DRAFT

PROGRAM ENVIRONMENTAL IMPACT REPORT

FOR THE

BIG BEAR AREA REGIONAL WASTEWATER AGENCY'S

RECYCLED WATER MASTER PLAN

SCH#2005041114

Prepared for:

Big Bear Area Regional Wastewater Agency
121 Palomino Drive
Big Bear City, California 92314

Prepared by:

Tom Dodson & Associates
2150 North Arrowhead Avenue
San Bernardino, California 92405

November 2005

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List of Abbreviations and Acronyms

afy	acre-feet per year
AOX	advanced oxidation
BBARWA	Big Bear Area Regional Wastewater Agency
BBCCSD	Big Bear City Community Services District
BOD5	Biochemical Oxygen Demand
CEQA	California Environmental Quality Act
CDHS	California Department of Health Services
DAF	dissolved-air floatation
DWP	City of Big Bear Lake Department of Water and Power
EIR	environmental impact report
gpm	gallons per minute
gpm/sf	gallons per minute per square foot
I&I	infiltration and inflow
MF	microfiltration
MG	million gallons
MGD	million gallons per day
mm	micrometer
NF	nanofiltration
NOP	Notice of Preparation
NPDES	National Pollutant Discharge Elimination System
PEIR	program EIR
RO	reverse osmosis
RWMP	Recycled Water Master Plan
RWQCB	Regional Water Quality Control Board, Santa Ana Region
TDA	Tom Dodson & Associates
TDS	Total Dissolved Solids
TIN	Total Inorganic Nitrogen
TKN	Total Kjeldahl Nitrogen
TSS	Total Suspended Solids
UF	ultrafiltration
Valley	Big Bear Valley
WAS	waste activated sludge
WDRs	Waste Discharge Requirements
WERF	Water Environment Research Foundation
WWTP	Wastewater Treatment Plant

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CHAPTER 1 - EXECUTIVE SUMMARY

This Executive Summary for the Big Bear Area Regional Wastewater Agency (BBARWA) Recycled Water Master Plan (RWMP) Program Environmental Impact Report (PEIR) summarizes the environmental effects that are forecast to occur from implementation of the proposed project. Throughout this document the terms "program" and "project" are used interchangeably. The term project is a term of art defined in the California Environmental Quality Act (CEQA) and it encompasses all of the actions that may be carried out assuming that the "project" is approved. However, in this instance the action, consideration of the RWMP for approval by the BBARWA Board, consists of a program that may be implemented over an undefined period of time. Even if the RWMP is approved by the Board, each component or phase of the project must be individually approved by the BBARWA Board in the future.

As part of this proposed project, Phase 1 of the RWMP program will also be considered for approval and implementation by the BBARWA Board. Phase 1 of the RWMP consists of the installation of those specific facilities necessary to deliver and recharge recycled water at the Greenspot site. Before any specific component of the RWMP program can be funded, built and operated, specific approval is required by the BBARWA Board. Only Phase 1 of the RWMP program is being considered for approval by the Board at this time and it must be explicitly approved by the Board, or it cannot be implemented.

The following text also provides the reviewer with a summary of the project background, project objectives, and project description. A table summarizing environmental impacts and mitigation measures is included at the end of this Executive Summary.

1.1 INTENDED USE OF THIS ENVIRONMENTAL IMPACT REPORT

This Program EIR (PEIR) has been prepared in accordance with the California Environmental Quality Act (CEQA) Statutes and Guidelines, 2004, pursuant to Section 21151 of CEQA. The BBARWA is the local Lead Agency for the project and has supervised the preparation of this PEIR. This PEIR is an information document which will inform public agency decision makers and the general public of the potential environmental effects of the project, including significant effects that may be caused by implementing the proposed project. Possible ways to minimize significant effects of the project and reasonable alternatives to the project are also identified in the PEIR. This document assesses the impacts, including any unavoidable adverse impacts and cumulative impacts, related to the construction and operation of the RWMP. This PEIR is also intended to support the permitting process of all agencies from which discretionary approvals must be obtained for particular elements of this project.

1.2 PROJECT BACKGROUND

Recycled Water Master Plan Project consists of five components.

1. The first component of the RWMP was identification of the project's potential recycled water users. Many future potential uses for recycled water have been identified in the Draft Final Recycled Water Master Plan, but the specific uses that will actually be served cannot be

defined at this time, except for the artificial surface recharge of groundwater at the Greenspot site. The range of potential recycled water uses includes: landscape irrigation; habitat enhancement; surface impoundment; industrial and commercial uses; and artificial groundwater recharge.

2. The second component of the project is the creation of the recycled water supply. This entails modifications to the existing secondary wastewater treatment facility to provide adequate treatment to meet the Title 22 water quality standards, and any other water quality standards required to support permitting the recycled water use. The proposed upgrades to the existing facility include: microfiltration unit; reverse osmosis unit; brine handling facility, including an evaporation pond; ultraviolet disinfection unit; and reclaimed water pump station. These facilities are proposed to be installed at the existing wastewater treatment plant (WWTP) location. The proposal at this time is to install these facilities allowing an initial capacity of 1,000 acre-feet per year and up to a maximum of 2,000 acre-feet per year capacity in modular 500 acre-feet per year phases. This will allow staging the treatment facility installation and spreading the cost expenditures over time.

3. The third component of the recycled water project is the installation of the transmission facilities required to distribute the recycled water to the point of use, and to install the facilities, such as the percolation basins, required to support the proposed recycled water use. The Recycled Water Master Plan identifies up to 34 miles of recycled water pipelines (mostly in existing disturbed road rights-of-way); 1.2 million gallons of storage; about 520 horsepower of pumping capacity; and up to 1,500 acre-feet per year of artificial recycled water recharge capacity, which will require installation of artificial surface recharge basins (percolation ponds).

4. The fourth component consists of the specific facilities required to deliver an initial 1,000 acre-feet per year of recycled water to users (including the recharge site in Greenspot) in the Agency's service area, with a maximum design capacity of 2,000 acre-feet per year of recycled water being made available to future recycled water consumers.

5. A reduction in wastewater deliveries to Lucerne Valley by up to 2,000 acre-feet per year in accordance with full implementation of the Recycled Water Master Plan.

1.3 PROJECT OBJECTIVES

BBARWA's general objective is to retain treated effluent within the project generation area and utilize this treated effluent as recycled water to augment groundwater supplies and offset the use of potable water in the Big Bear Valley.

Specific objectives include:

1. Provide an advanced treatment system at the existing WWTP that will produce high quality recycled water

2. Initially divert about an estimated 1,400 acre-feet of recycled water from the treated effluent pipeline that delivers approximately 2,200 acre-feet annually to a leased farm operation in Lucerne Valley.

3. Use approximately 1,000 acre-feet of advanced treated recycled water for recharge to augment the Big Bear Valley's water supply resources.

4. Install the infrastructure required to deliver several hundred acre-feet of recycled water to potential irrigation, commercial and industrial users.

5. Reduce the demand on the existing water supply wells and return local aquifers experiencing overdraft of available groundwater resources to a balanced state.

6. Provide the Big Bear Valley with a secure, assured and uninterruptible alternative source of potable water to help meet existing and future water demand, particularly during drought conditions.

1.4 PROJECT APPROVALS

Most water and wastewater facilities are allowed to be installed without obtaining any local land use permits. This is logical because other land uses cannot be developed without an adequate water supply and wastewater collection system. Thus, in this instance, the Agency expects to be the sole reviewing entity for implementation of the above facilities. Other agencies, including state and federal agencies that provide funding for recycled water projects, may also provide funding, but would rely upon the Agency's compliance with CEQA as CEQA "responsible agencies." These agencies include permitting agencies such as the Regional Water Quality Control Board, Santa Ana Region, and the State Department of Health Services. San Bernardino County issues non-discretionary permits for drilling wells.

If facilities will be placed in or across natural stream channels (waters of the United States or the State of California), it will be necessary to obtain permits from certain agencies to discharge fill into these channels. The U.S. Army Corps of Engineers issues Section 404 permits; the Regional Water Quality Control Board, Santa Ana Region issues Section 401 certificates; and the State Department of Fish and Game issues 1600 streambed alteration agreements, which includes lake bed modifications.

As previously stated, before any development under the RWMP can occur, the Agency must approve the Master Plan; provide funds for development of facilities; and obtain any of the additional permits or entitlements described above. It is these approvals that will allow the proposed potential development to proceed and allow the corresponding changes to the physical environment. This PEIR will be used as the information source and CEQA compliance document for the following discretionary actions or approvals by the Agency:

1. Adoption of the Recycled Water Master Plan
2. Funding of the Phase 1 identified facilities to support the Greenspot groundwater recharge
3. Funding of potential future second-tier facilities to deliver recycled water to customers as required and as consistent with the Master Plan. This PEIR, along with future second-tier documentation, will be used to prepare an environmental determination for compliance with CEQA as funding is considered for implementation of future RWMP phases.

In addition to the above discretionary actions, this PEIR may also be used by the following responsible agencies, dependent upon the review, approval or permit requirements of each in regards to the proposed project:

- California Regional Water Quality Control Board (RWQCB), Region 8, Santa Ana
  - » Enforce the National Pollution Discharge Elimination System (NPDES) Permit for construction activities and/or Stormwater Pollution Prevention Plan.
  - » Issue a 401 Certification to permit any discharge or fill "waters of the United States".
  - » Issue revised waste discharge requirements to allow the modifications to the treatment plant and use of treated effluent for recycled water purposes.
- California Department of Transportation
  - » Issue an encroachment permit for improvements to roadways under their jurisdiction.
- California Department of Fish and Game
  - » Issue a 1600 agreement (Section 1603) for any alteration "streambed" caused by implementing the Master Plan.
- U.S. Army Corps of Engineers
  - » Issue an individual permit (404) for any to disturbance, such as any dredging or filling within "waters of the United States".
- State Department of Health Services
  - » Issue a permit to use recycled water for specific purposes, including recharge of local groundwater basins.

Note that the Draft Recycled Water Master Plan contains a detailed description of permitting requirements in Chapter 5.0. Please refer to this discussion for a more detailed description of permitting issues related to treatment, delivery and use of recycled water.

1.5 IMPACTS

Based on data provided in this Draft PEIR, it is concluded the proposed project will result in a single significant impact to the environment. Aesthetic effects from construction and operating the Greenspot recharge site was determined to be a sufficient change in the visual setting of the Greenspot site to be considered a significant unavoidable adverse aesthetic impact. All other environmental issues addressed in the PEIR were determined to cause or experience less than significant adverse environmental impacts, many with implementation of mitigation measures. Thus, all potential impacts, except the visual/aesthetic effects at the Greenspot recharge site, were determined to be less than significant without mitigation or can be reduced to a less than significant level with implementation of the mitigation measures identified in this Draft PEIR.

Note that the cumulative significant impacts are identified in this document based on findings that the project's contributions to such impacts are considered to be less than cumulatively considerable which is the threshold identified in Section 15130 of the State CEQA Guidelines. Table 1.5-1 summarizes the environmental impacts and proposed mitigation and monitoring measures.

The following issues have been determined to experience less than significant impacts in this PEIR.

Aesthetics: The modification in the landscape required to support the proposed project, with the exception of the Greenspot recharge site, were found to be less than significant modifications in the landscape and reversible.

Agricultural Resources: The reductions in volume of water to the agricultural operations in Lucerne Valley are considered an unavoidable but less than significant impact of implementing the RWMP.

Air Quality: Construction emissions from implementing the proposed program are considered unavoidable but are not permanent. Construction emissions are short-term and will be eliminated when the project construction is completed. The volume of emissions from operations of new or expanded facilities can be reduced, but are unavoidable. All air emissions are reversible at any time by simply terminating the RWMP activities and facilities.

Biological Resources: The removal of habitat to support the recharge locations would be permanent and unavoidable. This impact is not considered to be significant. The biology impact could be reversed over the long-term by revegetating all disturbed areas.

Cultural Resources: Impacts to cultural resources are not significant and they are avoidable. Once encountered, recordation and curation of any cultural resources offsets any disturbance, except encounters with Native American remains or religious sites. Impacts to such facilities would be considered irreversible.

Geology and Soils: Impacts to geology and soil resources and any constraints they impose are unavoidable and less than significant. These impacts are reversible.

Hazards and Hazardous Materials: Hazards are avoidable and are reversible. Hazards and hazardous material impacts are considered less than significant.

Hydrology/Water Quality: Hydrology and water quality effects are avoidable and reversible because any changes can be remediated through return to pre-project conditions and treatment of any water quality degradation. Hydrology impacts were deemed less than significant.

Land Use/Planning: Land use impacts are unavoidable over the short-term and reversible over the long term. Land use and planning impacts were considered to be less than significant.

Mineral Resources: Mineral resource impacts are avoidable and reversible and less than significant.

Noise: Noise impact are unavoidable and less than significant. Such impacts are reversible by simply terminating the activities that produce noise.

Population/Housing: No direct housing or population impacts were identified. Therefore, direct housing and population impacts are avoidable and less than significant. The increase in the water supply carrying capacity from implementing the RWMP will not cause an unavoidable increase in the rate of growth and it is not considered to be significant. It is reversible by terminating the production of recycled water.

Public Services: Demand for public services is avoidable and reversible. This impact is less than significant.

Recreation: No direct demand for recreational resources will result from implementing the RWMP. This impact is avoidable and less than significant.

Transportation/Traffic: Transportation and traffic effects from implementing the RWMP are unavoidable and irreversible. These impacts are less than significant.

Utilities/Service Systems: Demand for utility/service systems is avoidable and reversible. This impact is less than significant.

Based on the detailed analysis in Chapter 4, as summarized above, the proposed project will cause a single significant unavoidable adverse environmental impacts on aesthetic resources. All other effects of the project can be mitigated to a less than significant adverse impact level.

1.6 ALTERNATIVES

The California Environmental Quality Act (CEQA) and the State CEQA Guidelines require an evaluation of alternatives to the proposed action. Section 15126 of the State CEQA Guidelines indicates that the "discussion of alternatives shall focus on alternatives capable of eliminating any significant adverse environmental effects or reducing them to a level of not significant...." In this case no environmental issues have been identified as causing potential or actual significant adverse impacts if the proposed project is implemented as proposed. The State Guidelines also state that "a range of reasonable alternatives to the project....which could feasiblely attain the basic objectives of the project" and "The range of alternatives required in an EIR is governed by "rule of reason" that requires the PEIR to set forth only those alternatives necessary to permit a reasoned choice." For this project, three alternatives have been selected for evaluation in an effort to reduce the proposed project impacts to a less than significant level.

One of the alternatives that must be evaluated in an EIR is a "no project alternative," regardless of whether it is a feasible alternative to the proposed project, i.e., would meet the project objectives or requirements. Under this alternative the environmental impacts that would occur if the proposed project is not approved and implemented are identified. The no project alternative evaluated in this PEIR assumes that the project sites remains undeveloped and in their present condition.

In addition to the no project alternative, two other alternatives are evaluated in this document: a limited use of recycled water alternative (found environmentally superior, but possibly not economically feasible); and imported water supply, found to cause more significant impacts and an infeasible alternative due to greater impacts. The evaluation of these alternatives also includes identification of an environmentally superior alternative as required by CEQA. The no project alternative was determined to be environmentally superior, but infeasible. Of the feasible

alternatives, the limited use alternative is identified as the environmentally superior alternative. This alternative was also determined to meet the objectives of the proposed project, but this alternative will not cause significant adverse impacts because it eliminates the aesthetic effects of installing and operating the Greenspot recharge site.

The table of environmental impacts follows, along with the required mitigation measures.

Table 1.5-1
SUMMARY OF POTENTIAL ADVERSE IMPACTS AND MITIGATION MEASURES DISCUSSED IN THIS DRAFT PEIR

Environmental Category/Issue	Potential Impact Description	Mitigation Measures	Impact After Mitigation
Aesthetics	Creation of nuisance dust and odor during construction activities and operations of the recycled water system.	4.2-1 The Agency shall install a reclaimed water spray system that will be utilized to control moisture and establish a crust over the evaporation pond(s). The spray system shall wet the pond surface sufficiently to prevent the transport of dust (fugitive or salt) outside the boundary of the ponds. The spray system shall be operated during periods when winds are sufficient to loft dust or salt into the atmosphere over the ponds or outside the pond boundary.	Less than significant
	Change in visual character at certain facilities sites–WWTP, pump stations, storage tanks, and pipeline alignments	4.2-2 If a pump station is proposed that could adversely affect an existing scenic vista, a focused evaluation of scenic vista impact shall be prepared for the station. If a scenic vista will be impacted, the Agency shall place the pump station below grade or the scenic vista sight line, or shall be relocated to an alternative location that will not interfere with or degrade a scenic vista. 4.2-3 Offsite structures will be designed to meet local and/or regional guidelines for Community Design and the appropriate agency or agencies will be afforded an opportunity to review the designs.	Less than significant
	Change in the visual character at the Greenspot recharge facility site.	4.2-4 To reduce the short-term effect of the Green-spot percolation basin scars from construction, the exterior of the berm/levee shall be revegetated with native vegetation to the extent feasible immediately after berm/levee construction is completed. Any tall shrubs or trees used as part of the revegetation shall not be clustered in a manner that could eliminate a scenic vista, such plants shall be spread over the berm landscape to resemble the existing natural vegetation. This measure shall also apply to the Van Dusen percolation basins when they are constructed in the future.	Unavoidable significant adverse impact

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SUMMARY OF POTENTIAL ADVERSE IMPACTS AND MITIGATION MEASURES DISCUSSED IN THIS DRAFT PEIR

Environmental Category/Issue	Potential Impact Description	Mitigation Measures		Impact After Mitigation
Aesthetics (continued)		4.2-5	If a pump station is proposed that must be installed within a scenic highway corridor, the Agency shall confer with either the County or City regarding the pump station enclosure to ensure that the design and materials conform with the requirements for such construction in these agency's development code. These agencies shall be afforded an opportunity to review and comment on the design, but the Agency shall make the final decision regarding conformance of the design with the pertinent development code design guidelines.	
	Potential night lights could create adverse visual and glare effects	4.2-6	Any permanent lighting shall be installed at the minimum required lumens for the project site. All lighting needed for project facilities will be directed so that no light or glare falls outside of the facility boundary. Measures to minimize offsite light and glare can include shielding; type of lighting; direction of lighting; use of automatic switches for emergencies; or use of other buffers or attenuation measures.	Less than significant
		4.2-7	Night lighting during construction shall be directed so that light and glare are controlled in the same manner as outlined in Mitigation Measure 4.2-5 for permanent facilities.	
Air Quality	Fugitive dust generation during construction activities. Nuisance odors during operations at recharge sites. Pollutant emissions from construction equipment and vehicles and from certain new permanent facilities.	4.4-1	The BBARWA will require construction contractors to apply water to the disturbed portions of each project site, including any haul roads, at least three times per day. On days where wind speeds are sufficient to transport fugitive dust beyond the working area boundary, contractors will be required to increase watering to the point that fugitive dust no longer leaves the property (typically a moisture content of 12%), and/or the contractor will terminate grading and loading operations.	Less than significant

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Environmental Category/Issue	Potential Impact Description	Mitigation Measures	Impact After Mitigation
Air Quality (continued)		4.4-2 The project will comply with regional rules such as SCAQMD Rules 402, 403 and 404 which would assist in reducing short-term air pollutant emissions. These dust suppression techniques are summarized below. • All material transported offsite will be either sufficiently watered or securely covered to prevent excessive amounts of dust. • The area disturbed by clearing, grading, earth moving, or excavation operations will be minimized at all times. 4.4-3 All material stockpiles subject to wind erosion during construction activities, that will not be utilized within 3 days, will be covered with plastic, an alternative cover deemed equivalent to plastic, or sprayed with a nontoxic chemical stabilizer. 4.4-4 All vehicles on the construction sites or dirt roads will travel at speeds less than 15 miles per hour. This will be enforced by including this requirement in the construction contract with penalty clauses for violation of this speed limit. 4.4-5 All engines will be properly operated and maintained. Proper tune for all diesel-powered vehicles and equipment in the South Coast Air Basin requires that fuel injection timing be retarded 2 degrees from the manufacturer's recommendation and use high pressure injectors. 4.4-6 All diesel-powered vehicles will be turned off when not in use for more than 5 minutes and gasoline-powered equipment will be turned off when not in use for more than 5 minutes.	

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Environmental Category/Issue	Potential Impact Description	Mitigation Measures	Impact After Mitigation
Air Quality (continued)		4.4-7 BBARWA shall replace ground cover in disturbed areas by revegetation or a suitable ground cover to control the generation of fugitive dust. 4.4-8 BBARWA shall require the use of equipment with diesel particulate filters if they are commercially available. 4.4-9 Architectural coatings used in support of the project shall have an emission factor for ROG of no greater than 0.0074 grams per liter. 4.4-10 Prior to selecting the new power generation unit at the WWTP, BBARWA shall confer with the SCAQMD to identify a unit that will meet the District's emission limits. A permit to construct/operate shall be obtained prior to installing the unit. 4.4-11 BBARWA shall either install a mechanical brine concentrating facility and no misters, or alternatively limit mister operations to those periods when wind speeds are less than 2 meters per second. If misters are used, the Agency shall further evaluate the potential for mister drift during pilot scale testing and implement a monitoring program in downwind areas for any constituents of concern. If drift exceeds thresholds established during pilot testing, BBARWA shall shift to a brine concentrating facility. 4.4-12 BBARWA shall establish a long-term recharge basin management plan that will ensure organic matter is removed on a schedule that does not allow decay or putrid odors to develop within the basins.	

Table 1.5-1
SUMMARY OF POTENTIAL ADVERSE IMPACTS AND MITIGATION MEASURES DISCUSSED IN THIS DRAFT PEIR

Environmental Category/Issue	Potential Impact Description	Mitigation Measures	Impact After Mitigation
Air Quality (continued)		4.4-13 BBARWA shall establish an odor complaint phone number and shall respond to such complaints within 24 hours. Response can include verifying the presence of a putrid odor; shutting down operation of a specific basin; and implementing maintenance activities to eliminate the source of any putrid odor.	
Biological Resources	Potential disturbance and/or removal of sensitive plant and animal species. Potential removal of trees at recharge and pump station sites and along pipeline alignments. Potential streambed alteration or riparian habitat disturbance.	4.5-1 Once final design parameters are developed for each future program component under the Recycled Water Master Plan Program, and sites are surveyed and mapped (to engineering specifications), site-specific biological surveys will be performed for threatened, endangered and rare plant and animal species. If sensitive species are identified, one or more of the following measures will be implemented to achieve mitigation: a. BBARWA will relocate the proposed RWMP facility to totally avoid direct and indirect effects that would "harm" sensitive species or their habitat. b. For plants or habitat effects within the APE of a specific facility and where avoidance cannot be achieved, mitigation may consist of purchasing habitat supporting the species for permanent protection; purchasing credits from a mitigation bank; creating new habitat; or seed and plant collection and revegetating disturbed areas within the project area. All of the above, except avoidance, shall be conducted in consultation with the appropriate regulatory agencies.	Less than significant

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SUMMARY OF POTENTIAL ADVERSE IMPACTS AND MITIGATION MEASURES DISCUSSED IN THIS DRAFT PEIR

Environmental Category/Issue	Potential Impact Description	Mitigation Measures	Impact After Mitigation
Biological Resources (continued)		4.5-1 (cont.) c. For loss of animals or their habitat within the APE of a specific facility and where avoidance cannot be achieved, mitigation may consist of purchasing habitat supporting the species for permanent protection; purchasing credits from a mitigation bank; and creating new habitat. All of the above, except avoidance, shall be conducted in consultation with the appropriate regulatory agencies. 4.5-2 Any trees identified as perch trees for use by overwintering bald eagles will be protected or replaced, in consultation with the City of Big Bear Lake or County authority. Construction activities near the shores of Big Bear Lake and Baldwin Lake where perch trees exist will be restricted from December 1 through April 1, as determined on a case-by-case basis. 4.5-3 Seed banks of the affected sensitive plant species shall be retained on the project site or alignment, for use in seeding once construction activities have ceased. Further, plants within a construction area will be relocated to the adjacent suitable habitat outside of the recharge basin area or other area of potential impact. 4.5-4 Any future RWMP program component that must discharge fill into a channel or otherwise alter a streambed shall be mitigated. Mitigation can be provided by purchasing into any authorized mitigation bank; by selecting a site of comparable acreage near the site being retained and enhancing it with a native riparian habitat in accordance with a habitat mitigation plan approved by regulatory agencies; or by acquiring sufficient compensating habitat to meet regulatory agency requirements. From	

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Environmental Category/Issue	Potential Impact Description	Mitigation Measures	Impact After Mitigation
Biological Resources (continued)		4.5-4 (cont.) the Agency's standpoint, mitigation for jurisdictional waters without any riparian or wetland habitat will mitigated at a 1:1 ratio. For loss of any riparian or other wetland areas (marsh, meadow, pebble plain, etc.), the mitigation ratio will begin at 2:1 and the ratio will rise based on the type of habitat, habitat quality, and presence of sensitive or listed plants or animals in the affected area. A revegetation plan using native riparian vegetation common to the project area shall be prepared and reviewed and approved by the appropriate regulatory agencies. BBARWA will also obtain permits from the regulatory agencies (U.S. Army Corps of Engineers, Santa Ana Regional Water Quality Control Board and California Department of Fish and Game). These agencies can impose greater mitigation requirements in their permits, but the Agency will utilize the ratios outlined above as the minimum required to offset or compensate for impacts to jurisdictional waters, riparian areas or other wetlands. The approved mitigation plan shall be implemented as mitigation for permanent loss of area within either or both channel areas. Created mitigation sites shall be monitored until the riparian habitat configuration contained in the plan approved by the regulatory agencies is completed. 4.5-5 BBARWA will have the recharge site(s), pump station and storage sites, and pipeline alignments evaluated by a forester or arborist prior to removing any trees. Replacement trees, including size of replacement trees, shall be planted in accordance with and at the location established by the forester/arborist in a report to the Agency, taking into account concerns regarding wildland fire hazards and tree density at the project site.	

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SUMMARY OF POTENTIAL ADVERSE IMPACTS AND MITIGATION MEASURES DISCUSSED IN THIS DRAFT PEIR

Environmental Category/Issue	Potential Impact Description	Mitigation Measures	Impact After Mitigation
Biological Resources (continued)		4.5-6 To avoid an illegal take of active bird nests, any grubbing, brushing or tree removal will be conducted outside of the State identified nesting season (nesting season is February 15 through September 1). Alternatively, the site will be evaluated by a qualified biologist prior to initiation of ground disturbance to determine the presence or absence of nesting birds. 4.5-7 Within those areas identified as potentially containing sensitive biological resources, future protocol surveys shall be conducted by a qualified biologist/ecologist. If sensitive species are identified as a result of the survey for which mitigation/compensation must be provided in accordance with regulatory requirements, the following subsequent mitigation actions will be taken: a. BBARWA shall provide compensation for sensitive habitat acreage lost by acquiring and protecting in perpetuity (through property or mitigation bank credit acquisition) habitat for the sensitive species at a ratio of 2-3:1 for habitat lost. The property acquisition shall include the presence of at least one animal or plant per animal or plant lost at the development site to compensate for the loss of individual sensitive species. b. An endowment, to be determined at the time the impact is proposed, shall be provided by BBARWA and this endowment shall be adequate to fund ongoing management requirements for the property purchased.	

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Environmental Category/Issue	Potential Impact Description	Mitigation Measures	Impact After Mitigation
Biological Resources (continued)		4.5-7 (cont.) c. The final mitigation may differ from the above values based on negotiations between BBARWA and FWS and CDFG for any incidental take permits for listed species. BBARWA shall retain a copy of the incidental take permit as verification that the mitigation of significant biological resource impacts at a project site with sensitive biological resources has been accomplished. 4.5-8 BBARWA may initiate a long-term study of Stickleback survival in recycled water if this component of the RWMP program is implemented. The following steps will be implemented: (1) obtain submittals outlining a proposed study program to answer the question of whether the Stickleback can survive and breed over several generations without any measurable damage to individuals or the population; (2) consult with the U.S. Fish and Wildlife Service and California Department of Fish and Game to obtain concurrence and approval to implement the study program; (3) fund the study implementation and compile a report of results and recommendations; and (4) submit the report and recommendation to the FWS and CDFG with the objective of obtaining an incidental take permit to use recycled water to supplement the habitat in Shay Creek and replace potable water currently being used for this purpose.	

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SUMMARY OF POTENTIAL ADVERSE IMPACTS AND MITIGATION MEASURES DISCUSSED IN THIS DRAFT PEIR

Environmental Category/Issue	Potential Impact Description	Mitigation Measures	Impact After Mitigation
Cultural Resources	Potential disturbance of archaeo-logical or paleontological resources during construction activities.	4.6-1 During construction of the Greenspot Recharge Site , the connecting pipelines, and the disturbance of original ground at the WWTP, a qualified archaeological monitor and a Native American monitor of Serrano heritage shall be present during any original ground disturbing activities. If any archaeological resources are exposed during initial ground disturbance, ground disturbance activities in the vicinity of the discovery will be terminated immediately and BBARWA will be contacted with recommended actions. If discovered resources merit long-term consideration, adequate funding will be provided to collect, curate and report these resources in accordance with standard archaeological management requirements. 4.6-2 Complete an field archaeological survey for final future second-tier RWMP pipeline alignments or project locations, except for project locations within 100% disturbed areas. The field survey shall include with recordation, testing and evaluation, and data-recovery and monitoring if needed, of any newly located cultural resources. 4.6-3 Archaeological monitoring will not be required for ground disturbing activities in 100% disturbed areas; however, if cultural resources are located during construction, construction in that area must stop, the resources must be protected, and treatment by a qualified archaeologist must occur. If discovered resources merit long-term consideration, adequate funding will be provided to collect, curate and report these resources in accordance with standard archaeological management requirements.	Less than significant

Table 1.5-1
SUMMARY OF POTENTIAL ADVERSE IMPACTS AND MITIGATION MEASURES DISCUSSED IN THIS DRAFT PEIR

Environmental Category/Issue	Potential Impact Description	Mitigation Measures	Impact After Mitigation
Cultural Resources (continued)		4.6-4 If any human remains are encountered during initial grading activities, all ground disturbing activities in the vicinity of the discovery will be terminated immediately and the County Coroner's office MUST be contacted within 24 hours at (909) 387-2543 to arrange for management of such remains. The Native American Heritage Commission shall be notified and the Serrano Tribe representatives shall also be notified within the same time period. 4.6-5 Assessment of lithology prior to ground disturbance is required for all second-tier RWMP projects to determine if older Pleistocene deposits have high sensitivity. If deposits being excavated do have high sensitivity, then paleontological monitoring will be required for all ground disturbing activities within these deposits. If discovered resources merit long-term consideration, adequate funding will be provided to collect, curate and report these resources in accordance with standard paleontological management requirements.	
Geology / Soils	Construction of new infrastructure in an actively seismic area–potential direct structural impacts and associated impacts, including liquefaction. Sedimentation/erosion due to construction activities and stormwater events at new facilities sites.	4.7-1 A site-specific evaluation for all future RWMP facilities shall be conducted in conformance with the California Department of Conservation, Division of Mines and Geology Special Publication 117, Guidelines for Evaluation and Mitigating Seismic Hazards in California. 4.7-2 Comprehensive geotechnical investigations shall be required prior to engineering and design for development or structural and/or substantial rehabilitation of structures identified under Risk Class I & II, e.g., public facilities, as identified below:	Less than significant

Table 1.5-1
SUMMARY OF POTENTIAL ADVERSE IMPACTS AND MITIGATION MEASURES DISCUSSED IN THIS DRAFT PEIR

Environmental Category/Issue	Potential Impact Description	Mitigation Measures	Impact After Mitigation
Geology / Soils (continued)		4.7-2 (cont.) a. Risk Class I & II, Structures Critically Needed after Disaster: Structures that are critically needed after a disaster include important utility centers, fire stations, police stations, emergency communication facilities, hospitals, and critical transportation elements such as bridges and overpasses and smaller dams. Acceptable Damage: Minor non-structural; facility should remain operational and safe, or be suitable for quick restoration of service. b. Risk Class III: High occupancy structures; uses are required after disasters (i.e., places of assembly such as schools and churches). Acceptable Damage: Some impairment of function acceptable; structure needs to remain operational. c. Risk Class IV, Ordinary Risk Tolerance: The vast majority of structures in urban areas; most commercial and industrial buildings, small hotels and apartment buildings, and single family residences. Acceptable Damage: An "ordinary" degree of risk should be acceptable. The criteria envisioned by the Structural Engineers Association of California provide the best definition of the "ordinary" level of acceptable risk. These criteria require that buildings be able to:	

Table 1.5-1
SUMMARY OF POTENTIAL ADVERSE IMPACTS AND MITIGATION MEASURES DISCUSSED IN THIS DRAFT PEIR

Environmental Category/Issue	Potential Impact Description	Mitigation Measures	Impact After Mitigation
Geology / Soils (continued)		4.7-2 (cont.) 1. Resist minor earthquakes without damage; 2. Resist moderate earthquakes without structural damage, but with some non-structural damage; or 3. Resist major earthquakes, of the intensity or severity of the strongest experienced in California, without collapse, but with some structural, as well as non-structural damage. 4. Risk Class V, Moderate to High Risk Tolerance: Open space uses, such as farms, ranches and parks without high occupancy structures; warehouses with low intensity employment; and the storing of non-hazardous materials. Acceptable Damage: Not applicable. 4.7-3 Ground water levels below the Greenspot recharge site and extending down to the production wells shall be kept below 30 feet bgs during recharge activities to minimize liquefaction potential. 4.7-4 BBARWA shall require that the construction contractor prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) which specifies Best Management Practices that will prevent construction pollutants from contacting stormwater and with the intent of keeping all products of erosion from moving offsite into receiving waters. Practices that may include but not be limited to: • The use of silt fencing or sand bags around disturbed areas to prevent sediments from being washed offsite.	

Table 1.5-1
SUMMARY OF POTENTIAL ADVERSE IMPACTS AND MITIGATION MEASURES DISCUSSED IN THIS DRAFT PEIR

Environmental Category/Issue	Potential Impact Description	Mitigation Measures	Impact After Mitigation
Geology / Soils (continued)		4.7-4 (cont.) • The use of temporary stormwater retention or detention basins to prevent stormwater runoff from the site. • Restriction on the storage of soil in channels subject to the flow of stormwater. 4.7-5 BBARWA shall require the pipeline contractor to properly backfill and compact excavated areas. Paved areas disturbed by this project shall be repaved in such a manner that roadways and other disturbed areas are returned to as near the pre-project condition as is feasible. 4.7-6 BBARWA shall require all pipelines installed in support of the RWMP to include pressure monitors, or the equivalent, to indicate if and when a pipeline rupture occurs. BBARWA will include in its Spill Prevention Control and Countermeasures plan a response protocol that will be implemented to minimize the volume of recycled water lost from an accidental rupture/spill from the pipelines.	
Hazards and Hazardous Materials	Public health risk due to potential exposure to hazardous materials.	4.8-1 BBARWA shall ensure that an on-call industrial hygienist is available during construction in areas with potential hazardous or toxic material contamination. The construction contractor shall have a monitoring program installed which will identify any discolored soil or odors associated with petroleum contamination and initiate a measurement and, if required, a remediation program to prevent exposure of persons or the environment to adverse concentrations of contamination shall be implemented. If such contaminated materials is exposed during construction, the	Less than significant

Table 1.5-1
SUMMARY OF POTENTIAL ADVERSE IMPACTS AND MITIGATION MEASURES DISCUSSED IN THIS DRAFT PEIR

Environmental Category/Issue	Potential Impact Description	Mitigation Measures	Impact After Mitigation
Hazards and Hazardous Materials (continued)		4.8-1 (cont.) contaminated soil/waste shall be delivered to a licensed treatment, disposal or recycling facility that has the appropriate systems to manage the contaminated material without significant impact on the environment. 4.8-2 BBARWA shall maintain adequate resources to support clean-up operations for chemicals being delivered to the WWTP. The BBARWA Business Plan/SPCC Plan shall be modified to include response support capabilities for agencies responding to an accidental spill. Before determining that an area contaminated as a result of an accidental release is fully remediated, specific thresholds of acceptable clean-up shall be established and sufficient samples shall be taken within the contaminated area to verify that these clean-up thresholds have been met. 4.8-3 Construction of the RWMP facilities has a potential to result in accidental release of chemicals, particularly petroleum products, during construction. All spills or leakage of petroleum products during construction activities will be remediated in compliance with applicable state and local regulations regarding cleanup and disposal of the contaminant released. The contaminated waste will be collected and disposed of at an appropriately licensed disposal or treatment facility. This measure will be incorporated into the SWPPP prepared for the project development.	

Table 1.5-1
SUMMARY OF POTENTIAL ADVERSE IMPACTS AND MITIGATION MEASURES DISCUSSED IN THIS DRAFT PEIR

Environmental Category/Issue	Potential Impact Description	Mitigation Measures		Impact After Mitigation
Hazards and Hazardous Materials (continued)	Safety hazards to traffic and pedestrians on roadways during construction period.	4.8-4	During construction activities within existing road rights-of-way or other easements where continuous access is required, a road operation management plan shall be prepared and implemented. At a minimum this plan shall define how to minimize the amount of time spent on construction activities; how to minimize disruption of vehicle and alternative modes of traffic at all times, but particularly during periods of high traffic volumes; adequate signage and other controls, including flagpersons, to ensure that traffic can flow adequately during construction; the identification of alternative routes that can meet the traffic flow requirements of a specific area, including communication (signs, webpages, etc.) with drivers and neighborhoods where construction activities will occur; and at the end of each construction day roadways shall be prepared for continued utilization without any significant roadway hazards remaining.	Less than significant
		4.8-5	To the extent feasible, installation of pipelines or other construction activities in support of the RWMP shall not be located on major evacuation or emergency response routes within any affected communities. Where construction on such routes is necessary, local emergency response providers shall be contacted and emergency access and evacuation requirements shall be maintained at a level sufficient to meet their needs.	
Hydrology and Water Quality	Public health risk due to accidental releases of pollutants associated with construction activities and recycled water system operations. Potential loss of well use by adjacent landowners due to proximity to recharge area.	4.9-1	All spills or leakage of petroleum products or any other toxic or hazardous materials during construction or operation activities will be remediated in compliance with applicable state and local regulations regarding cleanup and disposal of the contaminant released. The contaminated waste will be collected and disposed of at an appropriately licensed disposal or treatment facility.	Less than significant

Table 1.5-1
SUMMARY OF POTENTIAL ADVERSE IMPACTS AND MITIGATION MEASURES DISCUSSED IN THIS DRAFT PEIR

Environmental Category/Issue	Potential Impact Description	Mitigation Measures	Impact After Mitigation
Hydrology and Water Quality (continued)		4.9-2 The project proponent will select best management practices that achieve an 90% reduction in pollutants, both during and following construction, in control storm water runoff quality. BBARWA shall require that the construction contractor prepare and implement site-specific Storm Water Pollution Prevention Plans (SWPPPs) which specify Best Management Practices that will prevent construction pollutants from contacting stormwater and with the intent of keeping all products of erosion from moving offsite into receiving waters. Practices may include but not be limited to: • The use of silt fencing or sand bags around disturbed areas to prevent sediments from being washed offsite. • The use of temporary stormwater retention or detention basins to prevent stormwater runoff from the site. • Restrict the replacement of stored soil in areas subject to the flow of water. • Restrict areas in which equipment maintenance and refueling may take place. 4.9-3 BBARWA shall perform the additional physical tests and computer modeling necessary to refine the Greenspot Recharge Project site design and operational parameters, which are needed as part of the required DHS engineering report. Additionally, the agency will coordinate with the water purveyors BBDWP and BBCCSD on extraction well designs and locations. The objective of the data generated from these studies is to ensure that the recycled water recharged at the Greenspot site is managed to prevent the groundwater table from rising to less than 30 feet below the ground surface and to ensure that ground-	

Table 1.5-1
SUMMARY OF POTENTIAL ADVERSE IMPACTS AND MITIGATION MEASURES DISCUSSED IN THIS DRAFT PEIR

Environmental Category/Issue	Potential Impact Description	Mitigation Measures	Impact After Mitigation
Hydrology and Water Quality (continued)		4.9-3 (cont.) water levels do not increase (rise) substantially (more than a few feet) immediately downstream of the extraction wells. 4.9-4 BBARWA shall develop an operational plan for the Greenspot Site Artificial Recharge Project, in conjunction with the water purveyors BBDWP and BBCCSD, that will demonstrate, at a minimum, that: • The amount of recycled water artificially recharged will balance the amount artificially extracted such that baseline conditions are maintained, or improved (i.e., reducing the existing water budget deficit). • During periods of above normal precipitation, the amount of water recharged can be reduced through additional pumping from the extraction well field and the Lakewood Wells to artificially lower the groundwater levels and create storage space within the aquifer for additional artificial recharge. • Drawdown that affects pumping ability will not occur in BBDWP's Lakewood or private wells due to extraction of stored groundwater. • Prevent the groundwater table from rising to less than 30 feet below the ground surface. 4.9-5 BBARWA shall provide alternative water supply for any private well users if their well must be shut down due to proximity to the recycled water recharge plume. This may include connection to the potable water system should the operation of the recharge project result in inadequate recycled water	

Table 1.5-1
SUMMARY OF POTENTIAL ADVERSE IMPACTS AND MITIGATION MEASURES DISCUSSED IN THIS DRAFT PEIR

Environmental Category/Issue	Potential Impact Description	Mitigation Measures	Impact After Mitigation
Hydrology and Water Quality (continued)		4.9-5 (cont.) travel time (i.e., less than six months) from the recharge area to their individual extraction wells or provision of a new well at sufficient distance from the plume. 4.9-6 As part of its operating plan, BBARWA shall develop a monitoring program that will include specific chemicals and thresholds that will be utilized to determine whether the recycled water poses any health hazards. Specific adaptive management actions, up to and including cessation of recycled water recharge until a hazard is controlled or determined not to pose a hazard, shall be identified in this plan. The specific performance standard shall be minimizing health risks to that equivalent to use of existing surface water supplies in the Big Bear Valley. 4.9-7 BBARWA shall install a liner system beneath the evaporation ponds that will control percolation to a level that will ensure no significant degradation of the groundwater beneath the ponds. This liner system shall include a monitoring system and secondary protection that will allow detection of any leaks prior to release to the underlying sediment. BBARWA shall prepare and implement a management response program to control any leaks in the liner system and, if necessary, clean-up any released material so that no residual adverse effect will result from an accidental release.	

Table 1.5-1
SUMMARY OF POTENTIAL ADVERSE IMPACTS AND MITIGATION MEASURES DISCUSSED IN THIS DRAFT PEIR

Environmental Category/Issue	Potential Impact Description	Mitigation Measures	Impact After Mitigation
Mineral Resources	Disturbance or loss of aggregate resource areas.	4.11-1 As part of the geotechnical studies for specific BBARWA facilities or pipelines, significant mineral resources which have the potential to be excavated will be identified. Such areas will be protected for future extraction to the extent feasible.	Less than significant
Noise	Short-term noise impacts of construction activities on adjacent sensitive land uses (residential and schools). Operational noise impacts at permanent facilities, mostly from use of pumps.	4.12-1 During construction, vehicle staging areas and stockpiling will be located as far as is practicable from existing residential dwellings. 4.12-2 The BBAWRA will require that construction activities be limited to no more than the hours of 6:00 a.m. to 6:00 p.m. Monday through Saturday, except in the event of emergency. No construction shall occur on Sunday, except in the event of an emergency. 4.12-3 The BBARWA will require that all construction equipment be operated with mandated noise control equipment (mufflers or silencers). Enforcement will be accomplished by random field inspections by applicant personnel during construction activities. 4.12-4 The BBARWA will establish a noise complaint/ response program and will respond to any noise complaints received for this project by measuring noise levels at the affected receptor. If the noise level exceeds an Ldn of 65 dBA exterior or an Ldn of 45 dBA interior at the receptor, the applicant will implement adequate measures to reduce noise levels to the greatest extent feasible, including portable noise barriers or scheduling specific construc-tion activities to avoid conflict with adjacent sensitive receptors.	Less than significant

Table 1.5-1
SUMMARY OF POTENTIAL ADVERSE IMPACTS AND MITIGATION MEASURES DISCUSSED IN THIS DRAFT PEIR

Environmental Category/Issue	Potential Impact Description	Mitigation Measures	Impact After Mitigation
Noise (continued)		4.12-5 The BBARWA will establish a program to notify sensitive receptors, such as schools, mobile home parks, hospitals, etc. prior to initiating construction. The sensitive noise source will be given a copy of the noise management actions that will be taken to reduce and/or control noise and the sources will be provided a copy of the noise/complaint phone number to contact BBARWA or the BBARWA contractor. 4.12-6 Utilize construction methods or equipment that will provide the lowest level of noise impact, i.e., use newer equipment that will generate lower noise levels. Schedule the construction such that the absolute minimum number of equipment would be operating at the same time. 4.12-7 Project facilities shall be constructed and operated so that noise levels from operations (pump or mechanical equipment) do not exceed 50 dB during night hours and 65 dB averaged over the 12 hours of day time when located adjacent to existing or future sensitive land uses. This can be achieved by siting relatively noisy operations a sufficient distance from sensitive noise receptors; by incorporating attenuation features in the facility; or designing attenuation features at the boundary of the property.	
Public Services	Safety hazard to public, if trespass on permanent facility sites.	4.14-1 Recharge basin facilities shall be fenced and otherwise have access controlled to prevent illegal trespass and recreation use of ponds at all times. The Agency shall confer with the Sheriff's Department regarding the need for installation of an illegal entry alarm on the recharge basins.	Less than significant

Table 1.5-1
SUMMARY OF POTENTIAL ADVERSE IMPACTS AND MITIGATION MEASURES DISCUSSED IN THIS DRAFT PEIR

Environmental Category/Issue	Potential Impact Description	Mitigation Measures	Impact After Mitigation
Transportation and Traffic	Safety hazard to traffic and pedestrians on roadways during construction activities.	4.16-1 BBARWA shall review and approve a construction traffic management plan for work in public roads that complies with the Work Area Traffic Control Handbook or other applicable standards to provide adequate traffic control and safety during construction activities. 4.16-2 BBARWA shall require the pipeline contractor to properly backfill and compact excavated areas. BBARWA shall also require that all disturbances to public roadways be repaired in a manner that complies with the Standard Specifications for Public Works Construction (green book) or other applicable standards. 4.16-3 The BBARWA shall require the construction contractor to provide adequate traffic management resources during construction (signing, protective devices, flag persons, etc.) to maintain the safe flow of traffic, particularly emergency access, on local streets at all times. 4.16-4 During construction, BBARWA shall require traffic hazards for vehicles, bicycles, and pedestrians to be adequately identified and such traffic controlled to minimize hazards. 4.16-5 The BBARWA shall require the construction contractor to ensure that no open trenches or traffic safety hazards be left in roadways during periods of time when construction personnel are not present (nighttime, weekends, etc.), without appropriate signing and protection to minimize hazards.	Less than significant

Table 1.5-1
SUMMARY OF POTENTIAL ADVERSE IMPACTS AND MITIGATION MEASURES DISCUSSED IN THIS DRAFT PEIR

Environmental Category/Issue	Potential Impact Description	Mitigation Measures	Impact After Mitigation
Transportation and Traffic (continued)		4.16-6 The BBARWA shall require all roads to be repaired adequately after construction activities to ensure that traffic can move in the same manner as before construction without damage to vehicles. 4.16-7 The BBARWA shall require the contract for all deliveries for construction and operations and for removal of any waste material, to be specified to occur outside the traffic peak hours (from 7 a.m. to 9 a.m. and from 4 p.m. to 6 p.m.).	

CHAPTER 2 - INTRODUCTION

2.1 BACKGROUND

The Big Bear Area Regional Wastewater Agency (BBARWA or Agency) proposes to adopt and implement a Recycled Water Master Plan (RWMP). Phase 1 of the Master Plan includes the facilities and systems that will support immediate implementation of a specific program of artificial surface groundwater recharge by applying recycled water at the Greenspot recharge site in the Big Bear Valley. The other phases of the RWMP address extending recycled water to other users throughout the Valley over an extended period of time and these phases are further defined below. Phase 1 of the Master Plan is the only phase being considered for near term implementation if the project is approved by the BBARWA Board. BBARWA concluded that an environmental impact report (EIR) is required to document the potential adverse environmental effects of implementing the RWMP and identifying required mitigation and alternatives, where appropriate. Therefore, the Agency is acting as the Lead Agency for compliance with the California Environmental Quality Act (CEQA) based on its responsibility for funding the proposed recycled water system infrastructure improvements and for implementing the RWMP, assuming it is adopted after completion of the CEQA review process.

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In summary, the Recycled Water Master Plan Project consists of five components (both physical facilities and changes in existing operations).

1. The first component of the project was identification of potential recycled water users. Many future potential uses for recycled water have been identified in the Draft Final Master Plan, but the specific uses that will actually be served cannot be defined at this time, except for groundwater recharge in the Greenspot area. The range of proposed recycled water uses includes: landscape irrigation; habitat enhancement; surface impoundment; industrial and commercial uses; and artificial groundwater recharge.

2. The second component of the project is the creation of the recycled water supply. This entails modifications to the existing secondary wastewater treatment facility presently operated by the Agency to provide adequate treatment of wastewater to meet the Title 22 water quality standards, and any other water quality standards required to support permitting the proposed recycled water uses. The proposed upgrades to the existing facility include: microfiltration unit; reverse osmosis unit; brine handling facility, possibly including evaporation ponds; ultraviolet disinfection unit; recycled water storage facility; and reclaimed water pump station. These treatment units are proposed to be installed at the existing wastewater treatment plant location. The proposal at this time is to install these treatment unit upgrades in modular segments with a treatment capacity of 500 acre-feet per year, allowing an initial capacity of 1,000 acre-feet per year and up to a maximum of 2,000 acre-feet per year capacity. This will allow staging the treatment facility installation and spreading the cost expenditures over time.

3. The third component of the recycled water project is the installation of the transmission facilities required to store and distribute the recycled water to the point of use, and to install the facilities, such as the percolation basins, required to support Phase 1 of the proposed RWMP. The RWMP identifies up to 34 miles of recycled water pipelines (mostly in existing

disturbed road rights-of-way); 1.2 million gallons of storage; about 520 horsepower of pumping capacity; and up to 1,500 acre-feet per year of artificial recycled water recharge capacity, which will require installation of artificial surface recharge basins (percolation ponds). The Phase 1 facilities include: construction of up to nine percolation basins at the Greenspot site; a surface storage tank (0.3 million gallons) for backup storage; the pump station; approximately 3.5 miles of pipeline; two 500 acre-feet treatment modules; new water production wells to capture the percolated recycled water; and the brine handling facility. A more detailed description of these facilities is provided in Chapter 3 of this document and in the Draft RWMP document.

4. The means to deliver an initial 1,000 acre-feet per year of recycled water to users (including the recharge site in Greenspot) in the Agency's service area, with a maximum design capacity of 2,000 acre-feet per year of recycled water being made available to future recycled water consumers.

5. A reduction in wastewater deliveries to Lucerne Valley by up to 2,000 acre-feet per year at full development in accordance with full implementation of the RWMP.

A final component of the program implementation is the installation of up to six new wells to capture the recycled water percolated at the Greenspot recharge site. These wells would be independently installed by the major water purveyors in the Valley, and are not a specific component of the RWMP.

The project area is located in the central portion of the San Bernardino Mountains. The treatment plant is located in the eastern portion of the Big Bear Valley, adjacent to and south of Baldwin Lake. Future potential recycled water use sites are located throughout the Valley. Figure 3.1-1 shows the regional and area location. The Big Bear Valley is located on a portion of four USGS topographic maps: Big Bear Lake, Moonridge, Fawnskin and Big Bear City. Most of the Big Bear Valley is located within T2N and R1W/R2W, San Bernardino Meridian.

2.2 PURPOSE AND USE OF AN EIR

The California Environmental Quality Act (CEQA) was adopted to assist with the goal of maintaining the quality of the environment for the people of the State. Compliance with CEQA, and its implementing guidelines, requires that an agency making a decision on a project must consider its potential environmental effects/impacts before granting an approval. Further, the state adopted a policy "that public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects." Thus, an agency, in this case the Big Bear Area Regional Wastewater Agency, must examine feasible alternatives and identify feasible mitigation measures as part of the environmental review process. CEQA also states "that in the event specific economic, social, or other conditions make infeasible such project alternatives or such mitigation measures, individual projects may be approved in spite of one or more significant effects thereof." (§ 21002, Public Resources Code)

When applied to a specific project, such as the approval of the Recycled Water Master Plan and initial implementation of the Phase 1 facilities to implement the Greenspot recycled water recharge project, the reviewing agency, in this case BBARWA, is required to identify the potential environmental impacts of the project and where potential significant impacts are identified, the agency must determine whether there are feasible mitigation measures or alternatives that can be implemented to avoid or substantially lessen significant environmental effects of a project. The first step in this process, making the determination to prepare an EIR has been completed for RWMP Project, the "project being considered for approval and implementation" by BBARWA. Based on the information in the Notice of Preparation, the Agency concluded that the project proposed might cause significant impacts and is evaluating all of the standard issues contained in an Initial Study Environmental Checklist Form. Thus, this PEIR contains evaluations of potential adverse environmental effects to the following environmental issues:

- Aesthetics
- Agricultural Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Geology/Soils
- Hazards & Hazardous Materials
- Hydrology/Water Quality
- Land Use/Planning
- Mineral Resources
- Noise
- Population/Housing
- Public Services
- Recreation
- Transportation/Traffic
- Utilities/Service Systems

The Agency prepared and circulated a Notice of Preparation (NOP) for the project. The NOP review period began on April 20, 2005 and ended thirty days later, May 20, 2005. Respondents were requested to send their suggestions for and comments on environmental information and issues that should be addressed in the PEIR no later than thirty days after receipt of the NOP. The NOP was distributed to interested agencies, the State Clearinghouse, and interested parties. Eight letter responses to the NOP were submitted, including a letter from the State Clearinghouse identifying those State agencies receiving copies of the NOP. Copies of these eight letters are included in Section 8.2 of this PEIR. A scoping meeting was held by the Agency on May 10, 2005 and comments received at the scoping meeting are also provided in Section 8.2 of this PEIR.

Since the EIR being prepared by the Agency is a full scope EIR, no new issues were raised that are not already being addressed in this PEIR. However, the comment letters did identify several key issues of focus, which are further discussed below. This PEIR has been prepared to address the issues identified above and to provide an informational document intended for use by the BBARWA, interested parties and responsible agencies, and the general public in evaluating the potential environmental effects of implementing this project. A copy of the NOP is attached as Section 8.1 in Chapter 8 and as noted above, copies of the comment letters are provided in Chapter 8, Section 8.2 of this PEIR.

CEQA requires that BBARWA, the CEQA Lead Agency, consider the environmental information in the project record, including this PEIR, prior to making a decision on the proposed project. The decision that will be considered by the Agency Board is whether to approve the RWMP and proceed with implementation of a recycled water recharge program in the near future, or to reject the proposed project. This PEIR evaluates the environmental effects to all standard environmental issues. BBARWA will serve as the CEQA Lead Agency pursuant to the State CEQA Guidelines Section 15015(b)(1). This PEIR has been prepared by Tom Dodson & Associates (TDA) under contract to the Agency. TDA was retained to assist BBARWA to perform the independent review of the project required by CEQA as part of the overall review process. The Agency has reviewed the content of the PEIR and concurs in the conclusions and findings contained herein.

2.2.1 Responses to Comment Letters Submitted in Response to the NOP

The proposed RWMP, including the Phase 1 of the recycled water recharge project at Greenspot in the Big Bear Valley attracted extensive comments to the NOP and at the scoping meeting. As indicated above, a total of eight letters were received in response to the NOP, including the State Clearinghouse notification letter. A total of sixteen persons either spoke at the May 10 scoping meeting or provided written comments on the proposed RWMP and recycled water recharge project. In all about 172 comments were received on the proposed project, although some of the comments were duplicates of previous comments. The comments did identify additional issues and areas of investigation for consideration in the PEIR. The detailed comments are provided in Section 8.2 of the PEIR. Note that the specific issues raised in comments are most often addressed in the text of the PEIR, primarily Chapter 4, the detailed analysis of environmental impacts. Several issues, such as project costs and economic effects, are not standard CEQA issues and are addressed to the extent feasible and appropriate in Section 8.2.

2.2.2 Areas of Any Controversy/Issues to be Resolved

Based on the comments received, there are several controversial issues raised by the Agency's proposal to consider implementing the RWMP and the recycled water recharge project at Greenspot in Big Bear Valley. Based on the number of comments and the degree of concern expressed, the following environmental issues appear to be controversial with some residents in the Big Bear Valley.

1. Effects of recycled water recharge on the hydrology and water quality in the vicinity of recharge areas, including groundwater, springs and Baldwin Lake.

2. Public health effects of water quality and wind blown salts from recycled water operations.

3. Effects on endangered species known to occur in the general vicinity of the project area of potential impact.

4. Possible effects of RWMP implementation on future growth in Big Bear Valley.

5. Possible effects on availability of electricity within Big Bear Valley.

6. Effects of additional truck trips required to support the RWMP operations on the area circulation system.

7. Potential effects on known archaeological resources associated with use of Big Bear Valley by Native Americans, including human remains.

8. Aesthetic effects of the project, including odor effects on the local population.

These areas of controversy are directly addressed in the pertinent sections of Chapter 4 of this PEIR.

2.3 SCOPE AND CONTENT OF THIS PEIR

In accordance with Sections 15063 and 15082 of the State CEQA Guidelines, BBARWA decided to prepare a full scope EIR to address all of the potential issues in one document. Thus, this PEIR addresses all 16 issues that are contained in the standard Initial Study Environmental Checklist Form. The impact evaluation addresses all potential adverse environmental effects from the physical changes in the environment that will result from implementing the RWMP, if the Master Plan is approved. The evaluation encompasses direct and indirect effects; short- and long-term effects; and cumulative effects. Comments on the scope of the PEIR were considered by the Agency and after this consideration, the overall focus of the PEIR remained the same as identified in the Notice of Preparation.

In addition to evaluating the environmental issues listed above, this PEIR contains all of the sections mandated by the CEQA and State and City CEQA Guidelines. Table 2.3-1 provides a listing of the contents required in an EIR along with a reference to the chapter and page number where these issues can be reviewed in the document. This PEIR is contained in two volumes. Volume 1 contains the CEQA mandated sections and Volume 2 contains the technical appendices. Volume 2 has been distributed to agencies with purview over the use of recycled water to allow peer review of the technical studies. Copies of Volume 2 are also available to the public at the BBARWA offices in Big Bear; at the City of Big Bear Lake Department of Water and Power and City Hall offices; at the Big Bear City Community Services District office; and at the library.

Table 2.3-1
REQUIRED EIR CONTENTS

Required Section (CEQA)	Section in EIR	Page Number
Table of Contents (Section 15122)	same	ii
Summary (Section 15123)	Chapter 1	1-1
Project Description (Section 15124)	Chapter 3	3-1
Environmental Setting (Section 15125)	Chapter 4	4-3
Significant Environmental Effects of Proposed Project (Section 15126a); Environmental Impacts	Chapter 4	4-1
Unavoidable Significant Environmental Effects (Section 15126b)	Chapter 4	4-1
Mitigation Measures (Section 15126c)	Chapter 4	4-1
Cumulative Impacts (Section 15130)	Chapter 4	4-1

Table 2.3-1
REQUIRED EIR CONTENTS

Required Section (CEQA)	Section in EIR	Page Number
Alternatives to the Proposed Action (Section 15126d)	Chapter 5	5-1
Growth-Inducing Impacts (Section 15126g)	Chapter 6	6-1
Irreversible Environmental Changes (Section 15126f)	Chapter 6	6-1
Effects Found Not to be Significant (Section 15128)	Chapter 6	4-1
Organizations and Persons Consulted (Section 15129)	Chapter 7	7-1
Appendices	Chapter 8	8-1

2.4 PEIR FORMAT AND ORGANIZATION

This PEIR contains eight chapters which, when considered as a whole, provide the reviewer with an evaluation of the potential significant adverse impacts from implementing the proposed project, the adoption of the RWMP and the construction and operation of the Phase 1 recycled water recharge project at Greenspot. Since this document serves as a program environmental document, the PEIR also addresses the general impact and proposed mitigation measures to reduce effects of future, as yet undefined specific projects, i.e., second-tier projects. Second tier projects are those specific projects that may be funded in the future, for example delivery of recycled water for irrigation at the high school, that will require additional evaluation of site specific impacts in order to comply with CEQA. Although general locations of future facilities are identified in this document, the specific location, including for example what side of a roadway a pipeline may be installed or where a specific location of a future pump station will occur, is not known at this time. The following paragraphs provide a summary of the content of each chapter of this PEIR.

Chapter 1 contains the Executive Summary for the PEIR. This includes an overview of the proposed project and a tabular summary of the potential adverse impacts and mitigation measures.

Chapter 2 provides the reviewer with an Introduction to the document. This chapter of the document describes the background of the proposed project, its purpose, and its organization. The CEQA process to date is summarized and the scope of the PEIR is identified. Technical evaluations prepared for the PEIR are discussed and the format and availability of the PEIR are provided.

Chapter 3 contains the project description used to forecast environmental impacts. This chapter describes for the reviewer how the existing environment will be altered by the proposed project. This chapter sets the stage for conducting the environmental impact forecasts contained in the next several chapters.

Chapter 4 presents the environmental impact forecasts for the issues considered in this PEIR. For each of the five environmental issues identified in Section 2.3, the following impact evaluation is provided for the reviewer: the project's existing environmental setting; the potential impacts forecast

to occur if the project is implemented; proposed mitigation measures; unavoidable adverse impacts; and cumulative impacts.

Chapter 5 contains the evaluation of alternatives to the proposed project. Included in this section is an analysis of the no project alternative and other project alternatives.

Chapter 6 presents the topical issues that are required in an EIR. These include: any significant irreversible environmental changes; and growth inducing effects of the project. As of January 1, 1995, the assessment of short-term benefits relative to long-term impacts is no longer required because it is considered redundant to other sections in an EIR. This change was adopted as part of SB 749 (Thompson) which became law in January 1995.

Chapter 7 describes the resources used in preparing the PEIR. This includes persons and organizations contacted; list of preparers; and bibliography.

Chapter 8 contains those materials referenced as appendices to the PEIR, such as the Notice of Preparation and comments on the Notice. Appendix material is referenced at appropriate locations in the text of the PEIR.

Technical studies in support of the PEIR that could not be included in Chapter 8 due to their volume, are provided in Volume 2 of this PEIR. The technical data in Volume 2 are summarized in Chapter 4 in sufficient detail to allow the reader to follow the chain of logic contained in the technical appendices. However, if an individual or an agency finds that the more detailed technical study data are required, then the Agency has made copies available at several locations in the Valley, or for a nominal fee, a copy of Volume 2 can be purchased, either as an electronic copy or hard copy.

2.5 AVAILABILITY OF THE RECYCLED WATER MASTER PLAN PROGRAM EIR

The Draft PEIR for this project has been distributed directly to all public agencies and interested persons identified in the NOP mailing list (see Section 8.1, Chapter 8), the State Clearinghouse, as well as any other requesting agencies or individuals. All reviewers have been provided 45 days to review the Draft PEIR and submit comments to BBARWA for consideration and response. The Draft PEIR is also available for public review at the following locations during the 45-day review period:

Big Bear Area Regional Wastewater Agency
121 Palomino Drive
Big Bear City, CA 92314

City of Big Bear Lake
39709 Big Bear Boulevard
Big Bear Lake, CA 92315

Big Bear City Community Services District
139 Big Bear Boulevard
Big Bear City, CA 92314

Big Bear Lake Library
41930 Garstin Drive
Big Bear Lake, CA 92315

City of Big Bear Lake
Department of Water and Power
41972 Garstin Drive
Big Bear Lake, CA 92315-1929

The Draft PEIR is also available on the Agency's website which can be accessed at: bigbearwatersolutions.org

Copies of the document can also be purchased from the Agency (either hard copy or CD) for a nominal fee. Please contact the Agency at the address and phone number provided below.

2.6 BBARWA REVIEW PROCESS

After receiving comments on the Draft PEIR, BBARWA will prepare a Final PEIR for certification by the Agency Board prior to making a decision on the project. Information concerning the PEIR public review schedule and Agency meetings for this project can be obtained by contacting:

Mr. Steven Schindler
Big Bear Area Regional Wastewater Agency
121 Palomino Drive
Big Bear City, CA 92314
(909) 584-4018

2.7 OTHER AGENCY APPROVALS

Other agency approvals (if required) for which this environmental document may be utilized include:

- Section 401 certification under the Clean Water Act, National Pollutant Discharge Elimination System (NPDES) Permit, Waste Discharge Requirements (WDRs), and/or Stormwater Pollution Prevention Plan through the State Water Resources Control Board and enforced through the California Regional Water Quality Control Board, Santa Ana River Region.

- An encroachment permit for improvements to roadways under the jurisdiction of the California Department of Transportation, San Bernardino County, and City of Big Bear Lake.

- A 1600 agreement (Section 1603) for impacts waters of the State from the California Department of Fish and Game.

- A Section 404 Permit for impacts to "waters of the United States" from the U.S. Army Corps of Engineers.

- A Section 401 Permit for impacts to "water of the United States" from the California Regional Water Quality Control Board, Santa Ana River Region (Regional Board).

- A revised waste discharge permit from the Regional Board to Implement a Recycled Water Master Plan and change the location of a discharge.

- A permit from the State Department of Health Services to use recycled water for recharge of the local groundwater aquifer(s).

- Endangered Species Incidental Take Permits from either the California Department of Fish and Game or the U.S. Fish and Wildlife Service, depending upon second-tier project impacts on such species.

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CHAPTER 3 – PROJECT DESCRIPTION

Note: All Chapter 3 figures are located at the end of this chapter, not immediately following their reference in the text.

3.1 INTRODUCTION

The Big Bear Area Regional Wastewater Agency (BBARWA) is seeking to use advanced treated effluent from the wastewater treatment plant to produce recycled water for beneficial use within the Big Bear Valley (Valley), which is located in the mountains of western San Bernardino County, California (as shown in Figure 3.1-1). To achieve this objective, the BBARWA has developed a draft Valley-wide Recycled Water Master Plan. Implementation of this Master Plan, or elements thereof, is designed to reduce the Valley's dependence on limited groundwater supplies, extend available water resources, and provide valuable economic and environmental benefits to the surrounding community. This Recycled Water Master Plan is a result of a cooperative effort by the BBARWA, the Big Bear City Community Services District (BBCCSD), and the City of Big Bear Lake Department of Water and Power (DWP). BBCCSD and DWP supported this effort by providing pertinent data on potential recycled water users. For long range planning purposes and better coordination of reclamation efforts, this Recycled Water Master Plan was initiated to outline the project's components, technological alternatives, and program costs.

Local water resources in the Valley are limited and the demand for water periodically can exceed supply, particularly in dry years or during prolonged drought periods. With no imported water available, local water purveyors have expressed a need to explore other water sources to augment current groundwater supplies and provide a reliable long-term and locally-controlled water supply. Recycled water from the BBARWA's Regional Wastewater Treatment Plant (WWTP) has been identified as a potential supplemental supply within the Valley. Implementation of the reclamation program would require the WWTP to meet Title 22 standards.

Multiple potential beneficial uses have been identified for the recycled water from the BBARWA WWTP. These include artificial surface recharge of recharge, urban irrigation, industrial/commercial uses, and environmental or recreational impoundment. Specific users for each recycled water use type were identified in the Recycled Water Master Plan. Implementation of the proposed Recycled Water Master Plan has been grouped into phases with the initial phase (Phase I) considered the most feasible. Phase I, which consists of a 1,000 acre-feet per year (afy) artificial groundwater recharge project using advanced treated recycled water, is considered the optimal beneficial use for the recycled water within the Valley. The Phase I proposed project is a specific project that is presented in this program environmental impact report (PEIR) for immediate implementation.

Although Phase I of the Recycled Water Master Plan is ready for consideration, the timing and feasibility of implementation for the other potential recycled water uses is uncertain. Accordingly, this program EIR (PEIR) has been developed for use in support of implementing not only Phase I of the Recycled Water Master Plan but other phases or individual project components, which are identified in the Recycled Water Master Plan, as future studies demonstrate their feasibility. Thus, a PEIR has been selected as the appropriate document for compliance with the California

Environmental Quality Act (CEQA) based on the definition of a program document contained in Section 15168 of the State CEQA Guidelines which states:

"A program EIR is an EIR which may be prepared on a series of actions that can be characterized as one large project and are related either: (1) Geographically, (2) As a logical part in the chain of contemplated actions, (3) In conjunction with issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program, or (4) As individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental effects which can be mitigated in similar ways."

The BBARWA is working from a core concept that this master plan and its associated activities are so interrelated that they merit consideration under a program EIR. The rationale supporting this concept includes the following key concepts:

1. The BBARWA intends to recycle as much treated effluent (recycled water) as possible (potentially up to 2,100 acre-feet) in the future to provide a supplemental water supply source for the Big Bear Valley, and the greatest demand for this recycled water is anticipated to artificial surface recharge of groundwater. Therefore, a key goal is to treat the effluent to such a level that it can be used to recharge the groundwater aquifers in the Valley.

2. The demand for recycled water and the physical facilities required to deliver recycled water to consumers will occur over an extended period of time. Thus, there will be a series of actions to implement the Master Plan spread out over a number of years. Initially, only Phase I of the Recycled Water Master Plan is planned for immediate consideration and implementation. They are all related to implementation of a single program, the BBARWA Recycled Water Master Plan, and some of the specific facilities and users that may be required to serve future users remain to be defined. Therefore, a program environmental document establishes a framework for evaluating the Agency's ultimate recycling program, while providing the broadest environmental evaluation for public review of the whole program, to the extent feasible. Thus, the Recycled Water Master Plan is particularly suited to CEQA review utilizing the program environmental impact report concept.

The BBARWA is in the unique position to integrate the management of recycled water within the Big Bear Valley and derive important benefits by cooperating with other water supply management agencies in the Valley. The whole plan is being considered within one environmental document because BBARWA has concluded that all master plan actions proposed for potential implementation occur within the same geographic area by the Agency; they are interrelated as a logical part in the chain of contemplated potential actions by the Agency; and they are essentially part of the overall program (one large project) being implemented by the BBARWA to fulfill its water resource and water quality management responsibilities within its service area.

What follows is a description of the Recycled Water Master Plan including: project objectives; physical facilities; construction activities to implement these facilities; and facility operations once the plan's facilities are installed and operational. In this document, the Phase I proposed project will be highlighted in detail with the remaining potential phases discussed for potential future implementation. Review and evaluation of the Master Plan is inherently complex, but sufficient information must be provided to the reviewer to understand the chain of events that fully describe the physical changes to the environment that have a potential to cause adverse impacts to natural

and man-made systems in the affected environment. The following descriptions of the plan have been summarized to make clear how the implementation of the plan can cause physical changes to the environment and related adverse impacts. A copy of the Draft Recycled Water Master Plan is available for review at the Agency's office in Big Bear or can be purchased from the Agency for review.

3.2 AGENCY OVERVIEW

The BBARWA was formed in March 1974 to provide a mechanism to oversee and conduct a study to develop a plan for wastewater management for the Valley area. The BBARWA's service area encompasses the entire 79,000 acres of the Valley, which is located in the San Bernardino Mountains of Southern California (see Figure 3.1-1). The BBARWA collects wastewater from three separate collection systems (see Figure 3.2-1):

1. City of Big Bear Lake
2. Big Bear City Community Services District
3. County of San Bernardino, County Service Area 53B

Each member agency maintains and operates its own wastewater collection system and delivers wastewater to the BBARWA's interceptor system for transport to the Wastewater Treatment Plant (WWTP). The BBARWA operates three main lines:

- The "LPS force main" that services the City of Big Bear Lake's wastewater system;
- The "North Shore Interceptor" that services the County's wastewater system; and
- The "BBARWA Trunk Line" that services the BBCCSD's wastewater system and conveys flow from the North Shore Interceptor to the treatment plant.

The North Shore Interceptor ties into the BBCCSD "Trunk Line" which also services the BBCCSD wastewater system. The wastewater flows from the three main lines are conveyed to the BBARWA WWTP located at Baldwin Lake. Currently, the BBARWA system is composed of a 4.89 million gallons per day (MGD) capacity secondary wastewater treatment plant (with effluent pumping capacity at 9.2 MGD), 14.6 miles of sewer pipeline, and 1.5 miles of existing recycled water pipeline. A map of the influent system and the existing recycled water line is shown in Figure 3.2-2. The average daily flow treated by the BBARWA WWTP is approximately 2.2 MGD over the past 5 years from 1999 to 2003.

Currently, the BBARWA discharges secondary treated wastewater effluent to a 480-acre site in the Lucerne Valley where it is used to irrigate alfalfa fields. The alfalfa is used to feed horses, sheep, and other livestock. Figures 3.2-3 and 3.2-4 show the location and layout for the existing discharge site in the Lucerne Valley. Three monitoring wells are located on the property and are tested regularly to ensure that the groundwater is not adversely affected by the secondary effluent. While most of this water is being used productively to grow the field crops at the discharge site, some of the treated effluent percolates to the Lucerne Valley groundwater aquifer. The treated effluent being discharged in Lucerne Valley can be made available for beneficial reuse within this Valley.

The BBARWA has implemented a pilot recycled water program, which allows recycled water to be used for irrigation, construction compaction and dust control, and wildlands fire fighting in the

Valley. As of 2004/2005, the existing recycling program has supplied approximately 13 acre-feet of recycled water to users, primarily for construction activities.

3.3 PURPOSE AND OBJECTIVES

The BBARWA is seeking to expand the use of the effluent from its wastewater treatment plant to produce recycled water for beneficial use within the Valley. The purpose of the BBARWA's Valley-wide Recycled Water Master Plan is to identify potential users for the recycled water and present a time-phased plan for potential implementation. Implementation of this Master Plan will result in the following benefits and fulfill the following objectives:

- Provide an additional supply of high quality water to augment existing groundwater supplies;
- Increase the reliability of supply by providing operational flexibility for water purveyors during drought or high demand periods;
- Increase the reliability of supply during peak demand periods or emergencies (such as fires); and
- Reduce irrigation demand on the potable system, particularly during the summer when irrigation demand and overall demand for potable water is at its greatest.

Specific project objectives are defined in Chapter 1.

The Master Plan will be a management tool that the BBARWA can use to guide the future implementation of a valley-wide recycled water program. Simply stated, the purpose is to augment current and future demand for limited potable water supplies within the BBARWA service area with recycled water, to the extent feasible.

3.4 PROJECT LOCATION AND BACKGROUND

The Valley area is a resort community located in the San Bernardino Mountains approximately 100 miles northeast of the City of Los Angeles. The Big Bear Valley is located on a portion of four USGS topographic maps: Big Bear Lake, Moonridge, Fawnskin and Big Bear City. Most of the Big Bear Valley is located within T2N and R1W/R2W, San Bernardino Meridian. It encompasses an area of about 70 square miles and includes two main watersheds – the Big Bear Lake watershed and the Baldwin Lake watershed. The area provides year-round recreational opportunities including biking, boating, fishing, camping, golfing, hiking, snow skiing, snowboarding, and other resort activities.

The BBARWA WWTP is located in the eastern portion of the Big Bear Valley, adjacent to and south of Baldwin Lake. Future recycled water use sites are located throughout the Valley. However, the project considered for immediate implementation, the Phase I artificial groundwater recharge project is located in the Baldwin Lake Watershed with the principal project elements shown on Figure 3.4-1. The attached figure (Figure 3.1-1) shows the regional and area location.

The Valley area has a growing population composed of both permanent residents and seasonal visitors. The population of the area was reported to be approximately 12,000 in 2003, according to the California Department of Finance (Husing, 2003). However, based on the existing residences and part-time residential units, the population in the Valley can expand to about 58,000

residents when measured as the sum of full-time and part-time residents (BBARWA, 2004). In addition to residents, thousands of visitors arrive each year to engage in outdoor activities. Another major demographic change that is driving water demand is the change in the number of full-time residents in the BBARWA service area. The number of full time residents is increasing in the Valley due to increased telecommuting opportunities and existing part-time home owners retiring to the Valley. The City of Big Bear Lake Department of Water and Power (DWP) estimates that the number of full-time residents could change from approximately 30 percent at present to between 40 and 50 percent over the next 10 to 20 years. This could lead to an increase in the permanent population, without building any more residences, of about 4,000 to 8,000 persons (net population of 16,000 to 20,000 permanent residents by 2025.

Population is an important driving factor in the Valley due to the limited water supply resources available. In the Valley, the primary water supply is groundwater, although use of Big Bear Lake water for snowmaking is permitted at the two ski resorts in the area, Bear Mountain and Snow Summit. For this reason, as population and water demand continue to increase in the future, the Valley faces potential shortages in water supply availability and uncertain reliability, particularly during prolonged periods of below normal precipitation. During the past several years of drought-like conditions, the reduced availability of water resulted in substantial limitations in availability of potable water supplies that affected the whole community. Mandatory water conservation measures were implemented throughout the Valley to protect and maintain existing water supplies for potable uses.

The Valley relies almost entirely on spring flow and groundwater resources, which are supplied solely by localized rain and snowmelt, for the existing water supply. During periods of drought, the ability of water purveyors to meet supply demands is hampered by decreased spring flow and reduced well production capacity resulting from lowered groundwater levels. Also, much of the existing groundwater in aquifer storage is not currently useable because it contains naturally occurring fluoride and other minerals at concentrations that exceed regulatory standards. Surface water in Big Bear Lake is not available for water supply because communities outside of the Valley own the water rights. Preliminary studies of importing water from the State Water Project and/or Colorado River Aqueduct have been made but such import is not considered feasible from a cost and permitting perspective given the Valley's relatively remote location and high altitude. As a result, implementing water conservation measures, including water recycling, are important to augment water supply resources in the Valley.

3.5 PROJECT CHARACTERISTICS

As previously summarized, the Recycled Water Master Plan consists of five components, which include both new physical facilities and changes in existing operations.

1. The first component was identification of potential recycled water users. Future potential uses for recycled water have been identified in the Draft Final Master Plan, but the specific uses that will actually be served cannot be defined at this time, except for groundwater recharge in the Greenspot area (e.g., the Phase I project). The range of proposed recycled water uses includes: urban irrigation; environmental and recreational impoundment; industrial/commercial uses; and artificial groundwater recharge.

2. The second component was identification of the treatment systems required to meet Title 22 recycled water requirements to create the recycled water supply. For the BBARWA project, this entails modifications to the existing secondary wastewater treatment facility to provide adequate treatment to meet the Title 22 water quality standards, and other water quality standards required for permitting the recycled water use in Big Bear Valley. The proposed upgrades to the existing facility include: a microfiltration unit; a reverse osmosis unit; a brine handling facility, an ultraviolet disinfection unit; and a reclaimed water pump station. These facilities are proposed to be installed at the existing wastewater treatment plant location. The proposal at this time is to install these facilities in modular phases, allowing an initial capacity of 1,000 afy and up to a maximum of approximately 1,700 afy capacity.[1] This will allow the treatment facility installation to be staged and the cost expenditures spread over time.

3. The third component was the identification and installation of the transmission facilities required to distribute the recycled water to the point of use. In addition, the systems required to install the facilities, such as the groundwater recharge basins, were identified. The Draft Recycled Water Master Plan identifies implementation phases and highlights only those phases where water is available for delivery. Among these phases, the only phase recommended to be implemented was Phase 1. The Phase 1 project, as identified by the Recycled Water Master Plan, is composed of the advanced treatment upgrades at the WWTP, the Greenspot groundwater recharge basin site, and the transmission facilities required to convey water from the BBARWA WWTP to the Greenspot site. The Phase 1 project consists of approximately 3.5 miles of recycled water pipeline, 80 horsepower of pumping capacity, and up to 1,000 afy of artificial recycled water recharge capacity, which will require installation of artificial surface recharge basins (i.e., groundwater recharge basins).

4. The fourth component is the means to deliver an initial 1,000 acre-feet per year of recycled water to users (including the recharge site in Greenspot, Phase 1) in the Agency's service area, with a maximum design capacity of 2,000 acre-feet per year of recycled water being made available to future recycled water consumers.

5. A potential reduction in wastewater deliveries to Lucerne Valley by up to 2,000 afy for full implementation of the Recycled Water Master Plan and up to 1,000 afy for the proposed Phase I project implementation.

Each of these project components and their characteristics are summarized below.

3.5.1 Potential Recycled Water Customers: Demand

The amount of recycled water demand and lack of cost-effective alternative water sources within the Big Bear Valley will ultimately determine the need for the recycled water program and the physical facilities that must be installed to support such a program. As noted above, the Agency envisions installing treatment upgrades in modular increments. To address the demand issues, both quantity and location, the Agency's engineering consultant (CH2MHill) conducted a market study of the potential recycled water users in the Big Bear Valley, including an artificial groundwater

[1] The existing BBARWA WWTP flow of 2,100 afy will limit the recycle water production at approximately 1,700 afy.

recharge site, which would use recycled water to recharge local aquifers for future recovery through installation of new wells to extract the recycled water in accordance with Title 22 standards.

The market assessment identified and evaluated potential users of recycled water in the Valley. The detailed market survey can be viewed in Chapters 1 and 3 of the Draft Recycled Water Master Plan. The following summary is abstracted from this document.

Land use and other mapping sources were consulted to develop a preliminary assessment of where recycled water could be applied in the area. Next, the DWP and the BBCCSD were contacted to gather data for the top users of each water agency. Additional potential users evaluated included car washes, laundries, nurseries and those identified by the BBARWA staff. This assessment identified over 40 potential recycled water users.

To further determine the viability of these users, user interviews were conducted. Interviews with potential customers of recycled water were conducted to discuss how the water would be used (i.e., flow rate, schedule), identify users needs and expectations (i.e., quality, reliability, economic, others), and document user concerns. The majority of the interviews were conducted with irrigation users. Specific questions for irrigation users included: the number of days per week of irrigation, the duration of irrigation per day, the number of irrigation zones, and the net acreage of landscaped area. The findings of these interviews were cataloged in a database. Preliminary fieldwork also was conducted in the area to identify additional locations for applying recycled water. A visual field inspection determined that most of the landscaped areas were at public and recreational facilities, with very limited landscaped areas on residential and commercial properties.

A majority of the potential recycled water users identified in the Valley are urban irrigation users. Potential irrigation users that were identified consist primarily of schools and parks, but also include a golf course, a sports facility, a mobile home park, a timeshare resort, a small hotel, the civic center, a streetscape, a church, and a cemetery. The key concerns and issues identified by these users were the ability to maintain current irrigation schedules, water quality consistency to protect plants from damage, and a reasonably priced water supply.

Another potential use of recycled water in the Valley is environmental and recreational impoundment, to supply lakes and ponds including an endangered fish habitat. An example of this is Lake Williams, which is currently fed by natural drainage and acts as a holding basin for precipitation runoff. In the past, water in the lake was replenished by a well, but the well has been off-line for a number of years. Supplying recycled water for impoundment in the lake would require approximately 70 gallons per minute (gpm) of flow during the non-winter months from April to November. Another identified environmental use is to provide recycled water for the Shay Creek Unarmored Threespine Stickleback fish habitat and wetlands enhancement. This particular Stickleback fish is a state and federally listed endangered species. Since 1985, the BBCCSD has provided approximately 30 gpm of potable water to the pond to maintain the wetland habitat that supports this federally listed endangered fish.

Other potential uses of recycled water are industrial, commercial, and construction activities. Industrial and commercial facilities are limited in the Valley; therefore, only a few users were identified as potential recycled water users. One of these potential users, the Sterling Planet, is an industrial plant that is planning to produce electric energy by burning biomass. This facility would burn dead trees from the San Bernardino National Forest, thus providing a disposal option for the

agency removing them. Recycled water would be used at this facility in the cooling cycle. The plant would require a consistent flow of 300 gpm throughout the year, with the exception of 2 to 3 weeks per year when the plant would be shut down for scheduled maintenance. In addition to the plant, a few minor commercial uses were identified, including a car wash, laundries, and plant nurseries. The consumption of water by these commercial users would be relatively small compared to the other recycled water applications identified.

Another potential use of recycled water in the Valley is artificial surface groundwater recharge. An artificial surface groundwater recharge project could allow the BBARWA to augment water supply in the Valley by increasing the long-term reliability and availability of groundwater. Furthermore, implementing an artificial surface groundwater recharge project would provide the BBARWA with a beneficial use for recycled water within the basin of origin of the water. Artificial surface groundwater recharge would utilize the existing natural storage capacity that has been depleted through groundwater extraction. The BBARWA has performed a hydrogeologic evaluation that included preliminary investigation, reconnaissance and identification of multiple sites for further investigation, site access and environmental assessment borehole drilling, investigation of regulatory requirements, and pilot testing of candidate groundwater recharge sites. The preliminary investigation process narrowed the list of candidates to two potential groundwater recharge sites – the Greenspot and the Van Dusen sites.

Preliminary studies followed by hydrogeological pilot testing and analyses of these two sites have been used to assess percolation rates of recharge water, impacts on groundwater levels, and migration characteristics of the stored water. Based on these tests, the preliminary finding is that the sites can accept up to 1, 000 and 350 afy for Greenspot and Van Dusen, respectively. However, a factor in the ultimate amount of recycled water that these sites could accept will be the the amount of potable diluent water required by California Department of Health Services (CDHS) over the long-term.

In order to evaluate the potential users and their viability as recycled water customers, a number of evaluation categories and ranking system were developed. This evaluation was also used to determine how to phase-in the supply of recycled water and the connection of the most feasible users. The ranking system was based on a decision analysis process utilizing several comparative evaluation criteria. Initially, all the criteria were weighted equally; however, if one criterion was deemed to be more important than other criteria, then the weights and scores were modified. Seven criteria were selected to evaluate the list of potential users. These criteria are:

- Annual water demand – This criterion evaluated the users based on the amount of recycled water used. The more recycled water that could be potentially used, the higher the value of the score. The scale for this category ranged from 0 to 10, based on potential annual water consumption.

- Ability to use recycled water year-round – Due to climatic conditions, irrigation usually does not occur during the winter months; therefore, a higher score was given to potential users that use recycled water throughout the entire year. The scale for scoring the user against this criterion was from 0 to 10. The score then was based on the number of months out of the year that the user could use recycled water.

- Willingness to use recycled water – Based on the interviews conducted, users were scored on their interest in receiving recycled water. Most users were interested, with some being eager to initiate their recycled water deliveries. Users who did not respond or who were not interested in using recycled water were given a lower score in this category. The scale for scoring the user against this criterion was from 0 to 10, with a higher score given to users that were more willing to use recycled water. This category attempts to differentiate between users that are in close proximity and are, therefore, more desirable. The score for this category was the number of miles from the WWTP and was represented as a negative value to indicate the negative impact that distance can have on user feasibility.

- Elevation difference between the user property and the WWTP – The terrain in the Valley varies significantly due to its location in a mountainous area. This category evaluates the users based on their potential need for pumping. The larger the elevation change, the more pumping is required to move water to the user from the WWTP. The scale for this category ranged from –10 to 0, with –10 representing an elevation increase of over 200 feet and 0 representing an elevation change of less than 50 feet. This category was also represented by negative numbers to indicate the negative impacts of elevation impacts.

- Feasibility of user connection – This criterion evaluates non-quantifiable aspects related to the feasibility of each user's ability to connect to the system. The scale for this criterion ranges from 0 to 10, with 0 representing a speculative chance of connection and 10 representing a high likelihood of the connection occurring. The lowest category of use is speculative, which describes a user that was identified, but does not currently use water for the identified purpose or is not an existing water user. Other constraints, such as politics, also were taken into consideration under this criterion.

- Environmental constraints – Environmental constraints were initially included in the evaluation; however, due to a number of unquantified potential environmental issues ranging from archeological sites to endangered species, this category was not included in the final evaluation. A programmatic-level environmental document is under development in conjunction with this Master Plan that will complete the evaluation and the definition of the potential environmental constraints of this program.

Based on the criteria described above, the potential users listed in Table 3.5-1 were evaluated and ranked as to their feasibility of being able to accept recycled water. Otto Lawrence and the Greenspot Recharge site were identified as top potential recycled water users because they are relatively close to the WWTP, have the potential for use of significant amounts of recycled water, and can be made available to receive recycled water. Users that were ranked low in this analysis are far away from the treatment plant, could use only small amounts of recycled water, or have not expressed any interest in receiving recycled water.

Table 3.5-1
SUMMARY OF POTENTIAL RECYCLED WATER USERS

Potential User	Annual Recycled Water Demand (acre-feet)
Baldwin Lake Park	36
Baldwin Lake Stables	0
Baldwin Lane Elementary School	7.7
Bear Mountain Golf Course	112
Bear Valley Nursery	0.64
Big Bear Airport District	1.1
Big Bear City Park	28.8
Big Bear Cleaners	1.5
Big Bear Elementary School	10.2
Big Bear High School	28.1
Big Bear Middle School	10.2
Big Bear Snow Play	92.4
Big Bear Tennis Ranch	1.6
Chautauqua High School	2.6
Church of Jesus Christ Latter Day Saints	4.02
Cit of Big Bear Lake City Hall and Village Streetscape	3.8
Clean Jeans Laundromat	2.5
Dana Point Park	14.4
Emingers Mountain Nursery	1.4
Erwin Lake Park	3.4
Fox Farm Car Wash	2.7
Gold Mountain Memorial Park (Cemetery)	0.014
Green Spot Recharge Site	1,000[a]
Grout Bay Park	13.6
Hunters Nursery & Garden Center	0.78
Lake Williams	65.7
Magic Mountain/Alpine Slide	31.3
Meadow Park	39.5
Meadows Edge Park	25
Miller Park	1.3
North Shore Elementary School	12.8
Otto Lawrence (Inn Der Bach)	59
Rotary Park	2.5
Shay Meadow Ranch	1.67
Sonny's Place Equestrian Center	1.29
Sterling Planet	483.9
Stickleback Habitat	48.2
Sugar Tub Laundromat	4.1
Sugarloaf Park	22

Table 3.5-1
SUMMARY OF POTENTIAL RECYCLED WATER USERS

Potential User	Annual Recycled Water Demand (acre-feet)
Van Dusen Recharge Site	175
Veterans Park	3
Wash and Wear	9.4
Whispering Pines Estate (Mobile Home Park)	5.8
World Mark (Timeshare Resort)	25.5
TOTAL	1,887

Note:
[a] The recycled water demand for the Greenspot Site is an initial demand that would be introduced to surface artificial recharge basins in conjunction with a diluent water source of equal amount, which may in series (1 year of recycled water and 1 year of diluent water) be calculated over a 5-year running average. Thus, the artificial recharge capacity of the Greenspot Site is 1,000 afy which will accommodate both recycled water (500 afy) and diluent water (500 afy).

Based on the potential users identified in Table 3.5-1, a potential demand for approximately 1,850 afy of recycled water exists in the BBARWA service area. However, note that other factors, such as the timing of such demand, cost to install infrastructure (particularly pipelines) and other factors will affect the actual future demand for recycled water in the service area. The prospective recycled water use locations for future phases are shown on Figures 3.5-1 through 3.5-3. As previously noted, the locations of future potential use determine the type and amount of recycled water system infrastructure required to support the future Recycled Water Master Plan.

For the Phase I project, which is being considered for immediate implementation, the only user of recycled water would be the Greenspot artificial groundwater recharge site. This site is capable of accepting between 500 and1,000 afy of recycled water depending on basin operation and amount of diluent water required. Figure 3.4-1 shows the location of the Phase I proposed project components.

3.5.2 Recycled Water Supply and Proposed WWTP Modifications

The BBARWA WWTP will produce recycled water for the proposed recycled water uses identified in the master plan; however, modifications to the WWTP will be required to meet the pertinent Title 22 requirements. The BBARWA WWTP is a secondary treatment facility consisting of 3 oxidation ditches with a total design capacity of 4.89 MGD. However, the third oxidation ditch, which has a capacity of 1.63 MGD, is used only under peak flow conditions. The hydraulic capacity of the plant is 10.5 MGD, with an effluent pumping capacity of 9.2 MGD. On average, the BBARWA WWTP treats about 2.2 MGD of wastewater. The treatment capacity and wastewater production are critical components of the future water recycling program. Future wastewater flows are important because they will drive the amount of available wastewater that will be generated and that can be recycled.

To evaluate the supply conditions, historical and projected wastewater flows were evaluated. Figure 3.5-4 shows the annual wastewater flows from 1990 through 2003. The average annual flow during these years was approximately 2,766 acre-feet. The high flows in 1993 are the result of a broken transmission pipeline under Big Bear Lake, which resulted in inflow of lake water into the wastewater collection system. It was also a record period of precipitation. The flows in 1995, 1998, and 2000 correlate with higher precipitation years. When removing years of high precipitation and 1993, a slight downward trend of wastewater flows is shown. This could be attributed to a number of factors. In drier years, less precipitation means less water flowing into the wastewater lines from infiltration and inflow (I&I). Dryer years also will reflect less snow on the mountain, attracting fewer visitors and reducing the overall production of wastewater flow. In addition, new plumbing codes favor low-flow fixtures for new construction and replacement of existing fixtures. This decrease in wastewater flows occurred even though the Valley experienced population growth. Therefore, future wastewater flows were left at current levels (i.e. 2,100 afy), which is the inverse relation of growth vs. wastewater flows. This value is within the 2,100 afy minimum wastewater flow forecast shown in Figure 3.5-4.

For the Phase I proposed project, the BBARWA WWTP facility upgrades would need to be able to supply up to 1,000 afy of recycled water to the Greenspot artificial groundwater recharge site.

3.5.2.1 Water Quality Requirements

Combined with the potential volume of treated effluent that can be further treated to meet recycled water quality requirements, the required treatment facilities are determined by the level of treatment required to meet these water quality requirements. Chapter 5 of the Draft Recycled Water Master Plan defines the overall permitting requirements and identifies the main regulatory control over the recycled water quality as being established and enforced by two permitting agencies, the CDHS and the Regional Water Quality Control Board, Santa Ana Region (RWQCB). The former agency focuses on public health and the latter agency focuses environmental quality, particularly water quality, driven objectives. Tables F-1 through F-3 (Volume 2, Draft Final Recycled Water Master Plan)) summarizes the definitions of different treatment levels required for different recycled water uses. Accordingly, undisinfected secondary, disinfected secondary, and disinfected tertiary treated recycled waters are allowed for irrigation use and other applications. As shown in Table F-3 of Appendix in Volume 2, the primary regulated water quality parameters listed in the requirements that are not site specific are total coliform and turbidity for recycled water uses other than groundwater recharge. The water quality requirements for total coliform and turbidity, are summarized in Table 3.5-2

The CDHS regulates drinking water quality including the effects of groundwater recharge on groundwater basins with domestic water aquifers. In addition, the CDHS sets limits to control the quality of recycled water. The Santa Ana RWQCB sets quality objectives for groundwater, inland surface waters including the Santa Ana River, enclosed bays and estuaries, and ocean waters in the Santa Ana River Basin region. The CDHS Title 22 recycled water quality requirements and Santa Ana RWQCB recycled water quality objectives that apply to the BBARWA secondary effluent quality are summarized in Table 3.5-3. As can be seen from Table 3.5-3, the majority of organic compounds (i.e., TOC, pesticides, volatile and semi volatile organic compounds) and some of the inorganic compounds (i.e., sulfate) in the BBARWA secondary effluent already meet the Current Title 22 and RWQCB Recycled Water Quality requirements for artificial groundwater recharge without advanced treatment. In addition, Table 3.5-3 provides data for tested constituents from the

BBARWA Pilot Project RO permeate and the DWP Lakewood well #3. These sample locations, for the constituents that were tested, showed excellent water quality and meet the CDHS Title 22 recycled water quality requirements. The RO permeate from the Pilot Project does have a low pH due to the removal of minerals and reduction of alkalinity; however, a pH adjustment will be provided to raise the pH to 7.

Table 3.5-2
CURRENT RECYCLED WATER QUALITY REQUIREMENTS FOR RECYCLED WATER USES OTHER THAN ARTIFICIAL GROUNDWATER REPLENISHMENT

Parameters	Units	Undisinfected Secondary Effluent	Disinfected Secondary-23 Recycled Water	Disinfected Secondary-2.2 Recycled Water	Disinfected Tertiary Recycled Water
Turbidity	NTU	Not required	Not required	Not required	For conventional filtration process <2 NTU within a 24-hour period <5 NTU, 95% of the time within a 24-hour period <10 NTU at any time. For membrane processes (MF, NF, UF, or RO) <0.2 NTU, 95% of the time within a 24-hour period <0.5 NTU at any time.
Total Coliform	CFU/100 mL	Not required	< 23 MPN/100 mL for 7-day average <240 MPN/mL in more than one sample in a 30-day period	< 2.2 MPN/100 mL for 7-day average <23 MPN/mL in more than one sample in a 30-day period	< 2.2 5-log removal of MS-2 bacterio-phage or polio virus <2.2 MPN/100 mL for 7-day average <23 MPN/mL in more than one sample in a 30-day period <240 MPN/mL

Note:
MPN: Most Probable Number
CFU: Coliform Forming Unit
NTU: Nephelometric Turbidity Unit

Table 3.5-3
CURRENT DHS TITLE 22 AND RWQCB RECYCLED WATER QUALITY REQUIREMENTS FOR ARTIFICIAL GROUNDWATER RECHARGE

Classification	Constituents	Units / Detection Limit	BBARWA Secondary Effluent[1]	BBARWA Pilot Project RO Permeate[2]	DWP Lakewood Well #3 Water Quality[3]	CDHS Limits[4]	RWQCB Limits
General Physical Properties	Color	Color Units / 3.0	20	ND	ND	<15	<15
	Odor	T.O.N. / 1.0	64	ND	ND	<3.0	<3.0
	Turbidity	NTU / 2.0	1.7	ND	0.4	<2.0, <0.2[5]	<5
	Corrosivity	N/A	non-corrosive	corrosive	NM	non-corrosive	non-corrosive
	Specific Conductance	umhos/cm / 1.0	740	7	430	<900	NSL
	pH	pH units / 1.0	8	5.9[6]	7.4	NSL	6 to 9
Microbiological[7]	Total Coliform	MPN/100 / 2	30,000	<2	NM	<2.2[5]	<2.2
	Virus Inactivation	Log or %	NM	NM	NM	5.0 or 99,999[5]	NSL
General Minerals and Ions	Bicarbonate	mg/L / 3.0	320	7.3	240	NSL	NSL
	Carbonate	mg/L / 3.0	260	ND	ND	NSL	NSL
	Total Alkalinity	mg/L / 3.0	260	6	200	NSL	NSL
	Calcium	mg/L / 1.0	56	ND	52	NSL	NSL
	Chloride	mg/L / 1.0	51	ND	6.7	(<250)	<10
	Fluoride	mg/L / 0.1	0.5	ND	0.1	<2.0	<2.1
	Hydroxide	mg/L / 3.0	ND	ND	ND	NSL	NSL
	Magnesium	mg/L / 1.0	23	ND	23	NSL	NSL
	Nitrate (as N)	mg/L / 0.2	0.5	ND	1.7	NSL	<5
	Nitrite (as N)	mg/L / 0.1	1	ND	ND	NSL	NSL
	Total Nitrogen	mg/L / 2.0	2.6	1.2	NM	<10.0[8], <5.0[9]	NSL
	Total Anions	mg/L / 0.05	7.51	0.1	4.6	NSL	NSL
	Total Cations	mg/L / 0.05	7.80	ND	4.9	NSL	NSL
	Potassium	mg/L / 1.0	11	ND	1.7	NSL	NSL
	Sodium	mg/L / 1.0	65	ND	8.3	NSL	<20
	Sulfate	mg/L / 0.5	40	ND	16	(<250)	<20
	Total Dissolved Solids	mg/L / 10	430	ND	250	(<500)	<300
	Total Hardness	mg/L CaCO3 / 3.0	240	ND	220	NSL	<225
Other Ions	Perchlorate	ug/L / 4.0	ND	ND	ND	NSL	NSL
	Cyanide	mg/L / 0.10	ND	ND	ND	<0.15	<0.15
	Bromide	mg/L / 0.02	0.064	ND	0.04	NSL	NSL

Table 3.5-3
CURRENT DHS TITLE 22 AND RWQCB RECYCLED WATER QUALITY REQUIREMENTS FOR ARTIFICIAL GROUNDWATER RECHARGE

Classification	Constituents	Units / Detection Limit	BBARWA Secondary Effluent[1]	BBARWA Pilot Project RO Permeate[2]	DWP Lakewood Well #3 Water Quality[3]	CDHS Limits[4]	RWQCB Limits
Metals and Metalloids	Aluminum	ug/L / 50	63.0	56	ND	<1000 (<200)	<200
	Antimony	ug/L / 6.0	ND	ND	ND	<6	<6
	Arsenic	ug/L / 2.0	ND	ND	ND	<50	<50
	Barium	ug/L / 100	ND	ND	ND	<1000	<1000
	Berylium	ug/L / 1.0	ND	ND	ND	<4	<4
	Cadmium	ug/L / 1.0	ND	ND	ND	<5	<5
	Total Chromium	ug/L / 1.0	ND	ND	10	<50	<50
	Cobalt	ug/L / 10	ND	ND	NM	NSL	<200
	Copper	ug/L / 10	ND	ND	ND	<1300 (<1000)	<1000
	Iron	ug/L / 20	43	ND	ND	(<300)	<300
	Lead	ug/L / 5.0	ND	ND	ND	<15	<50
	Manganese	ug/L / 10	13	nd	nd	(<50)	<50
	Mercury	ug/L / 1.0	ND	ND	ND	<2	<2
	Nickel	ug/L / 10	ND	ND	ND	<100	<45,000
	Selenium	ug/L / 5.0	ND	ND	ND	<50	<5
	Silver	ug/L / 10	ND	ND	ND	(<100)	<50
	Thallium	ug/L / 1.0	ND	ND	ND	<2	<2
	Total Silica	mg/L / 1.0	24	ND	25	NSL	NSL
	Zinc	ug/L / 10	55	ND	ND	(<5000)	<5000
Radioactivity	Radium-226 + Radium-228	pCi/l	NM	NM	NM	<5	<5.0
	Radioactivity, gross alpha	pCi/l	NM	NM	NM	<15	<15.0
	Tritium	pCi/l	NM	NM	NM	<20,000	<20,000
	Strontium-90	pCi/l	NM	NM	NM	<8	<8.0
	Radioactivity, gross beta	pCi/l	NM	NM	NM	<50	<50.0
	Uranium	pCi/l	NM	NM	NM	<20	<20.0
Misc.	Asbestos	MFL	NM	NM	NM	<7	<7.0

Table 3.5-3
CURRENT DHS TITLE 22 AND RWQCB RECYCLED WATER QUALITY REQUIREMENTS FOR ARTIFICIAL GROUNDWATER RECHARGE

Classification	Constituents	Units / Detection Limit	BBARWA Secondary Effluent[1]	BBARWA Pilot Project RO Permeate[2]	DWP Lakewood Well #3 Water Quality[3]	CDHS Limits[4]	RWQCB Limits
Disinfection Byproducts	Bromate	mg/L	NM	NM	NM	10	NSL
	Chloramines	mg/L	NM	NM	NM	4	NSL
	Chloride	mg/L / 1.0	51	ND	6.7	(<250)	NSL
	Chlorine	mg/L	NM	NM	NM	4	NSL
	Chlorine Dioxide	mg/L	NM	NM	NM	0.8	NSL
	Chlorite	mg/L	NM	NM	NM	1	NSL
	Bromodichloromethane[10]	ug/L	NM	NM	NM	80	NSL
	Bromoform[10]	ug/L / 0.5	ND	ND	NM	80	NSL
	Chloroform[10]	ug/L / 0.5	ND	ND	NM	80	NSL
	Dibromochloromethane[10]	ug/L	NM	NM	NM	80	NSL
	Monochloroacetic acid[11]	ug/L	NM	NM	NM	60	NSL
	Dichloroacetic acid[11]	ug/L	NM	NM	NM	60	NSL
	Trichloroacetic acid[11]	ug/L	NM	NM	NM	60	NSL
	Monobromoacetic acid[11]	ug/L	NM	NM	NM	60	NSL
	Dibromoacetic acid[11]	ug/L	NM	NM	NM	60	NSL
Organics	Forming Agents (MBAS)	mg/L / 0.05	ND	ND	ND	(<0.5)	<0.05
	Total Organic Carbon	mg/L / 0.3	6.5	ND	ND	<16	NSL
Organochlorine Pesticides	Alachlor	ug/L / 1.0	ND	ND	ND	<2	<2
	Aldrin	ug/L / 0.075	ND	ND	ND	NSL	NSL
	Chlorothalonil	ug/L / 5.0	ND	ND	ND	NSL	NSL
	Dieldrin	ug/L / 0.020	ND	ND	ND	NSL	NSL
	Endrin	ug/L / 0.10	ND	ND	ND	<2	<3
	Lindane	ug/L / 0.20	ND	ND	ND	<0.2	<0.3
	Methoxycyhlor	ug/L / 10	ND	ND	ND	<30	<30
	Toxaphene	ug/L / 1.0	ND	ND	ND	<3	<3
	Chlordane	ug/L / 0.10	ND	ND	ND	<0.1	<0.1
	Heptachlor	ug/L / 0.010	ND	ND	ND	<0.01	<0.01
	Heptachlor Epoxide	ug/L / 0.010	ND	ND	ND	<0.01	<0.01
	Hexachlorobenzene	ug/L / 0.50	ND	ND	ND	<1	<1
	Hexachlorocyclopentadiene	ug/L / 1.0	ND	ND	ND	<50	<50

Table 3.5-3
CURRENT DHS TITLE 22 AND RWQCB RECYCLED WATER QUALITY REQUIREMENTS FOR ARTIFICIAL GROUNDWATER RECHARGE

Classification	Constituents	Units / Detection Limit	BBARWA Secondary Effluent[1]	BBARWA Pilot Project RO Permeate[2]	DWP Lakewood Well #3 Water Quality[3]	CDHS Limits[4]	RWQCB Limits
Organochlorine Pesticides (cont.)	Propachlor	ug/L / 0.50	ND	ND	ND	NSL	NSL
	Polychlorinated Byphenyls (PCBs)	ug/L / 0.50	ND	ND	ND	<0.5	<0.5
Organochlorine Herbicides	2,4-D	ug/L / 10	ND	ND	ND	<70	<70
	2,4,5-TP Silvex	ug/L / 1.0	ND	ND	ND	<50	<50
	Bentazon	ug/L / 2.0	ND	ND	ND	<18	<18
	Dalapon	ug/L / 10	ND	ND	ND	<200	<200
	Dicamba	ug/L / 1.5	ND	ND	ND	NSL	NSL
	Dinoseb	ug/L / 2.0	ND	ND	ND	<7	<7
	Pichloram	ug/L / 1.0	ND	ND	ND	<500	<500
	Pentachlorophenol	ug/L / 0.20	ND	ND	ND	<1	<1
N-P Pesticides	Atrazine	ug/L / 0.50	ND	ND	ND	<1	<1
	Molinate	ug/L / 0.90	ND	ND	ND	NSL	<20
	Simazine	ug/L / 1.0	ND	ND	ND	<4	<4
	Thiobencarb	ug/L / 1.0	ND	ND	ND	<70	<70
	Butachlor	ug/L / 0.38	ND	ND	ND	NSL	NSL
	Diazinon	ug/L / 0.25	ND	ND	ND	NSL	NSL
	Dimethoate	ug/L / 10	ND	ND	ND	NSL	NSL
	Diuron	ug/L / 1.0	ND	ND	ND	NSL	NSL
	Prometryn	ug/L / 2.0	ND	ND	ND	NSL	NSL
	Bromacil	ug/L / 10	ND	ND	ND	NSL	NSL
	Metolachlor	ug/L / 1.0	ND	ND	ND	NSL	NSL
	Metribuzin	ug/L / 1.0	ND	ND	ND	NSL	NSL
Fumigants	Ethylene Dibromide (EDB)	ug/L / 0.020	ND	ND	ND	NSL	<0.05
	Dibromochloropropane	ug/L / 0.010	ND	ND	ND	<0.2	<0.2
Carbamates	Aldicarb Sulfone	ug/L / 4	ND	ND	ND	NSL	NSL
	Aldicarb Sulfoxide	ug/L / 3	NM	ND	ND	NSL	NSL
	Oxamyl	ug/L / 5	NM	ND	ND	<50	<50
	Carbofuran	ug/L / 5	NM	ND	ND	<18	<18

Table 3.5-3
CURRENT DHS TITLE 22 AND RWQCB RECYCLED WATER QUALITY REQUIREMENTS FOR ARTIFICIAL GROUNDWATER RECHARGE

Classification	Constituents	Units / Detection Limit	BBARWA Secondary Effluent[1]	BBARWA Pilot Project RO Permeate[2]	DWP Lakewood Well #3 Water Quality[3]	CDHS Limits[4]	RWQCB Limits
Carbamates (cont.)	Carbaryl	ug/L / 5	NM	ND	ND	NSL	NSL
	3-Hydroxycarbofuran	ug/L / 3	ND	ND	ND	NSL	NSL
	Methomyl	ug/L / 2	NM	ND	ND	NSL	NSL
Misc.	Glyphosate	ug/L / 20	ND	ND	ND	<700	<700
Pesticides	Endothall	ug/L / 45	ND	ND	ND	<100	<100
	Diquat	ug/L / 0.40	ND	ND	ND	<20	<20
	2,3,7,8-TCDD Dioxic	pg/L / 5.0	ND	ND	ND	<0.00003	<0.00003
Semi-Volatile Organic Compounds	Benxo(a)pyrene	mg/L / 0.10	ND	ND	ND	<0.2	<0.2
	Di(2-ethylhexyl)adipate	mg/L / 5.0	ND	ND	ND	<400	<400
	Di(2-ethylhexyl)phthalate	mg/L / 3.0	ND	ND	ND	<4	<4
Volatile Organic Compounds	Benzene	ug/L / 0.50	ND	ND	ND	<1	<1
	Carbon tetrachloride	ug/L / 0.50	ND	ND	ND	<0.5	<0.5
	1,2-Dichlorobenzene	ug/L 0.50	ND	ND	ND	<60	<60
	1,4-Dichlorobenzene	ug/L / 0.50	ND	ND	ND	<5	<5
	1,1-Dichloroethane	ug/L / 0.50	ND	ND	ND	<5	<5
	1,2-Dichloroethane	ug/L / 0.50	ND	ND	ND	<0.5	<0.5
	cis-1,2-Dichloroethene	ug/L / 0.50	ND	ND	ND	<6	<6
	trans-1,2-Dichloroethene	ug/L / 0.50	ND	ND	ND	<10	<10
	1,1-Dichloroethene	ug/L / 0.50	ND	ND	ND	<5	<5
	1,2-Dichloropropane	ug/L / 0.50	ND	ND	ND	<5	<5
	cis-1,3-Dichloropropene	ug/L / 0.50	ND	ND	ND	NSL	<0.5
	Ethylbenzene	ug/L / 0.50	ND	ND	ND	<300	<300
	Methylene Chloride	ug/L / 0.50	ND	ND	ND	NSL	<5
	Methyl tert-butyl-ether	ug/L / 3	ND	ND	ND	<13 (<5)	<5
	Chlorobenzene	ug/L / 0.50	ND	ND	ND	<70	<70
	Styrene	ug/L / 0.50	ND	ND	ND	<100	<100
	1,1,2,2-Tetrachloroethane	ug/L / 0.50	ND	ND	ND	<1	<1
	Tetrachloroethene	ug/L / 0.50	ND	ND	ND	<5	<5
	1,2,4-Trichlorobenzene	ug/L / 0.50	ND	ND	ND	<5	<5
	1,1,1-Trichloroethane	ug/L / 0.50	ND	ND	ND	<200	<200