FINAL

RECYCLED WATER REUSE STRATEGY ANALYSIS REPORT

FOR

CITY OF BEAUMONT
CALIFORNIA

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List of Acronyms and Abbreviations

1,2,3-TCP	1,2,3-trichloropropane
AACE	Association for the Advancement of Cost Engineering
ACL	administrative civil liabilities
AF	acre-feet
AF/acre/day	acre-feet per acre per day
AFY	acre-feet per year
Banning	City of Banning
Basin	Adjudicated Beaumont Groundwater Basin
Basin Plan	Water Quality Control Plan for the Santa Ana River Basin
BCVWD	Beaumont Cherry Valley Water District
Beaumont or City	City of Beaumont
BOD	biological oxygen demand
WWTP	City of Beaumont Wastewater Treatment Plant
CASGEM	California Statewide Groundwater Elevation Monitoring
CEQA	California Environmental Quality Act
CECs	constituents of emerging concern
CFS	cubic feet per second
CAO	cleanup and abatement orders
CDO	cease and desist orders
County	Riverside County
CWC	California Water Code
DDW	Division of Drinking Water
DIP	ductile iron pipe
DWR	Department of Water Resources
FAT	full advanced treatment
fps	feet per second
ft-bgs	feet below ground surface
ft/day	feet per day
GMZ	Groundwater Management Zone
gpm	gallons per minute
GRRP	Groundwater Replenishment Reuse Project
MBR	membrane bioreactor
MCL	Maximum Contaminant Level
MG	million gallons
MGD	million gallons per day
mg/L	milligrams per liter
MND	Mitigated Negative Declaration

NDMA	n-nitrosodimethylamine
NOV	notices of violation
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric Turbidity Unit
PFOS	perfluorooctane sulfonate
PFOA	perfluorooctane sulfonic acid
Regional Water Board	Regional Water Quality Control Board
RO	reverse osmosis
RWC	recycled water contribution
RWQCB	Regional Water Quality Control Board
SARWQCB	Santa Ana Regional Water Quality Control Board
SAT	soil aquifer treatment
SGPWA	San Gorgonio Pass Water Agency
SMWC	South Mesa Water Company
State Water Board	State Water Resources Control Board
Study Area	Beaumont Basin
SWP	State Water Project
SWRCB	State Water Resources Control Board
TDS	total dissolved solids
TIN	total inorganic nitrogen
Title 22 Recharge	Groundwater recharge with Title 22 recycled water
TOC	Total Organic Carbon
TSO	time schedule orders
TSS	total suspended solids
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UV	ultraviolet
Watermaster	Beaumont Basin Watermaster
WDRs	Waste Discharge Requirements
WQOs	Water Quality Objectives
WRRs	Water Reclamation Requirements or Water Recycling Requirements
YVWD	Yucaipa Valley Water District

EXECUTIVE SUMMARY

The City of Beaumont (City or Beaumont) has constructed facilities at the Beaumont Wastewater Treatment Plant (WWTP) to produce recycled water in compliance with California Uniform Water Recycling Criteria[1] (Title 22) which provides reuse options to the community to enhance water supply reliability and improve sustainability. There are multiple options to utilize recycled water for beneficial purposes and this report is intended to assist the City Council in determining its preferred reuse option(s). This, in turn, will guide the City Council as it works cooperatively with the Beaumont Cherry Valley Water District (BCVWD) and other involved agencies to maximize use of the resource in the most sustainable and cost-effective manner.

Recycled water is treated domestic wastewater that is reused for beneficial purposes and is a valuable water resource that is widely used across California, the country, and the world as a supplemental water supply. In normal times, but particularly in times of drought and water shortages, recycled water provides a relatively drought resilient water source supporting overall water supply sustainability because recycled water is locally available and controlled and is available even when other sources may be restricted.

From a regulatory perspective, recycled water reuse in California is divided into three types: 1) non-potable reuse, 2) indirect potable reuse, and 3) direct potable reuse. Regulations have been adopted for non-potable reuse and indirect potable reuse, but direct potable reuse regulations are currently in development. Non-potable uses include activities such as agricultural and landscape irrigation, toilet flushing, cooling towers, and dust control that do not involve recycled water being intentionally introduced to the groundwater or drinking water sources. During non-potable reuse, the recycled water is typically taken up by plants, evaporated, consumed by the activity, or returned to the wastewater treatment plant. Indirect potable reuse involves indirect, intentional replenishment of drinking water sources, such as groundwater recharge through surface application (spreading), groundwater recharge through subsurface application (injection), or surface water augmentation (mixing into drinking water reservoirs). Direct potable reuse involves direct, intentional addition of recycled water to a potable drinking water supply.

This report considers non-potable reuse and indirect potable reuse (groundwater recharge by surface spreading only), not direct potable reuse. There are separate state regulations, requirements, and permits associated with each of these two uses. Title 22 specifies the minimum treatment requirements (e.g., disinfected secondary, disinfected tertiary, and full advanced treatment) depending on the final use. For disinfected secondary treatment, the organic matter is stabilized to ensure oxygen is present and disinfection occurs to reduce bacteria. For disinfected tertiary treatment, filtration is utilized to remove turbidity prior to disinfection to reduce viruses and bacteria. For full advanced treatment (FAT), reverse osmosis (RO) is utilized to remove dissolved constituents and an oxidation treatment is added to reduce

[1] California Code of Regulations Title 22, Chapter 3.

constituents of emerging concern and pathogenic microorganisms (viruses, giardia, cryptosporidium). The City's WWTP is designed to produce disinfected tertiary recycled water with RO provided as a treatment enhancement to reduce total dissolved solids. Disinfected tertiary treated recycled water can be used for non-potable reuse and indirect potable reuse (groundwater spreading only) projects. Indirect potable reuse for groundwater injection and surface water augmentation requires FAT.

This report includes preliminary evaluations and comparisons of four options for recycled water reuse under consideration by the City. The proposed options were developed in consultation with City staff, experts in the field of recycled water reuse, and City attorneys with water expertise. Each option provides benefits, challenges, and considerations. Ultimately, an option must be evaluated and agreed upon within the context of logistical functionality, cost, and regulatory requirements. In addition, the option ultimately selected by the City will involve close coordination between the City and BCVWD (and possibly San Gorgonio Pass Water Agency).

The City's initial overall goals for recycled water reuse include:

- Maximize the production and beneficial use of City-produced recycled water,
- Offset some of the need for imported water in the adjudicated Beaumont Groundwater Basin (Beaumont Basin or Basin),
- Minimize the City's long-term state-imposed liability as the producer of the recycled water, and
- Encourage and support sustainable development.

Section 1 summarizes the City's goals and options with respect to the use of the recycled water produced by the WWTP.

The identified recycled water reuse options include:

Option 1 - (City Conveyance, BCVWD and City Co-Permittees, Indirect Potable Reuse-Tertiary Treatment) - This option includes indirect potable reuse via surface spreading within the Beaumont Basin with the City constructing, owning, and operating an outfall pump station and conveyance pipeline between the WWTP and the recharge sites. Tertiary recycled water with 50% of the water undergoing RO would be delivered to the existing BCVWD spreading grounds (also referred to as spreading grounds, spreading basins or recharge facilities). The recycled water could also potentially be recharged in the existing San Gorgonio Pass Water Agency (SGPWA) spreading grounds. Non-potable reuse for irrigation or other non-potable uses would not occur under this option. The City and BCVWD would likely be co-permittees with liability extending from the WWTP through conveyance to the point of groundwater extraction for water supply. Recycled water recharged in the spreading grounds would be credited to the City's, BCVWD's, and/or SGPWA's Basin storage accounts.

Option 2 - (BCVWD Conveyance, BCVWD and City Co-Permittees, Indirect Potable Reuse-Tertiary Treatment) - This option includes indirect potable reuse via surface spreading within the Basin with BCVWD constructing a new pump station adjacent to the WWTP and operating its existing non-potable pipeline to convey recycled water to the existing BCVWD and/or SGPWA spreading basins. Tertiary recycled water with 50% of the water undergoing RO would be delivered to the spreading grounds. This option proposes that BCVWD disconnect and reroute its existing irrigation connections along the pipeline in order to limit City liability for permit violations associated with irrigation. Thus, non-potable reuse would not occur under this option. The City and BCVWD would likely be co-permittees with liability extending from the WWTP through conveyance to the point of groundwater extraction for water supply. Recycled water recharged in the spreading grounds would be credited to the City's, BCVWD's, and/or SGPWA's Basin storage accounts.

Option 3 – (BCVWD Conveyance, BCVWD Sole Permittee , Non-Potable and/or Indirect Potable Reuse-FAT) – This option includes indirect potable reuse via surface spreading within the Basin with BCVWD constructing a new pump station adjacent to the WWTP and operating its existing non-potable pipelines to convey recycled water to the BCVWD and/or SGPWA spreading basins. FAT water would be produced by the City and delivered to BCVWD for conveyance and groundwater recharge. Non-potable reuse (such as irrigation) would be at the discretion of BCVWD and overseen by BCVWD. To limit potential City liability, the FAT recycled water would meet pathogenic reduction requirements via multiple treatment processes at the WWTP and the treatment requirements would be specified in the City's permit for the WWTP. Under this option, the Santa Ana Regional Water Quality Control Board (SARWQCB) has indicated the City's liability would end at the WWTP when the FAT-compliant recycled water is delivered to BCVWD. BCVWD would then be the sole permittee with liability extending from conveyance to the point of groundwater extraction for water supply. Recycled water recharged in the spreading grounds would be credited to the City's, BCVWD's, and/or SGPWA's Basin storage accounts.

Option 4 – (BCVWD Conveyance, BCVWD and City Co-Permittees, Non-Potable and Indirect Potable Reuse-Tertiary Treatment) – This option includes non-potable reuse (such as irrigation) and indirect potable reuse (via surface spreading) within the Basin with BCVWD constructing a new pump station adjacent to the WWTP and operating its existing non-potable pipelines to convey recycled water to the BCVWD and/or SGPWA spreading basins. Tertiary recycled water with 50% of the water undergoing RO would be delivered to the spreading grounds. For the non-potable reuse portion, recycled water would be conveyed via the existing BCVWD non-potable transmission and distribution system to multiple irrigation sites. Irrigation/non-potable use would be conducted under permits issued by and overseen by the City. The City and BCVWD would likely be co-permittees with liability extending from treatment at the WWTP through conveyance and non-potable reuse to the point of groundwater extraction for water supply. Any recycled water not used for non-potable reuse would be recharged in the spreading grounds and credited to the City's, BCVWD's, and/or SGPWA's Basin storage accounts.

Table ES-1 summarizes the four options.

Section 2 describes the regulatory background, including current and future permit requirements applicable to use of the City's recycled water. As discussed above, the regulations, requirements, and permitting are different for non-potable reuse and indirect potable reuse projects. The different permits, applicable permittees, requirements, and regulations for each of these uses are discussed in this section.

The State Water Resources Control Board (State Water Board or SWRCB) adopts and implements statewide regulations and policies, including the regulatory requirements for treatment, distribution, and reuse of domestic wastewater. The SARWQCB or Regional Water Board and the SWRCB Division of Drinking Water (DDW) are the two agencies responsible for overseeing recycled water reuse projects (both non-potable reuse and indirect potable reuse projects) in the Beaumont Basin. For the near future, non-potable reuse projects using disinfected tertiary recycled water produced at the WWTP will be regulated under a Master Reclamation Permit combined with an NPDES permit that is issued to the City.

Indirect potable reuse projects (i.e., spreading) using recycled water produced at the WWTP will be regulated under site-specific Water Reclamation Requirements (WRRs). The site-specific WRRs will include required treatment processes, minimum recycled water quality, authorized discharge locations, allowable sources of diluent water (supplemental water such as imported water or stormwater), running monthly average recycled water contribution (RWC), response retention time, pathogenic microorganism control, monitoring, and reporting.

A significant consideration for the City (and potentially also for BCVWD/SGPWA) is the potential liability related to any permit violations for both non-potable reuse and indirect potable reuse projects. Per meetings and correspondence between the City and SARWQCB, if tertiary recycled water is produced, the City is the sole permittee responsible for compliance with all non-potable reuse regulatory requirements including production, distribution, and reuse. As a result, the City would be liable for all violations of permit requirements involving use of the City's recycled water (i.e., "from cradle to grave"). This means the City will bear ultimate responsibility and liability for future use of its recycled water by all third party irrigation (or other) users and BCVWD customers. Liability would extend to the City and the City's WWTP Operator of Record for potential permit violations at multiple reuse sites. While the City Council can assign liability to another entity, it cannot do this on behalf of the WWTP Operator of Record. Option 4 is the only proposed option that includes City liability for non-potable reuse. If FAT recycled water is produced (Option 3), City liability would end at the WWTP and BCVWD would assume liability for any violations associated with non-potable uses and indirect potable reuse.

Table ES-1 Summary of Recycled Water Reuse Options

Option	Uses		Conveyance and Liability Responsibility	Level of Treatment	
	Recharge in the Spreading Grounds	Irrigation and other Non-Potable Uses		Tertiary with 50% RO	FAT
1	X		New pump station and pipeline constructed and operated by the City. City and BCVWD likely co-permittees with associated liabilities.	X	
2	X		New pump station constructed by BCVWD and disconnection of all existing irrigation connections on the existing non-potable pipeline to spreading grounds. City and BCVWD likely co-permittees with associated liabilities.	X	
3	X	At BCVWD's discretion	New pump station constructed by BCVWD and use of BCVWD's existing conveyance pipeline to spreading grounds. City responsible for recycled water production only. BCVWD sole permittee responsible and liable for violations for indirect potable and non-potable reuse once recycled water leaves the WWTP.		X
4	X	X	New pump station constructed by BCVWD and use of BCVWD's existing conveyance system for non-potable reuse and delivery to spreading grounds. City solely responsible and liable for non-potable reuse. City and BCVWD responsible and liable for indirect potable use.	X	

Notes:
BCVWD – Beaumont Cherry Valley Water District
RO – reverse osmosis
FAT – full advanced treatment

For indirect potable reuse with tertiary recycled water under Options 1, 2, and 4, it is likely both the City and the owner/operator of the spreading grounds (BCVWD and/or SGPWA) would be co-permittees. Potential liability for permit violations for Options 1, 2, and 4 extends to compliance with receiving water limitations (i.e., water quality objectives (WQOs) in groundwater after percolation of recycled water from the spreading basins). It is unclear if and how the SARWQCB might allocate responsibility between the City and spreading grounds operator(s) or if this will be left up to the City and its project partners to resolve through operational agreements. For indirect potable reuse with FAT recycled water under Option 3, the City's liability would end after the FAT recycled water is produced at the WWTP.

Section 3 discusses the hydrogeologic considerations for indirect potable reuse by surface spreading. The Beaumont Groundwater Basin is adjudicated, and the associated Judgment defines allowable volumes of pumping and storage by defined entities. The Beaumont Basin Watermaster (Watermaster) is governed by a committee composed of representatives appointed by the City of Banning (Banning), Beaumont, BCVWD, South Mesa Water Company (SMWC) and Yucaipa Valley Water District (YVWD). The Watermaster manages the Basin and prepares annual reports documenting Watermaster activities and Basin conditions including pumping, recharge, groundwater levels and flow, and groundwater quality.

Analysis of hydrogeologic considerations found that it is feasible to recharge the Basin with recycled water from the WWTP, taking into consideration depth to groundwater and potential mounding of the groundwater surface; existing conditions including recycled water, imported State Water Project (SWP) water, and groundwater quality; groundwater WQOs implemented by the SARWQCB; and recharge capacities of the Noble Creek Spreading Grounds owned and operated by BCVWD and Brookside Spreading Grounds owned and operated by SGPWA. While not preventing recycled water recharge, limitations were identified related to the diluent water and underground retention time requirements.

Regulations for indirect potable reuse (by spreading) using disinfected tertiary recycled water allow a maximum of 20% recycled water recharged initially (RWC or recycled water contribution). The additional 80% recharge water is referred to as diluent water and is comprised of other sources of water such as SWP water or stormwater recharged in the spreading grounds. Mixing within the groundwater system is also considered a diluent water source. The hydrogeologic analysis found that based on historical SWP water recharge volumes in the Noble Creek Spreading Grounds, a maximum of 2,469 acre-feet per year (AFY) of disinfected tertiary recycled water can be recharged in the spreading grounds while still meeting the initial 80% diluent water requirement. Accordingly, an additional volume of SWP and/or stormwater would need to be recharged in the spreading grounds to meet the initial 20% RWC requirement when the recycled water volume exceeds 2,469 AFY. At buildout of the WWTP in about 2045, it is estimated the total recycled water flow will be 5,153 AFY. The diluent water requirement would likely be reduced if additional RO treatment (greater than 50% of the flow) is provided and would drop to zero if FAT recycled water were delivered for recharge.

The second limitation is related to underground retention (travel) time. Title 22 requires the recharged recycled water have a certain amount of residence time in the groundwater system prior to extraction at a drinking water well in order to provide time for pathogenic microorganism control (length of time depends on level of treatment provided at the WWTP) and to allow time to respond to potential off-specification recycled water being recharged in the spreading grounds (response retention time, regulatory minimum of 2 months). BCVWD owns a potable water supply well located adjacent to the Noble Creek Spreading Grounds (BCVWD Well 23). Travel time to this well is on the order of months and may not meet the underground retention time requirements for pathogenic microorganism control (for disinfected tertiary recycled water) or possibly the regulatory minimum response retention time (for disinfected tertiary or FAT recycled water). Accordingly, this well will need to be converted to non-potable uses or used solely for monitoring to allow recycled water recharge in the Noble Creek Spreading Grounds under all options. This issue was discussed with BCVWD, and BCVWD indicated conversion of this well to non-potable uses is a possibility. In addition, two other community wells are located near the Noble Creek Spreading Grounds and their use and status will need to be verified prior to project start-up. The wells located near the Noble Creek Spreading Grounds are shown in **Figure 3-4**.

Section 4 presents an analysis of the three recycled water reuse options identified above:

- **Option 1** - City Conveyance, BCVWD and City Co-Permittees, Indirect Potable Reuse-Tertiary Treatment
- **Option 2** - BCVWD Conveyance, BCVWD and City Co-Permittees, Indirect Potable Reuse-Tertiary Treatment
- **Option 3** - BCVWD Conveyance, BCVWD Sole Permittee, Non-Potable and/or Indirect Potable Reuse-FAT
- **Option 4** – BCVWD Conveyance, BCVWD and City Co-Permittees, Non-Potable and Indirect Potable Reuse-Tertiary Treatment

Some of the benefits, challenges, and considerations associated with the options are presented below.

Sustainability and Storage Credit

- Options 1 and 2 maximize use of recycled water for recharge (100%) providing the most benefit in terms of drought resilient groundwater sustainability compared with non-potable reuse. If non-potable reuse is implemented, Option 4 and Option 3 would use less than 100% of recycled water for recharge. However, it is anticipated that Option 3 would likely still recharge significant volumes of recycled water.
- All options offset the need for some future imported water by storing recycled water in the Groundwater Basin. Under Options 1 and 2, all recycled water is recharged. Under Option 3, BCVWD can use some recycled water for non-potable uses at its discretion, so less could be available for storage credit. Under Option 4, recycled water would be used primarily for irrigation (and potentially other uses) with less recharging the Basin and less storage credit compared with Options 1, 2, and 3.

- Options 1, 2, and 3 allow the City, BCVWD, and potentially SGPWA, to maximize additions to their Basin storage accounts. Recycled water recharge allows the City to use the stored water for its use or sell the credit to Basin pumpers and BCVWD to pump more groundwater or make other use of the storage credit. Option 4 and potentially Option 3 would result in less Basin recharge and storage credit compared with Options 1 and 2 if some recycled water is used for non-potable uses.

Facilities Ownership and Liability

- Under Option 1, the City would own and operate the recycled water distribution system to the spreading grounds. The City would need to build a new pump station and distribution pipeline.
- Under Options 2, 3, and 4, BCVWD would own and operate the recycled water distribution system to the spreading grounds. However, under Option 2, BCVWD would have to build pipelines and other facilities required to replace pipelines and irrigation connections that are removed to isolate the easterly portion of the 24-inch loop. Option 4 would utilize BCVWD's existing non-potable distribution system for irrigation, but the City would have to provide oversight and regulation for non-potable uses such as irrigation.
- For Options 1, 2, and 4, the City and the BCVWD would likely be co-permittees under site-specific WRRs for recharge. It is unclear how the SARWQCB would allocate relative responsibility for any violations of the permit. For Option 3, the City's liability would end once the FAT recycled water is produced at the WWTP if pathogenic reductions can be achieved by multiple treatment processes at the WWTP. Under Option 3, BCVWD would be the sole permittee for distribution, groundwater recharge, and non-potable reuse with sole liability for violations.
- Options 1, 2, and 3 help the City stay in compliance with recycled water permit requirements by limiting the number of recycled water users to two (City and BCVWD, and potentially SGPWA) and limiting City liability due to violations associated with leaks and spills that could occur with multiple irrigation (or other) users.
- Under Option 4, the City would be the sole permittee responsible for non-potable reuse and would have full liability for violations of permit requirements. As a result, the City would have a higher level of liability exposure due to potential permit violation associated the multiple irrigation (or other) users. The City will need to implement and monitor all aspects of recycled water reuse including, but not limited to cross-connection control, runoff and irrigation overspray, spills from pipeline breaks, and other reuse requirements. The City will need to adopt a strict regulatory and enforcement ordinance and issue recycled water use permits for all users, along with developing a specialized enforcement division. Liability extends to the City and the City WWTP Operator of Record for potential permit violations at multiple points of use. While the City Council can assign liability to other entities, it cannot do this on behalf of the WWTP Operator of Record.
- Option 4, and potentially Option 3, utilizes BCVWD's existing non-potable distribution system to achieve wide distribution of recycled water to potentially

over 300 non-potable water users. This system is currently in use only for irrigation water (groundwater and SWP water) distribution.

- Under Options 1, 2, 3, and 4, BCVWD would continue to operate its existing irrigation system (or modified system under Option 2) in a similar manner as in the past by pumping groundwater, SWP, and/or recycled water into the irrigation system and using its storage tank located at the Noble Creek Spreading Grounds to pressurize the system and supply operational storage. Seasonal storage is provided by recharge and recovery in the Basin.

Regulatory Considerations

- Options 1, 2, and 3, which primarily recharge the Basin, are likely to have greater regulatory support (DDW and SARWQCB) compared to Option 4, which uses a larger volume for irrigation and other non-potable uses.
- Option 4 would result in more exposure to the City for violations so it will require considerable regulatory and administrative oversight by the City for non-potable reuse.
- Option 3 is likely to have greater DDW and SARWQCB acceptance and support due to the use of the higher quality FAT recycled water compared to Options 1, 2 and 4.
- Option 3 will improve groundwater quality to a greater extent compared to Options 1, 2 and 4 due to the higher quality recycled water utilized for recharge.
- Because FAT recycled water is considered potential drinking water, Option 3 will require BCVWD to install backflow prevention devices along its conveyance system to prevent mixing of FAT recycled water and any non-potable water sources such as SWP water.
- Options 1, 2 and 4 will require diluent water to meet the RWC for recharge. If diluent water requirements cannot be met over the 10-year running averaging period, recycled water recharge will need to be halted until additional diluent water is available for recharge. Option 3 will have no diluent water requirements, eliminating the cost to purchase SWP water for spreading to meet RWC requirements. Option 3 also increases the reliability of recharge operations, since it would not rely on imported water, which can be unavailable during droughts.
- Based on experience with similar projects, obtaining a permit for indirect potable reuse will take approximately 18 to 24 months while obtaining a permit for non-potable reuse will take approximately 9 to 16 months.
- Under all options, BCVWD Well 23 may need to be converted to non-potable uses. Usage of wells on the Beaumont High School and California Baptist College sites would need to be confirmed, but if presently used for drinking water supply, may also need to be converted to non-potable uses or destroyed.

Costs

- Capital costs for pumping and conveyance for Option 3 and 4 are lower compared to Options 1 and 2. However, costs for regulation and oversight of the irrigation program under Option 4 are likely to be high and duplicative between BCVWD and the City. In addition, the potential costs for fines and penalties for violations of irrigation permits (or other non-potable uses) could be very high. The duplicative oversight requirements may lead to conflicts between the two agencies. Options 1, 2, and 3 reduce duplicative administration and oversight costs for recycled water use for irrigation and other non-potable uses (City liability ends at the WWTP under Option 3).

- Option 3 would not require purchase of diluent water for recharge, so this option would be less costly for supplemental water supplies compared with Options 1, 2, and 4.
- Under Option 3, FAT recycled water will be more expensive to produce compared to tertiary recycled water produced under Options 1, 2, and 4 (50% of the flow undergoing RO treatment). In addition, the volume of FAT recycled water will be less than produced for tertiary recycled water because there will be more residuals (e.g., brine or RO concentrate) generated during treatment. In addition to the increased treatment costs, there will be added costs for disposal of the larger volume of residuals. Residuals are discharged to the Inland Empire Brine Line for disposal by the Orange County Sanitation District. The City will be charged for a larger designated capacity of the brine line and higher ongoing costs based on volumes discharge to the brine line. It is assumed that the added costs for FAT would be passed along to recycled water users as increased rates.
- Under Option 4 and potentially Option 3, BCVWD will need to develop a recycled water use plan including rules and regulations, monitoring and the enforcement of all restrictions in the City's recycled water permit and have the plan approved by the City and likely the SARWQCB. In addition, the City will need to develop a permitting and enforcement division to oversee non-potable reuse under Option 4.

Stakeholder Consensus

- For all options, Beaumont and BCVWD will need stakeholder consensus including the Watermaster, for indirect potable reuse. The success of all options will rely to some extent on the Watermaster's cooperation in maximizing accounting for storage of recharged recycled water in the Basin.

Preferred Option

From the City's perspective, Option 3 is the preferred option for the following reasons:

- Recharges a potentially high volume of recycled water in the Basin;
- Recharge results in storage credits for the City, BCVWD, and potentially SGPWA;
- City liability for permit violations ends at the WWTP, assuming full pathogenic reduction is achieved at the WWTP;
- Use of FAT recycled water will have greater DDW and SARWQCB acceptance and support due to the production and use of higher quality recycled water;
- Puts the highest quality water into the Basin which will improve groundwater quality;
- Reduces overall costs by using existing BCVWD existing conveyance facilities;

- Reduces uncertainty by eliminating reliance on imported water for diluent water, which can be unavailable during droughts; and
- Reduces costs for purchase of imported water for dilution.

1. INTRODUCTION

1.1. Background

The City of Beaumont (Beaumont or City) is in the process of upgrading its Wastewater Treatment Plant (WWTP). The resulting plant effluent (recycled water) will be of high quality and suitable for various reuses. The WWTP has been upgraded to treat approximately 6 million gallons per day (MGD) with a future buildout capacity of 8 MGD. At the same time, the Santa Ana Regional Water Quality Control Board (SARWQCB or Regional Water Board) is in the process of reissuing the WWTP's operating permit.

The City is evaluating options for reuse of its recycled water.

1.2. Goals

The City's initial overall goals for recycled water reuse include:

- Maximize the production and beneficial use of City-produced recycled water,
- Offset some of the need for imported water in the adjudicated Beaumont Groundwater Basin (Beaumont Basin or Basin),
- Minimize the City's long-term state-imposed liability as the producer of the recycled water, and
- Encourage and support sustainable development.

1.3. Overview of Groundwater Reuse Concepts

This report describes four recycled water reuse options and analyzes the feasibility, benefits, and challenges associated with each. The options for recycled water reuse are:

Option 1 - (City Conveyance, BCVWD and City Co-Permittees, Indirect Potable Reuse-Tertiary Treatment) - This option includes indirect potable reuse via surface spreading within the Beaumont Basin with the City constructing, owning, and operating an outfall pump station and conveyance pipeline between the WWTP and the recharge sites. Tertiary recycled water with 50% of the water undergoing RO would be delivered to the existing BCVWD spreading grounds (also referred to as spreading grounds, spreading basins or recharge facilities). The recycled water could also potentially be recharged in the existing San Gorgonio Pass Water Agency (SGPWA) spreading grounds. Non-potable reuse for irrigation or other non-potable uses would not occur under this option. The City and BCVWD would likely be co-permittees with liability extending from the WWTP through conveyance to the point of groundwater extraction for water supply. Recycled water recharged in the spreading grounds would be credited to the City's, BCVWD's, and/or SGPWA's Basin storage accounts.

Option 2 - (BCVWD Conveyance, BCVWD and City Co-Permittees, Indirect Potable Reuse-Tertiary Treatment) - This option includes indirect potable reuse via surface spreading within the Basin with BCVWD constructing a new pump station adjacent to the WWTP and operating its existing non-potable pipeline to convey recycled water to the existing BCVWD and/or SGPWA spreading basins. Tertiary recycled water with 50% of the water undergoing RO would be delivered to the spreading grounds. This option proposes that BCVWD disconnect and reroute its existing irrigation connections along the pipeline in order to limit City liability for permit violations associated with irrigation. Thus, non-potable reuse would not occur under this option. The City and BCVWD would likely be co-permittees with liability extending from the WWTP through conveyance to the point of groundwater extraction for water supply. Recycled water recharged in the spreading grounds would be credited to the City's, BCVWD's, and/or SGPWA's Basin storage accounts.

Option 3 – (BCVWD Conveyance, BCVWD Sole Permittee, Non-Potable and/or Indirect Potable Reuse-FAT) – This option includes indirect potable reuse via surface spreading within the Basin with BCVWD constructing a new pump station adjacent to the WWTP and operating its existing non-potable pipelines to convey recycled water to the BCVWD and/or SGPWA spreading basins. FAT water would be produced by the City and delivered to BCVWD for conveyance and groundwater recharge. Non-potable reuse (such as irrigation) would be at the discretion of BCVWD and overseen by BCVWD. To limit potential City liability, the FAT recycled water would meet pathogenic reduction requirements via multiple treatment processes at the WWTP and the treatment requirements would be specified in the City's permit for the WWTP. Under this option, the Santa Ana Regional Water Quality Control Board (SARWQCB) has indicated the City's liability would end at the WWTP when the FAT-compliant recycled water is delivered to BCVWD. BCVWD would then be the sole permittee with liability extending from conveyance to the point of groundwater extraction for water supply. Recycled water recharged in the spreading grounds would be credited to the City's, BCVWD's, and/or SGPWA's Basin storage accounts.

Option 4 – (BCVWD Conveyance, BCVWD and City Co-Permittees, Non-Potable and Indirect Potable Reuse-Tertiary Treatment) – This option includes non-potable reuse (such as irrigation) and indirect potable reuse (via surface spreading) within the Basin with BCVWD constructing a new pump station adjacent to the WWTP and operating its existing non-potable pipelines to convey recycled water to the BCVWD and/or SGPWA spreading basins. Tertiary recycled water with 50% of the water undergoing RO would be delivered to the spreading grounds. For the non-potable reuse portion, recycled water would be conveyed via the existing BCVWD non-potable transmission and distribution system to multiple irrigation sites. Irrigation/non-potable use would be conducted under permits issued by and overseen by the City. The City and BCVWD would likely be co-permittees with liability extending from treatment at the WWTP through conveyance and non-potable reuse to the point of groundwater extraction for water supply. Any recycled water not used for non-potable reuse would be recharged in the spreading grounds and credited to the City's, BCVWD's, and/or SGPWA's Basin storage accounts.

2. PERMITTING CONSIDERATIONS

2.1. Regulatory Background

2.1.1 Water Quality Regulations and Policies

The SARWQCB adopts and implements the Water Quality Control Plan for the Santa Ana River Basin (Basin Plan)[2]. The Basin Plan identifies the beneficial uses of groundwater and surface waters within the Beaumont Basin, establishes water quality objectives (WQOs) to maintain the beneficial uses, and prescribes how the WQOs are implemented in permits. For discharges to groundwater and surface waters in the Beaumont Groundwater Management Zone (GMZ), the Basin Plan establishes Maximum Benefit WQOs[3] "to develop and implement projects that will assure reliable water supplies to meet rapidly increasing demands in this area." The Maximum Benefit WQOs for recycled water recharge projects are 330 milligrams per liter (mg/L) for total dissolved solids (TDS) and 5.0 mg/L for nitrate-nitrogen, implemented as 10-year running averages. Compliance can be met by recycled water treatment or blending recycled water with other sources (dilution water), such as State Water Project (SWP) water and/or stormwater. Maximum Benefit commitments[4] (projects, requirements) are prescribed to ensure water quality is consistent with maximum benefit to the people of the state. The SARWQCB must review any proposed recycled water recharge projects to determine compliance with Maximum Benefit commitments.

The State Water Board adopts and implements statewide regulations and policies. Title 22, Chapter 3 (California Uniform Water Recycling Criteria) includes the regulatory requirements for treatment, distribution, and reuse of domestic wastewater. Title 17[5]and the California Plumbing Code[6] includes the regulatory requirements for protection of drinking water systems which involves installing and testing backflow prevention devices and conducting cross-connection control investigations and testing. The Water Quality Control Policy for Recycled Water (Recycled Water Policy)[7] encourages recycled water use (in compliance with state and federal requirements), establishes statewide goals for recycled water use, defines regulatory agency roles, and provides direction for developing and permitting recycled water projects.

The State Water Board's Division of Drinking Water (DDW) develops recycled water regulations, reviews recycled water projects to determine regulatory consistency, and provides permitting

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[2] https://www.waterboards.ca.gov/santaana/water_issues/programs/basin_plan/index.html

[3] Resolution No. R8-2014-0005

[4] Ibid

[5] CCR Title 17, Article 1 and 2

[6] Section 1505.13

[7] Water Quality Control Policy for Recycled Water (Effective April 8, 2019) https://www.waterboards.ca.gov/water_issues/programs/recycled_water/policy.html

requirements to the Regional Water Quality Control Boards (Regional Water Boards). DDW evaluates regulatory compliance during its review and acceptance of each project's Engineering Report.[8] The Regional Water Boards then develop, adopt, implement, and enforce operating permits that are consistent with DDW requirements.

2.1.2. Recycled Water Permitting

Different types of operating permits are issued for recycled water projects, depending on the designated end use and the Regional Water Board's determination of projected impacts to water quality.

2.1.2.1 Non-Potable Reuse

Operating permits for non-potable reuse (e.g., irrigation, industrial, construction uses) may be issued as a Master Reclamation Permit[9], Site-Specific Water Reclamation Requirements (WRRs), or a Notice of Applicability under the Statewide General Order WRRs[10]. The permits may be issued to the recycled water producers, recycled water distributors, or recycled water users. The SARWQCB's policy is to issue Master Reclamation Permits (combined with applicable NPDES[11] permits and/or Wastewater Discharge Requirements[12]) to the recycled water producer that regulates operation of the wastewater treatment plant and the recycled water program. NPDES permits are limited by the federal Clean Water Act to 5-year permit terms. Master Reclamation Permits, WRRs and WDRs do not have termination dates. The permits can be implemented indefinitely until the Regional Water Board or the permittee determine revisions are needed.

2.1.2.2 Indirect Potable Reuse

Operating permits for indirect potable uses (i.e., groundwater augmentation by surface application, groundwater augmentation by subsurface application, or surface water augmentation) can only be issued as Site-Specific WRRs. Permits for potable reuse projects are issued to the "project sponsor(s)" which may include any entity (in whole or in part) that will be responsible for implementing the project in compliance with regulatory requirements.

2.1.3. Permit Enforcement and Liability

Enforcement of recycled water permit violations is discretionary, based on case review and decisions made by the Regional Water Board or State Water Board. The decision to pursue enforcement will be determined from the severity of the violations, compliance history of the

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[8] CCR Title 22 Section 60323

[9] CWC Section 13523.1

[10] State Water Resources Control Board Order WQ 2016-0068-DDW

[11] National Pollution Discharge Elimination System (NPDES) permits are issued pursuant to requirements specified in the federal Clean Water Act for discharges to water of the U.S.

[12] Waste Discharge Requirements (WDRs) are issued pursuant to requirements specified in the California Water Code for discharges to waters of the State.

discharger, impacts to high priority watersheds/waterbodies, and strength of evidence on hand. Potential enforcement actions range from oral and written comments, notices of violation (NOV), notices to comply, technical reports and investigations, cleanup and abatement orders (CAO), time schedule orders (TSO), cease and desist orders (CDO), and administrative civil liabilities (ACL).

2.1.3.1. Statutory and Civil Liability

Civil liability requirements are specified in California Water Code (CWC) Section 13385. Liability can be assigned to a person or an entity that is deemed responsible for the violation. For violations of permits issued to municipalities or special districts, liability is typically assigned to the permittee. If liability is imposed by the superior court, the maximum penalty is $25,000 for each day the violation occurs and $25/gallon not cleaned up (except for the first 1,000 gallons spilled). If liability is imposed by the Regional Water Board or State Water Board, the maximum penalty is $10,000 for each day the violation occurs and $10/gallon not cleaned up (except for the first 1,000 gallons spilled). To determine the final penalty, the maximum penalty is calculated for each event and then reduced based the following conditions. At a minimum, the penalty must recover the economic benefits (if any) derived from the violation.

1. Nature, circumstances, extent, and gravity of the violation or violations;
2. Whether the discharge was susceptible to cleanup or abatement;
3. The degree of toxicity of the discharge;
4. The ability to pay;
5. The effect on the dischargers ability to continue its business;
6. Any voluntary cleanup efforts undertaken;
7. Any prior history of violations;
8. The degree of culpability;
9. The economic benefit or savings, if any, resulting from the violation; and
10. Any other matters that justice may require.

2.1.3.2. Statutory Criminal Liabilities

Criminal penalties are specified in CWC Section 13387 and are assigned to any person that “knowingly or negligently” violates permit requirements. Criminal penalties are typically reserved for persons or organizations that intentionally or negligently introduce hazardous materials into waters of the state or falsify statements, reports, and monitoring results. Depending on previous convictions and the type of violation, criminal penalties for individuals range from $5,000 to $500,000 and criminal penalties for organizations range from $1,000,000 to $2,000,000.

2.1.3.3. Statutory Recycled Water Spill Liabilities

Administrative civil liabilities for unauthorized discharges of disinfected tertiary recycled water[13] are specified in CWC Sections 13529.2 and 13529.4. The violation is issued to the permittee(s). An unauthorized discharge of 50,000 gallons or more of disinfected tertiary recycled water requires notification to the appropriate Regional Water Board. Notification must occur as soon as the permittee has knowledge of the discharge, notification is possible, and notification can be provided without impeding cleanup or other emergency measures. If notification is not provided, the permittee is subject to administrative liabilities ranging from $5,000 to $25,000 depending on the number of violations and timeframe between violations.

2.1.3.4. Willingness to Pay

Another liability consideration related to fines is the responsible party's willingness to pay. For example, in the event there is a violation that is clearly the fault of the end user (not the permittee), the City would receive the notice of violation and associated fine and might need to sue the responsible party for payment. An additional liability consideration is the time between the incident and the notice of violation, which could make allocation of responsibility more challenging.

2.2. Current Permit and Requirements

The City is currently authorized to implement a non-potable recycled water program under a combined NPDES/Master Reclamation Permit. Order No. R8-2015-0026 allows production of disinfected tertiary recycled water for "landscape irrigation and other similar uses" and the discharge of "tertiary treated and disinfected wastewater" at the locations listed in **Table 2-1**. Discharge at any other location or in any other manner than what is described in the permit is a violation of Discharge Prohibition III.A. For enforcement purposes, discharge "at any other location" may include spills from pipeline breaks/equipment malfunctions, runoff at a recycled water use site, overspray at a recycled water use site, discharge of irrigation tailwater, and recycled water application before/after rainfall events (when ponding or runoff will occur). For enforcement purposes, discharges "in any other manner" may include improper operation of the WWTP or recycled water distribution system, non-compliance with effluent or recycled water limitations, negligence, and non-enforcement of the Rules and Regulations for Recycled Water Use (Title 22) at each of the reuse sites. The City is responsible for overseeing recycled water use to ensure regulatory compliance which involves adopting a recycled water use ordinance, conducting periodic inspections for compliance, protecting the public drinking water supply (e.g., backflow prevention device installation/testing, cross-connection control investigations/testing), and implementing corrective actions if needed.

[13] CCR Title 22 Section 60301.230

Table 2-1 Authorized Discharge Locations for the WWTP

Discharge Point	Description	Type of Receiving Water
001	Cooper's Creek Outfall	Surface Water
002	Unnamed Tributary of Marshall Creek Outfall	Surface Water
R-001	Tukwet Canyon Golf Course	Groundwater
R-002	Oak Valley Golf Course	Groundwater
R-003	Beaumont Cherry Valley Water District Distribution System	Groundwater

The NPDES permit also prescribes compliance with receiving water limitations for discharge to surface waters (Surface Water Limitations V.A, page 15) and discharge to groundwaters (Groundwater Limitations V.B, page 16). Compliance is based on measurements and observed impacts within the receiving waters. The surface water limitations include WQOs specified in the Basin Plan, additional water quality standards adopted through state and federal regulations, and pollutants not mentioned in the permit but may bioaccumulate to concentrations that are harmful to human health. The groundwater limitations include WQOs in the Basin Plan, unreasonable degradation of groundwater quality, protection of designated beneficial uses, and prevention of pollution or nuisance conditions.

To ensure compliance with effluent limitations and the Maximum Benefit WQOs, the RO concentrate produced at the WWTP is discharged to the Inland Empire Brine Line for ocean disposal by the Orange County Sanitation District. The City purchased capacity rights to the brine line and pays a base amount for pipeline maintenance, a dollar per gallon amount for flow contributions, and additional fees based on constituent concentrations measured above baseline monitoring results.

2.3. Future Permits and Requirements for Non-Potable Reuse

2.3.1. Non-Potable Reuse Permitting Mechanism

For the near future, non-potable reuse projects utilizing disinfected tertiary recycled water produced at the WWTP will be regulated under a Master Reclamation Permit issued to the City. The SARWQCB utilizes Master Reclamation Permits to ensure implementation of Basin Plan requirements and Maximum Benefit commitments and to simplify regulation of producers and users under a single permit (see email correspondence with SARWQCB, Appendix A). Since the Master Reclamation Permit is part of an NPDES permit, the permit is revised and reissued on a 5-year cycle.

2.3.2. Non-Potable Reuse Regulatory Requirements

Non-potable reuse regulatory requirements in a future Master Reclamation Permit are anticipated to be the same as specified in the current permit. As a result, the City will be responsible for compliance with all recycled water regulatory requirements including production, distribution, and reuse. If the City decides to implement a non-potable recycled water program, the specific types of uses should be identified in the future Master Reclamation Permit. The current permit only authorizes "landscape irrigation or other similar uses" which is a vague and limiting permit specification. All foreseeable non-potable uses should be defined in the CCR Title 22 Engineering Report and the Master Reclamation Permit to ensure authorization for additional uses and facilitate expansion of the recycled water during the permit term (as needed). For example, the City could seek pre-approval to use recycled water for agricultural irrigation, street cleaning, sanitary sewer cleaning, landscape impoundments, toilet flushing, and specific industrial processes if (and when) recycled water users are identified.

2.3.3. Non-Potable Reuse Special Studies and Approvals

Typically, the only special study required for non-potable recycled water projects is preparation and ongoing maintenance of the Title 22 Engineering Report. The Engineering Report must clearly demonstrate how the recycled water project will comply with Title 22 and any other requirements specified by DDW or the Regional Water Board. The Engineering Report must be prepared by a qualified engineer (licensed in California and experienced in the field of wastewater treatment) and describe the treatment processes (including onsite validation bioassay testing of the ultraviolet (UV) disinfection system), distribution system, reliability features, contingency plans, program administrator[14]/authority, proposed uses, use sites, and use site protections. To ensure use site protection, the program administrator is required to conduct periodic site inspections, conduct backflow prevention device testing, and implement cross-connection control investigations/testing. Upon DDW "acceptance" of the Engineering Report and receipt of DDW's written permit considerations, the Regional Water Board will prepare or revise the recycled water program operating permit.

2.3.4. Non-Potable Reuse Timeline for Approval

The estimated timeline for approval of a non-potable reuse program is shown in **Table 2-2.** The activities are conducted in series, so the overall timeline is determined by summing the individual time periods.

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[14] Program Administrator is an entity (producer, distributor, user, or legal entity) that submits an application for a Master Reclamation Permit to the Regional Water Board and will issue permits for uses of recycled water consistent with the Uniform Statewide Recycling Criteria. The Program Administrator is responsible for coordinating, collecting data, and submitting reports to the Regional Water Board.

Table 2-2 Timeline for Approval of a Non-Potable Reuse Program

Activity	Timeline
City Prepares Engineering Report	1 – 3 months
DDW Reviews Engineering Report and Provides Comments	1-2 months
City Revises Engineering Report	1 month
DDW Issues Conditional Acceptance of Engineering Report with Recommended Permit Provisions	1-2 months
Regional Water Board Prepares Draft Permit with DDW Input	2 - 4 months
Regional Water Board Releases Permit for Public Comment, Incorporates Changes as Needed, Adopts the Permit at Hearing	3 - 4 months
Total	**9 - 16 months**

2.4. Permitting for Groundwater Replenishment by Surface Application (Indirect Potable Reuse)

2.4.1. Indirect Potable Reuse Permitting Mechanism

The use of recycled water produced at the WWTP for groundwater replenishment by surface application (i.e., spreading) will be regulated under Site-Specific WRRs issued to the City and any other entity the SARWQCB deems responsible for meeting regulatory requirements. Depending on the quality of recycled water produced at the WWTP and ownership of the conveyance pipeline, BCVWD is anticipated to be either a co-permittee with the City or a sole permittee for groundwater replenishment. BCVWD (as the owner/operator of conveyance pipeline and the Noble Creek Spreading Grounds) will receive requirements to operate and maintain its facilities to prevent spills and ensure compliance with requirements for recycled water contribution (RWC[15]), response retention time, and underground travel time. These specific requirements are discussed in more detail below. Recycled water produced at the WWTP could also potentially be recharged in the Brookside Spreading Grounds which are owned and operated by the SGPWA and located just south of the Noble Creek Spreading Grounds. For recharge in the Brookside Spreading Grounds, it is anticipated the City and SGPWA would either be co-permittees or SGPWA would be the sole permittee in separate Site-Specific WRRs.

[15] Recycled Municipal Wastewater Contribution (RWC) is the fraction equal to the quantity of recycled municipal wastewater applied at the spreading divided by the sum of the quantity of recycled municipal wastewater and credited diluent water (CCR Title 22 Section 60301.705).

2.4.2. Indirect Potable Reuse Regulatory Requirements

The Site-Specific WRRs will include requirements for specific treatment processes, minimum recycled water quality, authorized discharge location, allowable sources of diluent water, running monthly average RWC, response retention time, pathogenic microorganism control, monitoring, and reporting. The anticipated requirements for groundwater replenishment by surface application are described below.

Required Treatment Processes. "Disinfected tertiary recycled water" is the minimum level of treatment required for surface application (spreading). To meet CCR Title 22 requirements for disinfected tertiary recycled water[16], the wastewater must be oxidized, coagulated (if using filter media), filtered, and subsequently disinfected to inactivate and/or remove 99.999% of the plaque forming units of F-specific bacteriophage MS2[17] or polio virus in the wastewater. The recycled water currently produced at the WWTP meets the minimum treatment requirements. A portion of the filtered effluent is also pumped through a RO system to remove TDS. The extra treatment is needed to meet the Maximum Benefit WQOs for discharge to surface waters and groundwater.

Full advanced treatment[18] (FAT) is the next higher quality of recycled water defined in CCR Title 22. To achieve FAT, oxidized wastewater is treated using RO and an oxidation process that achieves 0.5-log reduction of 1,4-dioxane. The oxidation process typically involves UV disinfection followed by the addition of disinfection chemicals such as sodium hypochlorite or hydrogen peroxide. The treatment processes are validated through performance monitoring and pilot testing and DDW must approve the test results.

Minimum Recycled Water Quality. The operating permit will include recycled water specifications to ensure high quality recycled water is produced and delivered to the spreading grounds. The minimum recycled water specifications consist of filter effluent turbidity limitations; UV transmittance and dose requirements; total coliform, total nitrogen, total inorganic nitrogen, and TDS limitations in the recycled water; and Total Organic Carbon (TOC) limitations in the recycled water (or groundwater).

Authorized Discharge Location. The permit will define the allowable location(s) for surface application (spreading basins). The point of connection between the recycled water distribution pipeline and spreading basin inlet(s) will be identified by latitude/longitude coordinates in the permit. Discharge at any other location will be a permit violation.

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[16] CCR Title 22 Sections 60320.230, 60320.320

[17] F-Specific Bacteriophage MS2 is cultivated, non-pathogenic strain of bacteria used for evaluating treatment process effectiveness.

[18] CCR Title Section 60320.201

Allowable Sources of Diluent Water. The permit will identify the sources of diluent water (e.g., SWP, rainfall, stormwater runoff, groundwater underflow) that can be used to determine compliance with the running monthly average RWC.

Running Monthly Average RWC. The permit will specify a maximum 120-month running monthly average RWC and define the method used to demonstrate compliance. The initial project RWC is 0.20 or 20% unless DDW approves an alternate initial value. The alternate RWC will be based on the Engineering Report, public hearing results, and a demonstration that treatment processes can reliably achieve TOC concentrations ≤ 0.5 mg/L divided by the RWC. Use of FAT recycled water may increase the allowable RWC to 1.0 or 100% and decrease/eliminate the amount of diluent water required for permit compliance.

Response Retention Time. Recycled water must be retained underground for a period of time (at least 2 months) to identify treatment failures and implement actions to protect public health. The response retention time is determined by the time needed to collect, analyze, and confirm problematic recycled water or groundwater samples, discuss actions with DDW and SARWQCB, and procure an alternate drinking water supply or provide wellhead treatment. The response retention time must be less than the underground retention time needed to achieve pathogenic microorganism control. For example, the response retention time must be less than the 10-months of underground travel time estimated for tertiary recycled water produced at the WWTP and described below for enteric virus reduction.

Pathogenic Microorganism Control. Groundwater replenishment projects must achieve at least 12-log enteric virus reduction, 10-log Giardia cyst reduction, and 10-log Cryptosporidium oocyst reduction. The required log reductions are achieved by a combination of treatment processes (validated by pilot testing) and underground travel time. At least 3 separate treatment processes are required, and 1-log enteric virus reduction is granted for each month retained underground. For planning purposes, the treatment processes provided at the WWTP (primary/secondary, membrane filtration, reverse osmosis, UV disinfection) are estimated to provide 7-log enteric virus reduction, 11-log Giardia reduction, and 11-log Cryptosporidium reduction. The remaining 5-log virus reduction will have to be achieved through underground retention. Modeled underground retention time provides 0.5-log virus removal per month, so 10-months of modeled (modeled values are doubled to account for model uncertainties) underground travel time will be needed to meet the minimum 12-log virus reduction requirement. If the WWTP is upgraded to meet FAT requirements and all log reductions are met through treatment, a minimum 2-months underground travel time will be required.

Monitoring. The permit will require monitoring of influent flow rates and quality, filter/RO/UV-AOP system operational parameters, recycled water flow rates and quality, diluent water flow rates and quality, and groundwater quality. Groundwater quality will be determined at monitoring wells located within specific travel times downgradient of the spreading grounds and upgradient of the nearest drinking water supply well.

Reporting. The permit will require routine monthly, quarterly, and annual reporting of all required monitoring parameters. In the event of non-compliance with recycled water specifications or other permit requirements, notification to the SARWQCB, DDW, and the local potable water purveyor is typically required within 24-hours.

2.4.3. Indirect Potable Reuse Special Studies and Approvals

Various special studies and approvals are required to obtain an operating permit for groundwater replenishment by surface application. The studies include validation of treatment processes, verification of recycled water quality, groundwater monitoring and modeling, diluent water monitoring, and documented plans to safeguard the public water supply. The anticipated special studies are described below.

Groundwater Monitoring. Prior to project operation, the City and/or BCVWD (and potentially SGPWA) must determine the existing quality of all potentially affected groundwater aquifers. At least 4 representative samples, one sample per quarter to evaluate seasonal variations, must be collected from each aquifer and analyzed for specific chemicals, contaminants, and characteristics.

Groundwater Modeling. The City and/or BCVWD (and potentially SGPWA) must conduct groundwater modeling to determine flow direction, underground travel time, and location of the nearest drinking water well. The modeling results will be used to select appropriate locations for monitoring wells, establish credits for enteric virus log reductions based on underground travel time, and the volume of underflow available for calculating diluent water contributions for compliance with the running monthly average RWC.

Treatment Process Validation. Each treatment process utilized at the WWTP (including underground retention for virus removal) will be assigned a specific log reduction value that will be used to determine compliance with pathogenic microorganism control requirements. The City will need to submit standard values, approved results from tests conducted at similar facilities, or onsite testing results to DDW for validation and approval.

Diluent Water Quality. The proposed diluent water sources may require testing and approval by DDW and SARWQCB. Potable water and SWP water are exempt from testing requirements. "New" (post 2004) stormwater must be evaluated to ensure compliance with Maximum Benefit WQOs. The testing methodology and planned compliance approach must be approved by the SARWQCB. A source water evaluation (per the American Water Works Association Watershed Sanitary Survey Guidance Manual) may be required for stormwater and groundwater underflow. The City and/or BCVWD will need to submit required documentation to DDW and the SARWQCB for review and approval.

Diluent Water Volume. The proposed method for determining the volume of diluent water to be credited and the planned approach for introducing diluent water to ensure compliance with the running monthly average RWC must be submitted by the City and/or BCVWD to DDW and the SARWQCB for review and approval.

Total Nitrogen and TOC Compliance. Recycled water (samples collected before or after surface spreading) must comply with a total nitrogen limit of 10 mg/L and a TOC limit of 0.5 mg/L. Sampling is recommended to predict compliance, evaluate treatment process operations, or propose groundwater compliance locations prior to preparation of the Engineering Report. If soil aquifer treatment (SAT) will be utilized to comply with the TOC limit, a soil-aquifer treatment factor must be approved by DDW based on demonstration studies conducted to predict removal efficiencies through the soil column. The City and/or BCVWD will need to submit the SAT studies to DDW for review and approval.

Wastewater Source Control. The City must implement a pollutant source control program that includes chemical source investigations and monitoring for DDW-specified chemicals, outreach programs to minimize discharge of pollutants to the WWTP, tracking the fate of DDW-specified chemicals through the treatment processes, and current inventories of DDW-specified chemicals. A revised sewer use ordinance is recommended to prescribe local limits, develop appropriate enforcement procedures, and prohibit discharge of constituents of concern to the sewer system.

Alternative Source of Drinking Water. The City and/or BCVWD (and potentially SGPWA) will need to develop a plan to provide an alternative source of drinking water or implement wellhead treatment if water quality standards are exceeded due to recycled water recharge. The proposed source of drinking water and implementation plan must be submitted to DDW for review and approval.

Response Retention Time. The City and/or BCVWD (and potentially SGPWA) will need to develop a response retention time (minimum of 2 months) that provides sufficient time to identify treatment failures and implement actions to protect public health. The proposed response retention time must be submitted to DDW for review and approval.

Zone of Controlled Drinking Water Well Construction. A primary zone of controlled drinking water well construction must be established based on the larger of the underground travel time approved for pathogen control or the response retention time. A secondary boundary is also required to delineate an area where more study or potentially mitigating activities may be conducted prior to drilling new drinking water wells.

Riverside County (County), Department of Environmental Health issues permits for new well construction, reconstruction, abandonment, and destruction (Ordinance 682). Watermaster Resolution 2004-04 accepts the County well regulations and includes some additional stipulations. The City and/or BCVWD will need to coordinate with the County and Watermaster to identify existing potable supply wells and prevent drilling of new potable supply wells within the zone of controlled drinking water well construction. Adoption of an ordinance or agreement by or among the City, BCVWD, County, and Watermaster to prohibit new drinking water well construction within the primary zone is encouraged and may be required by DDW.

Engineering Report. The City and BCVWD (and potentially SGPWA) must prepare Engineering Reports to describe the project facilities, treatment processes, results of the special studies (described above), and operational plans. The draft Engineering Reports are submitted to DDW and SARWQCB for their review and comment. After DDW and SARWQCB comments are addressed, the revised draft Engineering Reports will be made available for a 30-day public review period. At a minimum, all drinking water well owners located within 10-years underground travel time must be notified of the project by direct mail, newsletter, or local newspaper/TV/radio advertisements.

Groundwater Tracer Study. After the project is approved and groundwater recharge is initiated, the City and/or BCVWD (and potentially SGPWA) must conduct a groundwater tracer study to verify the groundwater modeling results and ensure the required virus log reduction is achieved. Use of an intrinsic tracer (e.g., comparison between the mineral compositions of recycled water and ambient groundwater) is allowed, but only 0.67-log virus removal is credited per month. Use of an added tracer (e.g., fluorescent dyes) results in a full 1.0-log virus removal credit per month.

Recycled Water Ordinance. Although not a regulatory requirement, the City's recycled water ordinance (Ordinance 775) and recycled water rates and terms of service should be revised to reflect any shared arrangements between the City and BCVWD (and/or SGPWA) and the increased costs to produce and utilize recycled water for indirect potable reuse.

Inland Empire Brine Line Capacity. If the WWTP is upgraded to FAT, 100% of the effluent will be treated with RO and more RO Concentrate will be generated for disposal. The City will need to purchase additional capacity in the Inland Empire Brine Line to make sure the larger volume of RO concentrate will be accepted. In addition, the City will pay higher recurring fees based on discharge flow rates and possibly surcharge fees based on changed quality of RO concentrate.

2.4.4. Timeline for Approval

The estimated timeline for approval of a groundwater replenishment project (by surface application) is shown in **Table 2-3**. Some of the activities are conducted in parallel and others are dependent on approval of previous documents and monitoring results. The total range of 18 to 30 months is predicted from experience with similar projects, but the actual timeline will depend on the type of recycled water produced (tertiary vs. FAT) and regulatory agency staff workload and availability.

Table 2-3 Timeline for Approval of Groundwater Replenishment Project (by Surface Application)

Activity	Timeline
Project sponsors conduct groundwater monitoring to characterize existing groundwater quality	12 months
Project sponsors conducts groundwater modeling to determine volume of underflow for diluent water credit (if diluent water is needed), identify closest drinking water well, determine underground retention time, and locate required monitoring wells	6 months
City validates treatment processes to ensure compliance with required pathogen LRVs (length of time depends on the number and type of treatment processes to be validated)	1-6 months
Project sponsors demonstrate appropriate diluent water quality (if diluent water is needed)	1-3 months
Project sponsors develop method to determine the volume of diluent water to be credited (if diluent water is needed)	1-3 months
Project sponsors demonstrates compliance with total nitrogen and TOC requirements	1-3 months
City demonstrates compliance with wastewater source control requirements	1-3 months
Project sponsors develop plan to provide alternative source of drinking water (i.e., plan that would be implemented if drinking water standards are violated at potable well)	1 month
City updates recycled water ordinance to reflect shared arrangements with project sponsors and costs of providing recycled water	3-6 months
City purchases additional capacity in the Inland Empire Brine Line for disposal of RO concentrate	2-3 months
Project sponsors develop protective response retention time	1 month
Project sponsors and other agencies adopt ordinance to establish zone of controlled drinking water well construction	2-3 months
Project sponsors prepare Engineering Report	3 months
DDW reviews Engineering Report and provides comments	3 to 6 months
Project sponsors revise Engineering Report	1-2 months
Project sponsors hold public hearing	1-2 months
DDW issues conditional acceptance of Engineering Report with recommended permit provisions	1-2 months
SARWQCB prepares draft permit with DDW input	2 to 4 months
SARWQCB releases permit for public comment, incorporates changes as needed, and adopts the permit at hearing	3 to 4 months
Total	**18 - 30 months**

Notes:

TOC – total organic carbon
LRVs – Log Removal Values

SARWQCB – Santa Ana Regional Water Quality Control Board
DDW – Division of Drinking Water

3. HYDROGEOLOGIC CONSIDERATIONS

3.1. Beaumont Basin Adjudication

An adjudication of the Beaumont Basin was adopted by a court judgment in 2004 and amended in 2006, 2008, and 2019 (Judgment). The adjudicated Beaumont Groundwater Basin boundaries are shown (in yellow) on **Figure 3-1**. The larger Beaumont Management Zone, spreading grounds, and WWTP are also shown on the figure. The Judgment identifies Appropriator Parties including the cities of Banning (Banning) and Beaumont, BCVWD, South Mesa Water Company (SMWC), and Yucaipa Valley Water District (YVWD). It identifies parties with water rights as Banning, BCVWD, SMWC, YVWD and other Overlying Parties (with smaller water rights). The Judgment established Basin Safe Yield, groundwater rights and provided for the creation of storage accounts and mechanisms for water transfers and adjustments of water rights. The Watermaster prepares annual reports documenting Watermaster activities and Basin conditions including pumping, recharge, groundwater levels and flow, and groundwater quality.

3.1.1. Basin Safe Yield

The Safe Yield of the Beaumont Basin is defined by the Judgment as "*The maximum quantity of water which can be produced annually from a groundwater basin under a given set of conditions without causing a gradual lowering of the groundwater level leading to depletion of the supply in storage." The Safe Yield* was originally defined in 2004 at 8,650 AFY and reevaluated in 2013 at 6,700 AFY based on use of the Watermasters refined groundwater flow model (Harder and ALDA, 2015). The Safe Yield can be increased through basin management such as managed aquifer recharge.

3.1.2. Basin Storage Accounting

Currently, water can be stored in the Basin by Banning, Beaumont, BCVWD, SMWC, YVWD, the Morongo Band of Indians, and SGPWA. Other parties could potentially store water in the Basin under a new agreement with the Watermaster. The current allowed storage volume by entity and the water in storage as of 2020 are provided in **Table 3-1**. From the inception of the Judgement, Appropriators have accumulated water in their storage accounts. The accumulation of storage has not taken into consideration potential storage losses due to underflow from the Basin.

Figure 3-1 Adjudicated Beaumont Basin and Management Zone Boundaries

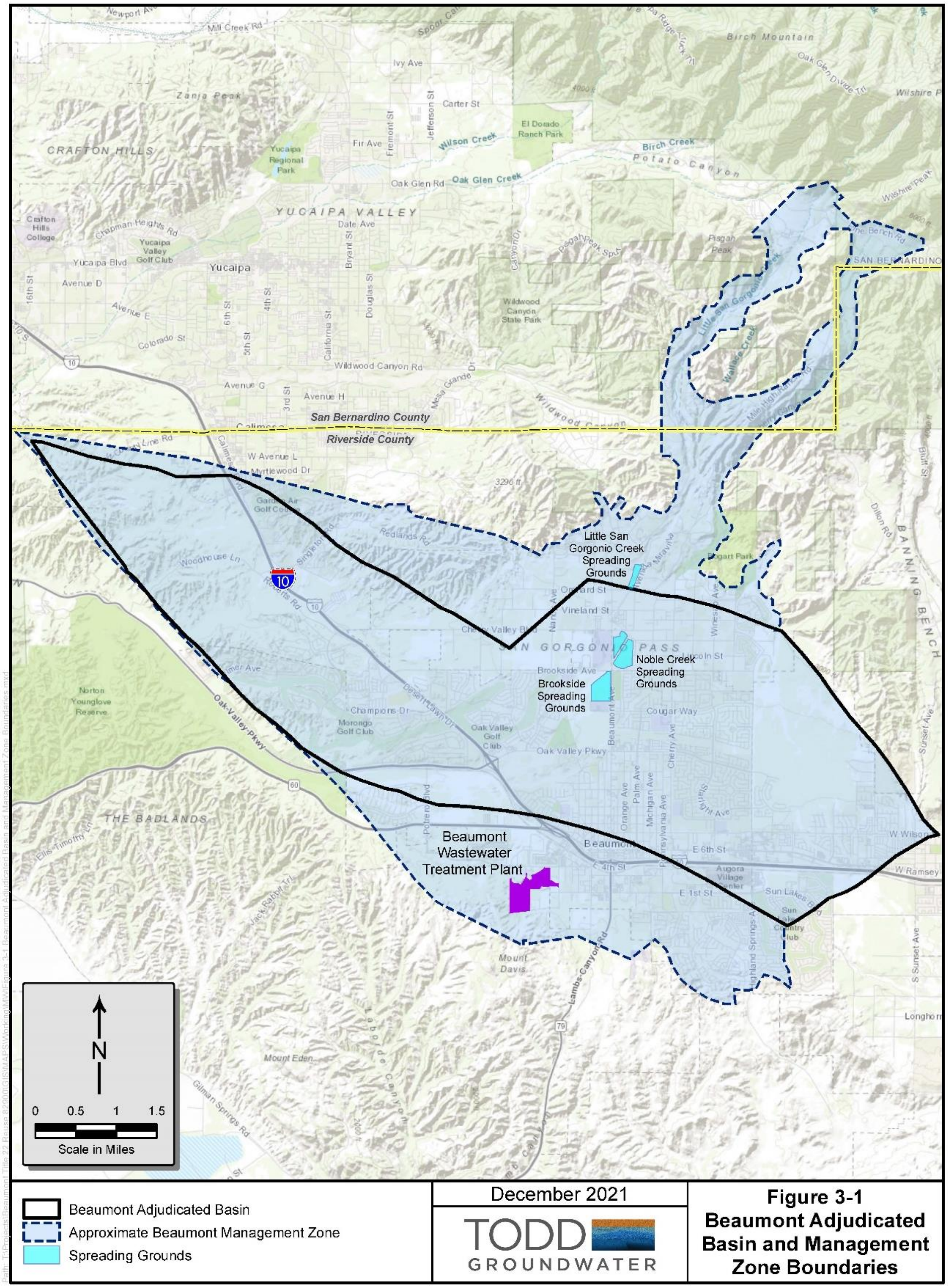


Table 3-1 Storage Limit and Water in Storage as of 2020

	Storage Allowed (AF)	Water in Storage as of 2020 (AF)
City of Banning	80,000	50,899.2
BCVWD	80,000	39,749.8
City of Beaumont	30,000	0.0
South Mesa Water Company	20,000	10,134.2
Yucaipa Valley Water District	50,000	16,287.7
Morongo Band of Mission Indians	20,000	0.0
San Gorgonio Pass Water Agency	10,000	471.8
Total in Storage	**290,000**	**117,532.8**

Notes:
AF – acre-feet
BCVWD – Beaumont Cherry Valley Water District

A *Study of Recharge Loses* was published in 2018 (Harder and ALDA) that modeled six different managed recharge and pumping scenarios. Under current and simulated recharge/pumping scenarios, some groundwater underflow leaves the Basin at various locations along the southeastern and western boundaries (see **Section 3.2.3**). Managed recharge at the Noble Creek Spreading Grounds has increased underflow out of the Basin by raising groundwater levels. Modeling showed that losses could potentially exceed 10%, mostly to the Banning area. Additional pumping in the southeastern portions of the Basin could mitigate some of the underflow losses.

The City, BCVWD, the Watermaster, and potentially SGPWA would need to work on a strategy for how recycled water recharged to the Basin would be credited to each agency.

3.1.3. Transfer and Adjustment of Water Rights

There are three types of transfers that the Watermaster accounts for:

1. Transfer of water rights and/or water in storage between Appropriators,
2. Transfer of water rights from Overlying Producers to an Appropriator in exchange for water service, and
3. Allocation of unused Overlying Water to the Appropriator Parties based on their share of the Operating Safe Yield.

The Judgement defines Appropriator's Production Right to "*consist of an Appropriator's share of the Operating Yield, plus (1) any water acquired by an Appropriator from an Overlying Producer* *or other Appropriator pursuant to this Judgement, (2) any water withdrawn from the Appropriator's storage account, (3) and New Yield created by the Appropriator.*

3.2. Beaumont Basin

3.2.1. Aquifer Conditions

Groundwater in the Beaumont Basin occurs within consolidated and semi-consolidated sedimentary rock overlain by unconsolidated to semi-consolidated alluvium consisting of interbedded layers of sand and silt with interbedded gravel and cobbles (Harder and ALDA, 2015). Crystalline basement rocks form the base of the aquifer system. The water-bearing deposits have been divided into an Upper Aquifer and Lower Aquifer. The Upper Aquifer is comprised of alluvial deposits and is more permeable than the Lower Aquifer. The Lower Aquifer is comprised of sedimentary deposits and ranges from 150 to 730 feet thick. The aquifers thicken toward the central area of the Basin to greater than 1,500 feet (maximum well depths). Most flow to wells, typically more than 80%, comes from the Upper Aquifer above approximately 1,000 feet below ground surface (ft-bgs) in the central portion of the Basin.

The upper portion of the Upper Aquifer is likely unconfined with the deeper portion being semi-confined. The Lower Aquifer is assumed to be confined (Harder and ALDA, 2015).

3.2.2. Groundwater Production

The Watermaster documents annual groundwater production from the Basin. While groundwater pumping fluctuates significantly from year to year, the highest Appropriator Party pumping was documented in 2020 (16,725 AF) (ALDA et al., 2021). Appropriator Party pumping accounted for 84% of the total pumping from the Basin. Overlying Party pumping has been decreasing over time. If Overlying Parties do not use their full water right, it is distributed to the Appropriator Parties.

Municipal supply wells in the Basin are as deep as 1,500 feet (BCVWD, 2021). Domestic, irrigation, and agricultural supply wells are typically shallower with lower yields.

3.2.3. Faulting and Groundwater Levels and Flow

The boundaries of the Beaumont Basin are based on faults that often form barriers to groundwater flow (Bloyd, 1971). The interpretation of the fault locations has evolved over time (Harder and ALDA, 2015). Major faults in the area include the Banning and Cherry Valley faults, which form the northern boundary of the Basin. The Beaumont Plains Faults are a series of northwest-southeast faults crossing roughly the center of the Basin west of Noble Creek (see **Figure 3-2**). They have been simulated with the Basin model as partial barriers to groundwater flow.

Figure 3-2 Model-Simulated Groundwater Elevation Contour Map in December 2020

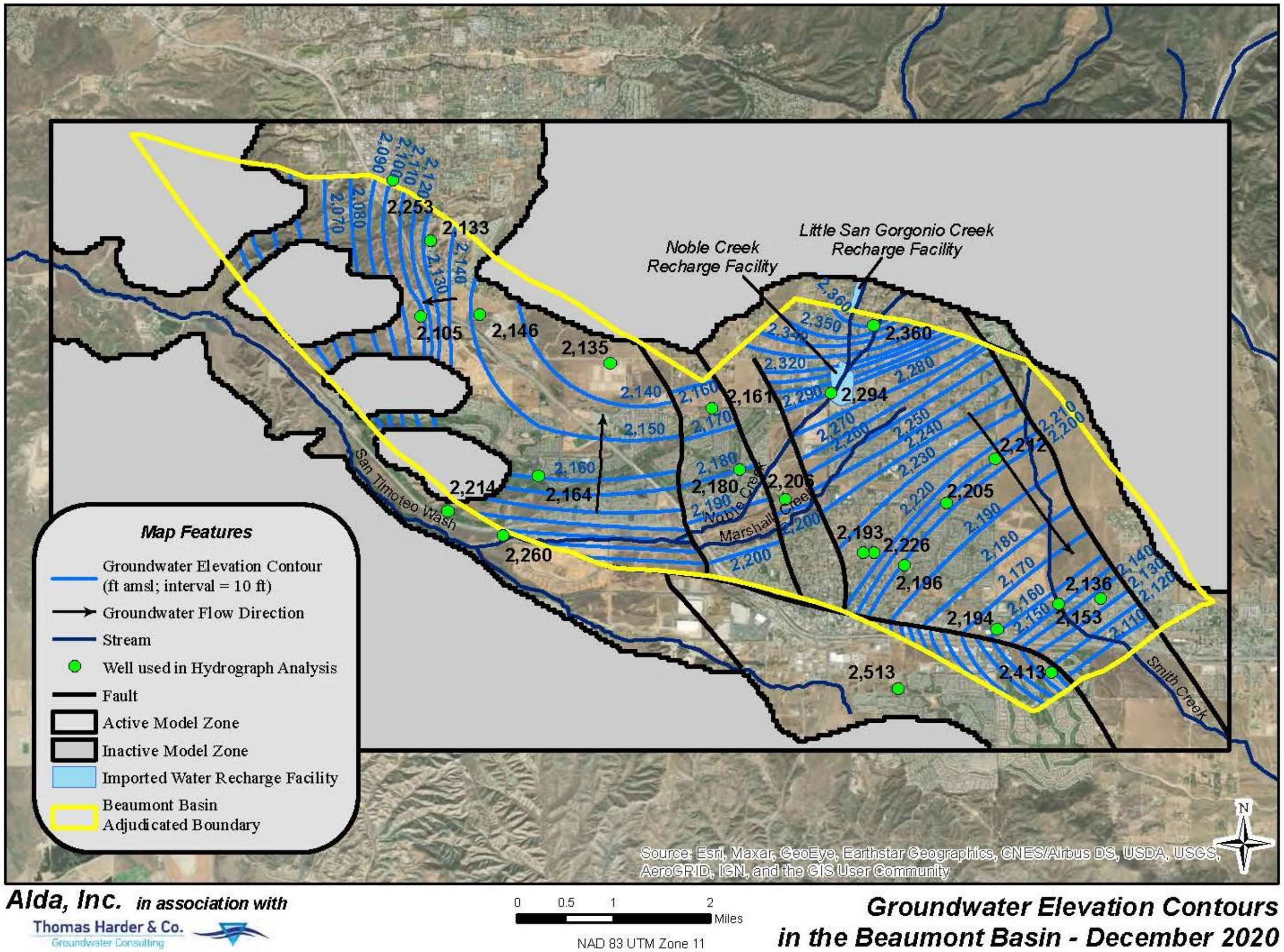


Figure 3-2 shows faults and model-generated groundwater elevation contours in December 2020 (ALDA, et al., 2021). Along the Banning Fault, groundwater levels on the north side of the fault outside the basin are as much as 400 feet higher than groundwater levels on the south side of the fault inside the Basin.

The Beaumont Plains Faults form a groundwater divide roughly along the Noble Creek drainage with flow moving west toward a pumping depression around BCVWD Well 29 in the west of the Basin and the San Timoteo Wash. In the eastern portion of the Basin, flow is southeasterly toward Banning. Groundwater underflow leaves the Basin at various locations along the southeastern and western boundaries of the Basin as shown in **Figure 3-2**.

Groundwater levels have generally declined 120 to 180 feet in the Beaumont Basin and surrounding area since 1927 (Harder and ALDA, 2015). Since the 2000s, groundwater level change has varied based on location within the Basin. As shown in groundwater level hydrographs in **Figure 3-3**, wells near, south and southeast of the Noble Creek Spreading Grounds are showing increasing trends presumably due to managed recharge in the spreading grounds. Further south in the eastern and western portions of the Basin, groundwater levels continue to show declining trends. The pattern of trends in the hydrographs clearly demonstrate the benefits of managed aquifer recharge with SWP water at the Noble Creek Spreading Grounds and the potential additional benefits of recycled water recharge.

3.2.4. Recycled Water, State Water Project (SWP) and Groundwater Quality

The SARWQCB has established Antidegradation and Maximum Benefit Water Quality Objectives (Antidegradation WQOs and Maximum Benefit WQOs) for TDS and nitrate as nitrogen (nitrate-nitrogen or nitrate) and other constituents in groundwater in its Basin Plan (SARWQCB, 2019). Antidegradation WQOs consider the goal of preserving historical groundwater ambient concentrations. Maximum Benefit WQOs consider management activities such as recharge with recycled water. As shown in **Table 3-2**, the Maximum Benefit WQOs for groundwater for TDS and nitrate-nitrogen are 330 mg/L and 5 mg/L, respectively.

As specified in its Basin Plan (SARWQCB, 2019), the ambient groundwater quality in the Santa Ana Watershed, including the Beaumont GMZ, must be recalculated every three years. The Beaumont GMZ is an area defined by the SARWQCB that is slightly larger than the adjudicated Beaumont Basin area; however, ambient concentrations for the Beaumont Groundwater Management Zone are considered representative of the adjudicated Beaumont Basin, as most monitored wells are located within the Basin. The most recent recalculation was completed in 2020 for water quality data collected from 1999 to 2018 (WSC, 2020). The ambient TDS and nitrate-nitrogen groundwater quality for this period are 280 mg/L and 2.7 mg/L, respectively, as shown in **Table 3-2**.

Figure 3-3 Groundwater Hydrographs in the Beaumont Basin

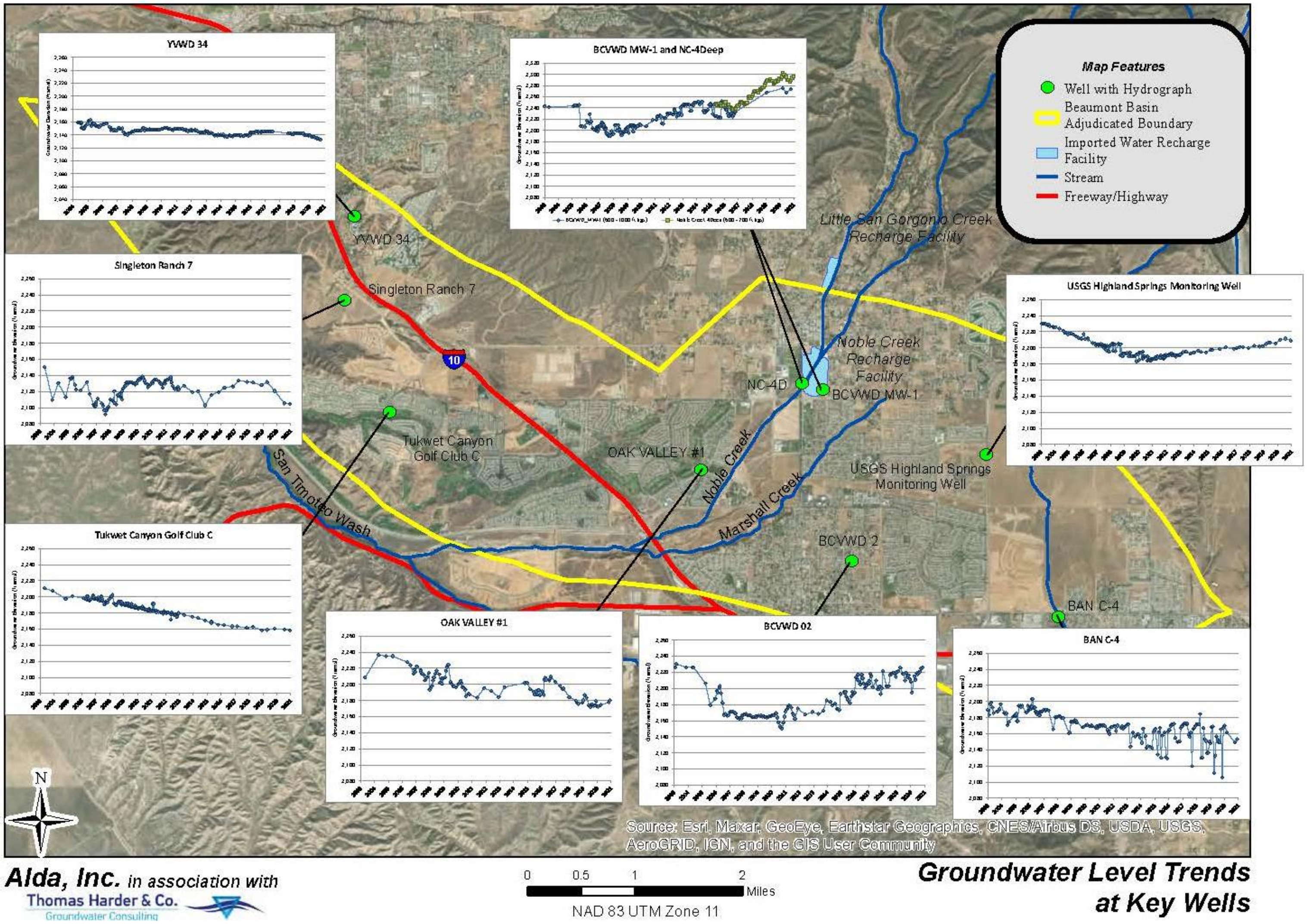


Table 3-2 Groundwater Quality Objectives and Average SWP, Recycled Water and Groundwater Quality

	TDS (mg/L)	Total Inorganic Nitrogen (mg/L)	Nitrate as Nitrogen (mg/L)
Antidegradation WQO	230		1.5
Maximum Benefit WQO	330		5.0
Average Ambient Groundwater[1]	280		2.7
Average SWP[2]	262		0.42
Average Tertiary RW with 50% RO[3]	365[4]/260[5]	3.9	
Ten-Year Running Average for RW Recharge[6]	330	6.7	6.7
Typical FAT RW[7]	55 - 80		0.3 – 1.1
Available Assimilative Capacity	**50**		**2.3**

Notes:
TDS – total dissolved solids
mg/L – milligrams per liter
BPO – Basin Plan Objective
RW – recycled water
RO – reverse osmosis
FAT – full advanced treated recycled water
SARWQCB – Santa Ana Regional Water Quality Control Board
WWTP – Beaumont Wastewater Treatment Plant
1 – Average in Beaumont Groundwater Management Zone from 1999 to 2018 (WSC, 2020)
2 – Average 2015 to 2018 (SGPWA, 2020)
3 – 50% of RW is run through RO treatment
4 – Average 2021 concentrations with limited RO runs
5 – WWTP Engineer's estimate of TDS when plant operations are optimized
6 – Per SARWQCB (2014 and 2015) including bended water such as SWP, surface water and/or stormwater
7 – Typical range observed at West Basin Municipal Water District's Edward C. Little Water Reclamation Water Replenishment District of Southern California's Leo J. Vanderlans Advanced Water Treatment Facility, Santa Clara Valley Water District's Silicon Valley Advanced Water Purification Center and Orange County Water District's Groundwater Replenishment System

SGPWA reports imported SWP water quality data from the sampling station at Devil Canyon in San Bernardino, which is the closest sampling station to the SGPWA service area (SGPWA, 2020). SWP water quality varies from year to year and from month to month. Water quality at the station is primarily a function of water quality conditions in the Sacramento/San Joaquin Delta and runoff in watersheds tributary to the Delta. That water quality in turn is largely a function of overall California hydrology. In wet years and during wet periods within dry and average years, fresh water from upland rivers drains to the Delta and improves overall water quality with dry years exhibiting poorer water quality. **Table 3-2** shows the average SWP water quality at the Devil Canyon station from 2015 to 2018 (SGPWA, 2020). Average TDS and nitrate-nitrogen concentrations in SWP water are 262 mg/L and 0.42 mg/L, respectively.

Table 3-2 also shows estimated and measured TDS and total inorganic nitrogen (TIN) or nitrate-nitrogen concentrations in recycled water quality at the WWTP assuming tertiary treatment with 50% of the effluent stream undergoing RO (tertiary/50% RO) to reduce TDS. Typical FAT recycled water quality from other facilities is also presented in the table. The City believes RO treatment of 100% of the effluent stream (tertiary/100% RO) and FAT are feasible in the future.

The WWTP can currently produce tertiary/50% RO, with the plant still undergoing operational optimization. The recycled water quality for TDS and TIN under tertiary/50% RO, with limited RO runs in 2021, are currently 365 mg/L and 3.9 mg/L, respectively. The WWTP Engineer estimates TDS will be in the 260 mg/L range once plant operations are optimized, including reduction in RO shutdowns, and addressing diurnal flows with implementation of equalization basins. The 3.9 mg/L TIN value is expected to be higher than the nitrate-nitrogen concentration and nitrate-nitrogen is also expected to be reduced with implementation of equalization basins and better biological removal.

SARWQCB Resolution No.R8-2014-005 and Order No. R8-2015-0026/NPDES No. CA0105376 require recharge of recycled water in the Beaumont Groundwater Management Zone be limited to the amount that can be blended with other recharge sources or RO diluent to achieve a 10-year running average equal to or less than the 330 mg/L “maximum benefit” TDS objective and less than or equal to the 6.7 mg/L nitrate-nitrogen “maximum benefit” objective or 6.7 TIN (taking the nitrogen loss coefficient of 25% into consideration) (**Table 3-2**). Potential sources of blending include imported water, stormwater, and/or groundwater underflow.

Assuming a RWC of 0.20 or 20% and current TDS and TIN/nitrate-nitrogen concentrations in tertiary/50% RO recycled water and 80% SWP diluent water, yields bended TDS and TIN/nitrate-nitrogen recharge concentrations of 282 mg/L and 1.1 mg/L, respectively, which are below those required by the SARWQCB in existing permits and the Basin Plan. The blended TDS is slightly higher than ambient groundwater, but effluent TDS concentrations are expected to be lower once the treatment train is optimized.

The recycled water quality for TDS and nitrate under tertiary/100% RO or FAT produced at the WWTP would need further study.

Beaumont believes tertiary/100% RO and FAT treatment are feasible for the WWTP with additional plant upgrades and reductions in tertiary/50% TDS and nitrate concentrations will be achieved with plant optimization. By enhancing treatment to tertiary/100% RO, it is expected that the City could achieve greater reductions in the concentrations of TDS and nitrate. With treatment optimization and blending with SWP water, the expected result would be TDS and nitrate concentrations that are lower than ambient groundwater. Tertiary/100% RO and FAT would both have TDS and nitrate concentrations less than ambient groundwater.

Table 3-2 shows the current assimilative capacity of the Basin for TDS and nitrate-nitrogen. Assimilative capacity is the difference between the groundwater Maximum Benefit WQOs and ambient groundwater quality. All treatment levels of recycled water combined with SWP diluent water are expected to improve ambient groundwater quality if recharged.

While only TDS and nitrate are discussed in this section, other constituents including chemicals of emerging concern (CECs) such as perfluorooctane sulfonates (PFOS), perfluorooctane sulfonic acid (PFOA), n-nitrosodimehtylamine (NDMA), 1,2,3-tricloropropane (1,2,3-TCP), and others, will likely need to be tested in recycled water and addressed if the recharge project moves forward.

3.3. Spreading Grounds

There are two active spreading grounds in the Beaumont Basin, the Noble Creek Spreading Grounds owned and operated by BCVWD, and the Brookside Spreading Grounds owned and operated by SGPWA. There are also the Little San Gorgonio Creek Spreading Grounds owned and operated by SGPWA located just outside the Beaumont Basin north of the Banning/Cherry Creek faults. The Watermaster has opined that spreading of imported water at the San Gorgonio Creek Spreading Grounds is likely to be a source of subsurface recharge to the Beaumont Basin; however, the Watermaster has not formally adopted this finding.

The Noble Creek Spreading Grounds are comprised of Phase 1 basins located northwest of Noble Creek and Phase 2 basins located southeast of Noble Creek. The facility includes 14 ponds divided into “trains” or sets of percolation ponds operated similarly in terms of wetting, drying and maintenance cycles. Phase 1 includes approximately 10.2 wetted acres of ponds and Phase 2 includes approximately 17 acres of wetted ponds. SWP water purchased by BCVWD has been recharged in the Phase 1 NCSBs since 2008 and the Phase 2 basins since 2015 (BCVWD, 2021). BCVWD has plans to recharge approximately 250 to 500 AFY of stormwater in the Phase 2 basins through a project currently underway with the Riverside Flood Control District (Jagger, 2021). Banning also purchases SWP water for spreading in the Noble Creek Spreading Grounds. SWP water is received directly through a 24-inch turnout into the spreading basins. The Noble Creek Spreading Grounds and Brookside Spreading Grounds are shown on **Figure 3-4**. The Little San Gorgonio Creek Spreading Grounds are located outside the Basin and shown in **Figures 3-2** and **3-3**.

SGPWA began recharging SWP water in the Brookside Spreading Grounds in 2019. The facility includes five ponds and approximately 20 acres of wetted area (SGPWA, 2021). The wetted area is the area of ponds covered when the ponds are full.

Table 3-3 shows the volume of water recharged annually in the Noble Creek Spreading Grounds, Brookside Spreading Grounds, and Little San Gorgonio Creek Spreading Grounds (ALDA, et al., 2021).

Figure 3-4 Beaumont Basin Spreading Grounds

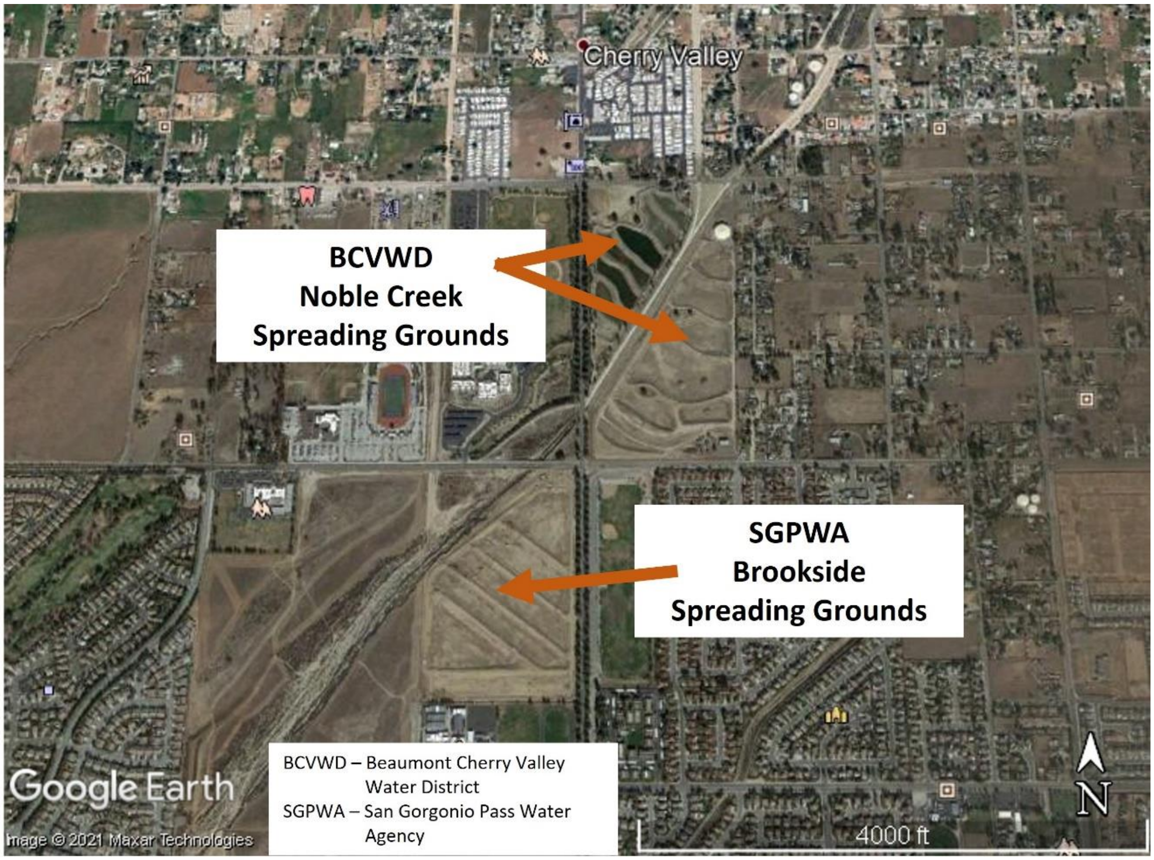


Table 3-3 Annual Supplemental Recharge – Calendar Year Accounting

Year	Banning[1] (AF)	BCVWD[1] (AF)	Total NCSGs (AF)	SGPWA[2] (AF)	Total (AF)
2003	-	-	-	-	-
2004	-	-	-	813.8	813.8
2005	-	-	-	687.4	687.4
2006	-	3,501.0	3,501.0	777.7	4,278.7
2007	-	4,501.0	4,501.0	541.3	5,042.3
2008	1,534.0	2,399.0	3,933.0	1,047.4	4,980.4
2009	2,741.2	2,741.2	5,482.4	823.4	6,305.8
2010	1,338.0	5,727.0	7,065.0	1,222.3	8,287.3
2011	800.0	7,979.0	8,779.0	1,842.0	10,621.0
2012	1,200.0	7,783.0	8,983.0	1,827.2	10,810.2
2013	1,200.0	7,403.0	8,603.0	881.8	9,484.8
2014	608.0	4,405.0	5,013.0	16.5	5,029.5
2015	694.0	2,773.0	3,467.0	9.2	3,476.2
2016	1,477.0	9,319.0	10,796.0	17.8	10,813.8
2017	1,350.0	13,590.0	14,940.0	-	14,940.0
2018	500.0	12,121.0	12,621.0	-	12,621.0
2019	250.0	13,645.0	13,895.0	257.8	14,152.8
2020	250.0	11,005.0	11,255.0	214.0	11,469.0
Totals	**13,942.2**	**108,892.2**	**122,834.4**	**10,979.6**	**133,814.0**

Notes:
AF – acre-feet
BCVWD – Beaumont Cherry Valley Water District
SGPWA – San Gorgonio Pass Water Agency
NCSGs – Noble Creek Spreading Grounds
SWP – State Water Project
1 - SWP water recharged in the BCVWD Noble Creek Recharge Facility
2 - Through 2018, the SGPWA recharged imported water at the Little San Gorgonio Creek Spreading Ponds, located just to the north of the Beaumont Basin boundary. Starting in 2019, the SGPWA recharges at their new spreading basins located at the southwest corner of Beaumont Blvd. and Brookside Ave. Imported water recharged at this location will be credited to the agency in their storage account.

3.3.1. Recharge Capacities

The Noble Creek Spreading Grounds have a percolation rate of 7 to 10 acre-foot per acre per day (AF/acre/day) (BCVWD, 2021). The recharge capacity of the spreading grounds is estimated to be 25,000 to 30,000 AFY (D. Jagger, 2021). At full buildout, and assuming 1.8 MGD for environmental stream releases, incidental losses through treatment, effluent discharge to the brine line, and reuse on the WWTP site, it is estimated that approximately 4.6 MGD would be the maximum recycled water volume discharged in the Noble Creek Spreading Grounds in the future. This is equivalent to 5,153 AFY. BCVWD has recharged a maximum of approximately 15,000 AFY since recharge operations began. Based on the lower estimated recharge capacity of

25,000 AFY results in 10,000 AFY of unused available recharge capacity and more than enough to accommodate the maximum anticipated recycled water volume of 5,153 AFY.

It is estimated that the recharge capacity of the Brookside Spreading Grounds is approximately 20,000 AFY (SGPWA, 2021). As SGPWA has only been recharging at the facility for a short period of time since December 2019, it is unclear what maximum or average volumes of SWP water might be recharged in the future; however, it is likely that in most years, there would be unused capacity in the Brookside Spreading Grounds that could be used to accommodate recycled water recharge, if needed.

The recharge capacities of the Noble Creek Spreading Grounds and Brookside Spreading Grounds appear more than adequate to accommodate the maximum volume of recycled water generated at the WWTP in the future.

3.3.2. Required Diluent Water

If tertiary treated recycled water is recharged to the Beaumont Basin, diluent water is required beginning with a RWC of 0.20 or 20% and a diluent water contribution of 0.80 or 80%. Diluent water can include SWP water and stormwater recharged in the ponds as well groundwater underflow within a defined mixing area. These percentages are calculated as a running average over 10 years. BCVWD and Banning have recharged a 10-year running average of approximately 9,800 AFY of SWP in the Noble Creek Spreading Grounds between 2011 and 2020. The current volume of recycled water produced by the WWTP is approximately 1,568 AFY (see **Section 4**, **Table 4-1**). These relative volumes of SWP and recycled water would result in a RWC of 0.16 or 16%, which would meet the initial regulatory requirements.

At full plant build-out flows of 8 MGD and considering losses during treatment, recycled water reused at the plant, 1.8 MGD discharged to Cooper's Creek for environmental habitat, and effluent discharged to the Brine Line results in an estimated maximum 4.6 MGD available for recharge. This is equivalent to 5,153 AFY of recycled water. Using the 10-year running average of SWP diluent water recharged in the Noble Creek Spreading Grounds yields a RWC of 38%, which is greater than the regulations allow. The RWC can be increased over time. An alternative initial RWC (up to 1.0) can be approved by DDW based on effluent TOC concentrations and public hearing results. For example, the Montebello Forebay Spreading Grounds in Los Angeles County have been tentatively approved for a RWC of 45%; however, the increase from 20% to 45% has been gradual and taken a number of years (LARWQCB, 2009).

Based on the last 10-year running average of SWP water recharged in the Noble Creek Spreading Grounds (9,835 AFY), the maximum tertiary treated recycled water that could be recharged would be 2,459 AFY. Groundwater underflow, additional recharge of SWP water, and/or additional stormwater recharge would be needed to meet the 20% RWC assuming the maximum anticipate recycled water volume and 20% RWC. Groundwater underflow is anticipated to be minimal given faulting north and west of the spreading grounds, which limits groundwater inflow.

A larger RWC (up to 1.0 or 100%) may be approved for recharge using FAT recycled water. In addition, the SARWQCB and DDW are more likely to approve increases in the RWC if tertiary/100% RO recycled water is produced and recharged in the spreading basins.

3.3.3. Hydrogeology Near the Spreading Grounds

The Noble Creek Spreading Grounds and Brookside Spreading Grounds sit along Noble Creek in the north-central portion of the Beaumont Basin. A geohydrologic investigation was conducted at the Noble Creek Spreading Grounds prior to their construction to assess the site's potential as a managed recharge site, in particular the existence of fine-grained confining layers, which could inhibit the downward percolation of recharge water (Geoscience, 2002). The investigation characterized four aquifers and is a modification of the Watermaster's characterization of a regional Upper Aquifer and Lower Aquifer. The aquifers, depth to groundwater, and aquifer properties from a pumping test are presented in **Table 3-4**.

Table 3-4 Spreading Basins Aquifers and Characteristics

	Depth (ft-bgs)	Depth to Groundwater During Investigation (ft-bgs)	Hydraulic Conductivity (ft/day)	Storativity (dimensionless)
Perched Aquifer	300 -400	300 - 400		
Shallow Aquifer	480 - 520	480		
Intermediate Aquifer	600 – 1,000	500 - 505	20 - 27	0.0261
Deep Aquifer	>1,000	495 - 498		

Notes:
ft-bgs – feet below ground surface
ft/day – feet per day

While a perched aquifer was identified with groundwater levels about 100 to 200 feet shallower than the shallow, intermediate, and deep aquifers, Geoscience concluded, based on observation well responses during the pumping test, that the zone between the perched and shallow aquifers was a semi-confining unit and recharge water would slowly move from the surface spreading basins to the intermediate aquifer where most groundwater is produced (comparable to Watemaster's Upper Aquifer). Also, the storativity value calculated from pumping tests indicated semi-confined as opposed to fully confined conditions in the intermediate and deep aquifers. Observed mounding in the deeper aquifers around the spreading grounds indicates that recharge water is reaching these zones. Also, hydrographs of perched aquifer and deeper monitoring wells (NC-4S and NC-4D) at the spreading grounds, while showing differences in groundwater elevations, show the same pattern of increasing groundwater levels since recharge operations began. The deeper well does lag the perched well, supporting the characterization of delayed percolation of recharge water through the semi-confining layer (Jagger, 2021).

The lateral movement of recharge water is also confirmed by rising groundwater levels in wells located southeast and south of the site as shown in **Figure 3-2**.

3.4. Groundwater Levels and Mounding

Groundwater levels at the Noble Creek Spreading Grounds have risen since BCVWD began recharging SWP water in 2006 forming a mound around the basins. Groundwater levels rose approximately 90 feet between 2016 and 2020 (ALDA, et al., 2021). BCVWD has increased pumping in the area east of the Noble Creek Spreading Grounds to mitigate the mounding. Based on the groundwater elevation contours in December 2020 (**Figure 3-1**) and an estimated ground surface elevation of 2,700 feet mean sea level, the depth to groundwater beneath the spreading basins was about 400 feet. The degree of mounding will vary based on the volume of recharge in the Noble Creek Spreading Grounds and Brookside Spreading Grounds. Mounding affects groundwater flow directions resulting in radial flow in the local area of the spreading basins. Understanding flow patterns/directions and velocities is essential to recycled water recharge planning.

Mounding can be an issue if groundwater levels rise to near the ground surface, which can reduce infiltration rates, impact shallow underground structures like basements or freeway underpasses, discharge to surface water, or mobilize shallow contamination areas (i.e., environmental release sites). Given the depth to groundwater (400 feet) after 15 years of spreading grounds operation, any additional mounding due to recycled water recharge, which is a small percentage of the total recharge, is not expected to have adverse impacts. This was confirmed with groundwater modeling, which showed groundwater levels do not rise above current levels with maximum projected recycled water recharge.

3.5. Nearby Water Supply Wells and Travel Times

Understanding travel time for water to flow underground from one point to another is also important in recycled water recharge planning. Recycled water recharge regulations require various water travel times be demonstrated including travel time to the nearest monitoring and drinking supply wells, pathogen reduction time, and time to respond to improperly treated recycled water recharge (response retention time). Water travel times are used to define the zone of controlled drinking water wells. For planning purposes, these travel times are typically demonstrated with a groundwater flow model and confirmed with a tracer test after project startup.

The Watermaster's groundwater flow model was used as a preliminary evaluation of travel times to nearby potable supply wells. The modeling assumed the 2010 to 2019 SWP recharge volumes (average 9,416 AFY) and current volume of recycled water (1,568 AFY) being produced. When using a groundwater flow model for recycled water recharge planning, the regulations require a safety factor of two to account for uncertainties associated with groundwater flow models. Assuming the underground travel time to provide pathogen reduction credit is 5 months, under the regulations this is equivalent to 10-months when estimated with groundwater modeling.

The importance of travel time is demonstrated in **Figures 3-4** and **3-5. Figure 3-4** shows modeled travel times with monthly contours for the first year of recycled water recharge in the Noble Creek Spreading Grounds. **Figure 3-5** shows annual contours for 10 years of travel time for recycled water recharge. BCVWD Well 23 is located just south of the Noble Creek Spreading Grounds and is currently used for potable supply. This well is at 8-months travel time from the spreading grounds and would not meet regulatory criteria for underground residence time of recycled water assuming a required pathogen reduction time of 10-months. BCVWD has indicated the well could be converted to non-potable uses to allow use of the spreading grounds for recycled water recharge (Jagger, 2021). The Riverside County, Department of Environmental Health website shows wells located on the Beaumont High School and California Baptist College sites located just west and northwest of the spreading grounds, respectively. These wells are located 4 to 7-months of travel time from the spreading grounds. It is unclear from the website if these wells are used for potable supply or irrigation. The usage for these two wells will need to be clarified, and if used for potable supply, the wells will need to be converted to non-potable uses or destroyed in order to implement recycled water recharge.

Once the zone of controlled drinking water wells is defined, it is recommended that a study be conducted to determine if there may be undocumented wells within the zone through review of drillers' logs, County and Watermaster records and databases, BCVWD water supply connection records, and a windshield survey.

As shown in **Figure 3-5** recycled water is estimated to take a little less than 3 years to reach the next closest drinking water well to the Noble Creek Spreading Grounds, BCVWD Well 21. This amount of travel time is likely sufficient to meet underground retention time requirements. Travel time to BCVWD Well 23 and two other nearby wells was discussed previously.

The 10-year travel time is shown to indicate the area where well owners would need to be notified of the recycled water project. **Figure 3-5** shows wells included in the Watermaster's modeled pumping. Other potential well owners in the area will need to be verified and given notice prior to the required public hearing.

Figure 3-4 Recycled Water Monthly Distribution for 1 Year of Recharge in the Noble Creek Spreading Grounds

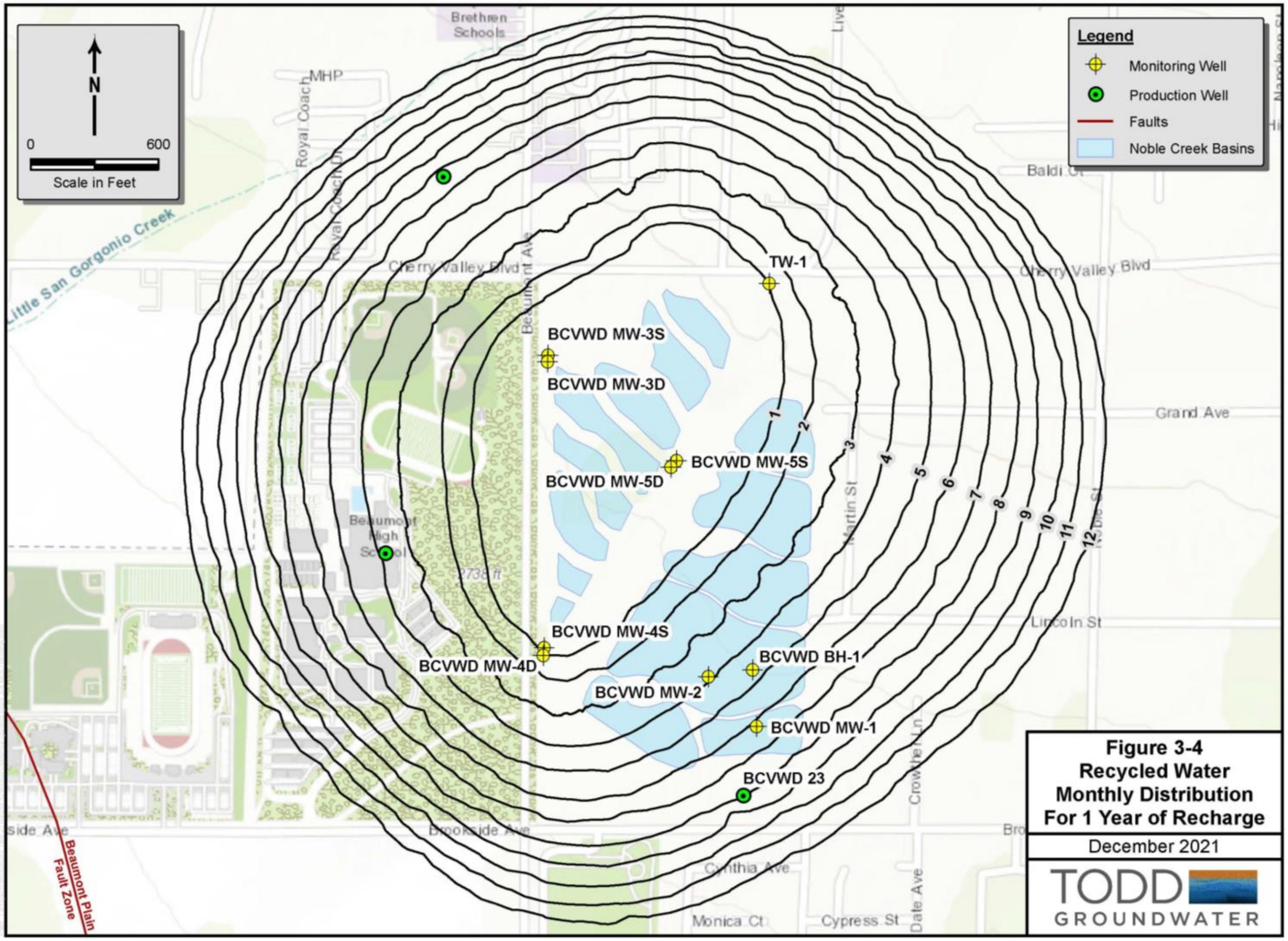
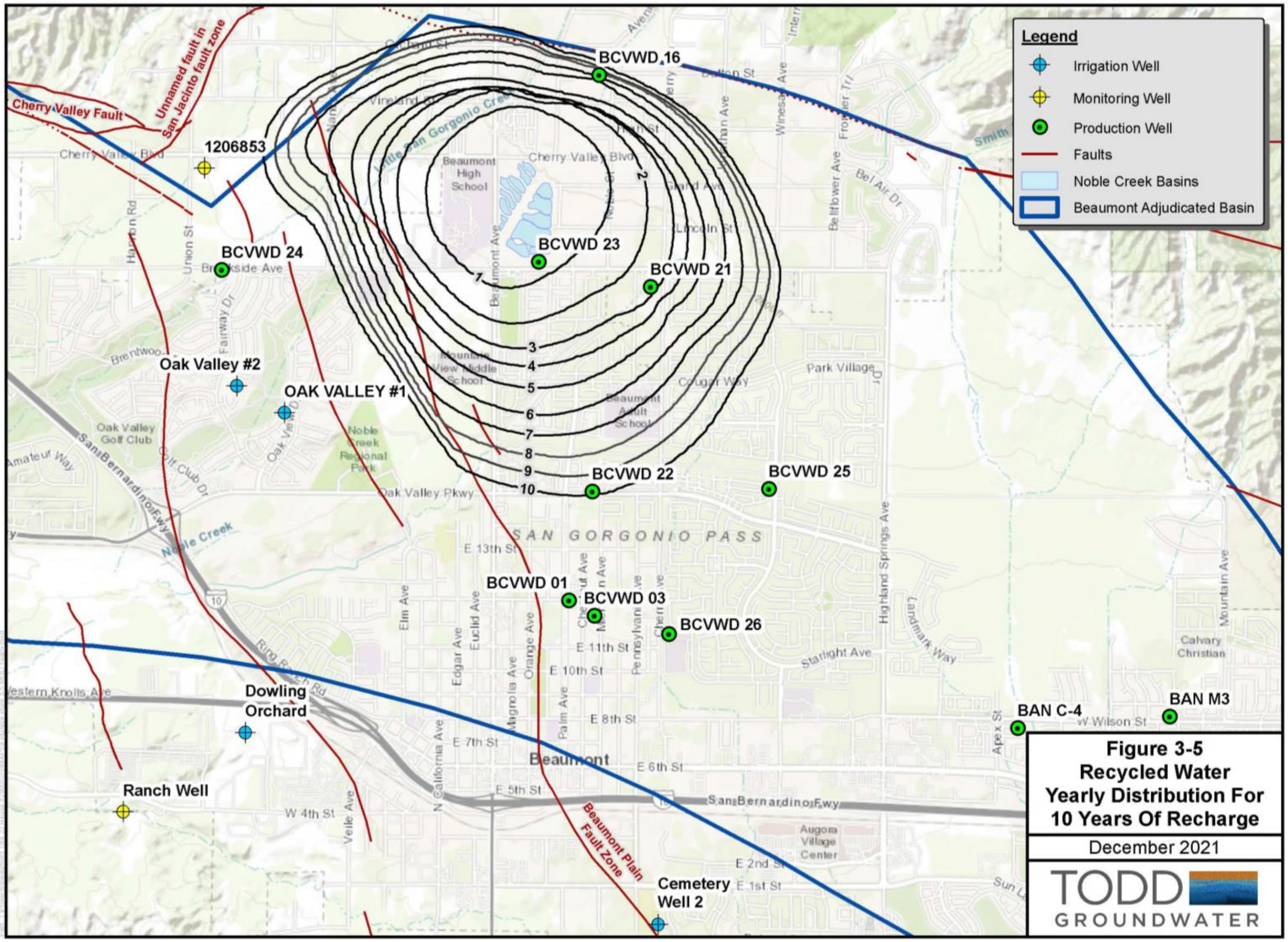


Figure 3-5 Recycled Water Yearly Distribution For 10 Years of Recharge in the Noble Creek Spreading Grounds



3.6. Potential for Recycled Water Recharge

The use of the Noble Creek Spreading Grounds and potentially the Brookside Spreading Grounds to recharge recycled water appears feasible considering the following.

- TDS and nitrate-nitrogen (and TIN) concentrations in tertiary/50% RO recycled water, tertiary/100% RO recycled water, and FAT recycled water meet regulatory requirements for spreading with recycled water assuming blending with SWP water and/or stormwater for tertiary treated recycled water.
- The available spreading grounds capacity is more than adequate to accommodate current and maximum recycled water and diluent water volumes.
- Available diluent water (SWP) based on the last 10 years of recharge in the Noble Creek Spreading Grounds is adequate to allow recharge of up to 2,459 AFY of tertiary treated recycled water assuming 50% of the recycled water undergoes RO treatment. After this threshold, an increase in the RWC, more SWP water, introduction of stormwater recharge, a higher percentage of RO treatment, and/or FAT recycled water will be needed.
- Modeling of travel times indicate that BCVWD Well 23 located adjacent to the Noble Creek Spreading Grounds would need to be converted to non-potable uses. Travel time to the next closest potable supply well, BCVWD 21, appears adequate to meet required underground retention time.
- The current status of wells located on the Beaumont High School and California Baptist College sites will need to be verified.

3.7. Hydrogeologic Benefits, Challenges, and Considerations

3.7.1. Benefits

Use of recycled water for recharge has the following benefits relative to hydrogeologic consideration.

- Maximizing use of recycled water for recharge provides the most benefits in terms of drought resilient groundwater sustainability compared with non-potable reuse.
- Recycled water recharge will help (along with SWP recharge) reverse long-term declining trends in groundwater levels.
- BCVWD, Beaumont, and SGPWA have existing storage agreements with the Watermaster, which accommodate recycled water recharge.
- Use of tertiary/50% RO, tertiary/100% RO and FAT recycled water are all feasible with respect to groundwater quality considering TDS and nitrate concentrations and blending with diluent water (as needed). FAT recycled water provides the most groundwater quality benefits as it has the lowest TDS and nitrate concentrations, followed by tertiary/100% RO recycled water and tertiary/50% RO recycled water.

- Beaumont believes recycled water quality will improve at the WWTP as operations are optimized and generation of tertiary/100% RO and FAT recycled water are feasible.
- Based on historical recharge, enough SWP water is available to meet diluent water requirements for tertiary treated recycled water under current recycled water production volumes and up to 2,459 AFY of recycled water in the future. Regulators may approve increases in the RWC over time and would likely consider an increase in the RWC if tertiary/100% RO were recharged. Diluent water may not be required to recharge FAT recycled water with DDW approval.
- Model-estimated underground travel time appears adequate to meet regulatory requirements for BCVWD Well 21; however, as discussed above, BCVWD Well 23 located adjacent to the Noble Creek Spreading Grounds, would need to be converted to non-potable uses.

3.7.2. Challenges/Considerations

- Meeting regulatory requirements and getting regulatory approval is typically more involved than for non-potable reuses. Additional studies will be required, including modeling. Planning and permitting could take multiple years.
- BCVWD Well 23 would need to be converted to non-potable uses. Usage of wells on the Beaumont High School and California Baptist College sites would need to be confirmed and if presently used for drinking water supply, would need to be converted to non-potable uses or destroyed.
- Based on historical SWP recharge volumes in the Noble Creek Spreading Grounds, a maximum of 2,459 AFY of tertiary/50% RO recycled water can be recharge in the spreading grounds while meeting the 20% RWC.
- Additional SWP and/or stormwater may need to be recharged in the spreading grounds to meet the 20% RWC once the recycled water volume exceeds 2,459 AFY. There is very little groundwater underflow to provide diluent credit.
- Beaumont/BCVWD will need to address other potential chemicals in recycled water including CECs.
- Upgrades to the WWTP could be required by the regulators or may be needed to meet the RWC as volumes of recycled water increase.
- Beaumont and BCVWD will need stakeholder consensus, including the Watermaster.

4. OPTIONS ANALYSIS

The City of Beaumont owns and operates the WWTP. The facility receives and treats domestic and commercial/industrial wastewater generated within the City and the Highland Springs area (portions of the unincorporated area of Cherry Valley). The facility was originally designed and permitted to discharge up to 4 MGD of tertiary-treated wastewater.

The City's treated wastewater is currently discharged to Cooper's Creek, a tributary to Marshall Creek and Noble Creek, all of which are tributary to San Timoteo Creek. The discharge to Cooper's Creek overlies the Beaumont Groundwater Management Zone. The Cooper’s Creek outfall does not overlie the adjudicated Beaumont Basin and studies have shown that very little of the wastewater recharges the Beaumont Groundwater Management Zone. The discharge primarily recharges the downstream San Timoteo Groundwater Management Zone.

In order to comply with the SARWQCB Basin Plan and WWTP permit, the City’s salt mitigation measures include RO treatment as well as construction of a 23-mile-long Brine Line commencing at the WWTP and terminating at the City of San Bernardino’s connection point to the Inland Empire Brine Line for exporting excess salt. The Inland Empire Brine Line conveys the brine to the Orange County Sanitation District for discharge with treated effluent in the Pacific Ocean. The City’s Brine Line is completed and is in operation.

The final construction for the WWTP and Brine Line to produce tertiary/50% RO recycled water, including WWTP expansion from the current 4 MGD to 6 MGD, has been completed. The upgraded WWTP design includes activated sludge, membrane bioreactor (MBR), RO, and UV disinfection facilities to treat wastewater to Title 22 reuse standards. The Master Reclamation/NPDES permit for the WWTP is currently being reissued by the SARWQCB.

Upgrading the WWTP to produce FAT recycled water would likely take an additional 18 to 24 months; although, given recent supply chain issues, it is difficult to reliably predict construction times.

The current upgraded WWTP was designed to ensure compliance with the Maximum Benefit WQOs for TDS and nitrate-nitrogen, as well as effluent limits for conventional pollutants as required by the discharge permit. The expected effluent quality is as follows:

- Biochemical Oxygen Demand (BOD) < 20 mg/L
- Total Suspended Solids (TSS) < 20 mg/L
- Total Inorganic Nitrogen (TIN) < 5 mg/L
- Turbidity < 2.0 NTU
- Total Coliform < 2.2 MPN/100 mL
- Total Dissolved Solids (TDS) < 330 mg/L

Four options for reuse of the WWTP recycled water have been developed and are described and assessed in the following section.

4.1. Option 1 – City Conveyance, BCVWD and City Co-Permittees, Indirect Potable Reuse-Tertiary Treatment

4.1.1. General Description

Option 1 includes recharge of recycled water into the Basin through the construction and use of a City-constructed, owned and operated dedicated WWTP outfall pump station and pipeline to the BCVWD and/or SGPWA spreading basins.

The treatment plant will produce tertiary recycled water with 50% undergoing RO suitable for indirect potable reuse. This option includes a recycled water pump station located at the WWTP and outfall pipeline from the pump station to the BCVWD and/or SGPWA's spreading grounds. **Figure 4-1** is a conceptual illustration of the components of this option. Disinfected tertiary/50% RO recycled water from the WWTP would be pumped from the in-plant final treated effluent holding basin(s) directly to the BCVWD and/or SGPWA groundwater recharge basins. No recycled water would be diverted for irrigation, which would limit the City's final end-users to BCVWD and, potentially, SGPWA. The recycled water will commingle with groundwater that can be recovered by groundwater wells for use in BCVWD's potable and non-potable distribution systems. Recycled water recharged in the spreading grounds would be credited to the City's, BCVWD's, and/or SGPWA's Basin storage accounts.

The WWTP recycled water quality and permit requirements are discussed above in **Section 2** The City and BCVWD would likely be co-permittees for recycled water reuse with liability extending to the point of groundwater extraction for water supply.

Table 4-1 summarizes existing and expected WWTP effluent flows through build-out of the WWTP. Currently, the WWTP treated effluent is being discharged into Cooper's Creek adjacent to the WWTP and as a result of this long-term discharge, regulatory agencies have required that at least 1.8 MGD continue to be discharged into Cooper's Creek for environmental mitigation. In addition, there are losses that occur in the treatment process including evaporation and RO brine discharges. The City estimates these losses are about 20% of the inflow.

Figure 4-1 Preliminary Outfall from WWTP to Recharge Ponds

Table 4-1 Projected WWTP Effluent Supply

Year	2020	2025	2030	2035	2040	2045
WWTP Gross Production, MGD	4.0	6.0	6.5	7.0	7.5	8.0
WWTP Net for Reuse, MGD[1]	1.4	3	3.4	3.8	4.2	4.6
WWTP Net for Reuse, AFY	1,568	3,360	3,808	4,257	4,705	5,153

Notes:
WWTP – Beaumont Wastewater Treatment Plant
MGD – million gallons per day
AFY – acre-feet per year1 (Source: City of Beaumont projected WWTP flows)
1 – Net effluent available for reuse after 20% in-plant losses and 1.8 MGD discharge to Cooper's Creek for environmental mitigation

4.1.2. Conceptual Facilities

The conceptual facilities for this option include an approximately 400 horsepower recycled water pump station located at the WWTP, and approximately 21,000 feet of 20-inch diameter pipeline crossing multiple railroad tracks and Interstate 10. Both the railroad and freeway crossings are envisioned to be completed by bore and jack or micro-tunnel technologies.

4.2. Option 2 – BCVWD Conveyance, BCVWD and City Co-Permittees, Indirect Potable Reuse-Tertiary Treatment

4.2.1. General Description

Option 2 includes indirect potable reuse via surface spreading within the Basin with BCVWD constructing a new pump station adjacent to the WWTP and operating its existing non-potable pipeline to convey recycled water to the BCVWD and/or SGPWA spreading basins. Tertiary recycled water with 50% of the water undergoing RO would be delivered to the spreading grounds. BCVWD will need to disconnect and reroute all of the existing irrigation connections along the pipeline since non-potable reuse would not occur under this option. Recycled water recharged in the spreading grounds would be credited to the City's, BCVWD's, and/or SGPWA's Basin storage accounts.

Currently, BCVWD has about 30 miles of non-potable water transmission pipelines in place, which are supplemented by an extensive network of smaller distribution lines installed by developers as part of tract development that has occurred since about 2002. The transmission system forms a loop around the City comprised primarily of 24-inch diameter ductile iron pipe (DIP). The system includes a 2 million gallon (MG) non-potable water reservoir which provides gravity operational storage and pressurization for the system. The 2 MG tank is located at elevation 2,800 at the BCVWD's groundwater recharge facility at Beaumont Avenue between Brookside Ave. and Cherry Valley Blvd.

The 2 MG tank is configured to receive potable water or untreated SWP water through air gap connections. The non-potable water system can have a blend of recycled water (when available), non-potable, imported water, and potable water. A reach of the 24-in diameter DIP pipeline loop in 4th Street also runs in front of the WWTP.

For this option, the easterly potion of BCVWD's non-potable 24-inch diameter loop would be used exclusively to transport recycled water from the WWTP to the recharge ponds and isolated from the rest of the loop system. All irrigation distribution pipelines and direct connections along this portion of the loop would be disconnected. This is illustrated schematically in **Figure 4-2** where the solid line represents the dedicated portion of the pipeline to be used as the recycled water outfall to the spreading basins. It is in the City's interest to disconnect the irrigation connections to limit its potential liability for permit violations. For tertiary treated recycled water, the SARWQCB has indicated the City is the sole permittee responsible for non-potable reuse. Elimination of non-potable reuse will limit the number of direct recycled water users to only BCVWD and/or SGPWA.

This option requires the BCVWD to construct a recycled water pump station adjacent to the WWTP, connect into its 24-inch non-potable pipeline in 4th Street, and construct facilities necessary to completely isolate the easterly part of the loop system from any irrigation or other types of non-potable uses.

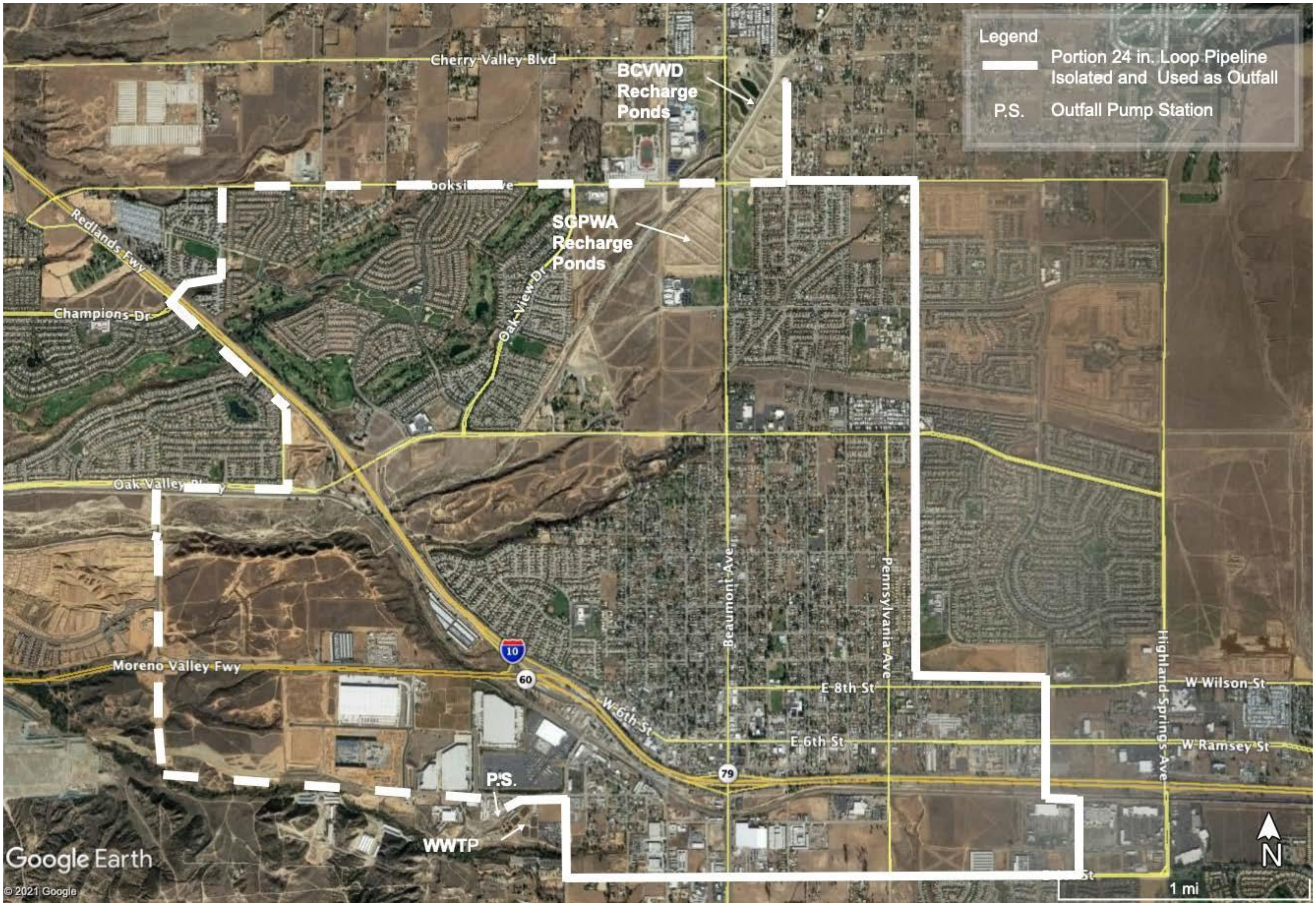
The City and BCVWD would likely be co-permittees for recycled water reuse with joint liability extending to the point of groundwater extraction for water supply.

4.3. Option 3 - BCVWD Conveyance, BCVWD Sole Permittee, Non-Potable and/or Indirect Potable Reuse-FAT

4.3.1. General Description

Option 3 includes indirect potable reuse via surface spreading within the Basin with BCVWD constructing a new pump station adjacent to the WWTP and operating its existing non-potable pipeline to convey recycled water to the BCVWD and/or SGPWA spreading basins. FAT water would be produced by the City and delivered to BCVWD for conveyance and groundwater recharge. Non-potable reuse such as irrigation would be at the discretion of BCVWD under this option. To limit potential City liability, the FAT recycled water produced would meet the required pathogenic reductions using multiple treatment processes at the WWTP. The SARWQCB has indicated in verbal discussions with the City (Van Belle, 2021) that compliance withall pathogenic reduction requirements at the WWTP would result in the City's liability ending once the FAT water is delivered to BCVWD at discharge from the WWTP.

Figure 4-2 Option 2 Pipeline Schematic



FAT is the treatment of an oxidized wastewater using RO and an advanced oxidation treatment process. The RO and advanced oxidation processes must meet design and performance criteria specified and validated by DDW. The advanced oxidation process typically employs hydrogen peroxide, hypochlorite, ozone and/or ultraviolet light, which breaks down organic molecules into metabolites. The exact treatment train to achieve FAT with complete pathogenic reduction at the WWTP has not been determined and would require additional City planning and design. Generation of FAT recycled water would require the City to provide RO treatment for 100% of the recycled water.

BCVWD would be the sole permittee for recycled water distribution and reuse and liable for any permit violations.

Recycled water recharged in the spreading grounds would be credited to the City's, BCVWD's, and/or SGPWA's Basin storage accounts. This option requires BCVWD to construct a recycled water pump station adjacent to the WWTP and connect into its 24-inch non-potable pipeline in 4th Street. Because the FAT recycled water with complete pathogenic reduction at the WWTP is considered a potential potable supply, BCVWD would need to provide backflow prevention along its conveyance system to prevent mixing of FAT water with other non-potable water such as SWP water.

4.4. Option 4 – BCVWD Conveyance, BCVWD and City Co-Permittees, Non-Potable and Potable Reuse-Tertiary Treatment

4.4.1. General Description

Option 4 includes recycled water reuse for irrigation and other non-potable uses using BCVWD's existing non-potable transmission pipeline system and pump station (to be constructed adjacent to the WWRP) with surplus recycled water discharged into BCVWD's and/or SGPWA's recharge basins to recharge the Basin. Irrigation would be under permit and oversight by the City.

BCVWD has over 300 non-potable irrigation connections and, as describe in Option 2, a large non-potable distribution system, part of which is a 24-inch DIP loop transmission system with a reach running in front of the WWTP and a 2 MG operational storage tank. In 2021, non-potable irrigation water demand closely matches WWTP recycled water production. However, BCVWD does not currently have any monthly or seasonal recycled water storage. **Table 4-2** illustrates the annual irrigation demand compared with the projected annual WWTP recycled water production, estimated through build-out in year 2045. Recycled water production will exceed irrigation demand in 2025 or when the WWTP flows approach 6 MGD. The WWTP will have flow equalization in place which will level out daily flows; however, there will be no seasonal storage to capture winter WWTP recycled water production when irrigation demand is at a minimum.

Excess recycled water would be recharged in the spreading grounds or discharged to Cooper's Creek.

Table 4-2 Comparison of WWTP Recycled Water Production with Irrigation Demand

	Beaumont WWTP Projected Flows[1]				Irrigation Demand[2]	
Year	Rated[3] (MGD)	Net[4] (MGD)	Net (AFY)		AFY	Difference[5]
2020	4	1.4	1,569		0	1,569
2025	6.0	3.00	3,362		1,957	1,405
2030	6.5	3.40	3,810		2,175	1,635
2035	7.0	3.80	4,258		2,478	1,780
2040	7.5	4.20	4,706		2,561	2,145
2045	8.0	4.60	5,153		2,578	2,577

Notes:
BCVWD – Beaumont Cherry Valley Water District
WWTP – Beaumont Wastewater Treatment Plant
MGD – million gallons per day
AFY – acre-feet per year
1 – Source: City of Beaumont
2 – Recycled Water Demand, BCVWD Draft Urban Water Management Plan, July 2021, Table 4-5
3 – Rated WWTP capacity is the WWTP flow rate capacity in MGD recognized and permitted by the RWQCB
4 – Net includes rated flow less 1.8 MGD for environmental mitigation and 20% losses for miscellaneous losses including brine disposal
5 – Difference between WWTP recycled water production and BCVWD irrigation demand

Under this Option, the City would have the highest level of liability exposure for permit violations associated with recycled water irrigation or other non-potable reuses. This means that the City will need to have its own staff of professionals providing oversight, inspection, and control of its recycled water reuse, duplicating the oversight and control necessarily provided by BCVWD. The City will likely not be able to support this Option because the potential liability is extreme compared with other Options and also considering current and past observed irrigation leakage and overspray occurring at sites irrigated with BCVWD's non-potable system and under BCVWD's oversight and control. The City would have a high level of liability exposure due to the multiple irrigation users, requiring the City to implement and monitor all aspects of recycled water reuse including, but not limited to, cross-connection control, over-irrigation and runoff, spillage from pipeline breaks and leaks, and other reuse-regulated requirements. The City might also have to enact and enforce, special recycled water use permits for all users, and develop and adopt regulations through a dedicated recycled water reuse enforcement department. This duplication of oversight and control is not cost effective or economic for City residents and BCVWD customers, who will pay for it for both agencies. While the City Council can assign liability to another entity for potential violations, they cannot do this on behalf of the WWTP Operator of Record.

4.5. Relative Cost Comparison of Options

Table 4-3 roughly compares Option 1 with Options 2, 3, and 4 with regards to capital and operating costs.

4.5.1. Capital Costs

Option 3 and 4 have the lowest capital costs as they utilize BCVWD's existing conveyance system for recharge and irrigation; although BCVWD will need to resolve any cross-connection issues related to its non-potable distribution system under Option 4 and will need to install backflow prevention under Option 3. All four options require construction of a new pump station, monitoring wells, and performance of tracer tests. Options 1 and 2 are comparable in terms of conveyance as Option 1 requires the City to construct a new conveyance pipeline, while Option 2 requires BCVWD to disconnect and reroute all irrigation connections.

Option 1 provides the least duplication of public services and least exposure for the City to excessive liability for violations of its WWTP permit discharge requirements because it would construct, own, operate, and maintain the pumping and conveyance system. Under Option 3, the City will have added costs to produce FAT recycled water.

The City and BCVWD may recover capital expenditures through rates and fees.

4.5.2. O&M Costs

Options 1 requires the City to maintain and provide conveyance to the spreading grounds. The City will recover these costs through recycled water fees. Options 2, 3, and 4 are similar in terms of O&M costs for BCVWD for maintenance and operation the recharge facilities. Options 3 and 4 have added costs for BCVWD for maintenance, operation, and regulation and oversight of non-potable facilities. The City has significant regulation and oversight costs for Option 4 non-potable facilities.

Options 1, 2, and 4 require BCVWD to purchase diluent water. No diluent water will need to be purchased for Option 3. This will reduce the O&M costs associated with the purchase of SWP diluent water.

The City will need to work with BCVWD and SGPWA to develop the relative water costs associated with each option. FAT recycled water will be more expensive to produce under Option 3. Options 2 and 4 will all utilize tertiary/50% RO recycled water so costs for production of the recycled water should be similar. Because the City will recover the costs of conveyance under Option 1, the cost of recycled water to BCVWD would be higher.

Table 4-3 Relative Costs Comparison of Options

	Option 1	Option 2	Option 3	Option 4
Capital Cost	**City Capital Costs:**	**City Capital Costs:**	**City Capital Costs:**	**City Capital Costs:**
	• The City builds and operates the Option 1 pump and distribution facilities	• City capital cost is relatively minimal mostly covered in WWTP expansion.	• Increased City capital costs to produce FAT recycled water and additional brine disposal may be passed to BCVWD/SGPWA in recycled water rates.	• City capital cost is relatively minimal mostly covered in WWTP expansion.
	BCVWD Capital Cost:	**BCVWD Capital Cost:**	**BCVWD Capital Costs:**	**BCVWD Capital Cost:**
	• Cost to install an additional monitoring well and conduct and report on tracer tests.[1]	• BCVWD will need to build a recycled water pump station at the WWTP. • The cost to disconnect and reestablish irrigation connection. • Cost to install an additional monitoring well and conduct and report on tracer tests.[1]	• BCVWD will need to build a recycled water pump station. • BCVWD will need to provide backflow prevention along its conveyance pipeline to prevent mixing of FAT and non-potable water (SARWQCB permit requirement). • Cost to install an additional monitoring well and conduct and report on tracer tests.[1]	• BCVWD will need to build a recycled water pump station • BCVWD's additional capital costs for resolving cross connections and potential recycled application site related runoff issues. • Cost to install an additional monitoring well and conduct and report on tracer tests.[1]

	Option 1	Option 2	Option 3	Option 4
Operational Costs	**City O&M Costs:**	**City O&M Costs:**	**City O&M Costs:**	**City O&M Costs:**
	• Maintain and operate PS and pipeline and pumping cost will likely be the largest component. Costs may be passed to BCVWD/SGPWA in recycled water rates. • Potential costs for permit violations.	• The City's cost will largely be those related to distribution and discharge permit monitoring plus, the cost of added risk and liability. Costs may be passed to BCVWD/SGPWA in recycled water rates. • Potential costs for permit violations.	• City O&M costs likely to be minimal once FAT water leaves the plant.	• The City will need to build a recycled water discharge permit enforcement department to monitor potentially over 300 BCVWD irrigation users. • The City's cost will largely be those related to distribution and discharge permit monitoring and enforcement. • Potential costs for permit violations.
	BCVWD O&M Cost:	**BCVWD O&M Cost:**	**BCVWD O&M Costs:**	**BCVWD O&M Cost:**
	• Cost to operate, monitor, and report annually on recycled water recharge in the spreading grounds.[2] • Distribution costs will likely be similar to current costs. • Cost to purchase diluent water. • Potential costs for permit violations.	• Maintain and operate PS and pipeline with pumping cost will likely be the largest component. • Cost to operate, monitor, and report annually on recycled water recharge in the spreading grounds.[2] • Distribution costs will likely be similar to current costs. • Cost to purchase diluent water. • Potential costs for permit violations.	• Recycled water irrigation use permit monitoring and enforcement cost. • Maintain and operate PS and pipeline with pumping cost will likely be the largest component. • May have increased costs for monitor and enforcement of BCVWD rules and regulations for irrigation end users. • Cost to operate, monitor, and report annually on recycled water recharge in the spreading grounds.[2] • Distribution costs will likely be similar to current costs. • Potential costs for permit violation.	• Recycled water irrigation use permit monitoring and enforcement cost. • Maintain and operate PS and pipeline with pumping cost will likely be the largest component. • May have increased costs for monitor and enforcement of BCVWD rules and regulations for irrigation end users. • Cost to operate, monitor, and report annually on recycled water recharge in the spreading grounds.[2] • Distribution costs will likely be similar to current costs. • Cost to purchase diluent water. • Potential costs for permit violations.

Notes:

PS – pump station

HP – horsepower

GRRP – Groundwater Replenishment Recharge Project

O&M – operations and maintenance

BCVWD – Beaumont Cherry Valley Water District

RWC – Recycled Water Contribution

1 - It appears BCVWD has adequate monitoring for the closest required monitoring well(s), but a second down gradient monitoring well between the GRRP and BCVWD Well 21 will need to be installed. In addition, a tracer test to verify modeled travel times will be required. The City could potentially share some of these costs.

2 - The spreading grounds recharge water and monitoring wells would need to be monitored and annual reporting including documentation of the RWC to the SARWQCB will be required. The City could potentially share some of these costs

Under Option 4 (and possibly Option 3), groundwater and SWP water for irrigation would be largely replaced by recycled water. Relatively speaking recycled water is likely the least expensive water supply, although the City would need to develop rates. The cost of groundwater is highly dependent on the depth to groundwater and the associated pumping costs. SWP water is likely the most expensive of the three water sources (recycled water, groundwater, and SWP water).

A comparison of water supply (recycled water, SWP water, and groundwater) costs among the options is beyond the scope of this study. In order to objectively compare water costs of each option, the real cost of water for each option would need to be calculated and compared between the options. The real cost of water isn't necessarily comparable with the water rate charged by a water supplier. The real cost of water is basically the amortized cost of capital facilities plus operational and maintenance cost**s** spread over the full amount of water delivered through those facilities. However, there are other revenue streams that water agencies use to offset some costs such as property tax and developer fees and in lieu facilities. As an example, SWP contractors cover some if not all their SWP purchased water though property tax revenues, then base their water rates on their local operations costs. Thus, their water rates do not reflect the cost they paid for the SWP water purchase.

4.6. Benefits, Challenges, and Considerations

Some of the benefits, challenges, and considerations associated with the options are presented below.

4.6.1. Sustainability and Storage Credit

- Options 1 and 2 maximize use of recycled water for recharge (100%) providing the most benefit in terms of drought resilient groundwater sustainability compared with non-potable reuse. If non-potable reuse is implemented, Option 4 and Option 3 would use less than 100% of recycled water for recharge. However, it is anticipated that Option 3 would likely still recharge significant volumes of recycled water.
- All options offset the need for some future imported water by storing recycled water in the Groundwater Basin. Under Options 1 and 2, all recycled water is recharged. Under Option 3, BCVWD can use some recycled water for non-potable uses at its discretion, so less could be available for storage credit. Under Option 4, recycled water would be used for irrigation (and potentially other uses) with less recharging the Basin and less storage credit compared with Options 1, 2, and 3.
- Options 1, 2, and 3 allow the City, BCVWD, and potentially SGPWA to maximize additions to their Basin storage accounts. Recycled water recharge allows the City to use the stored water for its use or sell the credit to Basin pumpers and BCVWD to pump more groundwater or make other use of the storage credit. Option 4 and potentially Option 3 would result in less Basin recharge and storage credit compared with Options 1 and 2 if some recycled water is used for non-potable uses.

4.6.2. Facilities Ownership and Liability

- Under Option 1, the City would own and operate the recycled water distribution system from the WWTP to the spreading grounds. The City would need to build a new pump station and distribution pipeline.
- Under Options 2, 3, and 4, BCVWD would own and operate the recycled water distribution system to the spreading grounds. However, under Option 2, BCVWD would have to build the required pipelines and other facilities to replace pipelines and irrigation connections removed in order to isolate the easterly portion of the 24-inch loop. Option 4 would utilize BCVWD's existing non-potable distribution system for irrigation, but the City would have to provide oversight and regulation for non-potable uses such as irrigation.
- For Options 1, 2, and 4, the City and the BCVWD would likely be co-permittees under site-specific WRRs for recharge. It is unclear how the SARWQCB would allocate relative responsibility for any violations of the permits. For Option 3, the City's liability would end once the FAT recycled water is produced at the WWTP if pathogenic reductions can be achieved by multiple treatment processes at the WWTP. Under Option 3, BCVWD would be the sole permittee for distribution, groundwater recharge, and non-potable reuse with sole liability for violations.
- Options 1, 2, and 3 help the City stay in compliance with recycled water permit requirements by limiting the number of recycled water users (City and BCVWD and potentially SGPWA) and limiting City liability due to violations associated with leaks and spills that could occur with multiple irrigation (or other) users.
- Under Option 4, the City would be the sole permittee for non-potable reuse and would have full liability for violations of permit requirements. As a result, the City would have a higher level of liability exposure due to potential permit violations associated the multiple irrigation (or other) users. The City will need to implement and monitor all aspects of recycled water reuse including, but not limited to cross-connection control, runoff and irrigation overspray, spills from pipeline breaks, and other reuse requirements. The City will need to adopt a strict regulatory and enforcement ordinance and issue recycled water use permits for all users, along with developing a specialized enforcement division. Liability extends to the City and the City WWTP Operator of Record for potential permit violations at multiple points of use. While the City Council can assign liability to other entities, it cannot do this on behalf of the WWTP Operator of Record.
- Option 4 and potentially Option 3 utilizes BCVWD's existing non-potable distribution system to achieve wide distribution of recycled water to potentially over 300 non-potable water users. This system is currently in use only for irrigation water (groundwater and SWP water) distribution.
- Under Options 1, 2, 3, and 4, BCVWD would continue to operate its existing irrigation system (or modified system under Option 2) in a similar manner as in the past by pumping groundwater, SWP, and/or recycled water into the irrigation system and using its storage tank located at the Noble Creek Spreading Grounds to

pressurize the system and supply operational storage. Seasonal storage is provided by the recharge and recovery in the Basin.

4.6.3. Regulatory Considerations

- Options 1, 2, and 3, which primarily recharge the Basin, are likely to have greater regulatory support (DDW and SARWQCB) compared to Option 4, which may use a larger volume for irrigation and other non-potable uses.
- Option 4 would result in more exposure to the City for violations so it will require considerable regulatory and administrative oversight by the City for non-potable reuse.
- Option 3 will have greater DDW and SARWQCB acceptance and support due to the use of the higher quality FAT recycled water compared to Options 1, 2 and 4.
- Option 3 will improve groundwater quality to a greater extent compared to Options 1, 2 and 4 due to the higher quality recycled water utilized for recharge.
- Because FAT recycled water is considered potential drinking water, Option 3 will require BCVWD to install backflow prevention devices along its conveyance system to prevent mixing of FAT recycled water and any non-potable water sources such as SWP water.
- Options 1, 2 and 4 will require diluent water to meet the RWC for recharge. If diluent water requirements cannot be met over the 10-year running averaging period, recycled water recharge will need to be halted until additional diluent water is available for recharge. Option 3 will have no diluent water requirements, eliminating the cost to purchase SWP water for spreading to meet RWC requirements. Option 3 also increases the reliability of recharge operations, since it would not rely on imported water, which can be unavailable during droughts.
- Based on experience with similar projects, obtaining a permit for indirect potable reuse will take approximately 18 to 24 months while obtaining a permit for non-potable reuse will take approximately 9 to 16 months.
- Under all options, BCVWD Well 23 may need to be converted to non-potable uses. Usage of wells on the Beaumont High School and California Baptist College sites would need to be confirmed, but if presently used for drinking water supply, may also need to be converted to non-potable uses or destroyed.

4.6.4. Costs

- Capital costs for pumping and conveyance for Option 3 and 4 are lower compared to Options 1 and 2. However, costs for regulation and oversight of the irrigation program under Option 4 are likely to be high and duplicative between BCVWD and the City. In addition, the potential costs for fines and penalties for irrigation permit violations could be very high. These duplicative oversight requirements may lead to conflicts between the two agencies. Options 1, 2, and 3 reduce duplicative administration and oversight costs for recycled water use for irrigation and other non-potable uses (City liability ends at the WWTP under Option 3).

- Option 3 would not require purchase of diluent water for recharge, so this option would be less costly for supplemental water supplies compared with Options 1, 2, and 4.
- Under Option 3, FAT recycled water will be more expensive to produce compared to the tertiary recycled water produced under Options 1, 2, and 4 (50% of the flow undergoing RO treatment). In addition, the volume of FAT recycled water will be less than produced for tertiary recycled water because there will be more residuals (e.g., brine, RO concentrate) generated during treatment. In addition to the increased treatment costs, there will be added costs for disposal of the larger volume of residuals. Residuals are discharged to the Inland Empire Brine Line for disposal by the Orange County Sanitation District. The City will be charged for a larger designated capacity of the brine line and higher ongoing costs based on volumes discharge to the brine line. It is assumed that the added costs for FAT would be passed along to recycled water users as increased rates.
- Under Option 4 and potentially Option 3, BCVWD will need to develop a recycled water use plan including rules and regulations, monitoring, and the enforcement of all restrictions in the City's recycled water permit. In addition, the City will need to develop a permitting and enforcement division to oversee non-potable reuse under Option 4.

4.6.5. Stakeholder Consensus

- For all options, Beaumont and BCVWD will need stakeholder consensus including the Watermaster and other parties, for indirect potable reuse. The success of all options will rely to some extent on the Watermaster's cooperation in maximizing accounting for storage of recharged recycled water in the Basin.

4.7. Preferred Option

From the City's perspective, Option 3 is the preferred option for the following reasons:

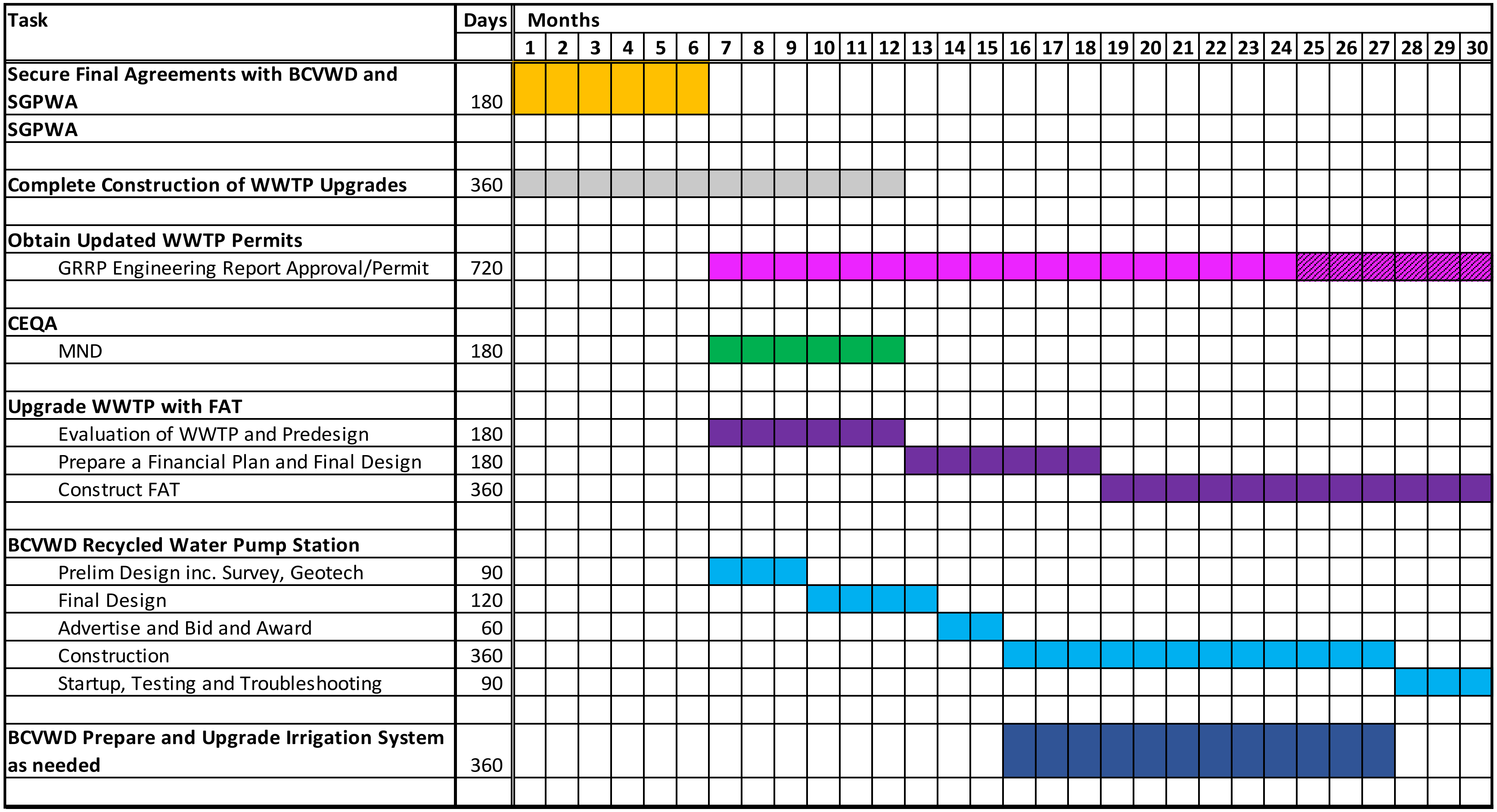
- Recharges a potentially high volume of recycled water in the Basin;
- Recharge results in storage credits for the City, BCVWD, and potentially SGPWA;
- City liability for permit violations ends at the WWTP, assuming full pathogenic reduction is achieved at the WWTP;
- Use of FAT recycled water will have greater DDW and SARWQCB acceptance and support due to the production and use of higher quality recycled water;
- Puts the highest quality water into the Basin which will improve groundwater quality;
- Reduces overall costs by using existing BCVWD existing conveyance facilities;

- Reduces uncertainty by eliminating reliance on imported water for diluent water, which can be unavailable during droughts; and
- Reduces costs for purchase of imported water for dilution.

4.8. Schedule for Option 3 (Preferred Option)

Construction of Option 3 facilities is expected to take approximately 3 years to complete. **Figure 4-3** illustrates the estimated project schedule.

Figure 4-3 City of Beaumont Recycled Water Use Project – Option 3 Preliminary Schedule (preferred option)



Notes:

BCVWD - Beaumont Cherry Valley Water District
SGPWA - San Gorgonio Pass Water Agency
WWTP - Beaumont Wastewater Treatment Plant
GRRP - Groundwater Replenishment Recharge Project

CEQA - California Environmental Quality Act
MND - Mitigated Negative Declaration
FAT - fully advanced treated

- upper estimated time schedule

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APPENDIX A

January 16, 2020, Email Correspondence Between City and SARWQCB (Julio Lara (Regional Water Board) to Brian Knoll (Webb Associates) and Kristine Day (Beaumont)

From: Lara, Julio@Waterboards <Julio.Lara@waterboards.ca.gov>
Sent: Thursday, January 16, 2020 1:49 PM
To: Brian Knoll
Cc: Justin Logan; Kristine Day; Amin, Najah@Waterboards; Joy, Jayne@Waterboards; Thaxton VanBelle; Smythe, Mark@Waterboards
Subject: RE: Recycled Water Question

Hi Brian,

From a Clean Water Act (CWA) and California Water Code (CWC) perspective (as explained in the current Order No. R8-2015-0026) Beaumont is only allowed to discharge tertiary treated and disinfected wastewater into surface waters (waters of the US) through the discharge points noted in the order/permit. Any other discharges of tertiary treated and disinfected wastewater that occur through non-authorized discharge points are prohibited; which include tail water derived from the irrigation with recycled water (RW) of agricultural fields, overapplication of RW, irrigating with RW during or right after a rain storm event, and over spray from faulty RW irrigation systems. When a volume of RW leaves the authorized use area/site and enters waters of the US it becomes a discharge of tertiary treated and disinfected wastewater through an unauthorized discharge point and the Discharge/Producer of the RW is liable. Also, the application of RW at use areas for irrigation purposes are authorized as a discharges to land only and not to surface waters. There's a clear distinction in the permit regarding which discharge points are authorized for discharges to surface waters and which ones are authorized for RW application. The transfer of recycled water to a RW retailer does not relieve Beaumont/Producer from its obligations under the CWA and the CWC. DDW view of things differs because they are not regulating the discharge of wastewater for disposal purposes to surface waters and/or land (groundwater being the receiving water body that needs to be protected). Other recycled water producers in the region provide RW to other agencies as satellite RW distribution programs under an MOU that clarifies the lead role of the producer and their authority to audit the satellite RW program (to retain authority in case of monetary liability that needs to be passed down to the contracting party for their negligence). In other words, if a significant volume of RW (containing chlorine residual and other pollutants) is discharged due to negligence in to a waters of the US or an unauthorized receiving water body we would issue an enforcement action primarily to Beaumont (NPDES permittee and producer of the RW).

In addition, the Statewide RW general permit does not deals with basin plan water quality objectives nor max ben considerations. We issue master reclamation permits to simplify the regulation of the producer and user with one single order/permit. Let me know is this clarifies our position.

Thanks,

Julio C. Lara, P.E., Chief
Sr. Water Resources Control Engineer
Santa Ana Regional Water Quality
Control Board
Wastewater Section
3737 Main Street, Suite 500
Riverside, CA 92501
Phone: (951) 782-4901
Email: julio.lara@waterboards.ca.gov

From: Brian Knoll <brian.knoll@webbassociates.com>
Sent: Wednesday, January 15, 2020 11:13 AM
To: Lara, Julio@Waterboards <Julio.Lara@waterboards.ca.gov>
Cc: Justin Logan <justin.logan@aquaeng.com>; Kristine Day <kday@beaumontca.gov>; Amin, Najah@Waterboards

<Najah.Amin@Waterboards.ca.gov>; Joy, Jayne@Waterboards <Jayne.Joy@Waterboards.ca.gov>; Thaxton Van Belle <TVanBelle@beaumontca.gov>
Subject: Recycled Water Question

EXTERNAL:

Hi Julio.

Thank you for meeting with us and the City of Beaumont this week. It was a very helpful discussion as the City works towards the completion of their new Water Reclamation Facility. The discussion regarding permitting of Beaumont Cherry Valley Water District's distribution of recycled water was different than I had previously understood it and different than discussions we had with DDW. As I understand our discussion on Monday, the City will have ultimate responsibility (cradle to grave) on the recycled water and would be responsible for any mis-use, mis-application, and spills of the recycled water by the water purveyor and/or end user. I want to make sure that we can accurately represent this to our clients so they can prepare to implement the use of recycled water over the basin. Can you point me to the code section(s) that cover this issue. I just want to make sure that I am accurate in my representation of these issues.

Thank you for your help in this regard.

Brian P. Knoll, PE - Senior Vice President
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