and Paso Robles Formations may be the best potential partners for this basin benefit option, assuming cost issues could be addressed.

5.3 Water Treatment Plant (WTP)

Another approach to putting available Nacimiento water to use would be to expand an existing WTP or building a new WTP. The treated water can then be delivered directly to customers for potable use in lieu of groundwater or to injection wells to directly recharge the Paso Robles Formation of the basin.

5.3.1 Expand an Existing WTP

One option would be for the City of Paso Robles to increase their use of treated Nacimiento water in lieu of pumping approximately 2,000 AFY from the Paso Robles Formation on the east side of the City, as suggested by the BRC (*Option ST-13*). However, according to the City, those wells only operate during the peak season so the Nacimiento WTP capacity would need to increase for the City to be able to meet peak season demands without those wells. WTP capacity would also need to increase to serve entities outside of the City's service area to offset basin pumping and/or to deliver to injection wells. This scenario would require the City to use a more expensive water supply (Nacimiento water versus pumped groundwater). Therefore, to expand the WTP to offset the City's and/or other potential project partners' pumping in the basin and help stabilize levels, an equitable distribution of the expansion costs and associated O&M cost increases amongst the beneficiaries would need to be established. Also, water rights issues would need to be addressed.⁷

Another concept is for expansion of the City's WTP for wheeling for potable use by rural residential areas, such as the Jardine area. This concept would require expansion of the WTP, additional WTP O&M costs, wheeling costs through the existing potable system, infrastructure to convey potable water from the edge of the City's potable water system to the rural residential area, and new water distribution system within the rural residential area.

Templeton CSD has considered implementation of a new water treatment plant but does not have current plans to move forward with implementation. Atascadero MWC does not have any plans for a water treatment plant. Therefore, this study assumes that no other WTPs will exist to expand.

⁷ See previous footnote.

5.3.2 Construct a New WTP

Another option is to build a new WTP to provide potable water to applicable areas within the basin to offset pumping and/or to injection locations for direct recharge. For direct use, a community water system would likely need to be created to manage delivery and distribution infrastructure for rural customers. Assuming the hydrogeology is appropriate, injection of treated water into the deep basin aquifer is the most reliable recharge method for the Paso Robles Formation; however, installation and operation of injection (or aquifer storage and recovery (ASR)) wells adds additional expenses to already high costs of providing the treated water to the injection location (purchase, treatment, and distribution).

6.0 PRELIMINARY EVALUATION OF OPTIONS

This section evaluates the identified Nacimiento water acquisition and points of delivery options to determine whether they should be deferred due to one or more of the criteria below or if they are appropriate for further evaluation in more detail in the rough screening. This evaluation also identifies any potential fatal flaws with the options. The criteria for the evaluation include:

- Institutionally/contractually/financially complicated compared to other options.
- Other option would need to be implemented first (not an independent project).
- Potential key partner not interested.
- Strong opposition at this time.

Water acquisition options identified below were evaluated in Section 4 and are followed by an analysis of points of delivery options. Although water acquisition and water transfer points are separate concepts, the two are intertwined. Water acquisition options identify institutional requirements of expanding the supply and allocation of Nacimiento Project Water, while transfer point options identify infrastructure needs to expand the use within the basin.

6.1 Nacimiento Water Acquisition Options

As presented in Section 4, the following findings were made regarding Nacimiento water acquisition options:

- Existing Participants: Based on discussions with the existing participants, and subject to the decisions of the governing bodies of those agencies, their preferred plan is to reach full subscription through increasing their own entitlements along with having the District (and/or others) become an allocation holder. Until full subscription process is completed, only existing participants are in a position to access surplus Nacimiento water at a rate competitive with other sources of supply.

- **Non-Participants:** The more viable option for non-participants is purchasing long-term contracted temporary water from an existing participant once full subscription is reached due to the high cost of “buying in” to the project for a permanent allocation.
- **Santa Margarita Exchange:** The cost required to modify the Santa Margarita dam and other institutional challenges inhibit this exchange supply option from being viable and further evaluation in this study should be deferred.
- **Recycled Water Exchange:** Options to acquire Nacimiento water described in this TM are lower cost than the recycled water exchange scenario, therefore further evaluation of this option is recommended to be deferred.
- **San Antonio Intertie:** Discussions need to evolve further to determine if this is a viable supply option to pursue, therefore further evaluation of the this option in this study is recommended to be deferred. Based on these conclusions, the following water acquisition options were carried forward for preliminary evaluation in combination with water use options (see Table 2.13).

Table 2.13 Summary of Preferred Water Acquisition Options Paso Robles Groundwater Basin Supplemental Supply Options Study San Luis Obispo County Flood Control and Water Conservation District					
	Water Acquisition Option	Estimated Supply (AFY)	Point of Delivery	Brief Description	Timeline/ Duration⁽¹⁾
A	Temporary Agreements (Existing Setting)	Up to ~9,000 ⁽¹⁾	Existing or New Turnouts	Unused water acquired by existing or non-participants under existing contractual setting.	S/T
B	Temporary Agreements (Full Subscription)	Up to ~9,000 ⁽¹⁾	Existing or New Turnouts	Unused water acquired by existing or non-participants after full subscription.	S/T
C	Permanent Allocation (Full Subscription)	6,095	Existing or New Turnouts	Acquired by existing participants, the District, non-participants or any combination thereof.	S/P
Notes:					
(1) Supplies under temporary agreements are dependent on the amount of water requested by each participant in a given year.					
(2) Short-term (S), Mid-term (M), or Long-term (L); Temporary (T) or Permanent (P).					

6.2 Delivery Options Summary and Evaluation

Nacimientto project point of delivery options were discussed in Section 5. Important to Nacimientto Project Water supply options is the incorporation of end use with water acquisition as a way to further define and evaluate the most viable options considering technical issues, costs, and obstacles to full implementation (see Table 2.14).

Table 2.15 summarizes preliminary evaluation criteria results for each potential delivery option.

Table 2.14 Summary of Nacimientto Water Delivery Options Paso Robles Groundwater Basin Supplemental Supply Options Study San Luis Obispo County Flood Control and Water Conservation District			
#	Point of Delivery	Basin Benefit Strategy	Feasibility Considerations
Raw Water (Existing or New Turnout)			
1	Direct Delivery	Direct Delivery of Untreated Water to offset Basin pumping.	May require substantial infrastructure investment and associated commitments to use the water. Can be combined with a recycled water project.
2	Salinas River	River recharge and recovery to offset Paso Robles Formation use. Paso Robles Formation Recharge via Surface Discharge.	Expansion of existing recharge and recovery facilities, or new facilities, may be needed; Project partners must be willing to offset Paso Robles Formation use. Should the Basin model demonstrate that the recharge action helps to stabilize levels, this option may be less complex than the recharge and recovery option.
3	Greatest Decline Areas	Alluvial Formation recharge and recovery to offset Paso Robles Formation use. Paso Robles Formation Recharge via Surface Discharge.	Infrastructure from the Nacimientto Pipeline to the recharge location would be needed; Expansion of existing recharge and recovery facilities, or new facilities, may be needed; Project partners must be willing to offset Paso Robles Formation use. Should the Basin model demonstrate that the recharge action helps to stabilize levels, this option may be less complex than the recharge and recovery option.
Treated Water (Water Treatment Plant)			
4	Expand Existing WTP	Direct delivery of treated water to offset groundwater pumping or directly inject.	Higher cost due to WTP expansion and associated O&M as compared to other options.
5	New WTP	Direct delivery of treated water to offset groundwater pumping or directly inject.	Highest cost due to WTP construction and associated O&M as compared to other options.

Table 2.15 Comparison of Water Delivery Options - Fatal Flaw Analysis Paso Robles Groundwater Basin Supplemental Supply Options Study San Luis Obispo County Flood Control and Water Conservation District					
#	Delivery Option	Uncomplicated⁽¹⁾	Independent⁽²⁾	Partner Support⁽³⁾	Public Support⁽⁴⁾
1	Direct Delivery	►	●	►	►
2	Salinas River Recharge	►	●	►	►
3	Greatest Decline Area Recharge	►	●	►	►
4	Expand Existing WTP	○	●	►	►
5	New WTP	○	●	○	►

Notes: ● = positive (meets criteria); ► = neutral; ○ = negative (does not meet criteria)
(1) Not institutionally/contractually/financially complicated compared to other options.
(2) Independent project, not reliant on implementation of other project first.
(3) Potential key partner(s) are interested.
(4) Public support for project at this time.

6.3 Conclusions

6.3.1 Water Acquisition Options

The following findings were made regarding Nacimiento water acquisition options:

- Existing Participants: Based on discussions with the existing participants, and subject to decisions of the governing bodies of those agencies, their preferred plan is to reach full subscription through increasing their own entitlements along with having the District (and/or others) become an allocation holder. Until full subscription process is completed, only existing participants are in a position to access surplus Nacimiento water at a rate competitive with other sources of supply.
- Non-Participants: The more viable option for non-participants is purchasing long-term contracted temporary water from an existing participant once full subscription is reached due to the high cost of “buying in” to the project for a permanent allocation.

However since negotiations for full subscription are ongoing, three water acquisition options were carried forward in combination with the water delivery options:

- Temporary Agreements (Existing Setting) (up to ~9,000): Unused water acquired by existing or non-participants under existing contractual setting.
- Temporary Agreements (Full Subscription) (up to ~9,000): Unused water acquired by existing or non-participants after full subscription.
- Permanent Allocation (Full Subscription) (6,095): Reserve water acquired by existing participants, the District, non-participants or any combination thereof.

6.3.2 Water Delivery Options

Table 2.16 presents recommendations for placement of each water delivery option into lists based on evaluation criteria results. The project placement lists are:

- Fatal flaw list (those options screened out).
- Deferred list (those that may have merit but are not within the scope of this study or include a degree of complexity that does not meet the criteria for passing onto next phase for strategy development).
- Strategy Development list (passing into next phase for further evaluation).

#	Delivery Option	Estimated Supply AFY	Timeline and Duration ⁽²⁾	Criteria Triggered	Placement
1	Direct Delivery	Up to 9,000 ⁽¹⁾	M T or P	Need irrigation customers	Strategy Development
2	Salinas River Recharge	Up to 9,000 ⁽¹⁾	S T or P	Need customers Need to confirm recharge benefit	Strategy Development
3	Greatest Decline Area Recharge	Up to 9,000 ⁽¹⁾	M P	Large infrastructure commitment Need to confirm recharge benefit	Strategy Development
4	Expand Existing WTP	Up to 9,000 ⁽¹⁾	L P	Raw water options are less expensive and provide greater basin benefit	Deferred
5	New WTP	Up to 9,000 ⁽¹⁾	L P	Too expensive	Fatal Flaw

Notes:

(1) Supplies under temporary agreements are dependent on the amount of water requested by each participant in a given year.

(2) Short-term (S), Mid-term (M), or Long-term (L); Temporary (T) or Permanent (P).

7.0 SUMMARY OF FATAL FLAWS ANALYSIS AND RECOMMENDATIONS FOR FURTHER CONSIDERATION

7.1 Pass to Strategy Development

Based on preliminary evaluation of potential Nacimiento water delivery options, three options are recommended for evaluation in more detail:

- Direct delivery for irrigation.
- Salinas River recharge for recovery in lieu of Paso Robles Formation pumping, or for Paso Robles Formation recharge.
- Greatest Decline Area recharge for recovery in lieu of Paso Robles Formation pumping, or for Paso Robles Formation recharge.

All options could be implemented after full subscription under temporary agreements. However, the more significant the infrastructure investment, the more critical that the temporary water agreement is for a longer term.

7.2 Fatal Flaw List

Based on the preliminary evaluation of potential Nacimiento water supply projects, the following option was screened out:

- New water treatment plant.

This project is screened out primarily due to the high cost compared with other options and the lack of need for other agencies to construct water treatment facilities, as most preferentially use groundwater recharge and extraction.

7.3 Deferred List

Based on the preliminary evaluation of potential Nacimiento water supply projects, the following option is to be considered at a later date:

- Expand existing water treatment plant.

This project may be feasible in the future if community water systems are formed as a part of basin management efforts.

7.4 Next Steps – Strategy Development

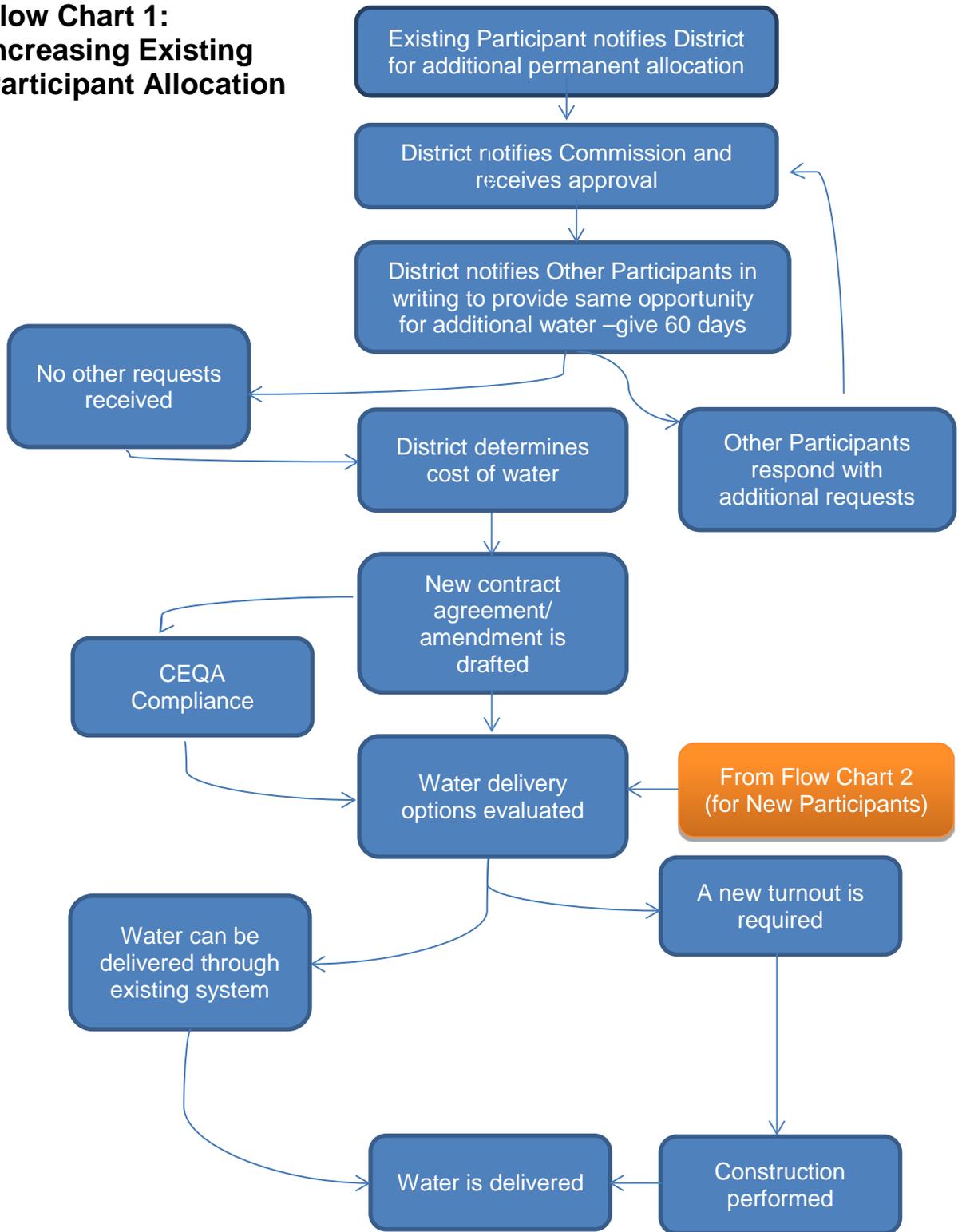
This initial phase of work has identified supply options from each of the supply types (Nacimiento, State Water and Recycled Water) available to supplement the Paso Robles Basin in terms of quantity, suitable uses, transfer points and implementation issues. In the next phase of work, the options that passed this initial screening will be carried forward into a more detailed strategy development process. The options will be further evaluated as to the reliability of supply (quantity and quality), potential costs, environmental impacts, schedule for implementation, time of use, regulatory/legal/permitting approvals, public acceptance, and technical complexity.

Additionally, the computer model of the Paso Basin will be used to identify the potential benefits that may be gained from implementation of one or more of these options. As part of

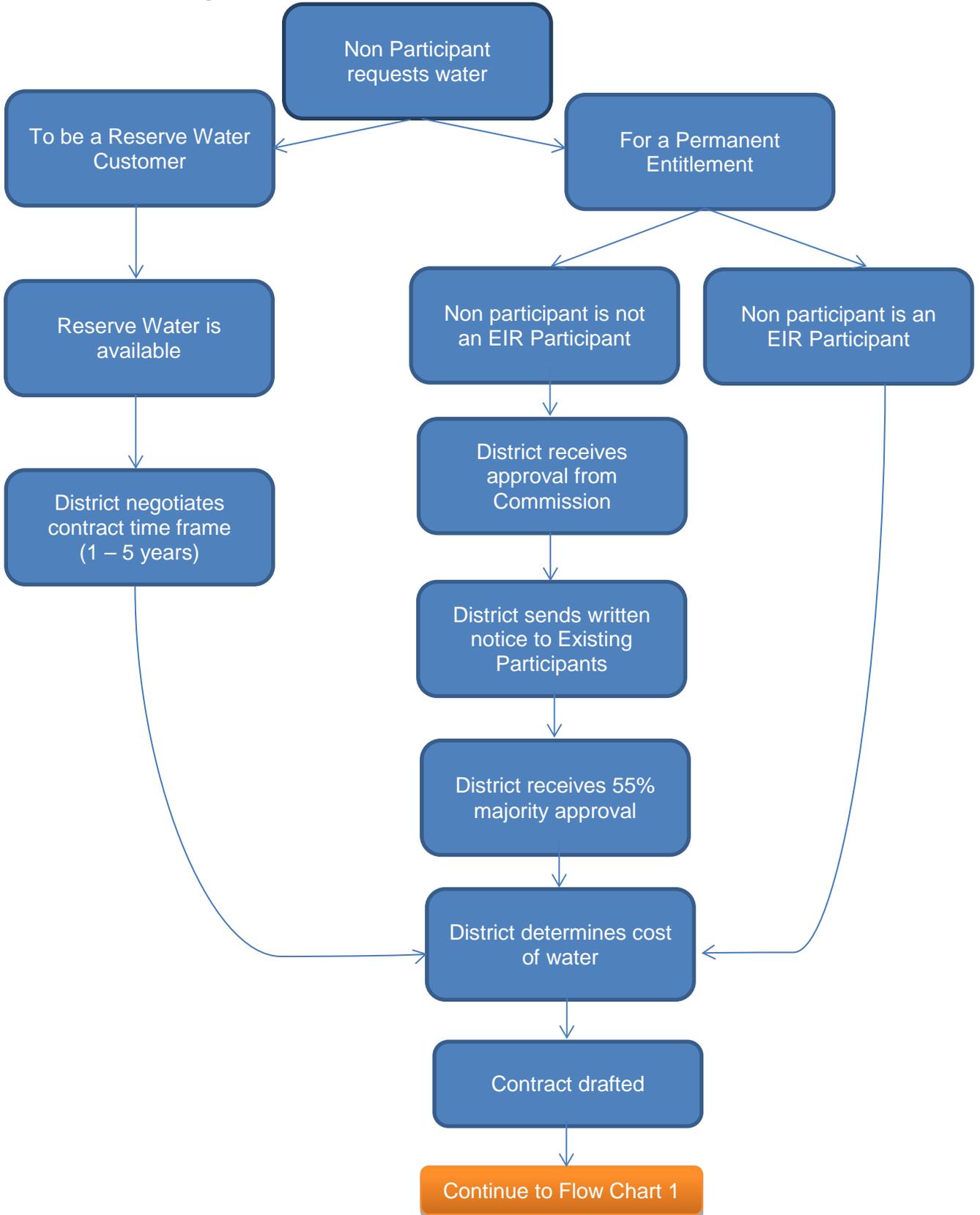
the next phase of work, the potential to combine options for additional cost effectiveness and greater benefit will also be considered.

APPENDIX A – CONTRACTUAL PROCESS

**Flow Chart 1:
Increasing Existing
Participant Allocation**



Flow Chart 2: Non Participants



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**APPENDIX B – CONTRACTUAL PROCESS FOR SURPLUS
WATER BY DISTRICT**

