COUNTY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

"To Enrich Lives Through Effective and Caring Service"

JAMES A. NOYES, Director

900 SOUTH FREMONT AVENUE
ALHAMBRA, CALIFORNIA 91803-1331
Telephone: (626) 458-5100
www.ladpw.org

ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1460
ALHAMBRA, CALIFORNIA 91802-1460

IN REPLY PLEASE
REFER TO FILE: W-0

July 31, 2003

The Honorable Board of Supervisors
County of Los Angeles
383 Kenneth Hahn Hall of Administration
500 West Temple Street
Los Angeles, CA 90012

Dear Supervisors:

LOS ANGELES COUNTY WATERWORKS DISTRICT NO. 40, ANTELOPE VALLEY, REGION 4
CERTIFICATION OF FINAL RECIRCULATED ENVIRONMENTAL IMPACT REPORT FOR THE AQUIFER STORAGE AND RECOVERY PROJECT AND APPROVAL OF THE PROJECT
SUPERVISORIAL DISTRICT 5
3 VOTES

IT IS RECOMMENDED THAT YOUR BOARD:

As the governing body of the Los Angeles County Waterworks District No. 40, Antelope Valley, Region 4 (District):

1. Consider the proposed Final Recirculated Environmental Impact Report (EIR) (Enclosure A) for the Aquifer Storage and Recovery Project, including the comments received and responses thereto, and certify the Final Recirculated EIR pursuant to Section 15090 of the California Environmental Quality Act (CEQA) Guidelines finding as follows:

   a. The Final Recirculated EIR has been completed in compliance with CEQA, Public Resources Code, §§ 21000 et seq.

   b. Your Board has reviewed and considered the information contained in the Final Recirculated EIR prior to approving the project.

c. The Final Recirculated EIR reflects your Board's independent judgment and analysis.

2. Adopt the Mitigation Monitoring and Reporting Program included in the Final Recirculated EIR to ensure compliance with CEQA.

3. Find that the proposed Aquifer Storage and Recovery Project would have no adverse effect on wildlife resources and authorize the Director of Public Works to complete and file a Certificate of Fee Exemption for the proposed Aquifer Storage and Recovery Project.

4. Approve the Aquifer Storage and Recovery Project and authorize the Director of Public Works or his designee to carry out the project.

5. Adopt the Finding of Fact pursuant to Section 15091 of the State CEQA Guidelines as set forth in Enclosure B.

6. Adopt the Statement of Overriding Considerations pursuant to Section 15093 of the State CEQA Guidelines.

PURPOSE/JUSTIFICATION OF RECOMMENDED ACTION

The purpose of this action is for your Board to certify the Final Recirculated EIR for the Aquifer Storage and Recovery Project, approve the project, and adopt the Findings of Fact and Statement of Overriding Considerations. The District is responsible for the preparation of the Final Recirculated EIR pursuant to the full disclosure requirement of CEQA.

Description of Project

The District is proposing to install and operate injection/extraction facilities for an Aquifer Storage and Recovery Project within the Lancaster subbasin in the Antelope Valley. The Aquifer Storage and Recovery Project would inject excess treated State Water Project (SWP) water into the Lancaster subbasin for subsequent recovery and use during high demand periods or during drought cycles. The District seeks to proceed with this project to ensure the availability of potable water supplies to customers of the District.

The injection/extraction wells and appurtenant facilities would be installed at five different locations within the Lancaster/Palmdale area. The five sites are currently within the boundary of the Waterworks District, owned by the District, and are in use by the District. The Aquifer Storage and Recovery Project calls for the utilization of 11 new/replacement wells, 4 existing wells, and related facilities. On September 4, 2001, your Board approved the construction of 2 replacement wells. On July 29, 2003, your Board approved an agreement and authorized the expenditure for the design of 4 new wells for this project. To the extent that the project requires the District to enter into any future construction contracts for the design and installation of additional wells and/or facilities, we will return to your Board for approval.

Your Board's approval of the project will authorize the Director to take the following specific actions:

1. Take all steps to obtain the required permits for the project.

2. Determine whether to purchase available water from the SWP.

3. Inject water purchased from the SWP into the Lancaster subbasin in the Antelope Valley.

4. Extract excess water from the Lancaster subbasin during high demand periods or drought cycles.

Implementation of Strategic Plan Goals

This action is consistent with the County Strategic Plan Goal of Service Excellence as it will enhance water system reliability and protect the District's service area from potential water delivery interruption or curtailment.

FISCAL IMPACT/FINANCING

There will be no impact to the County's General Fund. Sufficient funds for the construction and operation of this project are available in Los Angeles County Waterworks District No. 40 General and Accumulative Capital Outlay Funds. The cost of the facilities needed for this project is estimated to be $4.5 million.

FACTS AND PROVISIONS/LEGAL REQUIREMENTS

A public notice regarding the Draft Recirculated EIR was published in the Antelope Valley Press on March 10, 2003, pursuant to Section 21092 of the Public Resources Code. In accordance with CEQA requirements, the Draft Recirculated EIR was circulated for a 45-day public review and comment period. A public meeting was held on April 1, 2003, to present the Draft Recirculated EIR and receive public comments.

We have confirmed with County Counsel that upon obtaining the necessary permits the District shall have the legal authority to inject water into the Lancaster subbasin and subsequently extract it.

ENVIRONMENTAL DOCUMENTATION

An Initial Study was prepared pursuant to the requirements of Section 15063 of the CEQA Guidelines. The determination that the proposed project has the potential to produce significant environmental impacts was based on preliminary findings stated in the Initial Study and written comments received following the 30-day public circulation period for the Notice of Preparation.

In compliance with CEQA, Public Works prepared and circulated a Draft EIR for the Aquifer Storage and Recovery Project in May 2002. The 45-day public review period for this document extended from May 17, 2002, to July 1, 2002, and a public meeting on the proposed project was held on June 18, 2002. The Draft EIR was then modified to change the mitigation measures. Section 15088.5 of the State CEQA Guidelines requires recirculation of an amended Draft EIR if significant new information is added to the Draft EIR after Public Notice of Availability of the original Draft EIR was given. Public Works recirculated the Draft Recirculated EIR from March 11, 2003, through April 5, 2003. A public meeting to present the Draft Recirculated EIR was held on April 1, 2003.

It was determined that the Aquifer Storage and Recovery Project would likely have significant environmental effects on the groundwater basin unless mitigation measures were incorporated as part of the project to mitigate or avoid those significant impacts. This determination was made in part because the treated surface water used for injection contained trihalomethanes (THMs), which are not naturally occurring in the groundwater. THMs are disinfection byproducts formed by reaction between natural dissolved organic carbon that is present in surface water and chlorine that is added during the drinking water treatment process. THMs are carcinogenic compounds and their concentrations in drinking water are regulated by the United States Environmental

Protection Agency (USEPA) and California State Department of Health Services (DHS). The Final Recirculated EIR uses as a threshold of significance for THMs the Regional Water Quality Control Board's (RWQCB) Anti-degradation Policy. The proposed injection water contains THMs at concentrations above those found in the Lancaster subbasin and which exceed levels specified in the Anti-degradation Policy. However, for the other constituents of concern identified, including HAA5, the Final Recirculated EIR uses the threshold of significance for drinking water standards of the USEPA and DHS, and determines that these standards are not exceeded. Even with the THMs, the injection water meets drinking water standards and does not pose a threat to human health or safety.

The Final Recirculated EIR discusses a mitigation measure to reduce or avoid the adverse impacts associated with THMs, which would involve treatment of the injection water with Granular Activated Carbon. However, the Final Recirculated EIR determines that this mitigation measure is infeasible as the cost of implementing the treatment system would render the project economically infeasible. Consequently, your Board must adopt a Statement of Overriding Considerations if the project demonstrates that project benefits outweigh the potential adverse environmental impacts.

The project benefits include enhancing the reliability of water supply in the Antelope Valley, increasing the level of conjunctive use, and providing greater operational flexibility. The project will comply with all drinking water standards and will not affect the present and anticipated beneficial use of the Lancaster subbasin prescribed in the RWQCB's Water Quality Control Plan.

The Mitigation Monitoring Program has been prepared to ensure that the mitigation measures included in the Final Recirculated EIR are a condition of the project and will be implemented as part of the proposed project. However, even after mitigation, it has been determined that the proposed project would still have a potential significant impact on the groundwater basin.

As required by Section 15091 of the State CEQA Guidelines, the projected significant effect on the environment has been found to be unavoidable as identified in the Findings of Fact. Your Board must adopt a Statement of Overriding Considerations. A Notice of Determination will be filed within five working days after your Board's approval (CEQA Guidelines, Sections 15094 and 15112).

IMPACT ON CURRENT SERVICES (OR PROJECTS)

This project will not have a negative impact on current County services. The proposed project will enhance water system reliability and protect the District's service area from potential water delivery interruption or curtailment.

CONCLUSION

Please return two approved copies of this letter to Public Works.

Respectfully submitted,

JAMES A. NOYES
Director of Public Works

RG:nm
BDL2120

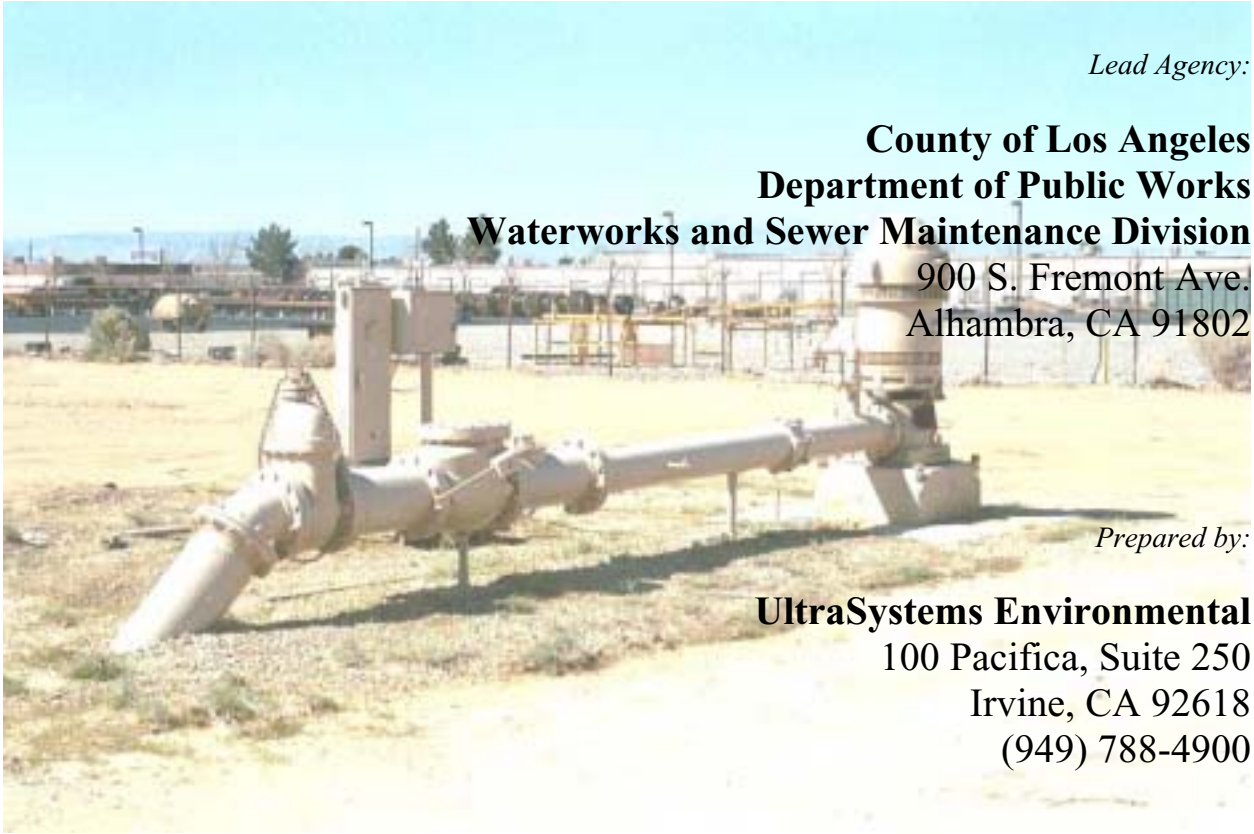
Enc. 2

cc: Chief Administrative Office
County Counsel

ENCLOSURE A

FINAL RECIRCULATED ENVIRONMENTAL IMPACT REPORT

Final Recirculated Environmental Impact Report Waterworks District No. 40 Antelope Valley Aquifer Storage and Recovery Project



Lead Agency:

County of Los Angeles
Department of Public Works
Waterworks and Sewer Maintenance Division
900 S. Fremont Ave.
Alhambra, CA 91802

Prepared by:

UltraSystems Environmental
100 Pacifica, Suite 250
Irvine, CA 92618
(949) 788-4900

State Clearinghouse Number:
2001051091

July 2003

Final Recirculated Environmental Impact Report Waterworks District No. 40 Antelope Valley Aquifer Storage and Recovery Project

Lead Agency:

County of Los Angeles
Department of Public Works
Waterworks and Sewer Maintenance Division
900 S. Fremont Ave.
Alhambra, CA 91802
(626) 300-3357
Attn: Eleni Hailu and Ramy T. Gindi

Prepared by:

UltraSystems Environmental
100 Pacifica, Suite 250
Irvine, CA 92618
(949) 788-4900
Attn: Gene Anderson

State Clearinghouse Number:
2001051091

July 2003

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This page is intentionally blank.

A. INTRODUCTION

As presented in the Draft Recirculated Environmental Impact Report (Draft REIR),[1] Los Angeles County Department of Public Works, Waterworks and Sewer Maintenance Division, Waterworks District 40 (District) proposes the development and operation of an Aquifer Storage and Recovery (ASR) Project in the Antelope Valley portion of Los Angeles County. The State Clearinghouse number for this project is 2001051091. Pursuant to *State CEQA Guidelines* (Section 15088), the District evaluated the comments received on the Draft REIR, and prepared this response document as a companion document to the Draft REIR that together constitute the Final REIR for the project. In accordance with *State CEQA Guideli*nes (Section 15132), the Final REIR is comprised of the following:

a.) The Draft REIR;
b.) Comments and recommendations received on the Draft REIR;
c.) A list of persons, organizations, and public agencies that commented on the Draft REIR;
d.) The responses of the Lead Agency to significant environmental points raised in the review and consultation process;
e.) The revised portions of the Draft REIR; and
f.) The Mitigation Monitoring and Reporting Program.

This Final REIR augments the Draft REIR, and specifically includes the following sections:

A. **Introduction:** This section provides an introduction to the Final REIR.

B. **Responses to Comments:** This section of the report includes a list of persons, organizations, and public agencies that commented on the Draft REIR, the comments and responses made on the Draft REIR. It includes the original comment letters, and the responses to the comments.

C. **Revised Draft REIR:** This section provides a revised Draft REIR that reflects the changes made to the document.

D. **Mitigation Monitoring and Reporting Program:** This section includes a summary of the program that has been identified for the monitoring of mitigation measures outlined in the Draft REIR.

The Draft REIR for the ASR Project was circulated for agency and public comment on March 11, 2003. The 45-day public comment period ended on April 25, 2003. Public notices for this project are included in **Appendix A** (Public Notices).

Pursuant to Section 15088 of the *State CEQA Guidelines*, District 40 (the Lead Agency for the project) reviewed all comments received on the Draft REIR. Responses to these comments are contained within Section B, "Responses to Comments," of this Final REIR. Any revisions to the Draft REIR based on these comments have been presented in Section C, "Revised Draft REIR," of this Final REIR in revision mode text (i.e., deletions are shown with ~~strikethrough~~ and additions are shown with <u>underline</u>).

[1] / The Draft REIR recirculated between March 11, 2003 and April 25, 2003 replaces the Draft EIR, which was circulated between May 17, 2002 and July 1, 2002.

The evaluation and response to comments is an important part of the CEQA process because it allows the following:

- the opportunity for the public and agencies to review and comment on the methods of analysis contained in the Draft REIR;
- the ability to detect any omissions that may have occurred during the preparation of the Draft REIR;
- the ability to check for accuracy of the analysis contained in the Draft REIR; and
- the ability to discover and respond to public concerns.

Process

The District took several steps to ensure that all interested parties had an opportunity to comment on the Draft REIR, in accordance with Article 7, EIR process of the *State CEQA Guidelines* (Section 15087 *et seq*.). The document was submitted to the Governor's Office of Planning and Research, State Clearinghouse, which established a 45-day public review period from March 11, 2003 to April 25, 2003, and was available for public review at the four locations listed below. The Notice of Availability (NOA) was posted at the Los Angeles County Clerk's office for 30 days. The NOA was mailed to various agencies and organizations, and to individuals that had previously requested such notice. Additionally, the NOA was published in several local publications, including the *Daily Journal, La Opini|n*, and *The Daily News of Los Angeles*.

The Draft REIR was available for public review at the following locations during the review period:

- Los Angeles County Department of Public Works Waterworks and Sewer Maintenance Division, 1000 S. Fremont Avenue - Suite A-9 East, 4th Floor, Alhambra, CA
- Los Angeles County Department of Public Works Waterworks and Sewer Maintenance Division, 260 East Avenue K-8, Lancaster, CA
- Palmdale Library, 700 East Palmdale Boulevard, Palmdale, CA
- Lancaster Library, 601 West Lancaster Boulevard, Lancaster, CA

Technical appendices not included in the Draft REIR are available for public review at the Los Angeles County Department of Public Works Waterworks and Sewer Maintenance Division, 1000 S. Fremont Avenue - Suite A-9 East, 4th Floor, Alhambra, CA.

A.1 Acronyms

AF	Acre-feet
ASR	Aquifer storage and recovery
AVEK	Antelope Valley East Kern Water Agency
Basin Plan	Water Quality Control Plan for the Lahanton Region
BMPs	Best Management Practices
Board	County of Los Angeles Board of Supervisors
CEQA	California Environmental Quality Act
County	County of Los Angeles
CUWCC	California Urban Water Conservation Council
DHS	California Department of Health Services

District	County of Los Angeles Department of Public Works, Waterworks and Sewer Maintenance Division, Waterworks District No. 40
DOCs	Dissolved organic carbons
DBPs	Disinfection byproducts
Draft REIR	Draft Re-circulated Environmental Impact Report
DWR	Department of Water Resources
EIR	Environmental Impact Report
EPA	United States Environmental Protection Agency
GAC	Granular activated carbon
HAAs	Haloacetic acids
MCL	Maximum contaminant level
μg/L	Micrograms per liter
mg/L	Milligrams per liter
MMRP	Mitigation Monitoring and Reporting Program
Project	Antelope Valley Aquifer Storage and Recovery Project
ppb	Parts per billion
ppm	Parts per million
PWD	Palmdale Water District
QMR	Quarterly Monitoring Reports
RWQCB	Regional Water Quality Control Board, Lahontan Region
SMCL	Secondary maximum contaminant level
SWP	State Water Project
TCE	Trichloroethane
TDS	Total dissolved solids
THMs	Trihalomethanes
THMFP	Trihalomethane formation potential
TTHMs	Total Trihalomethanes
USGS	United States Geological Society
WDR	Waste Discharge Requirements

B. RESPONSES TO COMMENTS

B.1.1 Comment Letters Received on the Draft EIR

The Draft REIR on the Antelope Valley ASR Project was publicly circulated for 45 days between March 11, 2003 and April 25, 2003. The District received six comment letters on the Draft REIR.

The persons and agencies that submitted comments on the Antelope Valley ASR Project Draft REIR are listed in **Table B-1** (Comments Received). Each comment letter is also assigned a number that appears in the margin of the letter adjacent to where the comment is made. Therefore, the first comment of the first letter would receive the number A-1, and the fourth comment of the third comment letter would receive the number C-4. The response to each comment receives the same number and appears to the right of the comment letter.

Table B-1
COMMENTS RECEIVED

Letter Reference Number	Commenter	Date of Comment	Page Number
Comment Letters Received on the Draft EIR			
A	State of California Department of Health Services	April 21, 2003	B-2
B	Palmdale Water District	April 23, 2003	B-7
C	A.V. United Water Purveyors, Inc.	April 23, 2003	B-16
D	White Fence Farms Mutual Water Co., Inc.	April 24, 2003	B-18
E	Quartz Hill Water District	April 24, 2003	B-20
F	California Regional Water Quality Control Board (RWQCB)	April 25, 2003	B-22

The six-comment letters are provided beginning on the next page. The Lead Agency's responses to the comments immediately follow the comment letters on page B-25.

State of California—Health and Human Services Agency
Department of Health Services

California Department of Health Services
DIANA M. BONTÁ, R.N., Dr. P.H.
Director

GRAY DAVIS
Governor

April 21, 2003

Letter A

Mr. Brian Hooper, Assistant Deputy Director
Los Angeles County Public Works
Waterworks/Sewer Maintenance Division
P.O. Box 1460
Alhambra, CA 91802-1460

SYSTEM NO. 1910070 – ANTELEOPE VALLEY AQUIFER STORAGE AND RECOVERY PROJECT, RE-CIRCULATED ENVIRONMENTAL IMPACT REPORT

Dear Mr. Hooper:

The State Department of Health Services has received and reviewed the re-circulated draft Environmental Impact Report (EIR) Waterworks District No. 40 Antelope Valley Aquifer Storage and Recovery Project (Project) prepared by UltraSystems Environmental Company, dated March 12, 2003.

We have reviewed the Project and have found that our concerns still have not been adequately addressed through this re-circulated EIR. The Department sent you a letter on August 22, 2002 regarding the high concentration of disinfection byproducts (DBPs) in the supply water (see enclosure). The potential for continuing formation of total trihalomethanes (TTHMs) in the aquifer after injection, and further TTHMs formation upon extraction and re-chlorination of the water is still present and a concern to the Department. A-1

Please incorporate a discussion of DBPs in the Project and propose a remedy to our address concerns.

If you have any questions regarding this letter, please contact Mr. James Ko at (213) 977-68087.

Sincerely,

Heather L. Collins

Heather L. Collins, P.E.
District Engineer
Central District

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Southern California Drinking Water Field Operations Branch, Los Angeles Region
1449 West Temple Street, Room 202, Los Angeles, CA, 90026
Telephone: (213) 580-5723 Fax: (213) 580-5711
Internet Address: www.dhs.ca.gov/ps/ddwem/

Enclosure – August 22, 2002 letter

cc: Mr. Dennis Dickerson, Executive Officer
California Regional Water Quality Control Board
Los Angeles Region
320 West 4th Street, Suite 200
Los Angeles, CA 90013

Mr. Ted Saari, Water Resource Control Engineer
Antelope Indian Wells Units
California Regional Water Quality Control Board
Lahontan Region
15428 Civic Dr, Ste 100
Victorville, CA 92392

Mrs. Eleni Hailu, P.E.
Supervising Civil Engineer III
LACDPW, Waterworks and Sewer Maintenance Division
P.O. Box 1460
Alhambra, CA 91802-1460

Mr. Ramy Gindi, Assistance Engineer
LACDPW, Waterworks and Sewer Maintenance Division
P.O. Box 1460
Alhambra, CA 91802-1460

Mr. Sami Kabar, P.E.
LACDPW, Waterworks and Sewer Maintenance Division
P.O. Box 1460
Alhambra, CA 91802-1460

Mr. Chris Stewart
Environmental Review Unit
601 North 7th Street, MS 92
P.O. Box 942732
Sacramento, CA 94234-7320

Mr. Scott Morgan
State Clearinghouse
P.O. Box 3044
Sacramento, CA 95812-3044

ENCLOSURE

State of California—Health and Human Services Agency
Department of Health Services

California Department of Health Services
DIANA M. BONTÁ, R.N., Dr. P.H.
Director

GRAY DAVIS
Governor

August 22, 2002

Mr. Brian Hooper, Assistant Deputy Director
Los Angeles County Public Works
Waterworks/Sewer Maintenance Division
P.O. Box 1460
Alhambra, CA 91802-1460

SYSTEM NO. 1910070 – ANTELEOPE VALLEY AQUIFER STORAGE AND RECOVERY PROJECT

Dear Mr. Hooper:

This letter is in response to the Draft Environmental Impact Report Waterworks District No. 40 Antelope Valley Aquifer Storage and Recovery Project (Project) dated May 2002. The Project involved the construction and modification of existing wells to injection/extraction wells in the Lancaster area.

The Department has a concern with the high concentration of disinfection byproducts [i.e. total trihalomethanes (TTHM) and Haloacetic acids (five) (HAA5)] in the Antelope Valley East Kern Water Agency (AVEK) supply water, which will be the main source for the injection process as indicated in the Project. For the two initial quarters (January 2002 to June 2002) of TTHM and HAA5 sampling, AVEK had an average concentration of 67.1 μg/L and 37.1 μg/L of TTHM and HAA5, respectively. The highest result for TTHM and HAA5 for these quarters was 97.6 μg/L and 40.0 μg/L, respectively. After December 2002, the Maximum Contaminant Level (MCL) for TTHM and HAA5 will be 80 μg/L and 60 μg/L, respectively, based on an annual running average (in the distribution system) and maybe reduced to 40 μg/L and 30 μg/L, respectively, in the near future (Stage 2 Disinfections/Disinfection Byproduct Rule). A-1

It is indicated in the Project that AVEK is in the process of constructing a Granular Activated Carbon (GAC) treatment system to control disinfection byproducts their product water. AVEK has not indicated to our Department that they will proceed in constructing such a treatment system. Therefore, the Department highly recommends that Los Angeles County Public Works (County) develop a contingency plan to treat TTHMs and HAA5 in source water for the injection process. The County may want to consider constructing an on-site treatment system for the removal of these disinfection byproducts for the Project.

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Southern California Drinking Water Field Operations Branch, Los Angeles Region
1449 West Temple Street, Room 202, Los Angeles, CA, 90026
Telephone: (213) 580-5723 Fax: (213) 580-5711
Internet Address: www.dhs.ca.gov/ps/ddwem/

The Department believes that the County's Lancaster system (1910070) will have problems in the future meeting the TTHM MCL, if the system uses both AVEK and groundwater that is high in TTHMs. More importantly, the Department does not want the Project to degrade existing water quality.

If you have any questions regarding this letter, please contact Mr. Chi Diep at (213) 580-5727.

Sincerely,

Heather L. Collins, P.E.
District Engineer
Central District

cc: Mr. Dennis Dickerson, Executive Officer
California Regional Water Quality Control Board
Los Angeles Region
320 West 4th Street, Suite 200
Los Angeles, CA 90013

PALMDALE WATER DISTRICT

2029 East Avenue Q • Palmdale, California 93550 • Telephone (661) 947-4111
Fax (661) 947-8604
www.palmdalewater.org

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LAGERLOF, SENECAL, BRADLEY, GOSNEY & KRUSE LLP
Attorneys

ACWA

Letter B

April 23, 2003

County of Los Angeles
Department of Public Works
Waterworks and Sewer Maintenance Division
ATTN: Ramy Gindi
P. O. Box 1460
Alhambra, CA 91802-1460

RE: PALMDALE WATER DISTRICT COMMENTS ON RECIRCULATED DRAFT E.I.R. FOR AQUIFER STORAGE AND RECOVERY PROJECT DATED MARCH, 2003

Dear Ramy Gindi:

Thank you for the opportunity to review and comment on the above-referenced environmental document. There appears to be major revisions to both the text and the mitigation measures compared to the project's prior Draft E.I.R. Much of the detailed information seems to have been replaced with broader, more general discussion. This leaves many of the District's prior comments unaddressed and not likely to be addressed in a final document. Therefore, the District's comment letter dated June 27, 2002 is attached as part of this comment letter. The following contains similar comments in addition to comments arising from the current environmental document. Again, these can be separated into general and more specific comments. The general comments are as follows:

1) The document does discuss the general cumulative effect of the proposed project within the Los Angeles County Waterworks District 40 (LACWW) draft Master Plan relating to issues of meeting future water demands, groundwater use, water reliability, and energy consumption. However, it does not address the effect on the operations and storage ability of the project of the immediate, twenty-two (22), and future, one hundred-eight (108), groundwater wells shown in the draft Master Plan for Regions 4 and 34. B-1

2) The project description still does not contain an operational plan for this project. A project level E.I.R. is inadequate without this specific information. An operational plan should include the maintenance of injection efficiencies, the maximum storage capacity, injection time needed to reach the maximum storage capacity, average and maximum retention time of injected water, extraction amounts tied to water supply availability, the frequency of complete extraction of injected amounts of water, the average and full range of water levels that will be maintained, the horizontal size and limits of the injected water at maximum storage levels, control of vertical surface deformation, the control of water quality, and the incorporation of mitigation measures resulting from the CEQA process as a minimum. B-2

3) The document uses the draft Master Plan as a reference. Although the CEQA process has begun, the draft Master Plan contains a significant amount of dated information and could be substantially revised prior to adoption by LACWW. This should be completed before its use in providing information for this project. B-3

4) The document discusses the fact that injected water is not completely recovered even when much larger volumes of water are extracted. It identifies the fact that there will be residual volumes of injected water that remain in the injection area or may migrate away from the area. The document does not address the impact of these volumes of water to the LACWW or other basin users. B-4

5) The Potential Regional Benefit of halting the decline of groundwater levels is not supported. That claim is made in Section 5.2.6 on Page 5-21, where the EIR claims to benefit the entire Lancaster Subbasin. However, the project does not appear to compensate for all other pumping in the basin or subbasin beyond current levels. B-5

More specific comments for the project are as follows:

Geology and Subsurface Conditions

1) Under "Subsidence" in Table 2-1 the impact of extended periods of extraction is stated as "insignificant". There is no discussion in Chapter 5 of the document to support this statement. B-6

Groundwater Hydrology

1) Under "Groundwater Levels" in Table 2-1 the EIR states ". . . the District would monitor groundwater levels to ensure no detrimental effects result from injection." However, "detrimental effects" is not defined within the document. The prior EIR included a minimum depth to groundwater of 150 feet (that document also included waterlogging as a significant impact; although the recirculated EIR completely omits that impact). The present document does not discuss what potential water quality effects this or any other level may have. For instance, there is known TCE contamination at Air Force Plant 42 Site 1. This is only approximately one mile from Site 5 of the project. The contamination is documented in the Remedial Investigation Report Dated November, 2001 and is available at the Palmdale and Lancaster libraries. A groundwater level of 150 feet below surface at that location would contaminate the groundwater. B-7

   The effect of this site and other potential sources of contamination must be addressed in order to set a minimum groundwater depth.

2) Under "Water Supplies" in Table 2-1 the EIR states ". . . reduce demands on the Sacramento/San Joaquin Delta . . . thereby benefiting biological resources in that region." This is also stated on Page 5-20 of the document. However, it is not explained. The Delta is already very well protected through the CalFed Program. The only way this project would provide any additional benefit to the Delta region would be for LACWW to voluntarily reduce its SWP demands during drought periods beyond any State reductions to AVEK. If this is the intent, the level and amount of additional reductions should be identified. The project appears intended to merely make up for SWP cutbacks during dry years. B-8

3) Under "Water Quality" in Table 2-1, Mitigation Measure GW-3 states the LACWW will track any subsidence and the injected water movement with simulation models. The simulation models should be used in conjunction with actual measurement data. All the monitoring information should also be reported on a regular basis to groundwater pumpers in surrounding areas of the basin. B-9

4) Under "Water Quality" in Table 2-1, Mitigation Measure GW-4 states the THM precursors will be minimized. It does not state how this will be done. Specific methods should be included such as the removal of free chlorine at the wellhead prior to injection. This would prevent the continued formation of THMs in the Antelope Valley's groundwater.

There are no mitigation measures for other water quality parameters such as pH or TDS levels of the injected water. Both must be regulated at the injection point to match the existing groundwater parameters or used as guidance to stop injection due to water quality issues. B-10

The existing water quality levels are not shown or summarized in this document. They should be shown for all the specific sites to provide a basis for determining what treatment processes are necessary at the wellhead to protect the existing groundwater quality.

5) Under "Water Quality" in Table 2-1 the EIR states ". . . it would produce beneficial water quality impacts." This would not be possible without dilution due to less water being extracted than injected over the long term. It is not clear that this would actually happen. B-11

Please feel free to contact me if you have any questions.

Very truly yours,

Dennis D. LaMoreaux

DENNIS D. LaMOREAUX,
General Manager

DDL/dth

cc: Board of Directors

PALMDALE WATER DISTRICT

2029 East Avenue Q • Palmdale, California 93550 • Telephone (661) 947-4111
Fax (661) 947-8604
www.palmdalewater.org

Board of Directors

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Division 5

LAGERLOF SENECAL BRADLEY GOSNEY & KRUSE LLP
Attorneys

ACWA

June 27, 2002

County of Los Angeles
Department of Public Works
Waterworks and Sewer Maintenance Division
ATTN: Ramy Gindi
P. O. Box 1460
Alhambra, CA 91802-1460

RE: PALMDALE WATER DISTRICT COMMENTS ON DRAFT E.I.R. FOR AQUIFER STORAGE AND RECOVERY PROJECT DATED MAY, 2002

Dear Ramy Gindi:

Thank you for the opportunity to review and comment on the above-referenced environmental document. The project seems well intentioned. However, the District's review of this document finds a number of areas of concern. These can be separated into general, mitigation, and specific comments. The general comments are as follows:

1) The evaluation of this project is done without regard for the cumulative effect of any other Los Angeles County Waterworks District 40-Region 4 (LACWW) projects and planning. As a minimum, this project should be reviewed as part of the LACWW Master Plan because of the issues of meeting future water demands, groundwater use, water reliability, and energy consumption it attempts to address. B-12

2) The project description is inadequate because no proposed plan is supplied illustrating the operation of this project. The adequacy of the E.I.R. cannot be known without this information. An operational plan should include the maintenance of injection efficiencies, the maximum storage capacity, B-13

injection time needed to reach the maximum storage capacity, average and maximum retention time of injected water, extraction amounts tied to water supply availability, the frequency of complete extraction of injected amounts of water, the average and full range of water levels that will be maintained, the horizontal size and limits of the injected water at maximum storage levels, control of vertical surface deformation, and the incorporation of mitigation measures resulting from the CEQA process as a minimum. B-13

3) The discussion of project objectives is incomplete. For example, the project fails to satisfy Objective No. 4 without taking into consideration other activities and uses in the basin and including regional goals. It also fails to quantify the water quality difference between ASR affected groundwater and future groundwater without ASR to show compliance with Objective No. 6. Objective No. 7 is also not demonstrated by quantifying the effect of the project to reduce subsidence in its area or the basin as a whole. B-14

4) The document uses the draft Master Plan as a reference. To my knowledge, the draft plan has not been adopted by LACWW or reviewed through the CEQA process. This should be completed before its use in providing information for this project. B-15

5) The document discusses the fact that injected water is not completely recovered even when much larger volumes of water are extracted. It identifies the fact that there will be residual volumes of injected water that remain in the injection area or may migrate away from the area. The document does not address the impact of these volumes of water to the LACWW or other basin users. B-16

Comments on proposed and suggested mitigation for the project are as follows:

Water Quality

1) The THMFP of injected water must not be simply reduced to a lower level. It should be reduced to match the existing groundwater level of 21.1 ug/l to prevent groundwater quality degradation. The reliance on AVEK's treatment plant improvements is inadequate. B-17

2) Water quality parameters such as pH of the injected water must be regulated at the injection point to match the existing groundwater parameters. B-18

3) Operational constraints must be included to prevent the injection of unusually poor quality water into the aquifer. For example, injection operations should cease when TDS values are above 198 mg/l for the injection water. B-19

Waterlogging

This mitigation measure limits raising the groundwater level to 150 feet below ground surface. However, the document does not discuss what potential water quality effects this level may have. For instance, there is known TCE contamination at Air Force Plant 42 Site 1. It is documented in the Remedial Investigation Report Dated November, 2001 and is available at the Palmdale and Lancaster libraries. A groundwater level of 150 feet below surface at that location would contaminate the groundwater. B-20

The effect of this and other potential sources of contamination must be addressed in order to set a maximum groundwater level.

Groundwater Resources

There are no mitigation measures discussed to address the use of groundwater that drives the need for this project. Yet the project claims to have basin-wide benefits including reduced overdraft and subsidence. Regional cooperation is needed in order for this to happen. The following items were included in the Antelope Valley Water Resource Study by Kennedy/Jenks Consultants dated November, 1995 and agreed to by the LACWW and other members of the Antelope Valley Water Group. They have also been incorporated into the Palmdale Water District (PWD) 1996 and 2001 Master Plans. They should be included as a minimum amount of mitigation for the objectives of this project. B-21

1) Create institutional framework to manage the development and use of water supplies including groundwater basin;

2) Determine the safe yield of the Antelope Valley groundwater basin;
3) Continue the current groundwater monitoring program and publish an annual report on basin conditions;
4) Develop a program to optimize the use of available water supplies;
5) Develop the recommended water conservation, reclaimed water, stormwater management and aquifer storage and recovery programs; B-21
6) Actively encourage the DWR to complete the State Water Project (SWP) and/or improve reliability;
7) Obtain additional imported water supplies;
8) Develop a revenue plan to implement the recommended programs; and
9) Initiate public education program.

Comments on specific portions or subjects in the document are as follows:

1) Pages 5-17 and 7-7 contain outdated descriptions of the restoration work on Littlerock Dam. Work on the Dam was completed in 1994 and consisted mainly of a RCC gravity section to reinforce the original structure and a raise of the spillway increasing the storage capacity to approximately 3,500 acre-feet. No recharge facilities were considered at any time as an option to the work. B-22

2) Page 5-17 incorrectly states the PWD SWP entitlement as 17,300 acre-feet. It is currently 21,300 acre-feet. B-23

3) Page 5-29 discusses metals in the groundwater. The second line from the bottom of the page currently reads "…(their solubility is highly dependent on public hearings)." I believe this may be in error! B-24

4) The water quality sampling and testing operations described contain missed samples, mistakes with samples, and generalizations explaining inconsistent results. This indicates that an additional cycle of demonstration may be needed to obtain the planned set of samples and test results and help provide documented explanations of unusually high metal levels. B-25

5) Claims of decreased pumping costs are not substantiated by providing operational information as previously discussed. B-26

6) The discussion of the Spreading Basin Alternate does not appear to be objective. For instance, water recharged through spreading operations would have the same water quality effect that is claimed for injected water by preventing the upward migration of poorer quality water. **B-27**

7) There may be additional alternates for evaluation to satisfy the seven objectives stated for this project. These include: reduced reliance on groundwater, wellhead treatment of lower quality groundwater, management of the groundwater basin, and a combination of injection and spreading operations for conjunctive use. **B-28**

Please feel free to contact me if you have any questions.

Very truly yours,

Dennis D. LaMoreaux

DENNIS D. LaMOREAUX,
General Manager

DDL/dth

A.V. UNITED WATER PURVEYORS, INC.

Incorporated November 5, 1987

2008 West Avenue M-12 Palmdale, California 93551 (661) 272-0015

Letter C

April 23, 2003

County of Los Angeles
Department of Public Works
Waterworks and Sewer Maintenance Division
ATTN: Ramy Gindi
P.O. Box 1460
Alhambra, Ca 91802-1460

RE: A.V. United Water Purveyors Inc. Comments on your re-circulated Draft Environmental Impact Report Waterworks District NO. 40 Antelope Valley Aquifer Storage and Recovery Project.

Dear Ramy Gindi,

Thank you for the opportunity to review and comment on the above referenced Environmental document. We have a number of concerns regarding this document.

1). Why is the above EIR being separated from Los Angeles County Waterworks District #40 Master Plan EIR that is currently going through the CEQA process? C-1

2). The Draft EIR does not address the anticipated time line for this project to be completed. C-2

3). The Draft EIR states that the benefits of the proposed projects will avoid or reduce overdraft of the basin. This is incorrect. With the drilling of 11 new Wells in the Principal Aquifer, this would surely add to the overdraft of the basin. C-3

4). The Draft EIR does not address potential negative impacts to other basin users. C-4

5). Your prior EIR identifies water logging as a significant impact. You're re-circulated EIR completely omits that impact C-5

6). The Draft EIR does not address the ground water contaminations at Air Force Plat 42 Site 1 that is less than one mile from Site 5 of the project or the impact that it could have on the basin due to water logging. C-6

7). The Draft EIR does not address the funding for this project or the impact it would have on the already over burden L.A. County. C-7

8). The Draft EIR does not adaquitality address what impact the 2 additional Wells at Site 4 will have on White Fence Farms Mutual Water Company's Well that is located Within ¼ mile of Site 4. C-8

9). In reviewing the Draft EIR, I wish to register a strong protest, against the proposal to inject chlorinated water into the Principal Aquifer thus producing a possible THM contamination to our water basin. C-9

Southern California is facing a critical water shortage in the years to come. It is all of our responsibility to protect this precious resource. We feel that spreading of untreated water into our recharge areas is a safer alternative to the injection of chlorinated water in our ground water basin.

Very truly yours,

John Ukkestad
President of A.V. United
Water Purveyors Inc.

WHITE FENCE FARMS MUTUAL WATER CO., INC.
41901 – 20th Street West ♦ Palmdale, CA 93551
Phone: (661) 943-3316 ♦ Fax: (661) 943-3576

Letter D

APRIL 24, 2003

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
WATERWORKS AND SEWER MAINTENANCE DIVISION
ATTN: RAMY GINDI
P.O. BOX 1460
ALHAMBRA, CALIF. 91802-1460

RE: WHITE FENCE FARMS MUTUAL WATER DISTRICT COMMENTS ON RE-CIRCULATED DRAFT E.I.R. FOR AQUIFER STORAGE AND RECOVERY PROJECT DATED: MARCH 2003.

DEAR RAMY GINDI:

WE APPRECIATE THIS OPPORTUNITY TO PROVIDE WHITE FENCE FARMS MUTUAL WATER CO. COMMENTS ON THE 2ND DRAFT OF THE E.I.R. RECOVERY PROJECT.

OUR WATER CO. DID NOT RECEIVE A COPY OF THE 1ST. DRAFT. FROM THE COUNTY. WE WERE ABLE TO PROCURE A COPY OF THE 1ST. DRAFT FROM ANOTHER AGENCY, BUT WITHOUT SUFFICIENT TIME TO PREPARE A RESPONSE. D-1

OUR PRIMARY CONCERNS FOR OUR WATER CO. IS THE EFFECT THIS PROPOSED PROJECT WILL HAVE ON THE WATER QUALITY OF THE ANTELOPE VALLEY, WHICH INCLUDES OUR 2 WELLS SITES. D-2

IN REVIEWING THE DATA RECEIVED IN THE DRAFT AND FROM OTHER WATER AGENCIES, WE WISH TO REITERATE AND CONCUR WITH THEIR FINDINGS. SPECIFICALLY THE RESPONSE LETTERS OF PALMDALE WATER DISTRICT DATED JUNE 27, 2002 AND APRIL 23, 2003. D-3

WITH ALL DUE RESPECT, THE DRAFT APPEARS TO MINIMIZE THE IMPACT OF THIS PROJECT WITH REGARD TO SERIOUS ISSUES WITH WATER QUALITY AND ENVIRONMENTAL IMPACT. ONCE THE WATER QUALITY IS DEGRADED, RECOVERY MAY NEVER BE AN OPTION. THE QUANTITY OF WATER WILL NOT BE OF CONSEQUENCE AT THAT POINT. THEREFOR PRESERVATION OF WATER QUALITY STANDARDS IS IMPERATIVE. D-4

WITH KNOWN HAZARDOUS WASTE SITES IN THE ANTELOPE VALLEY BASIN, A CLEARLY DEFINED CONTAINMENT OF THE MIGRATION OF THE WASTE PRODUCTS, WITH THE USE OF THE INJECTION AND EXTRACTION WELLS, IS NOT FULLY IDENTIFIED. THIS EXPOSES AN AREA OF SERIOUS CONCERN. D-5

WHITE FENCE FARMS MUTUAL WATER CO., INC.
41901 – 20th Street West ♦ Palmdale, CA 93551
Phone: (661) 943-3316 ♦ Fax: (661) 943-3576

IT APPEARS THE MOST ENVIRONMENTALLY SUCCESSFUL WAY TO RECHARGE THE GROUND WATER IS WITH THE IMPLEMENTATION OF THE SPREADING BASINS AND THE RECYCLING OF TREATED WASTE WATER FOR IRRIGATION PURPOSES. D-6

WE REALIZE OUR SUGGESTIONS MAY BE OPPOSING; HOWEVER THEY ARE VERY VALID SOLUTIONS TO EXISTING PROBLEMS. D-7

IF YOU HAVE ANY QUESTIONS OR CONCERNS OR WISH TO CONTACT THE BOARD OF DIRECTORS OR SHAREHOLDERS OF THIS WATER COMPANY, REGARDING THIS RESPONSE, PLEASE FEEL FREE TO CONTACT US.

YOURS TRULY,

HELEN BARNETT, CORP. SEC.
ON BEHALF OF THE BOARD OF DIRECTORS
FOR WHITE FENCE FARMS MUTUAL WATER CO.

QUARTZ HILL WATER DISTRICT

P.O. BOX 3218, QUARTZ HILL, CALIFORNIA 93586-0218
42141 NORTH 50TH STREET WEST, QUARTZ HILL, CALIFORNIA 93536-3512
TELEPHONE (661) 943-3170
FAX (661) 943-0457

Letter E

April 24, 2003

County of Los Angeles
Department of Public Works
Waterworks and Sewer Maintenance Division
Attn: Ramy Gindi
P. O. Box 1460
Alhambra, CA 91802-1460

Re: Quartz Hill Water District Comments on Recirculated Draft EIR for Antelope Valley Aquifer Storage and Recovery Project

Dear Mr. Gindi:

This letter sets forth the comments of Quartz Hill Water District to the Recirculated Draft Environmental Impact Report, dated March 2003, for Los Angeles County Department of Public Works Waterworks District No. 40 Antelope Valley Aquifer Storage and Recovery Project. The following aspects of the Recirculated Draft EIR concern our district.

1. The mitigation measures set forth in Table 2-1 and Section 5.2.5 are not defined with sufficient specificity. In particular, Measure GW-4 does not set forth the monitoring plan with any degree of specificity and Measure GW-5 fails to state what steps the District will take to minimize the precursors for THM formation, and specific methods should be included. Also, the simulation models in Measure GW-3 should be used in conjunction with actual water quality data. Monitoring information should be published or otherwise made available to groundwater producers in the surrounding area. E-1

2. As we previously commented last year in response to the initial Draft EIR, we continue to believe that the level of THMFP and other contaminants in the injected water must be reduced to the levels found in the existing groundwater to avoid degradation. The Recirculated Draft EIR does not specify those threshold levels and it would be appropriate to add a schedule of the baseline levels at the various sites. E-2

3. The Recirculated EIR still does not include a specific plan with respect to operation of the project. Such a plan should include discussion of the maximum storage capacity, the time needed to reach the maximum storage capacity, average and maximum retention time of injected water, extraction amounts in relation to water supply availability, frequency of complete extraction of injected amounts of water, average and full range of water E-3

levels that will be maintained, and the horizontal size and limits of the injected water at maximum storage. E-3

4. Table 2-1 lists subsidence as an insignificant impact, but there is no supporting discussion in the Recirculated EIR to address that conclusion. E-4

5. We are curious as to why the waterlogging impact, which was considered significant in the prior Draft EIR, was not included as a significant impact in the Recirculated Draft EIR. The Recirculated EIR also does not discuss what water quality effects the varying groundwater level may have. This is particularly important in light of the known existing TCE contamination at Air Force Plant 42, which is located in close proximity to Site 5 of the project. E-5

6. The Recirculated EIR discusses the fact that injected water is not completely recovered even when much larger volumes of water are extracted. It states there will be residual volumes of injected water that remain in the injection area or that may migrate away from the area. However, the Recirculated EIR fails to address the impact of these volumes of water to the District or other basin users. E-6

7. The discussion of the ASR Demonstration Project in Section 3.6 does not clearly state conclusions from the various tests performed (see, also Section 2.5, on page 2-4). It would be easier to understand the possible impacts of the proposed project if those conclusions are more clearly stated. E-7

Please contact me if you have any questions regarding this response.

Very truly yours,

Quartz Hill Water District

David Meraz, General Manager

California Regional Water Quality Control Board
Lahontan Region

Winston H. Hickox
Secretary for Environmental Protection

Victorville Office
Internet Address: http://www.swrcb.ca.gov/rwqcb6
15428 Civic Drive, Suite 100, Victorville, California 92392
Phone (760) 241-6583 • FAX (760) 241-7308

Gray Davis
Governor

Letter F

April 25, 2003

Ramy Gindi
Waterworks and Sewer Maintenance Division
County of Los Angeles
P.O. Box 1460
Alhambra, CA 91802-1460

WDID No 6B199511001

COMMENTS ON THE RECIRCULATED DRAFT ENVIRONMENTAL IMPACT REPORT, ANTELOPE VALLEY AQUIFER STORAGE AND RECOVERY PROJECT (ASR), LOS ANGELES COUNTY

California Regional Water Quality Control Board staff (Board staff) has reviewed the referenced Recirculated Draft Environmental Impact Report (RDEIR) and have the following comments.

In our June 28, 2002 comment letter on the previous document titled "Draft Environmental Impact Report, Waterworks District No. 40, Antelope Valley Aquifer Storage and Recovery Project", (DEIR) Board staff provided comments concerning this project. Although the content of the RDEIR has been somewhat modified from the DEIR, it does not appear that the RDEIR has adequately addressed Board staff's previous comments (please see the enclosed letter dated June 28, 2002). F-1

It has not yet been demonstrated that the total trihalomethanes (THM) concentrations in the proposed injection water can consistently comply with the federal and the state drinking water maximum contaminant level (MCL) of 0.080 mg/L. The injection of such water would contribute to a significant adverse impact and possibly result in pollution of State waters. No adequate mitigation measures are proposed for this significant impact. F-2

In its August 22, 2002 comment letter on the DEIR, the California Department of Health Services (DHS) expressed its concern with the high concentration of disinfection byproducts (i.e. THM and Haloacetic acids [five] {HAA5}) in the Antelope Valley East Kern Water Agency (AVEK) supply water which will be the main source for the proposed injection process. DHS also indicated it believes the MCLs for THM and HAA5 will be reduced to 40 μg/L and 30 μg/L, respectively, in the near future (Stage 2 Disinfections/Disinfection Byproduct Rule). DHS recommended consideration of providing treatment of the AVEK water supply for the removal of these disinfection byproducts from the water proposed to be injected, to preclude future problems in meeting drinking water MCLs and for the prevention of ground water degradation. Previous tests showed an increase in THM concentrations as the injected AVEK water moved through the vadose zone. Board staff has similar concerns and supports DHS' recommendations. F-3

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our Web-site at http://www.swrcb.ca.gov

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Injection of treated surface waters containing THMs in excess of the MCL would unreasonably affect a water of the State for beneficial use, and constitute a pollution as defined in Section 13050 of the State Water Code. It has not been determined what level of temporary THM concentration, if any, above the background level in the aquifer would be acceptable to the Regional Board. State Water Resources Control Board Resolution No. 68-16 "Statement of Policy With Respect to Maintaining High Quality of Waters in California" requires:

F-4

> "Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained."

Board staff does not have information which would support a recommendation to the Regional Board that it should allow recharge of treated surface waters above the background levels for THMs. Ground waters do not contain any THMs. Until such time as mitigation measures are proposed to reduce the projected impact to a less than significant level, which would allow the project to comply with probable WDRs or a conditional waiver of WDRs, and adequate responses are provided for the previously submitted Board staff comments, we believe certification of the EIR for this project should not occur.

F-5

If you have any questions, or would like to discuss these comments, please telephone Hisam A. Baqai, Supervising Engineer in our Victorville office at (760) 241-7325 or me at (530) 542-5412 in our South Lake Tahoe office.

Sincerely,

Robert S. Dodds

for HAROLD J. SINGER
EXECUTIVE OFFICER

Enclosure: June 28, 2002 Regional Board comment letter

cc: Regional Board Members
California Department of Health Services

TS\rp (ASR Full\Aquifer S&R Comments RDEIR)

California Environmental Protection Agency

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our Web-site at http://www.swrcb.ca.gov

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California Regional Water Quality Control Board
Lahontan Region

Winston H. Hickox
Secretary for Environmental Protection

Victorville Office
Internet Address: http://www.swrcb.ca.gov/rwqcb6
15428 Civic Drive, Suite 100, Victorville, California 92392
Phone (760) 241-6583 • FAX (760) 241-7308

Gray Davis
Governor

LETTER NO. 4

June 28, 2002

Ramy Gindi
Waterworks and Sewer Maintenance Division
County of Los Angeles
P.O. Box 1460
Alhambra, CA 91802-1460

RE: COMMENTS ON DRAFT ENVIRONMENTAL IMPACT REPORT, ANTELOPE VALLEY AQUIFER STORAGE AND RECOVERY PROJECT, LOS ANGELES COUNTY

California Regional Water Quality Control Board staff (Board staff) has reviewed the referenced Environmental Impact Report (EIR) and have the following comments:

General

Board staff agrees that, given the severe overdraft of the ground water in the area, the objectives of the project are laudable in that it would decrease the rate of ground water mining in the sub-basin.

Specific Comments

1. Section 5.2.1.1 notes that "the Blue Clay effectively confines the Deep Aquifer hydraulically, isolating it from the Principal Aquifer." Yet, Section 3.5 on Page 3-19 states that "the deeper regions of the Principal Aquifer may become contaminated as water from the Deep Aquifer moves vertically from the Deep Aquifer into the Principal Aquifer." So, which one is correct? Are the wells drawing water up from the Deep Aquifer or is the water in the lower-most part of the Principal Aquifer of poorer quality? F-6

2. The EIR offers no data, nor estimates of the water quality resulting from the mixing of injected water with the native ground water. Section 5.2.1.3 does provide a general description of the water quality of the entire basin; however, a complete characterization of the native ground water vs. the injected water quality is not presented. F-7

   Rather than use terms like "minimally affected," "no physical impact," or "minor changes to the average concentrations" the Final EIR should present sufficient data so that Board staff can independently determine if the ground water quality will be degraded due to the Recharge Project. Board staff will be required to make a recommendation to the Regional Board based on State Board Resolution No. 68-16 Statement of Policy with Respect to Maintaining the High Quality Waters of the State (attached).

The proponent will have to prove that this project will (1) not cause a pollution or nuisance, (2) not unreasonably affect present and anticipated beneficial use of the ground water, and (3) maintain the highest water quality consistent with the maximum benefit to the people of the State. F-7

3. The EIR notes that no state maximum contaminant levels (MCL) were exceeded; however, the USEPA's MCL goal of 80 µg/L for trihalomethanes (THM) was exceeded, sometimes by a wide margin. At several points in the EIR, the proponent also notes that the injected water contains elevated concentrations of some metals, but these are not listed. F-8

4. In Section 5.2.5, it's not clear why the discussion about the use of granular activated carbon (GAC) focuses on reducing the dissolved organic carbon (DOC) concentrations to between 0.5 and 1.0 mg/L when the EIR makes it clear that THM formation is limited by the availability of free chlorine. The EIR notes that chlorine is removed by the GAC but does not discuss the resulting chlorine concentrations in the water treated for injection. F-9

   It would seem that DOC concentrations of 0.5 to 1.0 mg/L would produce similar concentrations of THM in the subsurface (which is 6 to 12 times the USEPA's MCL goal). Although the EIR notes that "no simple relationship exists between chlorine consumption and the extent of THM formation" the Final EIR should at least provide an estimate of THM formation in the aquifer resulting from the estimated concentrations of DOC and chlorine after treatment.

In summary, the Draft EIR does not provide sufficient information or analysis to determine whether the project will comply with State Board Resolution No. 68-16. It appears from the references made in the EIR that the information is available; however, the document does not prove the case that the project is in compliance with the State Water Code and State Board Resolutions.

If you have any questions, or would like to discuss these comments, please telephone Hisam A. Baqai, Supervising Engineer, or me at (760) 241-6583.

Sincerely,

for Tim E. Post
Senior Engineering Geologist

TP\rc\Drafts\Aquifer S&R Comments rc

STATE WATER RESOURCES CONTROL BOARD

RESOLUTION NO. 68-16

STATEMENT OF POLICY WITH RESPECT TO

MAINTAINING HIGH QUALITY OF WATERS IN CALIFORNIA

WHEREAS the California Legislature has declared that it is the policy of the State that the granting of permits and licenses for unappropriated water and the disposal of wastes into the waters of the State shall be so regulated as to achieve highest water quality consistent with maximum benefit to the people of the State and shall be controlled so as to promote the peace, health, safety and welfare of the people of the State; and

WHEREAS water quality control policies have been and are being adopted for waters of the State; and

WHEREAS the quality of some waters of the State is higher than that established by the adopted policies and it is the intent and purpose of this Board that such higher quality shall be maintained to the maximum extent possible consistent with the declaration of the Legislature;

NOW, THEREFORE, BE IT RESOLVED:

1. Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until It has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies.

2. Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.

3. In implementing this policy, the Secretary of the Interior will be kept advised and will be provided with such information as he will need to discharge his responsibilities under the Federal Water

Pollution Control Act.

BE IT FURTHER RESOLVED that a copy of this resolution be forwarded to the Secretary of the Interior as part of California's water quality control policy submission.

CERTIFICATION

The undersigned, Executive Officer of the State Water Resources Control Board, does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly adopted at a meeting of the State Water Resources Control Board held on October 24, 1968.

Dated: October 28, 1968

Kerry W. Mulligan

Executive Officer

State Water Resources

Control Board

B.2 Responses to Comments Received on the Draft EIR

B.2.1 State of California Department of Health Services (Letter A)

Response A-1: The design of a usable and cost-effective ASR system has to consider a number of hydrogeologic and geochemical factors. Of particular importance for this ASR project are chemical reactions induced by the injection of treated SWP water that may limit the quality and quantity of water stored and the length of time for storage. Potential water quality concerns that were evaluated included chemical reactions causing precipitation that would result in screen encrustation, geochemical reactions that could result in clay dispersion, and the reduction in permeability or chemical reactions causing the changes in redox potential that could cause precipitation reactions to occur. There were no significant chemical reactions that would cause clogging of the screen and/or gravel pack. The water used for injection met drinking water standards and therefore no significant shifts in water quality that are considered adverse were observed throughout the course of the demonstration project. All water produced from the aquifer and delivered to customers complied with the established State and Federal water quality standards for drinking water.

Section 3.6. Draft REIR, discusses water quality and chemical compatibility for the proposed ASR project, and presents a discussion on DBPs. The only disinfection byproducts presently regulated besides THMs are the five Haloacetic acids compounds (HAA5). The original THM standard of 0.1 ppb was promulgated on November 29, 1979 with an effective date of Nov. 29, 1981 for systems serving 75,000 or more people and Nov. 29, 1983, for systems serving between 10,000 and 75,000. The THM MCL was then amended to 80 ppb by the Stage 1 DBP Rule, which took effect on January 1, 2002, for systems serving 10,000 or more people, and will be effective on January 1, 2004 for systems serving less than 10,000. There was no MCL for HAA5 prior to the Stage 1 DBP Rule. The MCL set by the Stage 1 DBP Rule is 60 ppb and the effective dates for our system in Lancaster was January 1, 2002. The demonstration project did not analyze the effect of injecting water with HAA5. The annual average concentration of HAA5 of quarterly averages in water we served our customers for year 2002 was 17.05 ppb with typical quarterly average values ranging between 15 to 23. The presence of HAA5 and THM at the levels below the MCL set by the USEPA and California State DHS does not pose a threat to human health or safety, and does not threaten to impact the beneficial uses of the Lancaster subbasin groundwater.

As discussed in the project description, the demonstration project investigated the hydraulic and chemical compatibility of ASR in the Lancaster subbasin used the California State Regional Water Quality Control Board's "anti-degradation policy" that was put as a condition of their permit. THMs

dissolved in the SWP water were classified as waste by the permit only because the receiving water does not contain THMs. Therefore, one of the principal concerns at the initiation of the demonstration project became the existence of THMs in the treated SWP water and the potential to form more THMs in the groundwater basin. A study to determine the fate of THMs was therefore initiated at the beginning of the Third Cycle. A fourth cycle was added to quantitatively assess the factors controlling the continued formation of THMs in recharge water and the aquifers so that potential means of altering ASR practices to limit THM formation are identified. The study concluded that the free chlorine in the injection water controlled the formation of THMs in the aquifer.

The District's implementation of the ASR Project is contingent on AVEK's ability to deliver water that meets the standards set by stages 1 and 2 of the DBP Rule. Good operating practice dictates that the drinking water that the District serves contain no more chlorine than is necessary to maintain a trace residual. Furthermore, the District would select the best injection times and locations based on several factors including AVEK's DBP levels, DBP formation potentials, and water system demand.

AVEK is currently conducting studies to determine the most suitable treatment alternative to reduce the DBP levels in their water. AVEK is currently studying GAC and membrane filtration alternatives. Although AVEK's DBP levels vary considerably throughout their system, they currently meet the standards established by Stage 1 of the DBP Rule. AVEK is required by a State mandate to meet Stage 2 requirements by its implementation date of June 2006.

Based on the District's review of the Stage 2 requirements, it is the District's understanding that the MCLs for THMs and HAAs will remain at 80 ppb and 60 ppb, respectively. These standards are enforced at each sampling point in the water system. However, your letter dated August 28, 2002, indicates that under Stage 2 of the DBP Rule, the MCLs for THMs and HAAs may be reduced to 40 ppb and 30 ppb, respectively. The District has not been able to find any written documentation supporting your suggestion of a lower standard for DBPs. In addition, the District contacted DHS staff, and they were not able to find any documentation proposing a lower standard for THMs and HAAs. Therefore, construction of onsite treatment systems for the removal of DBPs, as proposed by your August 28,2002 letter, would not be necessary.

B.2.2 Palmdale Water District (Letter B)

Response B-1: Section 4 of the Draft REIR discusses cumulative impacts of the proposed project, which are created as a result of the combination of the proposed project, and other reasonably foreseeable probable future projects causing

related impacts. There are no related projects identified (including those described in the District **Draft** Master Plan) that could cause the proposed ASR project to result in cumulative impacts.

The District **Draft** Master Plan described in Section 4 of the Draft REIR, which has not been approved, recommends the development of additional water resources to meet future demands. While, the **Draft** Master Plan recommends the construction of additional wells, their operational plans have not been defined and will be dependent on population growth. The **Draft** Master Plan is still being evaluated, and subject to amendment, and no specific projects in it have been finalized.

The revised Draft REIR presented in Section C of this Final REIR revises the cumulative impact analysis by removing the District **Draft** Master Plan discussion from the text, and replacing it with the cumulative impact analysis presented in the first Draft EIR (May 2002) for the proposed ASR project.

Response B-2: The ASR Project Draft REIR does include a description of an operational plan for the proposed project. Section 3.5 of the Draft REIR fully describes the project characteristics and operations.

There are multiple variables that would affect project operations. The most important factor would be the availability of SWP. The availability of SWP water varies from year to year, depending on a number of factors including precipitation, regulatory restrictions, legislative restrictions, and operational considerations.
See Section 3 – Project Description, page 3-21 of the Draft REIR (provided as Section C in the Final REIR) for a more detailed discussion on SWP reliability.

The retention time of the stored water, the extraction amounts, and the frequency of complete extraction are totally dependent upon the demand for water within the District service area, and the availability of other sources of water at that time.

The Draft REIR cites reports with estimates of storage capacity of the aquifer (see pages 3-20 and 3-29). The maximum storage capacity within the Principal Aquifer far exceeds the maximum amount of water that would ever be injected as a result of this ASR Project; therefore, the injection time needed to reach the maximum storage capacity is not pertinent.

As Discussed under mitigation measure GW-3 and GW-4 in Section 5.2.5 of the Revised Draft REIR (Section C of the Final REIR), the District would implement a regular monitoring program throughout the life of the project. A system of monitoring networks (such as water quality points, surface survey monuments, piezometers, and extensometers) would be used to monitor water quality changes, vertical deformation of the aquifer system, groundwater level

fluctuation, land surface deformation, and rates of water injection and recovery.

The proposed project would be operated contingent to avoiding long-term degradation within the depression area and any degradation outside of the depression area as a result of the proposed project. Measures would be taken to abate a condition of groundwater degradation, and contain a plume of degraded groundwater. The District would immediately cease injection and proceed with contingency plan as approved by RWQCB, should the monitoring data indicate operations beyond the aforementioned constraints.

All mitigation measures listed in Section 5.2.5 of the Revised Draft REIR (Section C of the Final REIR) would be implemented pursuant to the Mitigation Monitoring and Reporting Program included as Section D of the Final REIR.

Response B-3: The *Water System Master Plan for Los Angeles County Waterworks District No. 40 (Antelope Valley)* was only referenced in Section 4 - Cumulative Impacts of the ASR Project Recirculated Draft EIR. The **Draft** Master Plan is still being evaluated and no specific projects have been finalized. For this reason, the District analyzed the cumulative impacts of the Master Plan and all its objectives and strategies, which include ASR. The revised Draft REIR (see Section C of the Final REIR) revises Section 4 – Cumulative Impacts - to use related projects as the method for determining the cumulative impacts associated with implementing the proposed ASR project, as was the method used in the first Draft EIR (May 2002) on the proposed ASR project. Since there are no related projects, there are no cumulative impacts associated with the proposed ASR project.

Response B-4: During the demonstration project, injection water was not completely recovered, even when much larger volumes were extracted. A recently published USGS report (Water Resources Investigation Report 03-4062), suggests that water may have become stranded in the upper parts of the aquifer during injection and, therefore could not be efficiently recovered during extraction owing to drawdown around the well.

As Discussed under mitigation measure GW-3 and GW-4 in Section 5.2.5 of the Revised Draft REIR (Section C of the Final REIR), the District would implement a regular monitoring program throughout the life of the project. A system of monitoring networks (such as water quality points, surface survey monuments, piezometers, and extensometers) would be used to monitor water quality changes, vertical deformation of the aquifer system, groundwater level fluctuation, land surface deformation, and rates of water injection and recovery. **NOTE:** The mitigation measures for Groundwater Hydrology have been rewritten to make them clearer, and they are presented in Section C of this Final REIR.

The proposed project would be operated contingent to avoiding long-term degradation within the depression area and any degradation outside of the depression area as a result of the proposed project. Measures would be taken to abate a condition of groundwater degradation, and contain a plume of degraded groundwater. The District would immediately cease injection and proceed with contingency plan as approved by RWQCB, should the monitoring data indicate operations beyond the aforementioned constraints.

Response B-5: Increased water demand is expected to continue as a result of increased urban development. The need for water resources management that meets future demands with the minimum economic and environmental costs associated with overall use is here. Surface water availability is extremely variable and a function of the hydrogeology as well as climatic conditions. Since, the District is the largest water purveyor in the Antelope Valley, activities that work to minimize groundwater use such as in-lieu or conjunctive use would significantly reduce demand on the Lancaster subbasin. The demonstration project described in Section3.6 showed that recharge of the subbasin resulted in water-level rises in both the wells and water table near the wells. The District's production records indicate that 18 of the existing wells are within the pumping depression and extract close to 48 percent of the total groundwater extractions. The long-term injection of surplus supplies in this area would benefit existing groundwater users within the Lancaster Subbasin through reduced pumping lifts and associated costs. Therefore, the project implementation would result in a beneficial residual impact.

Response B-6: Section 5.1.2 of the Draft REIR discusses the thresholds of significance, which are analyzed in Section 5.1.3.

Historical overproduction in the area has been shown to result in degradation and consolidation of the basin. Production of groundwater that exceeds the natural and / or artificial replenishment is a threat not only to the available potable water supply, but also the District's storage capacity in the future years. As stated in a series of USGS studies referenced in the Draft DEIR, groundwater use in Antelope Valley has exceeded recharge since the 1920s, causing groundwater levels to decline about 60 meters in the Lancaster area. Water levels are presently (2002) at or near historical lows (Carlson & Phillips 1998). Consequences of this decline include depletion of the groundwater resource, degradation of water quality, and land subsidence. Land subsidence in Lancaster area resulting from groundwater extraction exceeded 2 meters from 1930 to 1992 (Ikehara & Phillips 1994), and a subsidence of as much as 0.05 meters occurred from 1993 to 1995 (Galloway *et al*. 1998).

Groundwater use should be limited to minimize depletion of groundwater. However, under emergency or drought conditions in which imported water supply is reduced or no longer available, it will be necessary to meet demand

from the groundwater. This increased production will adversely impact the groundwater basin unless existing available basin storage can be utilized for seasonal storage. Injection of treated imported water into the aquifer system as proposed by the ASR project, when water is most available, for later during peak demand periods and emergencies gives the District a tool to avoid/reduce subsidence which would otherwise be occurring. One of the main benefits of the proposed project is the possible reduction of subsidence. The ASR project wells will be utilized as injection wells during times when imported water available, limiting their extraction capabilities. Usage of stored water for supply in lieu of the native groundwater would aide in reducing the potential for subsidence in the project area.

Response B-7: The comment addresses a statement made in the Summary of Impacts and Mitigation Measures table regarding Groundwater Levels. The question is that "detrimental effects" is not defined in the document. "Detrimental effects" is used to mean significant adverse impacts. Significant adverse impacts regarding groundwater levels are fully defined in Section 5.2.2 (Thresholds of Significance) on page 5-18 of the Draft REIR (see Section C).

Waterlogging is defined as saturation of soil with water. The issue of waterlogging was pulled out of the Draft REIR because it was determined to not be a significant adverse impact of the project. The water table in the Lancaster area is at an average depth of about 300 feet below ground surface. South and southeast of the proposed project area (the location of the Air Force Base) wells generally show a water table level of about 390 feet to 490 feet below ground surface. The ASR project would help raise groundwater levels in vicinity of the wells used for injection, however, the amount of water available for recharge compared to the estimated storage of the depression is such that the level would not cause water waterlogged soils that could increase liquefaction potential, or result in malfunctioning septic systems, floating foundations, or differential settlement. Water levels rises attributed to ASR activities would not be high enough to alter the direction of flow over the subbasin and therefore, the water quality of the Principal Aquifer is not going to be affected from a movement of the plume of TCE at Air Force Plant 42, Site 1.

Response B-8: The Draft REIR on page 5-20, states that conjunctive use of SWP water would benefit biological resources. Utilizing stored water for supply during drought or high-peak periods would decrease District demand from AVEK, which would in turn reduce their demand from the Delta. This issue is not intended to, nor does it affect the overall analysis of the proposed ASR Project in the Draft REIR.

The third paragraph (under Water Supplies) on page 5-20 of the Revised Draft REIR is being removed from the text of the document. See Section C of this Final REIR.

Response B-9: GW-3 is revised to read:

GW-3 The District shall monitor injection rates, volume of injected SWP water, and groundwater levels during the lifetime of the ASR project.

Water flow monitoring shall include taking continuous measurements of the rate and amounts of injection and extraction through flow meters, which will be located at each ASR well. Flow meters will be calibrated as specified by the manufacturer, and the results will be logged in a flow meter instrument maintenance logbook.

The District shall also monitor groundwater levels. Depth to static groundwater measurements shall be obtained at each of the monitoring sites (see **Table 5-2** in Section C) using an electric water level sounder. The sounder shall be calibrated at the manufacturer's specifications.

To obtain a depth to water measurement, the electric sounder cable shall be lowered slowly into the well via the water level sounding tube or equivalent orifice until the sounder indicates submergence by either a beeping sound or light depending on the type of signal installed for that particular model. At this point, the designated District personnel shall note the number of feet from the established and/or surveyed measuring point for that well to the groundwater surface by using gradations on the electric sounder cable. The height of the water column in the well shall be calculated by subtracting the depth to water measurement from the total well depth and shall be entered in a field notebook.

Groundwater measurement for piezometers shall be taken electronically from the pressure transducers. The pressure transducers shall be calibrated semi-annually with the electric sounder.

The District shall utilize the simulation model developed during the demonstration project to estimate aquifer characteristics, calculate directions and quantities of groundwater flow, and to analyze resulting effects on water levels.

Response B-10: A number of published reports address water quality resulting from the mixing of injected water with native groundwater. Quarterly Monitoring Reports on the demonstration project were presented to the RWQCB in compliance with the February 8, 1996,

Waste Discharge Requirements and Reporting Program No. 96-7. Several water quality analyses including data from the 2 injection wells, 15 production/monitoring wells, and 9 piezometers for each of the injection/extraction cycles of the project were also presented in the demonstration project completion report. The District's Demonstration Project Final Report (January 2000), and other USGS reports and are incorporated in the Draft REIR by reference.

The Draft REIR addresses groundwater quality in Section 5.2.1 under the heading "Groundwater Quality."

The water in the Principal Aquifer has a TDS concentration ranging from 200 to 800 mg/L. State Water Project water from the Tehachapi Afterbay furnished to AVEK has a TDS concentration range from 230 to 335 mg/L, fluctuating within the average TDS of the basin. The range of injected water TDS concentration is less than the SMCL of 500 mg/L for drinking water established by EPA and DHS.

The average pH of AVEK produced water was around 6.8. The pH in the Principal Aquifer was found to be around 7.2 to 8.3. EPA's SMCL for pH ranges from 6.5 to 8.5. While, both AVEK water and groundwater are within this acceptable range, the District will work with AVEK to adjust pH during injection periods.

CEQA requires that only significant adverse impacts be mitigated. Since pH or TDS levels of the injected water were not identified as significant adverse impacts in the Draft REIR no mitigation measures were required. However, the aforementioned and other water quality parameters that are of concern would be monitored per GW-3, GW-4, and GW-5 as revised, which read:

GW-3 The District shall monitor injection rates, volume of injected SWP water, and groundwater levels during the lifetime of the ASR project.

Water flow monitoring shall include taking continuous measurements of the rate and amounts of injection and extraction through flow meters, which will be located at each ASR well. Flow meters will be calibrated as specified by the manufacturer, and the results will be logged in a flow meter instrument maintenance logbook.

The District shall also monitor groundwater levels. Depth to static groundwater measurements shall be obtained at each of the monitoring sites (See **Table 5-2**) using an electric water level sounder. The sounder shall be calibrated at the manufacturer's specifications.

To obtain a depth to water measurement, the electric sounder cable shall be lowered slowly into the well via the water level sounding tube or equivalent orifice until the sounder indicates submergence by either a beeping sound or light depending on the type of signal installed for that particular model. At this point, the designated District personnel shall note the number of feet from the established and/or surveyed measuring point for that well to the groundwater surface by using gradations on the electric sounder cable. The height of the water column in the well shall be calculated by subtracting the depth to water measurement from the total well depth and shall be entered in a field notebook.

Groundwater measurement for piezometers shall be taken electronically from the pressure transducers. The pressure transducers shall be calibrated semi-annually with the electric sounder.

The District shall utilize the simulation model developed during the demonstration project to estimate aquifer characteristics, calculate directions and quantities of groundwater flow, and to analyze resulting effects on water levels.

GW-4 The District shall implement water quality monitoring throughout the life of the proposed project, for both source water being injected and the water being extracted. The District shall implement the following Sampling and Analysis Plan (SAP).

The District appointed ASR project manager shall be responsible for the overall administration and implementation of the SAP. The Environmental Toxicology Laboratory (Lab) of the Los Angeles County Department of Agricultural Commissioner / Weights and Measures, or a comparable state-certified laboratory, shall perform the water quality analysis.

Monitoring Program

The Monitoring Program addresses water quality monitoring for both groundwater and SWP water used for recharge, and responsibilities for analysis and reporting.

Background Groundwater Quality

Background groundwater quality shall be developed for each monitoring point prior to initiation of the project. This one time sampling event is intended to confirm that background groundwater

quality at the ASR well sites is consistent with historical groundwater quality data. The chemical and physical constituents to be to be analyzed and frequency of testing are listed in **Table 5-1**. The monitoring points are listed in **Table 5-2**.

Pre-Injection SWP Water Quality Monitoring

Analysis shall be performed on treated SWP water that is being injected at the beginning of each injection cycle to establish background water quality data for recharged water. The chemical and physical constituents to be to be analyzed and frequency of testing are listed in **Table 5-3**. The monitoring points are listed in **Table 5-2**.

Groundwater Extraction Water Quality Monitoring

In order to document potential groundwater quality changes in the aquifer due to injection and extraction operations, sampling and analysis shall be performed on groundwater collected at monitoring sites established by the District. Monitoring wells were selected so that this monitoring plan successfully confines the injected water to the depression area (see **Figure 5-7**).

Tables 5-3 and **5-1** presents the complete list of constituents and parameters that shall be monitored, and the respective MCL.

Reporting Program

The District shall maintain water quality data and make it available to the RWQCB upon request. The monitoring and project operating data that the District shall maintain, include all above mentioned water quality data and Chain-of-custody (COC) forms with pertinent field information for water quality sampling and analysis done (See **Figure 5-8**).

The District shall also identify and report problems related to well sampling including temporary lack of access to well(s), inoperable or malfunctioning purging and sampling equipment, and unsafe working conditions.

Field Water Quality Sampling Methods And Procedures

Sample Containers

The Lab shall prepare appropriately selected containers with both preservative and container type in accordance with the requirements

presented in **Table 5-4**. Extra containers of each type shall be provided in the event of breakage or loss. Each container shall have a pre-printed identification label clearly showing the group or type of analysis to be performed. The Lab shall assign a laboratory sample number upon receiving the sample for proper identification and tracking.

Sample containers shall be laboratory cleaned prior to use based in the analyte of interest in accordance with standard United States Environmental Protection Agency (USEPA) protocol. Sample containers shall be stored in a fashion that prevents dust or other contaminant accumulations. The Lab shall be responsible for verifying the cleanliness and integrity of the sample containers prior to shipment to the District pursuant to their sample container quality control (QC) procedures.

Well and Sample Line Purging

Prior to sampling, each well shall, to the extent possible, be pumped by the District for a sufficient period of time to evacuate any standing water in the well, ensure movement of "fresh" groundwater in the well and ensure pH, specific conductance, and temperature stabilization.

Water discharge from the production wells shall be conveyed directly to waste. The sample line flow shall remain constant and continuous during sample collection to minimize the potential for particulate matter becoming dislodged in the discharge pipe and entering sample container(s).

Sample Collection and Preparation

The District shall contact the Lab and arrange to have ice chests of prepared sample bottles delivered to the appropriate location requested by the District at least one week prior to the sampling event. Upon receipt of the sample bottles, designated District sampling personnel shall make an inventory of the bottles received to assure that adequate number and types of sample bottles required for the upcoming sampling event have been provided.

Prior to each sampling event the designated District personnel shall inventory, restock, replace, clean, calibrate, maintain, and test water quality monitoring equipment as needed. Sampling equipment shall include portable specific conductance meter, pH meter, residual chlorine test kit and thermometer, including pH buffer solutions and specific conductance calibration solutions. At a minimum, the

frequency and nature of equipment maintenance shall be consistent with the manufacturer's recommendations.

Total Organic Carbon samples shall be collected with as little aeration as possible to ensure that no air bubbles are incorporated into the sample containers after they are capped. If air bubbles are observed in a sample container, re-sampling shall be performed.

Sample Preservation

Designated sampling personnel shall use "clean sampling techniques" to minimize potential contamination of water samples. Sample containers and lids shall not touch the ground, the sampling personnel's clothing, or any other potential source of contamination. Sample container lids shall not be removed from a particular container until that container is to be filled. Sampling containers shall be rinsed three times with the sample prior to collection unless the container contains a preservative. The sample container shall be filled to the top of the rim to minimize air space between the liquid level and the lid. The container lid shall also be rinsed with the sample before use. The lid shall be tightened securely to the container immediately after sample collection is completed.

Chemical preservatives and refrigeration shall be used to maintain sample integrity prior to analysis. After sample collection, water samples shall be stored in insulated coolers or ice chests at a temperature of 4 ^{0}C, or 39 ^{0}F, until delivery to the Lab. Samples to be analyzed for total metals shall be filtered using a 0.45-micron filter then acidified with nitric acid by the Lab immediately on arrival.

Designated sampling personnel shall exercise extreme care at all times during the handling of acid-preserved sample containers to minimize spillage, damage and/or injury to the sampler(s) or the field equipment. In addition to nitrile sampling gloves, the designated sampling personnel shall wear safety glasses or goggles to minimize potential eye injury.

Water Quality Sample Record Keeping

All sample containers shall be pre-labeled, to the extent possible, prior to each sampling event to facilitate sampling activities. Sample containers provided by the Lab shall contain waterproof labels and pre-marked information such as analyte and laboratory identification number. To the extent possible, the designated Lab / District sampling personnel shall inscribe the well identification and

sampler(s) name or initials on the labels under dry conditions using a waterproof marker pen prior to each sampling event. Immediately prior to collection of water samples, the designated District sampling personnel shall inscribe on the sample bottle label the date and time of sample collection and the name of any preservatives used with a waterproof marker pen. The designated District sampling personnel shall maintain a record showing:

- Site name and/or well number
- Name(s) of sampling personnel
- Measured depth to groundwater
- Discharge rate [in gallons per minute (gpm)]
- Number of minutes of well purging
- Field measurements of pH, specific conductance, residual chlorine and temperature
- Date and time(s) of sample collection
- Weather conditions
- Other significant field or sampling conditions

In addition, a COC form indicating the well name(s) or well number, sampler's name, date and time sampled, any special observations, and laboratory sample number shall be filled out by the designated sampling personnel and placed in a sealed plastic bag (e.g., Ziplocs) with the sample(s) in the ice chest to provide a COC record. A sample COC form is presented as **Figure 5-8**. The lab shall submit the completed COC record to the designated District sampling personnel upon delivery of the sample(s) to the lab.

Sample Results

The Lab shall use a standard reporting form for all water sources listing date(s) of analysis, name(s) of person who analyzed the samples, USEPA analytical method(s) used, name of analytical method used, name of parameter analyzed, detection limit and result of the analysis. Any analytical result less than detectable shall be reported as less than the method detection limit.

The Lab shall submit paper or electronic copies of laboratory results and written reports to the Water Quality Senior Civil Engineer. Unusual spikes, questionable results, or detection of chemicals not on the list of required constituents shall be promptly reported to the designated District sampling personnel. Nitrate analytical results shall be reported as mg/L as NO_3. Hardness and alkalinity shall be reported as mg/L as $CaCO_3$. The Lab shall maintain records for at least three years from the date the analytical reports were submitted to the designated sampling personnel made showing the calibration of equipment used in the various analyses.

GW-5 The District shall maintain THM levels in stored water below the MCL, thus not negatively affecting the District's or any other purveyor's ability to pump and serve groundwater from the regional aquifer for beneficial uses as described in Water Quality Control Plan for the Lahontan Region. The District shall achieve this through the reduction of free chlorine and/or organic compounds by implementing best practicable treatment or control methods.

The introduction of TTHM concentrations associated with the groundwater banking component of the Project would not lead to violation of any drinking water standards (Title 22 of the California Code of Regulations) or any Basin Plan water quality objectives. The proposed project would not negatively affect the District's or any other purveyor's ability to pump and serve groundwater for all current beneficial uses.

To minimize precursors, the District would control chlorine residual in the distribution system to a minimum level necessary to protect public health.

The District has revised mitigation measures GW-3, GW-4, and GW-5 (see above) to ensure water quality changes would not unreasonably affect present and anticipated beneficial uses.

Response B-11: Arsenic, radon, and hexavalent chromium are three of the naturally occurring carcinogens found in the Antelope Valley Basin. Injection and storage of SWP water would improve the quality of groundwater in the project area by diluting existing concentrations of these carcinogens thereby producing beneficial water quality impacts.

Additionally, it is generally true that the water quality within the Principal Aquifer diminishes with depth. Measured vertical gradients across the Blue Clay in the vicinity of the demonstration site were upward during static conditions and downward during pumping where wells are screened in the Deep Aquifer. Historically, water quality data for wells also suggests a correlation between arsenic levels in the Principal Aquifer and deep wells at those locations. Over the lifetime of the project, it could be construed that the injection water would boost the pressure gradient within the Principal Aquifer, forming a barrier against the migration of pollutants and thereby providing a measure of protection against degradation of the water quality.

Response B-12: This comment was rewritten by Palmdale Water District in their April 23, 2003 letter, and included as Comment B-1. See Response B-1.

Response B-13: This comment was rewritten by Palmdale Water District in their April 23, 2003 letter, and included as Comment B-2. See Response B-2.

Response B-14: This comment was not included in Palmdale Water District's April 23, 2003 letter. The Draft REIR revised the objectives presented in the Draft EIR. Section 2.3 of the Draft REIR describes the three objectives of the proposed ASR Project, and separates three benefits that would also occur with project implementation.

Response B-15: This comment was rewritten by Palmdale Water District in their April 23, 2003 letter, and included as Comment B-3. See Response B-3.

Response B-16: This comment was rewritten by Palmdale Water District in their April 23, 2003 letter, and included as Comment B-4. See Response B-4.

Response B-17: The concentration of THMs depends on the concentrations of organic carbons in the source water, the concentration of free chlorine residual in the recharge water and the contact time during treatment. As stated, THMs form by the reaction between organic carbons and free chlorine. In general, free chlorine reacts with organic carbons and continues to react with organic carbons until either all the chlorine or all the reactive sites in the organic carbons are consumed. As indicated in response A-1, a study initiated to determine the fate of THMs was therefore during the demonstration project concluded that the free chlorine in the injection water controlled the formation of THMs in the aquifer. The approach recommended by the EIR is to limit the organic precursors available for reaction with free chlorine. Good operating practice dictates that the water supply-system, contain no more chlorine than is necessary to maintain a trace residual in the water. GAC and the use of nonofiltration or ultrafiltation are being evaluated by AVEK and each is capable of achieving the goal of removing organic carbons stated in the Draft EIR. However, the option to treat injection water to a THMFP level of 21.1 µg/L is economically infeasible.

Response B-18: This comment was rewritten by Palmdale Water District in their April 23, 2003 letter, and included as Comment B-10. See Response B-10.

Response B-19: This comment is addressed in Response B-10.

Response B-20: This comment was rewritten by Palmdale Water District in their April 23, 2003 letter, and included as Comment B-7. See Response B-7.

Response B-21: All of the parties associated with the proposed ASR Project would seem to be in agreement with these comments. The proposed project does not alter the need for these items to be implemented, however, overall basin management and policies are beyond the scope of this proposed ASR Project and Draft REIR. The measures described in the comment do not address the effects of the ASR project.

Response B-22: Comment noted. Thank you for the information regarding the Littlerock Dam. Corrections were incorporated in the Draft REIR Section 3.4 (page 3-20).

Response B-23: Comment noted. Thank you for the information regarding the PWD SWP entitlement. Corrections were incorporated in the Revised Draft REIR Section 3.4 (page 3-20).

Response B-24: Comment noted with regards to this typographical error.

Response B-25: Extensive water quality data were collected during the demonstration project under the direction of the RWQCB. Quarterly Monitoring Reports on the demonstration project were presented to the RWQCB in compliance with the February 8, 1996, Waste Discharge Requirements and Reporting Program No. 96-7. The District's Demonstration Project Final Report (January 2000) addresses water quality sampling procedures and results. Water quality monitoring included data from the 2 injection wells, 15 production/monitoring wells, and 9 piezometers for each of the injection/extraction cycles of the demonstration project.

Generally, the chemistry of extracted water is much like that of the median injected water early in the extraction period, as might be expected. Data from the extraction phase of the third cycle at a piezometer showed the presence of metals at elevated concentrations for some of the monitoring wells. As reported to the RWQCB, the concentration of metals was attributed to the condition at the particular piezometer and the sampling and analysis methods. One explanation why the concentration of metals was elevated was that the piezometer is small in diameter (2 inches) and water was collected using a special pump that could have also pumped sediment in the sample. The lab protocol as presented with our explanation then, did not call for the isolation of dissolved solids. The samples showed very high turbidity and were not filtered, which means that the suspended solids may have contributed considerably to the said concentrations.

Another possible explanation was the use of low pH water for recharge. Aluminum is the third most abundant element in the Earth's crust; manganese and iron are also present in the groundwater and occur in many rocks and clay material. The solubility of these metals is highly dependent on pH; recharge

water with a pH below 8.0 may have mobilized these metals. The recharge water from Antelope Valley AVEK had an average pH of 6.76. The District will work with AVEK to adjust pH during injection periods.

The District does not believe that additional cycles are needed.

Response B-26: This comment is addressed in Response B-5.

Response B-27: While the Spreading Grounds/Infiltration alternative may improve water quality in the groundwater basin in some ways, it would require extensive investigations and an extensive monitoring network to track the recharge water. Extraction wells would have to be placed near the spreading grounds in areas where production capacity is limited or uncertain. Additional pipelines would have to be constructed to convey water to the spreading grounds and from the extraction wells.

Although, the Spreading Ground Alternative may not introduce THMs into the aquifer, it has several environmental and operational constraints. Water quality of recharged water would be dependant on water quality of the supply water and the effects of adsorption and biological degradation through the spreading ground recharge process. The recharge water may dissolve more minerals from formations as it migrates, thereby reducing its quality.

Response B-28: These additional alternatives could be pursued independently of the proposed ASR Project. The proposed ASR Project does not increase or lessen the importance of these additional water resources management strategies. The proposed ASR Project does not increase or lessen the importance of these additional alternatives.

B.2.3 A.V. United Water Purveyors, Inc. (Letter C)

Response C-1: Section 4 of the Draft REIR discusses in detail the District's **Draft** Master Plan. The **Draft** Master Plan is a work in progress, and it has not been approved. A Draft EIR for the **Draft** Master Plan has not been circulated for public review, and **Draft** Master Plan is still subject to amendment. As stated in Response B-1, the Master Plan is proposing strategies and recommendations to meet future water demand. The **Draft** Master Plan is proposing the development of local storage, with ASR as one of the solutions. Since the ASR Project has been under consideration for quite some time, it is appropriate to conduct the environmental review of the ASR Project now. Only after the environmental review for the ASR Project was commenced did the District include it in the Draft Master Plan, so that the Draft Master Plan will be complete once it is finalized.

Response C-2: Project schedule is contingent upon RWQCB's approval of the project and availability of District funding.

Response C-3: As stated in Response B-6, groundwater use should be limited to minimize depletion of groundwater. However, under emergency or drought conditions in which imported water supply is reduced or no longer available, it will be necessary to meet demand from the groundwater. This increased production will adversely impact the groundwater basin unless existing available basin storage can be utilized for seasonal storage. Injection of treated imported water into the aquifer system as proposed by the ASR project, when water is most available, for later during peak demand periods and emergencies gives the District a tool to avoid/reduce continued overdraft conditions which would otherwise be occurring. The ASR project wells will be used to recharge the basin during times when imported water available, limiting their extraction capabilities. Usage of stored water for supply in lieu of the native groundwater would aide in reducing the potential for subsidence in the project area.

Response C-4: Groundwater Beneficial Uses for the Antelope Valley Basin (6-44) are described in Table 2-2 of the Basin Plan. These uses are municipal, agricultural, industrial, and freshwater replenishment. Narrative and numerical water quality objectives to protect these beneficial uses are described in the Basin Plan. The levels of TTHMs introduced to the groundwater by the proposed project would not violate these water quality objectives or unreasonably affect present or anticipated beneficial uses because the anticipated water quality resulting from discharges associated with this project is suitable for all the beneficial uses mentioned above.

The proposed project would not lead to violation of any drinking water standards (Title 22 of the California Code of Regulations) and thus would not negatively affect the District's or any other purveyor's ability to pump and serve groundwater from the Regional aquifer for domestic use.

Response C-5: Waterlogging is defined as saturation of soil with water. The effects of waterlogging are dependent not only upon the elevation of the groundwater table, but also on the soil type. Generally, the effects of waterlogging are most noticeable in granular soils. Increased liquefaction potential results when the water table is high in a loosely compacted, granular soil. Liquefaction is the sudden drop in bearing capacity in soils of saturated non-cohesive particles, such as sand, during ground movement (i.e., seismic events).

The issue of waterlogging was pulled out of the Draft REIR because it was determined not to be a significant adverse impact of the project. The water table in the Lancaster area is at an average depth of about 300 feet below ground surface. The effects of waterlogging are dependent on the elevation of the groundwater table and the soil type. The depth to groundwater, for the

proposed project, is relatively deep, and as previously discussed the groundwater elevations in the area have been declining. In addition, the proposed injection rates are relatively low, enabling the underground strata to become saturated without significant pressure buildup. The seasonal operation of the injection process would provide periods of relaxation during which the hydraulic pressures within the underground system will be allowed to dissipate.

Response C-6: Please refer to Response B-7.

Response C-7: The proposed project would be funded by customers within the District through the Los Angeles County Waterworks District No. 40, General, and Accumulative Capital Outlay Funds. This project would not impact the County's General Fund.

Response C-8: This comment is addressed in Response C-4.

Response C-9: The comment is acknowledged, and it will be forwarded to the decision-makers.

B.2.4 White Fence Farms Mutual Water Co., Inc. (Letter D)

Response D-1: The May 2002 Draft EIR was circulated pursuant to the requirements of CEQA and the *State CEQA Guidelines* (Section 15087). The 45-day public review period for the Draft EIR extended from May 17, 2002 to July 1, 2002, and a public meeting on the proposed project was held on June 18, 2002. The notice of Draft EIR availability was sent to all organizations and individuals who had previously requested such notice in writing, and it was published on May 16, 2002 in the Antelope Valley Press. The Draft EIR was available to the public at the Los Angeles County Department of Public Works, Waterworks and Sewer Maintenance Division, 260 East Avenue K-8, Lancaster, and at the Lancaster and Palmdale libraries. The March 2003 Draft REIR was also circulated pursuant to the same requirements.

Response D-2: This comment is acknowledged, and it will be provided to the decision-makers. The effects of the proposed ASR Project on water quality are described on page 5-20 of the Draft REIR, where it states, "Potential long-term impacts on groundwater quality include those associated with mixing of injected water with groundwater. The introduction of chlorine and THMs to the aquifer would have a potential significant impact on the environment."

The proposed project would not lead to violation of any drinking water standards (Title 22 of the California Code of Regulations) and thus would not negatively affect the District's or any other purveyor's ability to pump and serve groundwater from the Regional aquifer for domestic use.

However, as described on page 5-23 of the Draft REIR (Section C), "Therefore, the proposed ASR project would result in a significant adverse impact in regards to the increase in the level of THMs in the groundwater."

Therefore, pursuant to Section 15093 of the *State CEQA Guidelines*, ". . . the decision-making agency to balance, as applicable, the economic, legal, social, technological, or other benefits of a proposed project against its unavoidable environmental risks when determining whether to approve the project. If the specific economic, legal, social, technological, or other benefits of a proposed project outweigh the unavoidable adverse environmental effects, the adverse environmental effects may be considered 'acceptable'."

For the County Board of Supervisors to approve the proposed ASR Project a statement of overriding considerations will be prepared, which states the specific reasons the action is being supported. The specific reasons must be based on the final EIR and/or other information in the record. The statement of overriding considerations will be supported by substantial evidence in the record.

Response D-3: This comment is acknowledged, and it will be provided to the decision-makers. Please refer to Responses B-1 through B-30 for individual responses to the Palmdale Water District letters.

Response D-4: This comment is acknowledged, and it will be provided to the decision-makers. The analysis in the Draft REIR results in a conclusion that the proposed ASR Project would result in a significant adverse impact that cannot be mitigated below a level of significance.

To ensure water quality changes would not unreasonably affect present and anticipated beneficial uses, the District revised mitigation measures GW-3, GW-4, and GW-5 (see Response B-10).

Response D-5: The existing groundwater quality in the Principal Aquifer is not affected by any of the known hazardous waste sites in the Antelope Valley. The SWP water that would be injected into the Principal Aquifer would remain in close proximity to the wells where it is injected. As described on page 5-15 of the Draft REIR (Section C), ". . . local depressions occur adjacent to overpumped wells. In fact, these local depressions serve to impound the injected water and, therefore, the project area has been chosen in close proximity to a local depression."

Please refer to Response B-7 for information regarding potential sources of contamination.

Response D-6: Please refer to Response B-27 for Spreading Grounds/Infiltration alternative discussion.

The recycling of treated wastewater for irrigation purposes, if utilized by the District, would minimally decrease demand and would not enhance the reliability of the system.

Response D-7: This comment is acknowledged, and it will be provided to the decision-makers.

B.2.5 Quartz Hill Water District (Letter E)

Response E-1: Mitigation measures GW-1 through GW-5 of the Draft REIR (Section 5.2.5) have been revised to make them clearer, and they are presented in Section C (Revised Draft REIR) of this Final REIR. The District would establish a monitoring and contingency plan in accordance with the RWQCB in accordance with State Water Resources Control Board Resolution No. 68-16 "Statement of Policy with Respect to Maintaining High Quality Waters in California."

As Discussed under revised mitigation measure GW-4 in Section 5.2.5 of the Draft REIR, the District would implement regular monitoring program throughout the life of the project. A system of monitoring networks (such as water quality points, surface survey monuments, piezometers, and extensometers) would be used to monitor water quality shifts, measure vertical deformation of aquifer system, groundwater level fluctuation, land surface deformation, and rates of water injection and recovery.

The proposed project would be operated contingent to avoiding long-term degradation within the depression area and any degradation outside of the depression area as a result of the proposed project. Measures would be taken to abate a condition of groundwater degradation, and contain a plume of degraded groundwater. Should the monitoring data indicate that the criteria for implementation of the contingency plan are met, the District would immediately cease injection and proceed with contingency plan procedures (as approved by RWQCB).

Introduction of TTHM concentrations associated with the groundwater banking component of the Project would not lead to violation of any drinking water standards and thus would not negatively affect the District's or any other purveyor's ability to pump and serve groundwater from the Regional aquifer for domestic use.

The problem of THMs would be mitigated by minimizing the organic precursors for their formation and persistence. The EPA's final Surface Water Treatment Rule and recent rules mandating reduced DBP concentrations would generally improve the quality of water available for ASR by cutting down the organic concentrations of recharge waters and providing adequate disinfection residual at the same time. The DBP rule would regulate the

concentration of THMs and other organic compounds in drinking water supplies.

To minimize precursors, the District would control chlorine residual in the distribution system to a minimum level necessary to protect public health. Control of treatment process to reduce disinfectant demand, and control of disinfection treatment process to reduce disinfectant levels would minimize further formation of THMs in the groundwater.

The District would use the information obtained from the simulation models in conjunction with the actual water quality data recorded from the sampling of the source water being injected and the water being extracted.

Response E-2: CEQA thresholds are provided on page 5-18 of the Draft REIR (Section C). The first listed threshold states, "Regarding all regulated constituents including disinfection byproducts, substantially degrade groundwater quality below State Drinking Water Standards (Title 22 of the California Code of Regulations)." The second listed threshold states, "Regarding THMs - violate the RWQCB's Anti-Degradation Policy (Resolution 68-16) maintaining Groundwater Beneficial Uses for the Antelope Valley Basin. The introduction of any THMs into the groundwater would be a violation of the Anti-Degradation Policy." The California RWQCB has a non-degradation policy. Therefore, any degradation of the groundwater quality within the Principal Aquifer by the proposed ASR Project would constitute a significant adverse impact. The Draft REIR on page 5-21 reports that the proposed ASR Project would result in a significant adverse impact because it would degrade the groundwater basin by the introduction of THMs. There is no known way to implement the proposed ASR project as currently planned and avoid degradation of the groundwater quality.

For the County Board of Supervisors to approve the proposed ASR project a statement of overriding considerations will be prepared, which states the specific reasons the action is being supported. The specific reasons must be based on the Revised Final EIR and/or other information in the record. The statement of overriding considerations will be supported by substantial evidence in the record.

The existing groundwater quality is discussed on page 5-17 of the Draft REIR (Section C). While a specific list of baseline water quality levels at the five proposed sites is not included, the necessary information to perform the analyses is provided.

Response E-3: Please see Response B-2 regarding an operation plan for the project.

Response E-4: Please see Response B-6 regarding subsidence impacts.

Response E-5: Please see Response C-3 regarding the waterlogging issue and Response B-7 with regards to the effects of varying groundwater levels as it relates to Air Force Plant No. 42.

Response E-6: Please see Response B-4 regarding residual volumes of injected water.

Response E-7: This comment is acknowledged, and it will be provided to the decision-makers. Section 3.6.7 of the Draft REIR (Section C) on page 3-31 provides the results and findings of the Demonstration Project regarding "Hydraulic Compatibility" and "Water Quality and Chemical Compatibility." The manner in which the conclusions are stated in the Draft REIR is consistent with the way the conclusions are presented for the Demonstration Project.

B.2.6 California Regional Water Quality Control Board (Letter F)

Response F-1: The Recirculated Draft EIR attempts to address comments and concerns raised by the May 2002 Draft EIR. Comments from RWQCB June 28,2002 are addressed below as Responses F-6 through F-9.

Response F-2: The ASR project is proposing to inject treated SWP water that is suitable for domestic supply as defined by the EPA and DHS. The demonstration project was performed to address issues including potential groundwater degradation.

Mitigation measure GW-4 implements a water quality monitoring program throughout the life of the project, in accordance with RWQCB Waste Discharge Requirements or waiver thereof, would demonstrate compliance with federal and state drinking water standards.

The proposed approach for limiting THM formation is to minimize the organic precursors and the presence of free chlorine available for reaction. GAC, or the use membrane filtration, are currently being evaluated by AVEK to minimize the presence of organic precursors. The levels of TTHMs introduced to the groundwater by the proposed project would not violate Basin Plan[1] water quality objectives or unreasonably affect present or anticipated beneficial uses as listed in the Basin Plan.

The EPA's final Surface Water Treatment Rule and recent restrictions in Disinfectants/Disinfection byproduct rule will improve the quality of water available for ASR by cutting down the organic concentrations of recharge waters and providing adequate disinfection residual at the same time.

Response F-3: The August 28, 2002 comment letter on the Draft EIR by the California Department of Health Services is addressed under Response A-1.

[1] Water Quality Control Plan for the Lahontan Region - State of California Regional Water Quality Control Board, Lahontan Region.

Response F-4: The proposed ASR project would be consistent with the maximum benefit to the people of the State and would not unreasonably affect the Basin beneficial use.

The use of SWP water eliminates further groundwater overdraft that would occur if groundwater were continued to be utilized to meet growing water demands. Further extraction on the existing system without injection of additional water would likely cause poor quality water from the lower aquifer to migrate into the higher quality upper aquifer.

The proposed ASR project would:

- Increase the level of conjunctive use
- Reduce potential subsidence problems
- Halt the decline of ground-water levels, and thereby reduce energy consumption required for pumping lifts.

The proposed project would enhance the reliability of water supply in the Antelope Valley, to support current demand and future growth in the area. The development of the additional storage using seasonally available water supplies can be utilized to either augment imported supplies or to meet total demand during the event of emergencies (SWP outages) and drought periods.

Groundwater Beneficial Uses for the Antelope Valley Basin (6-44) are described in Table 2-2 of the Basin Plan. These uses are municipal, agricultural, industrial, and freshwater replenishment. Narrative and numerical water quality objectives to protect these beneficial uses are described in the Basin Plan. The levels of TTHMs introduced to the groundwater by the proposed project would not violate these water quality objectives or unreasonably affect present or anticipated beneficial uses because the anticipated water quality resulting from discharges associated with this project is suitable for all the beneficial uses mentioned above.

Response F-5: The potential environmental impacts associated with the proposed project's injection of State Water Project (SWP) water with levels of trihalomethanes (THMs) higher than found in groundwater were analyzed to demonstrate compliance with State Water Resources Control Board Resolution No. 68-16, *"Statement of Policy with Respect to Maintaining High Quality of Waters in California."* Under this policy, water quality degradation may be allowed if the following conditions are met: 1) any change in water quality must be consistent with maximum benefit to people of the State; 2) will not unreasonably affect present and anticipated beneficial uses; 3) will not result in water quality less than prescribed in the Basin Plan; and 4) discharger must treat with the best practicable treatment to avoid pollution or nuisance and maintain the highest water quality consistent with maximum benefit to the people of the state. Based on the above-described analysis, the District finds that:

1) The use of SWP water eliminates further groundwater overdraft that would occur if groundwater were continued to be utilized to meet growing water demands thereby showing changes in water quality as a result of this project to be consistent with maximum benefit to people of the state. Further extraction on the existing system without injection of additional water would likely cause poor quality water from the lower aquifer to migrate into the higher quality upper aquifer. The proposed project would enhance the reliability of water supply in the Antelope Valley, to support current demand and future growth in the area.

2) Beneficial uses would not be affected because the proposed project would inject surface water treated to drinking water standards, store it within identified depression, and recover it as needed. It is of course to be noted that the native groundwater and the recharge water are different in composition in many ways. Differences may in some cases work to improve the quality of the native groundwater or may work to degrade it in other cases. There would be no measurable change in TTHM concentrations in the Regional aquifer at the drinking water wells outside of the depression area. The water in the Principal Aquifer has a TDS concentration ranging from 200 to 800 milligrams per liter (mg/L). SWP water from the Tehachapi Afterbay furnished to AVEK has a TDS concentration range from 230 to 335 mg/L, fluctuating within the average TDS of the basin. The range of injected water TDS concentration is less than the secondary maximum contaminant level (SMCL) of 500 mg/L for drinking water established by USEPA and State of California Department of Health Services (DHS). Banking of treated SWP water in the Lancaster Subbasin may improve the quality of native groundwater by diluting existing concentrations, arsenic and chromium. The Demonstration Project showed that the water-banking component of the ASR Project would not cause exceedances of Title 22 drinking water standards.

3) Changes in water quality would be consistent with Basin Plan objectives. Groundwater Beneficial Uses for the Antelope Valley Basin (6-44) are described in Table 2-2 of the Water Quality Control Plan for the Lahontan Region (Basin Plan). These uses are municipal (MUN), agricultural, industrial, and freshwater replenishment. Narrative and numerical water quality objectives to protect these beneficial uses are described in the Basin Plan. The levels of TTHMs introduced to the groundwater by the proposed project would not violate these water quality objectives or unreasonably affect present or anticipated beneficial uses because the anticipated water quality resulting from discharges associated with this project is still suitable for all the beneficial uses mentioned above. The Basin Plan utilizes provisions of Title 22 of the California Code of Regulations as the water quality objective for MUN uses, which are already required of the District by DHS.

4) The best practicable treatment or control of the discharge has been incorporated such that no pollution or nuisance results and that the highest water quality consistent with maximum benefit to the people of the State is maintained. The USEPA has indicated that the best available technology for THM is enhanced coagulation or enhanced softening or GAC10*, with chlorine as the primary and residual disinfectant. Although GAC has been identified as the best available treatment or control for removing TTHMs in the water prior to injection, best "available" control does not consider cost, unlike best "practicable" control. Significant costs associated with treatment at the wellhead by the District, makes use of such a system infeasible. AVEK as the SWP supplier is currently conducting pilot studies to identify the feasibility of GAC and membrane filtration.

Response F-6: The aquifer system of the Lancaster Subbasin consists of two alluvial aquifers; the Principal and the Deep Aquifer, which are separated by a confining bed (Londquist and others, 1993). Both aquifers consist of an interbedded heterogeneous mixture of sand and gravel. The Principal Aquifer is unconfined and overlies lacustrine clay sediments. This aquifer extends over most of the Lancaster Subbasin south and southwest of Rogers Lake and provides most of groundwater pumped in the Antelope Valley. The Deep Aquifer is confined by a massive bed of Blue Clay except in the northeastern part of the Antelope Valley where the clay intersects land surface and thins to extinction (Durbin, 1978). Where unconfined, the Deep Aquifer grades upwards into the alluvium of the Principal Aquifer. The grading of the two aquifers also provides a direct hydraulic connection between the two aquifers along the southern, western, and northeastern margins of the Lancaster Subbasin. The Deep Aquifer is confined, but is not hydraulically isolated from the Principal Aquifer. The flow through the Blue Clay can occur and flow through wells perforated in both aquifers maybe considered significant.

With the extensive development of the groundwater system in the valley during the 1950s and 1960s, came both water levels decline and changes in flow patterns of the Deep Aquifer. Durbin (1978) estimated that by 1961, the direction of groundwater flow out of the northern Lancaster Subbasin had been reversed and groundwater in the Deep Aquifer flowed toward the major pumping central part of the subbasin. Movement of groundwater between the two aquifers also occurs as leakage through the lacustrine beds and is said to be dependent on the heads in the two aquifers.

It is generally true that the water quality within the Principal Aquifer diminishes with depth. Measured vertical gradients across the Blue Clay in the vicinity of the demonstration site were upward during static conditions and downward during pumping where wells are screened in the Deep Aquifer.

* GAC10 means granular activated carbon with an empty bed contact time of 10 minutes and reactivation frequency for GAC of no more than six months.

Historical water quality data for wells also suggests a correlation between arsenic levels in the Principal Aquifer and deep wells at those locations. Wells drilled through the Blue Clay have also created the potential for migration of contaminants between the two aquifers. Over the life of project, it could be construed that the injection water would boost the pressure gradient within the Principal Aquifer, forming a barrier against the migration of pollutants and thereby providing a measure of protection against degradation of the water quality.

Response F-7: The groundwater and the injected water are different in composition in many ways. Differences may work to improve the quality of the native groundwater, in some cases, while they may degrade it in others. A demonstration project was initiated during 1994-1998 to evaluate hydraulic and chemical compatibility, as well as technical, institutional, legal and economical issues associated with ASR. Several water quality analysis including data from the 2 injection wells, 15 production/monitoring wells, and 9 piezometers for each of the injection/extraction cycles of the project were also presented in the completion report. The analysis was performed on samples taken before and after the injection phase of each cycle. Section 3.6.6 of the DEIR discusses concentrations of constituents prior, during, and after injection and details the ones with significant deviation from that of the native groundwater. The DEIR also references a number of reports that address water quality resulting from the mixing of injected water with native groundwater. Quarterly Monitoring Reports on the demonstration project were presented to the Regional Board in compliance with the February 8, 1996, Waste Discharge Requirements and Reporting Program No. 96-7.

As stated in our reports and other communications with the Regional Board staff, the design of a usable and cost-effective ASR system has to consider a number of hydrogeologic and geochemical factors. Of particular importance for the proposed project, were and still are chemical reactions induced by the injection of treated SWP water that may limit the quality and quantity of water stored and the length of time for storage. A fourth cycle dedicated to studying the fate of THMs was conducted, besides the extensive water quality analysis on the source water being injected, and the water being pumped at the injection site and at other monitoring wells through the course of the demonstration project. Potential water quality concerns that were evaluated included chemical reactions causing precipitation that would result in screen encrustation, geochemical reactions that could result in clay dispersion, and the reduction in permeability or chemical reactions causing the changes in redox potential that could cause precipitation reactions to occur. There were no significant chemical reactions that would cause clogging of the screen and/or gravel pack. No shifts in water quality that are considered detrimental were observed throughout the course of the demonstration project other than the temporary formation of THMs.

The tests conducted on the treated SWP water through the life of the demonstration project indicated consistent compliance with State and Federal MCLs for drinking water. The proposed project would comply with the State Water Resources Control Board Resolution No. 68-16, Statement of Policy with Respect to Maintaining the High Quality Waters in California. It would achieve the goal of maximum benefit to the people of the State by enhancing the reliability of water supply. The proposed project would enable the District to support current demand and future growth, reduce energy consumption required for pumping lifts, decrease dependence on lower quality groundwater, prevent further degradation of water quality in the Principal Aquifer, and reduce land subsidence problems. The proposed project would not affect the present and anticipated beneficial use of the Lancaster Subbasin. The proposed project would comply with drinking water standards and all applicable laws, regulations, plans, and policies to ensure water quality as prescribed in the Water Quality Control Plan for the basin.

Technical studies are herein incorporated by reference, and summarized where pertinent to reduce unnecessary duplication. The studies are available to the public review at the District's Alhambra office located at 900 S. Fremont Street.

Response F-8: The data developed during the demonstration project showed THM levels consistently at or below the USEPA's MCL, which was 100 Fg/L until December 2001. Exceptions were at the very beginning of the first two extraction cycles, where the THM concentration registered 119.4 Fg/L and 127.4 Fg/L, respectively. The concentrations went below the MCL after the first day of extraction and remained low throughout the remainder of the extraction cycles. The THM concentration started below 55 Fg/L at the beginning of the third extraction cycle, and then declined as in the first two cycles. All water produced from the aquifer and delivered to customers complied with the established State and federal water quality standards for drinking water. As described in Section 3.6.6, there are many significant differences between the chemistry of native groundwater and injected treated water, including pH, several major ions, trace metals, and THMs. The water quality data of SWP water from 1985 to present also show that the various constituents vary seasonally and from year to year. For example, the TDS of raw SWP water, which ranges from 230 to 335 ppm fluctuates within the average TDS of the groundwater basin.

Generally, the chemistry of extracted water is much like that of the median injected water early in the extraction period, as might be expected. Data from the extraction phase of the third cycle at a piezometer showed the presence of metals at elevated concentrations for some of the monitoring wells. As we reported at that time, the concentration of metals was attributed to the condition at the particular piezometer and the sampling and analysis methods. One explanation why the concentration of metals was elevated was that the

piezometer is small in diameter (2 inches) and water was collected using a special pump that could have also pumped sediment in the sample. The lab protocol as presented with our explanation then, did not call for the isolation of dissolved solids. The samples showed very high turbidity and were not filtered, which meant that the suspended solids may have contributed considerably to the said concentrations. Another possible explanation was the use of low pH water for recharge. Aluminum is the third most abundant element in the Earth's crust; manganese and iron are also present in the groundwater and occur in many rocks and clay material. The solubility of these metals is highly dependent on pH; recharge water with a pH below 8.0 may have mobilized these metals. The recharge water from AVEK had an average pH of 6.76.

Response F-9: The quantity of the THMs can vary not only by the disinfection conditions, but also by properties of the organic molecules that comprise the DOC. The concentration of THMs depends on the concentrations of organic carbons in the source water, the concentration of free chlorine residual in the recharge water, and the contact time during treatment. THMs form by the reaction between DOC and free chlorine. In general, free chlorine reacts with DOC and continues to react with DOC until either all the chlorine or all the reactive sites in the DOC are consumed.

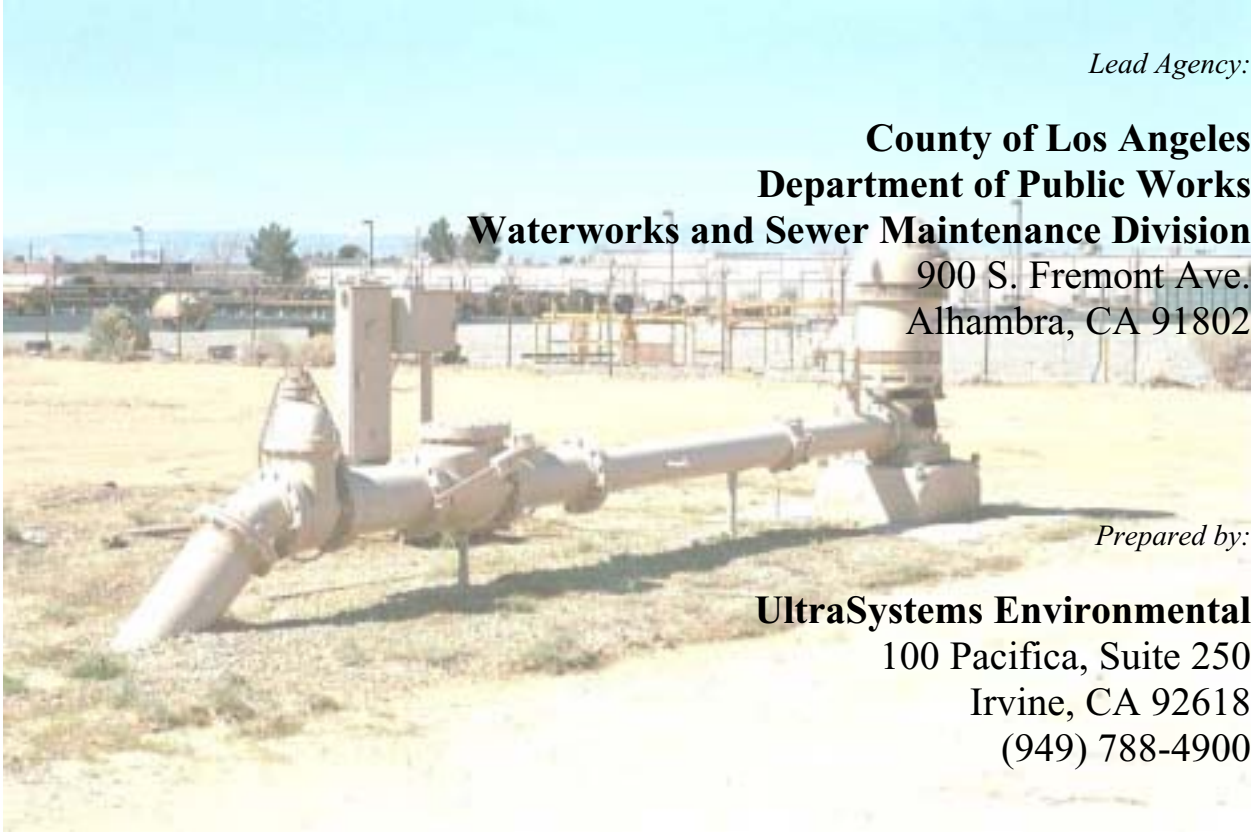
The approach recommended by the DEIR is to limit the organic precursors available for reaction and free chlorine. The studies referenced in the DEIR stated that the free chlorine in the injection water controlled the formation of THMs in the aquifer. Good operating practice dictates that the water supply system contain no more chlorine than is necessary to maintain a trace residual in the water. AVEK is currently evaluating alternatives for DOC removal. GAC and the use of membrane filtration are being evaluated by AVEK, each is capable of achieving low DOC levels.

The EPA's final Surface Water Treatment Rule and recent rules mandating reduced DBP concentrations would generally improve the quality of water available for ASR by cutting down the organic concentrations of recharge waters and providing adequate disinfection residual at the same time. The DBP rule would regulate the concentration of THMs in drinking water supplies.

Section C

Revised Draft REIR

Recirculated Draft Environmental Impact Report Waterworks District No. 40 Antelope Valley Aquifer Storage and Recovery Project



Lead Agency:

County of Los Angeles
Department of Public Works
Waterworks and Sewer Maintenance Division
900 S. Fremont Ave.
Alhambra, CA 91802

Prepared by:

UltraSystems Environmental
100 Pacifica, Suite 250
Irvine, CA 92618
(949) 788-4900

This version of the Recirculated Draft EIR has been revised and amended pursuant to the written comments received during the 45-day public circulation period.

State Clearinghouse Number:
2001051091

July 2003

Recirculated
Draft Environmental Impact Report
Waterworks District No. 40
Antelope Valley
Aquifer Storage and Recovery Project

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Lead Agency:

County of Los Angeles
Department of Public Works
Waterworks and Sewer Maintenance Division
900 S. Fremont Ave.
Alhambra, CA 91802
(626) 300-3357
Attn: Eleni Hailu and Ramy T. Gindi

Prepared by:

UltraSystems Environmental
100 Pacifica, Suite 250
Irvine, CA 92618
(949) 788-4900
Attn: Gene Anderson

State Clearinghouse Number:
2001051091

July 2003

PREFACE

This version of the Recirculated Draft EIR has been revised and amended pursuant to the written comments received during the 45-day public circulation period (March 11, 2003 through April 25, 2003). The changes in the document are made using strikeout to identify text being removed, and underline to identify text being added. All revisions and amendments are minor, and do not require recirculation pursuant to Section 15088.5 of the *State CEQA Guidelines*. The revisions and amendments have been made to clarify the information provided in the Recirculated Draft EIR.

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APPENDICES

Appendix

A Notice of Preparation and Initial Study
B Responses Received to Notice of Preparation and Initial Study
C Written Response to the Letter from Caltrans

1.0 INTRODUCTION

1.1 Project Background

The County of Los Angeles Department of Public Works Waterworks District No. 40 (District) is evaluating a proposal to construct and operate injection/extraction facilities for an aquifer storage and recovery (ASR) project within the Lancaster subbasin in Antelope Valley. The project would involve the construction and operation of a total of fifteen injection/extraction wells at five different project sites that are currently owned and in use by Waterworks District No. 40.

In compliance with the California Environmental Quality Act (CEQA), the District prepared and circulated a Draft Environmental Impact Report (Draft EIR) for the Lancaster subbasin Aquifer Storage and Recovery Project in May, 2002. The 45-day public review period for this document extended from May 17, 2002 to July 1, 2002, and a public hearing on the proposed project was held on June 18, 2002. Due to alteration to mitigation measures, and in order to ensure complete compliance with CEQA requirements, the District is recirculating the Draft EIR.

1.2 Purpose and Legal Authority

CEQA requires that local, regional, and state agencies and special purpose districts prepare an EIR for any discretionary action that may have the potential to significantly affect the quality of the environment. The District has prepared this Draft EIR for the proposed ASR project in accordance with the CEQA Statutes, Public Resources Code Section 21000 *et seq.*, the *State CEQA Guidelines*, Title 14, California Code of Regulations Section 15000 *et seq.*, as amended, and the Los Angeles County CEQA Guidelines. The proposed project must comply with CEQA because it is a "project" as defined by Section 15378 of the *State CEQA Guidelines*.

CEQA requires a Lead Agency to recirculate an EIR when significant new information is added to the EIR after public notice is given of the availability of the Draft EIR for public review under Section 15087 but before certification. Recirculation is required if:

1. A new significant environmental impact would result from the project or from a new mitigation measure proposed to be implemented.
2. A substantial increase in the severity of an environmental impact would result unless mitigation measures are adopted that reduce the impact to a level of insignificance.
3. A feasible project alternative or mitigation measure considerably different from others previously analyzed would clearly lessen the environmental impacts of the project, but the project's proponents decline to adopt it.
4. The Draft EIR was so fundamentally and basically inadequate and conclusory in nature that meaningful public review and comments were precluded.

The District is recirculating the Draft EIR as it addresses considerably different mitigation measures from those previously analyzed within the May 2002 Draft EIR. The new mitigation measures are described in Section 5.

This Draft EIR has been prepared for the purpose of analyzing the direct, indirect, cumulative, and growth-inducing environmental impacts associated with the proposed project. This Draft EIR is an informational document intended to fully disclose to the project's decision-makers, responsible agencies, interested parties, and the general public the significant or potentially significant environmental effects of implementing the proposed ASR project, to identify possible ways to avoid or reduce those impacts, and to describe reasonable alternatives to the proposed project.

1.3 Scope and Content

Pursuant to the requirements of *State CEQA Guidelines*, an Initial Study and Notice of Preparation was distributed on May 10, 2001. The Initial Study is provided in **Appendix A.** The following issues were considered in the Initial Study:

- Aesthetics
- Air Quality
- Geology and Soils
- Hazards and Hazardous Materials
- Hydrology/Water Quality
- Land Use Planning
- Noise
- Public Services
- Transportation/Traffic
- Utilities and Service Systems

The Initial Study determined that the proposed project could result in potentially significant adverse impacts on the environment, therefore, an EIR is required. This report addresses the following issues as determined by the Initial Study, and responses to the Notice of Preparation (**Appendix A**) that warrant analysis:

- Geology and Subsurface Conditions
- Groundwater Hydrology
- Public Services
- Energy Conservation

This report addresses the issues above and identifies any significant environmental impacts. In addition, the report recommends technically feasible mitigation measures, where possible, that would reduce or eliminate significant environmental effects. Potential project-generated effects that were determined not to be significant, and subsequently are not discussed in detail in this report, are identified and explained in the attached Initial Study (**Appendix A**).

In preparing this report, a number of technical studies were conducted in order to assess potential impacts to groundwater. These technical studies are herein incorporated by reference, and summarized where pertinent to reduce unnecessary duplication. The studies are available to the public review at the District Alhambra office located at 900 S. Fremont Street, and include the following:

- *Antelope Valley Groundwater Recharge Concept Plan, Air Force Site Along Amargosa Creek,* Anthony Wilkins and John Burton, Los Angeles County Department of Public Works, Hydraulic/Water Conservation Division, February 1992.

- *Antelope Valley Groundwater Recharge Study, Phase 2, Air Force Site Along Amargosa Creek,* Los Angeles County Department of Public Works, Materials Engineering Division, March 1991.

- *Antelope Valley Spreading Grounds Study, Phase 1 – Preliminary Report,* Los Angeles County Department of Public Works, Land Development Division, February 1989.

- *Antelope Valley Water Resource Study, Final Report, Antelope Valley Water Group,* Kennedy/Jenks Consultants, November 1995.

- *Analysis of Tests of Subsurface Injection, Storage, and Recovery of Freshwater in Lancaster, Antelope Valley, California,* Phillips, Steven P., Carlson, Carl S., et. al., March 12, 2001. *

- *Determination of Land Subsidence Related to Ground-Water-Level Declines Using Global Positioning System and Leveling Surveys in Antelope Valley, Los Angeles and Kern Counties, California 1992*, Marti E. Ikehara and Steven P. Phillips, U.S. Geological Survey, Water Resources Investigation Report 94-4184, 1994.

- *Hydrogeologic Assessment of the Western Portion of the Antelope Valley of Los Angeles County, California*, Richard C. Slade & Associates, August 1992.

- *Land Use and Water Use in the Antelope Valley, California*, William E. Templin, Steven P. Phillips, Daniel E. Cherry, Myrna L. DeBortoli, and others, U.S. Geological Survey, Water Resources Investigations Report 94-4208, 1995.

- *Process Affecting the Trihalomethane Concentrations Associated with the Aquifer Storage and Recovery Program in Lancaster Subbasin, Antelope Valley, California,* U.S. Geological Survey, August 30, 2000. *

- *Study of Potential Recharge Sites in The Antelope Valley,* Stetson Engineers Inc., September, 2002.

- *Time Series Ground-Water-Level and Aquifer-System Compaction Data, Edwards Air Force Base, Antelope Valley, California, January 1991 through September 1993,* Lawrence Freeman, U.S. Geological Survey, Open File Report 96-186, 1996.

- *Vertical-Deformation, Water-level, Microgravity, Geodetic, Data Collected During Tests of Subsurface Injection, Storage and Recovery of Freshwater in Lancaster, Antelope Valley, California,* 1995-1998, Metzger, Loren R., Marti E. Ikehara, and James Howle, U.S. Geological Survey, Open File Report 01-414, 2002.

- *Water-Quality Monitoring and Studies of the Formation and Fate of Trihalomethane During the Third Injection, Storage, and Recovery Test at Lancaster, Antelope Valley, California, March 1998 Through April 1999,* U.S. Geological Survey, Open-File Report 02-102, 2002.

- *Water System Master Plan for Los Angeles County Waterworks District No. 40 (Antelope Valley)*, Krieger & Stewart, Incorporated, April 29, 1999.

- *Waterworks District 40 Antelope Valley, Lancaster, Aquifer Storage and Recovery Demonstration Program*, Los Angeles County Department of Public Works, Waterworks and Sewer Maintenance Division, January 2000.

The Alternatives Section of the report is prepared in accordance with Section 15126 of the *State CEQA Guidelines*. The Alternatives Section examines the "No Project" alternative, and spreading grounds/infiltration alternative. This section also identifies the "environmentally superior" alternative.

The level of detail contained throughout this report is consistent with the requirements of CEQA and recent court decisions. The *State CEQA Guidelines* provide the standard by which the adequacy of this report is based.

1.4 Responsible and Trustee Agencies

The *State CEQA Guidelines* define "lead" and "responsible" agencies. The County of Los Angeles (County), as a public agency, has the principal responsibility for approving the proposed project. Therefore, the County will serve as the "Lead Agency." The Lead Agency is responsible for preparing the environmental documents on a project pursuant to the full disclosure requirements of the CEQA.

Responsible agencies are defined as those public agencies that have discretionary authority over certain aspects of the project. These agencies may utilize this report in their decision-making process. Responsible agencies for the proposed project include the following: Antelope Valley East Kern Water Agency (AVEK), which is responsible for State Water Project (SWP) deliveries to the District; and the Regional Water Quality Control Board, Lahontan Region (RWQCB), which would issue a Waste Discharge Permit or waiver thereof.

1.5 Mitigation Monitoring Plan

Pursuant to California Resources Code Section 21081.6, a Mitigation Monitoring Plan will be developed to ensure the implementation of the mitigation measures identified in the revised Draft EIR. The Plan will be adopted in conjunction with the findings required under CEQA, when the Board certifies the EIR and the proposed project. The Mitigation Monitoring Plan will be included in the final EIR.

1.6 Project Approvals and Permits

Project implementation may require the District to obtain permits and /or other forms of approval from federal, State and local agencies. These agencies may include, but are not limited to the following:

Federal Agencies

- United States Environmental Protection Agency (EPA)- Underground Injection Control (UIC) under Safe Drinking Water Act. Wells that inject potable water into drinking water aquifers are classified as Class V injection wells. Injection into Class V wells is exempt under permitting procedures.

State Agencies

- Regional Water Quality Control Board – Resolution No. 68-16 – Statement of Policy with Respect to Maintaining High Quality of Waters in California regulates disposal of wastes into the waters of the State as to achieve the highest water quality consistent with maximum benefit to the people of the State.
- Regional Water Quality Control Board – National Pollution Discharge Elimination System (NPDES).

Local Agencies

- City of Lancaster – Right of Way and Encroachment Permit.

1.7 Certification of Final EIR

This report will be circulated for review by public agencies and interested members of the public for a 45-day period. The District will prepare responses to all comments on the adequacy of the report received during this period. Per *State CEQA Guidelines*, although written comments for the original DEIR are a part of the administrative record, the previous comments do not require a written response in the Final EIR. The Final EIR will be comprised of the revised Draft EIR, comments and responses to comments received during the recirculation of the document, and the mandated CEQA Findings and Mitigation Monitoring Plan. The County as the lead agency for the EIR has the responsibility of determining the adequacy of the EIR pursuant to CEQA.

1.8 Acronyms

AF	acre feet
ASR	aquifer storage and recovery
AVEK	Antelope Valley East Kern Water Agency
BMPs	Best Management Practices
CEQA	California Environmental Quality Act
DHS	Department of Health Services
District	County of Los Angeles Department of Public Works Waterworks District No. 40

DOA	Department of Airport
DOCs	dissolved organic carbons
Draft EIR	Draft Environmental Impact Report
DWR	Department of Water Resources
EPA	United States Environmental Protection Agency
GPS	Global Positioning System
LACDPW	Los Angeles County Department of Public Works
LCID	Littlerock Creek Irrigation District
MCL	maximum contaminant level
mgd	million gallons per day
NOP	Notice of Preparation
NPDES	National Pollution Discharge Elimination System
pmol/L	picomoles per liter
ppm	parts per million
PWD	Palmdale Water District
RCSD	Rosamond Community Services District
RWQCB	Regional Water Quality Control Board, Lahontan Region
SWP	State Water Project
TDS	Total Dissolved Solids
THMs	trihalomethanes
UIC	Underground Injection Control
USGS	United States Geological Survey
WRP	Palmdale Water Reclamation Plant

2.0 EXECUTIVE SUMMARY

This summary section has been prepared pursuant to Section 15123 of the *State CEQA Guidelines*. This summary contains a brief description of the proposed actions and its consequences. This summary identifies each significant effect with the proposed mitigation measures and alternatives that would reduce that effect. It describes the areas of controversy that are known to the lead agency including those issues raised by other public agencies and the public, and it also addresses the issues yet to be resolved.

2.1 Project Description

The District proposes to construct water injection/extraction facilities in the Antelope Valley Basin, Lancaster subbasin in the City of Lancaster. The project consists of the installation of eleven new ASR wells (four of which would be replacement wells), the modification of four existing wells and the addition of appurtenant facilities. The facilities would deliver water supply to the wells for injection, as well as deliver water extracted from storage to existing District distribution facilities.

The ASR project would inject and store excess treated SWP water into the Lancaster subbasin for subsequent recovery of the supplies during high demand periods or during drought cycles.

Injection/Extraction Wells

The District is proposing to construct and operate injection/extraction facilities for an ASR project within the Lancaster Subbasin in Antelope Valley ground-water basin. The ASR project would inject excess treated SWP water into the Lancaster Subbasin for subsequent recovery of the supplies during high demand periods or during drought cycles.

The injection/extraction wells and appurtenant facilities would be constructed at five different locations within the Lancaster/Palmdale area. The five sites are owned by the County, and are in use by the District. Each of the five locations is an existing site for wells, tanks, and/or pumping plants. The proposed project calls for the installation of eleven new wells (four of which would be replacement wells) and modification of four existing wells. The project would also require the installation of pump/hydroelectric stations, pipelines, and related facilities.

The proposed ASR wells would be installed in the Principal aquifer system of the Lancaster subbasin. In order to provide maximum flexibility with regard to hydraulic parameters, the precise location of individual facilities has not been determined. Rather, general areas of potential installation have been identified based upon hydrologic conditions, proximity to existing infrastructure, and simulation/optimization models. All proposed wells would be installed to a depth of approximately 500-700 feet below ground surface, penetrating the Principal aquifer and terminating at the Blue Clay layer.

Three new injection/extraction wells would be installed at Site No. 1 (see **Figure 3-3**). The wells would be located no closer than 50 feet of the western and northern site boundaries, which abut residential uses. Two of the new wells would replace existing wells on site.

No new facilities would be installed at Site No. 2. The existing two wells would be modified for injection/extraction purposes (see **Figure 3-3**).

Two new injection/extraction wells would be installed at Site No. 3, both wells would replace existing wells on site (see **Figure 3-4**).

Two new injection/extraction wells would be installed at Site No. 4 (see **Figure 3-5**).

Four new injection/extraction wells would be installed within the southern portion of the property at Site No. 5 (see **Figure 3-6**). These wells would be separated from Avenue M by the three existing water tanks that occupy the northern portion of this site.

Injection/Extraction Quantities

All of the selected injection/extraction wells are or would be connected to a network of pipelines that allow routing AVEK water to the wells for injection, and widespread distribution of pumped water to District customers.

The proposed project calls for the ASR wells to be operated in an injection mode of up to 5 months in a year, depending upon water availability of imported water supplies from AVEK. Based upon an average injection/extraction scenario of 5 months of injection and 7 months of extraction, and assuming 24-hour operations, the wells are capable of injecting 6,843 acre-feet (AF) and extracting 13,282 AF.

The wells could potentially be operated in an extraction mode of up to 12 months a year, depending on the need to meet drought and emergency demands. Based upon the extraction capacities, and assuming 12 months of 24-hour extraction operations, the maximum extraction capacity of the proposed project would be approximately 23,085 AF.

The amount of injection per year would be dependent upon the availability of surplus AVEK water, which would fluctuate from year to year based upon the availability of SWP water and water demand factors within the Antelope Valley area. Neither the maximum average annual extraction nor the maximum extraction capacity would be sustainable on a yearly basis, as customers increase and peak hour demands fluctuate.

2.2 Project Location

The five project sites are located in the Antelope Valley, which makes up a portion of the southwestern part of the Mojave Desert in Southern California. A regional map is provided as **Figure 3-1**. As shown in **Figure 3-1**, the project area is within the southern portion of the City of Lancaster in the northern reaches of the County of Los Angeles.

A local vicinity map is provided as **Figure 3-2**. The location of the five project sites is shown on this figure.

- **Figure 3-3** shows the location of Site Nos. 1 and 2. An existing dirt road connects Avenue K and Avenue L. Site Nos. 1 and 2 are located adjacent to this dirt road. Site No. 1 is located mid-way between Avenues K and L. Site No. 2 is approximately 300 to 400 feet north of Avenue L.
- **Figure 3-4** shows the location of Site No. 3. Site No. 3 is located on the west side of Division Street approximately 1,500 feet south of Avenue K.
- **Figure 3-5** shows the location of Site No. 4. Site No. 4 is located on the north side of Avenue M approximately 700 feet east of 10th Street West.
- **Figure 3-6** shows the location of Site No. 5. Site No. 5 is located on the south side of Avenue M just east of 5th Street.

2.3 Project Objectives and Benefits

The objectives of the proposed ASR Project include:

1. Enhance the reliability of water supply in the Antelope Valley <u>by storing SWP water in a manner that is cost effective and easily accessible for use by the District during high demand times.</u>

2. Increase level of conjunctive use <u>in a cost-effective manner</u> <u>by storing SWP water in the Lancaster subbasin that can be extracted during periods when demand exceeds regular supply</u>.

3. Provide greater operational flexibility <u>by increasing local storage and allowing the District to better maintain its entire system</u>.

Benefits of the proposed ASR Project include:

1. Avoid or reduce overdraft of basin.

2. Halt the decline of groundwater levels, and thereby reduce energy consumption required for pumping lifts.

3. Reduce potential problems related to land subsidence.

2.4 Summary of Alternatives Considered

Based on the Lead Agency's independent analysis of the project and comments received following the release of the Initial Study, NOP and original Draft EIR, the District has identified and considered a range of potential project alternatives. In formulating a range of alternatives, the following factors were initially considered by the District: 1) alternatives capable of fulfilling applicable CEQA requirements; 2) alternatives capable of obtaining most of the project's basic objectives; and 3) alternatives capable of reducing or avoiding the project's significant or potentially significant adverse environmental effects.

The Alternative Section of the EIR examines in detail the "No Project" alternative, and spreading grounds/infiltration alternative. Other alternatives that have also been considered by the District, but were rejected as infeasible during the scoping process include storage alternatives such as storage tanks and surface reservoirs.

2.5 Summary of Environmental Impacts and Mitigation Measures

Groundwater purveyors within the Lancaster subbasin have expressed concern about the introduction of Trihalomethanes (THMs), a disinfection by-product of municipal water treatment, into the groundwater basin. Currently, the EPA has reduced the MCL of total THMs to 80 micrograms/liter. Residual chlorine present in the injection water from AVEK's water treatment process reacts with dissolved organic solids to produce THMs. Therefore, the injected water has a certain level of THMs as it is injected and then continues to form THMs once in the aquifer to a level proportional to the level of chlorine initially present. The District in cooperation with AVEK and the United States Geological Survey (USGS) conducted a demonstration project consisting of four cycles of injection/extraction of SWP. The fourth cycle was dedicated to study the formation and fate of injected water's THMs within the aquifer.

A summary of the proposed project's environmental impacts, mitigation measures, and the level of significance after mitigation is provided on the following pages (**Table 2-1**). The information in this summary is presented in a matrix format and briefly summarizes each of the project's potentially significant environmental impacts, the mitigation measures recommended to reduce or avoid each potentially significant environmental impact, and the level to which the mitigation measures are expected to reduce the potentially significant environmental impacts.

Table 2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance	Mitigation Measures	Level of Significance After Mitigation
GEOLOGY AND SUBSURFACE CONDITIONS			
Construction Project construction would not have a significant effect on local geological formations. Potential impacts would include soil erosion during the drilling and construction of the wells. Project implementation would utilize standard erosion control measures and waste management as specified under the Los Angeles County Department of Public Works Best Management Practices (BMPs) Handbook for Construction Activities. In addition the District and its contractors (if required) would procure discharge permits from the California Regional Water Quality Control Board for discharge of water from well construction operations, including development testing, and disinfection.	Not Significant	No mitigation measures are required.	No significant adverse geology and soil impacts have been identified.

Table 2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance	Mitigation Measures	Level of Significance After Mitigation
GEOLOGY AND SUBSURFACE CONDITIONS (Cont.)			
Operation The project, which consists of the construction and operation of injection/extraction facilities at five separate existing District sites, would result in water being injected into the principal aquifer zone at a depth of 300 to 700 feet. It is estimated that the acceptance rate of injected water into the principal aquifer to be 72% of the extraction rate.[4] Minimal impacts to project area geology are anticipated.	Not Significant	No mitigation measures are required.	No significant adverse geology and soil impacts have been identified.

[4]/ Geology & Soils Investigation-Antelope Valley Groundwater Recharge Study, Phase 2. County of Los Angeles Department of Public Works, Materials Engineering Division. March 13, 1991.

Table 2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance	Mitigation Measures	Level of Significance After Mitigation
GEOLOGY AND SUBSURFACE CONDITIONS (Cont.)			
Faults and Seismicity The section of the San Andreas Fault near the project area has not experienced a major earthquake in the past 134 years. Therefore, it is reasonable to assume that an earthquake of this size would occur during the design life of the recharge installation. The effects of a major earthquake on the injection/extraction well facilities are expected to be minor since the pumps are underground and very little "equipment" is exposed at the surface. While the project area is subject to seismic activity and as such the existing water facilities on the five sites have withstood previous seismic activity. The proposed project injection/extraction wells are expected to be capable of withstanding similar seismic activity in the future.	Not Significant	No mitigation measures are required.	No significant adverse geology and soil impacts have been identified.

Table 2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance	Mitigation Measures	Level of Significance After Mitigation
GEOLOGY AND SUBSURFACE CONDITIONS (Cont.)			
Liquefaction The unconsolidated soils in the project area may be subject to liquefaction during a major seismic event, if they are saturated by water recharge. If a liquefaction condition occurs, sand boils and fissures are likely to develop, and damage to project structures and underground installations can be significant. Typically, in order for liquefaction to occur, the groundwater table must be less than 50 feet deep. However, the potential for high groundwater conditions within the project area are considered low.	Not Significant	No mitigation measures are required.	No significant adverse geology and soil impacts have been identified.

Table 2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance	Mitigation Measures	Level of Significance After Mitigation
GEOLOGY AND SUBSURFACE CONDITIONS (Cont.)			
Subsidence Under drought or emergency conditions, ASR wells may be utilized as extraction wells. Extended extraction may result in insignificant impacts as a result of the inelastic compaction of the aquifer. One of the main benefits of the proposed project is the possible reduction of subsidence problems. Usage of stored water for supply in lieu of natural groundwater would aide in reducing the potential for subsidence within the project area.	Not Significant	No mitigation measures are required.	No significant adverse geology and soil impacts have been identified.

Table 2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance	Mitigation Measures	Level of Significance After Mitigation
GROUNDWATER HYDROLOGY			
Construction Impacts The discharge of water from the development, testing and disinfection of wells could degrade surface or groundwater quality during the construction phase of the ASR project.	Temporary potential adverse impacts at these five sites.	**GW-1** This measure mitigates the temporary potential adverse impact that the construction portion of the project may cause. The requirements for such impacts in most areas of the state are Waste Discharge Requirements (WDRs) and general National Pollutant Discharge Elimination System (NPDES) permits. In order to avoid the impacts of the discharge of water from the development, testing and disinfection of wells and ensure no degradation of surface or groundwater quality during the construction phase of the ASR project, the District shall monitor compliance with both WDRs and NPDES permits from the Regional Water Quality Control Board. All discharges are proposed to be conveyed by a combination of piped and/or storm channel overland flow to confined / bermed areas for dissipation by evaporation / percolation with no discharge occurring to surface waters. The mechanism to be followed prior to discharge includes confining the water to tanks for sedimentation treatment and holding the water in the tanks during the disinfection phase until the results confirm a reduction of chlorine residual concentration to 0.5 mg/L or less. The process of development / testing / disinfection may last about a week for each well being constructed.	Less-than-significant impact

Table 2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance	Mitigation Measures	Level of Significance After Mitigation
Groundwater Levels Under proposed project conditions, groundwater levels in the project area would be higher on average than current conditions. However, the direction of the hydraulic gradient is not expected to be altered over the subbasin. Therefore, the potential rise of groundwater into previously unsaturated zones is low. Long-term injection and storage of water supplies would raise the groundwater levels within the project area, thereby benefiting existing groundwater users. A decrease in pumping costs is expected due to increasing groundwater levels. As the pumping lift decreases so does the power cost to lift the water. As groundwater increases, additional pump bowls and larger motors would not be necessary. During the operations of the proposed project, the District would monitor groundwater levels to ensure no detrimental effects result from injection.	This is a potential beneficial environmental impact of the proposed project.	No mitigation measures are required.	Not significant

Table 2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance	Mitigation Measures	Level of Significance After Mitigation
GROUNDWATER HYDROLOGY (Cont.)			
The monitoring program will be reviewed and approved by the RWQCB.			
Groundwater Movement Investigation of how the proposed project affects local groundwater flow and water levels helps determine the fate of injected water constituents and recovery efficiency. A model or some visualization of what happens to the water once it is injected into the aquifer is useful and critically important in terms of aquifer water quality. Most models and theories suggest that the injected water creates a discreet dome or balloon type formation around the injection well. The model supposes that extraction of the well then deflates the balloon. However, the "balloon" model of fluid flow during the injection and extraction phases of ASR is probably much too simplistic and ignores other important geohydrologic and biogeochemical processes. In the demonstration project, two	Not Significant	No mitigation measures are required.	Not significant

Table 2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance	Mitigation Measures	Level of Significance After Mitigation
GROUNDWATER HYDROLOGY (Cont.)			
methods were used to determine a more accurate visualization of the injected water shape within the aquifer. The first method simply measured the water table level within the network of wells and peizometers consistently throughout the demonstration project. The second method measured changes in gravity due to small, but measurable net changes in mass proportional to the volume of water that fills or drains the pore spaces within the sediments. Gravity measurements were made before and during injection over a network of gravity stations. During the second injection/ extraction cycle, changes in gravity were determined along a north-south line. Results of the gravity changes indicate a rise in water table levels that form a conical shape with its apex at the injection site that slopes downward in a radial fashion. A general rise and fall of this shape occurred before injection and prior			

Table 2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance	Mitigation Measures	Level of Significance After Mitigation
GROUNDWATER HYDROLOGY (Cont.)			
to extraction during the second phase. Water level data also gives some indication of groundwater flow. Since water levels are generally sloping downward from north to south around the project area water flows from north to south also. Water levels in April 1996, prior to injection show water levels being 4-9 feet higher than those of a well at Palmdale. This suggests that during periods of low extraction in Lancaster, there exists a very slight gradient from the injection site to the southeast. However, there may be a temporary ground water flow divide between the Palmdale area and the injection site that would prohibit injection water flow southward. Water levels at wells greater than a mile from the injection site did not show any changes.			

Table 2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance	Mitigation Measures	Level of Significance After Mitigation
GROUNDWATER HYDROLOGY (Cont.)			
Water Supplies Concerns over the depletion of groundwater resources in the Lancaster area of the Antelope Valley have increased in recent years because of rapid population growth and the resulting demand imposed on existing water supplies. Historically, groundwater withdrawal has exceeded natural replenishment, resulting in as much as 200 feet of water-level declines throughout the Lancaster area and more than 6 feet of land subsidence in parts of Lancaster since the 1920's (Ikehara and Phillips, 1994). Reliance on groundwater eased somewhat in the 1970's with the introduction of imported surface water from the SWP California Aqueduct. However, because of the climactic influence on surface-water availability and steadily increasing demand, local groundwater sources are still an important part of the water supply. This project serves to augment supplies by providing additional	Not Significant	No mitigation measures are required.	Not significant

Table 2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance	Mitigation Measures	Level of Significance After Mitigation
GROUNDWATER HYDROLOGY (Cont.)			
water during periods of drought. The potential for future withdrawal of water during droughts and emergencies enhances the reliability of the District's service, as well as, helps sustain the future growth in the service area. The proposed project would result in a positive effect on groundwater due to conjunctive use of the SWP water. Utilization of conjunctive use would also reduce demands on the Sacramento/San Joaquin Delta during drought periods, thereby benefiting biological resources in that region.			
Water Quality All discharges associated with project implementation and long-term operations would be accomplished in accordance with RWQCB guidelines. Potential long-term impacts on groundwater quality include those associated with mixing of injected water with groundwater. The introduction of chlorine and THMs to the aquifer would have a	Potentially Significant	**GW-2** During the life of the ASR Project, the District shall operate the ASR project in compliance with the RWQCB's Anti-degradation Policy (Resolution 68-16) maintaining present and potential beneficial uses for the Antelope Valley Basin as described in Chapter 2 of the Water Quality Control Plan for the Lahontan Region (Basin Plan). Beneficial uses for the Antelope Valley Basin as described in the Basin Plan are: • Municipal and Domestic Supply – beneficial uses of water used for	The introduction of THMs to the groundwater basin would not be mitigated to a level of less than significant.

Table 2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance	Mitigation Measures	Level of Significance After Mitigation
GROUNDWATER HYDROLOGY (Cont.)			
potential significant impact on the environment. Concentrations of THMs in extracted water during the Demonstration Project showed an abrupt rise in THMs, followed by a very rapid drop and then a long slow decline as time goes on. Seasonal operation of an injection program would likely have a residual effect on groundwater chemistry given the same chemical and hydrologic conditions, and a similar ratio of injection to extraction volume. Results from an analytical mixing model, assuming complete mixing, are in agreement with this conclusion (Fujii and Bergamaschi, 2001). Although the imported water and groundwater are both of drinking-water quality, and are both delivered to customers in Lancaster, imported water does contain constituents, including chloride and THMs, with concentrations greater than those in native groundwater. On the other hand, groundwater contains		community, military, individual water supply systems including, but not limited to, drinking water supply. • Agricultural Supply – beneficial uses of waters used for farming, horticulture, or ranching, including, but not limited to, irrigation, stock watering, and support of vegetation for range grazing. • Industrial Service Supply – beneficial uses of waters used for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, geothermal energy production, hydraulic conveyance, gravel washing, fire protection, and oil well re-pressurization. • Freshwater Replenishment – beneficial uses of waters used for natural or artificial maintenance of surface water quantity or quality. The District shall operate the ASR project in compliance with drinking water regulatory program established by the California Legislature. The California Legislature established drinking water regulatory program (Title 22 Code of Regulations) within the State Department of Health Services (DHS) in order to provide the orderly and efficient delivery of safe drinking water. The District shall operate	

Table 2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance	Mitigation Measures	Level of Significance After Mitigation
GROUNDWATER HYDROLOGY (Cont.)			
some constituents at higher concentrations than imported water, including arsenic and hexavalent chromium, which are both constituents of concern locally. The demonstration project showed that THMs continued to form in the groundwater system after injection. Formation of THMs requires the presence of chlorine, the presence of organic precursors, and conditions favorable to the reactions forming THMs. In light of this, and with current available water treatment technology, the District would implement measures to improve injection water quality by limiting THM precursors during the proposed Project. While, the proposed project would have significant unavoidable impacts as a result of the introduction of THMs to the groundwater, it would produce beneficial water quality impacts.		the ASR project in compliance with primary and secondary drinking water standards established by DHS. • Primary Standards are maximum contaminant levels (MCLs) of contaminants that, in the judgment of DHS, may have an adverse effect on the health of persons. • Secondary Standards are MCLs of contaminants that, in the judgment of DHS, are necessary to protect the public welfare. **Table 5-1** lists the constituents and their MCLs that shall be used for compliance purposes. **GW-3** The District shall monitor injection rates, volume of injected SWP water, and groundwater levels during the lifetime of the ASR project. Water flow monitoring shall include taking continuous measurements of the rate and amounts of injection and extraction through flow meters, which will be located at each ASR well. Flow meters will be calibrated as specified by the manufacturer, and the results will be logged in a flow meter instrument maintenance logbook.	

Table 2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance	Mitigation Measures	Level of Significance After Mitigation
GROUNDWATER HYDROLOGY (Cont.)			
		The District shall also monitor groundwater levels. Depth to static groundwater measurements shall be obtained at each of the monitoring sites (see **Table 5-2**) using an electric water level sounder. The sounder shall be calibrated at the manufacturer's specifications. To obtain a depth to water measurement, the electric sounder cable shall be lowered slowly into the well via the water level sounding tube or equivalent orifice until the sounder indicates submergence by either a beeping sound or light depending on the type of signal installed for that particular model. At this point, the designated District personnel shall note the number of feet from the established and/or surveyed measuring point for that well to the groundwater surface by using gradations on the electric sounder cable. The height of the water column in the well shall be calculated by subtracting the depth to water measurement from the total well depth and shall be entered in a field notebook. Groundwater measurement for piezometers shall be taken electronically from the pressure transducers. The pressure transducers shall be calibrated semi-annually with the electric	

Table 2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance	Mitigation Measures	Level of Significance After Mitigation
GROUNDWATER HYDROLOGY (Cont.)			
		sounder. The District shall utilize the simulation model developed during the demonstration project to estimate aquifer characteristics, calculate directions and quantities of groundwater flow, and to analyze resulting effects on water levels. **GW-4** The District shall implement water quality monitoring throughout the life of the proposed project, for both source water being injected and the water being extracted. The District shall implement the following Sampling and Analysis Plan (SAP). The District appointed ASR project manager shall be responsible for the overall administration and implementation of the SAP. The Environmental Toxicology Laboratory (Lab) of the Los Angeles County Department of Agricultural Commissioner / Weights and Measures, or a comparable state-certified laboratory, shall perform the water quality analysis. **Monitoring Program** The Monitoring Program addresses water quality monitoring for both groundwater and	

Table 2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance	Mitigation Measures	Level of Significance After Mitigation
GROUNDWATER HYDROLOGY (Cont.)			
		SWP water used for recharge, and responsibilities for analysis and reporting. Background Groundwater Quality Background groundwater quality shall be developed for each monitoring point prior to initiation of the project. This one time sampling event is intended to confirm that background groundwater quality at the ASR well sites is consistent with historical groundwater quality data. The chemical and physical constituents to be to be analyzed and frequency of testing are listed in **Table 5-1**. The monitoring points are listed in **Table 5-2**. Pre-Injection SWP Water Quality Monitoring Analysis shall be performed on treated SWP water that is being injected at the beginning of each injection cycle to establish background water quality data for recharged water. The chemical and physical constituents to be to be analyzed and frequency of testing are listed in **Table 5-3**. The monitoring points are listed in **Table 5-2**. Groundwater Extraction Water Quality Monitoring	

Table 2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance	Mitigation Measures	Level of Significance After Mitigation
GROUNDWATER HYDROLOGY (Cont.)			
		In order to document potential groundwater quality changes in the aquifer due to injection and extraction operations, sampling and analysis shall be performed on groundwater collected at monitoring sites established by the District. Monitoring wells were selected so that this monitoring plan successfully confines the injected water to the depression area (see **Figure 5-7**). **Tables 5-3** and **5-1** presents the complete list of constituents and parameters that shall be monitored, and the respective MCL. **Reporting Program** The District shall maintain water quality data and make it available to the RWQCB upon request. The monitoring and project operating data that the District shall maintain, include all above mentioned water quality data and Chain-of-custody (COC) forms with pertinent field information for water quality sampling and analysis done (See **Figure 5-8**). The District shall also identify and report problems related to well sampling including temporary lack of access to well(s), inoperable or malfunctioning purging and sampling	

Table 2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance	Mitigation Measures	Level of Significance After Mitigation
GROUNDWATER HYDROLOGY (Cont.)			
		equipment, and unsafe working conditions. **Field Water Quality Sampling Methods And Procedures** Sample Containers The Lab shall prepare appropriately selected containers with both preservative and container type in accordance with the requirements presented in **Table 5-4**. Extra containers of each type shall be provided in the event of breakage or loss. Each container shall have a pre-printed identification label clearly showing the group or type of analysis to be performed. The Lab shall assign a laboratory sample number upon receiving the sample for proper identification and tracking. Sample containers shall be laboratory cleaned prior to use based in the analyte of interest in accordance with standard United States Environmental Protection Agency (USEPA) protocol. Sample containers shall be stored in a fashion that prevents dust or other contaminant accumulations. The Lab shall be responsible for verifying the cleanliness and integrity of the sample containers prior to shipment to the District pursuant to their	

Table 2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance	Mitigation Measures	Level of Significance After Mitigation
GROUNDWATER HYDROLOGY (Cont.)			
		sample container quality control (QC) procedures. Well and Sample Line Purging Prior to sampling, each well shall, to the extent possible, be pumped by the District for a sufficient period of time to evacuate any standing water in the well, ensure movement of "fresh" groundwater in the well and ensure pH, specific conductance, and temperature stabilization. Water discharge from the production wells shall be conveyed directly to waste. The sample line flow shall remain constant and continuous during sample collection to minimize the potential for particulate matter becoming dislodged in the discharge pipe and entering sample container(s). Sample Collection and Preparation The District shall contact the Lab and arrange to have ice chests of prepared sample bottles delivered to the appropriate location requested by the District at least one week prior to the sampling event. Upon receipt of the sample bottles, designated District sampling personnel	

Table 2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance	Mitigation Measures	Level of Significance After Mitigation
GROUNDWATER HYDROLOGY (Cont.)			
		shall make an inventory of the bottles received to assure that adequate number and types of sample bottles required for the upcoming sampling event have been provided. Prior to each sampling event the designated District personnel shall inventory, restock, replace, clean, calibrate, maintain, and test water quality monitoring equipment as needed. Sampling equipment shall include portable specific conductance meter, pH meter, residual chlorine test kit and thermometer, including pH buffer solutions and specific conductance calibration solutions. At a minimum, the frequency and nature of equipment maintenance shall be consistent with the manufacturer's recommendations. Total Organic Carbon samples shall be collected with as little aeration as possible to ensure that no air bubbles are incorporated into the sample containers after they are capped. If air bubbles are observed in a sample container, re-sampling shall be performed. Sample Preservation Designated sampling personnel shall use "clean sampling techniques" to minimize potential	

Table 2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance	Mitigation Measures	Level of Significance After Mitigation
GROUNDWATER HYDROLOGY (Cont.)			
		contamination of water samples. Sample containers and lids shall not touch the ground, the sampling personnel's clothing, or any other potential source of contamination. Sample container lids shall not be removed from a particular container until that container is to be filled. Sampling containers shall be rinsed three times with the sample prior to collection unless the container contains a preservative. The sample container shall be filled to the top of the rim to minimize air space between the liquid level and the lid. The container lid shall also be rinsed with the sample before use. The lid shall be tightened securely to the container immediately after sample collection is completed. Chemical preservatives and refrigeration shall be used to maintain sample integrity prior to analysis. After sample collection, water samples shall be stored in insulated coolers or ice chests at a temperature of 4 ^{0}C, or 39 ^{0}F, until delivery to the Lab. Samples to be analyzed for total metals shall be filtered using a 0.45-micron filter then acidified with nitric acid by the Lab immediately on arrival. Designated sampling personnel shall exercise extreme care at all times during the handling of	

Table 2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance	Mitigation Measures	Level of Significance After Mitigation
GROUNDWATER HYDROLOGY (Cont.)			
		acid-preserved sample containers to minimize spillage, damage and/or injury to the sampler(s) or the field equipment. In addition to nitrile sampling gloves, the designated sampling personnel shall wear safety glasses or goggles to minimize potential eye injury. Water Quality Sample Record Keeping All sample containers shall be pre-labeled, to the extent possible, prior to each sampling event to facilitate sampling activities. Sample containers provided by the Lab shall contain waterproof labels and pre-marked information such as analyte and laboratory identification number. To the extent possible, the designated Lab / District sampling personnel shall inscribe the well identification and sampler(s) name or initials on the labels under dry conditions using a waterproof marker pen prior to each sampling event. Immediately prior to collection of water samples, the designated District sampling personnel shall inscribe on the sample bottle label the date and time of sample collection and the name of any preservatives used with a waterproof marker pen. The designated District sampling personnel shall maintain a record showing: • Site name and/or well number	

Table 2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance	Mitigation Measures	Level of Significance After Mitigation
GROUNDWATER HYDROLOGY (Cont.)			
		▪ Name(s) of sampling personnel ▪ Measured depth to groundwater ▪ Discharge rate [in gallons per minute (gpm)] ▪ Number of minutes of well purging ▪ Field measurements of pH, specific conductance, residual chlorine and temperature ▪ Date and time(s) of sample collection ▪ Weather conditions • Other significant field or sampling conditions In addition, a COC form indicating the well name(s) or well number, sampler's name, date and time sampled, any special observations, and laboratory sample number shall be filled out by the designated sampling personnel and placed in a sealed plastic bag (e.g., Ziplocs) with the sample(s) in the ice chest to provide a COC record. A sample COC form is presented as **Figure 5-8**. The lab shall submit the completed COC record to the designated District sampling personnel upon delivery of the sample(s) to the lab. Sample Results The Lab shall use a standard reporting form for	

Table 2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance	Mitigation Measures	Level of Significance After Mitigation
GROUNDWATER HYDROLOGY (Cont.)			
		all water sources listing date(s) of analysis, name(s) of person who analyzed the samples, USEPA analytical method(s) used, name of analytical method used, name of parameter analyzed, detection limit and result of the analysis. Any analytical result less than detectable shall be reported as less than the method detection limit. The Lab shall submit paper or electronic copies of laboratory results and written reports to the Water Quality Senior Civil Engineer. Unusual spikes, questionable results, or detection of chemicals not on the list of required constituents shall be promptly reported to the designated District sampling personnel. Nitrate analytical results shall be reported as mg/L as NO_3. Hardness and alkalinity shall be reported as mg/L as $CaCO_3$. The Lab shall maintain records for at least three years from the date the analytical reports were submitted to the designated sampling personnel made showing the calibration of equipment used in the various analyses. **GW-5** The District shall maintain THM levels in stored water below the MCL, thus not negatively affecting the District's or any other purveyor's ability to pump and serve	

Table 2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance	Mitigation Measures	Level of Significance After Mitigation
GROUNDWATER HYDROLOGY (Cont.)			
		groundwater from the regional aquifer for beneficial uses as described in Water Quality Control Plan for the Lahontan Region. The District shall achieve this through the reduction of free chlorine and/or organic compounds by implementing best practicable treatment or control methods.	
PUBLIC SERVICES			
Sheriff's Department Implementation of the proposed ASR project would not result in a significant impact to law enforcement services because they would not create a need for additional staffing, equipment, or facilities.	Not Significant	Mitigation measures are not required since no significant adverse impacts were identified.	No significant adverse impacts on police services would occur during construction or operation of the proposed ASR project.
Fire Department Implementation of the proposed ASR project would not result in a significant impact to fire services because they would not create a need for additional staffing, equipment, or facilities.	Not Significant	Mitigation measures are not required since no significant adverse impacts were identified.	No significant adverse impacts on police services would occur during construction or operation of the proposed ASR project.

Table 2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact	Significance	Mitigation Measures	Level of Significance After Mitigation
ENERGY CONSERVATION			
The electrical power demand of the equipment that run the motors (etc.) that operate the injection/ extraction well pumps and other operational equipment on the five sites would not utilize a significant amount of electrical power.	Not Significant	The Los Angeles County Department of Public Works shall specify that all electrical equipment purchased to operate the injection/extraction wells will be as energy efficient as is possible without sacrificing the quality necessary to ensure the equipment operates properly over time.	No significant adverse energy impacts have been identified.

3.0 PROJECT DESCRIPTION

The District is proposing to construct and operate injection/extraction facilities for an ASR project within the Lancaster subbasin in Antelope Valley groundwater basin. The ASR project would inject and store excess treated SWP water into the Lancaster subbasin for subsequent recovery of the supplies during high demand periods or during drought cycles.

3.1 Statement of Objectives

Pursuant to Section 15124(b) of the *State CEQA Guidelines* the following is the statement of objectives sought by the proposed project.

1. **Enhance the reliability of water supply in the Antelope Valley <u>by storing SWP water</u> in a manner that is cost effective and easily accessible for use by the District during high demand times. ~~and to support current demand and future growth in the area~~.** The development of the additional local storage facilities will provide a greater measure of water supply reliability in the event of emergencies and drought periods. The development of the additional storage using seasonally available water supplies can be utilized to either augment imported supplies or to meet total demand during outages of SWP facilities.
2. **Increase level of conjunctive use <u>in a cost-effective manner</u> <u>by storing SWP water in the</u> <u>.</u> ~~The~~ <u>Lancaster subbasin</u> ~~would be used to store water supplies~~ that can be extracted during periods <u>when demand exceeds regular supply</u>** ~~of below average precipitation when surface water supplies are below normal~~. Conjunctive use of the subbasin would further improve the overall reliability of the District system by augmenting water supplies during peak demand periods.
3. **Provide greater operational flexibility <u>by increasing local storage and allowing the District to better maintain its entire system</u>.** Increase in local storage would provide greater water system flexibility in that key system components could be placed out of service for inspection and maintenance activities without interruption in water service.

<u>Potential Regional Benefits</u>

As a result of implementing the proposed project, the District and the Lancaster subbasin would benefit from the following:

- **Avoid or reduce overdraft of basin.** Historically, groundwater withdrawals in the Lancaster area of the Antelope Valley have exceeded natural replenishment, resulting in overdraft and land subsidence (USGS 01-414, 2002). The development and utilization of the additional basin storage and the optimization of alternative water supplies would avoid or reduce overdraft in the basin.
- **Halt the decline of ground-water levels, and thereby reduce energy consumption required for pumping lifts.** Historically, water levels in the proposed project area were affected primarily by agricultural activity through the 1960's, but are now affected primarily by pumping for urban use (Templin and others, 1995). Since the 1920's, groundwater levels have declined as much as 200 feet in the area (USGS 94-4184, 1994).

The development and utilization of the additional basin storage would halt the decline of groundwater levels.

- **Reduce potential subsidence problems.** Groundwater extraction within the project area occurs throughout the Lancaster subbasin, and is utilized for agriculture, municipal and industrial purposes. Land subsidence in the Antelope Valley is caused by aquifer system compaction that is related to groundwater-level declines and the presence of fine grained, compressible sediment (USGS, 94-4184).

3.2 Project Location

Regional Location

The proposed project is located in the Antelope Valley, which makes up a portion of the southwestern part of the Mojave Desert in Southern California. A regional map is provided as **Figure 3-1**. The City of Lancaster is in the south central part of the Antelope Valley, in the western part of the Mojave Desert, and is about 50 miles north of Los Angeles. As shown in **Figure 3-1**, the project area is within the southern portion of the City of Lancaster in the northern reaches of the County of Los Angeles.

Local Vicinity

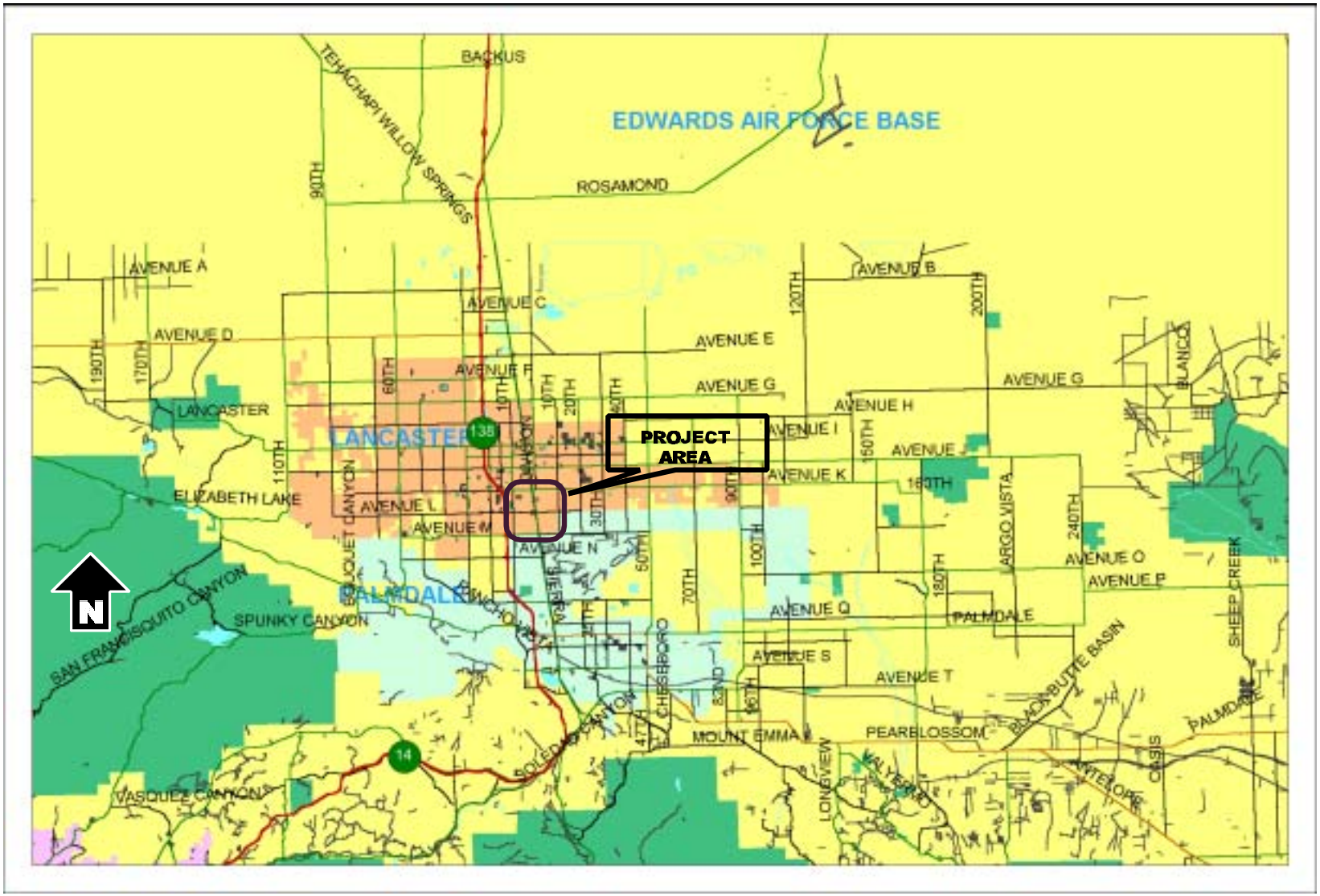
A local vicinity map is provided as **Figure 3-2**, depicting the five well sites for the proposed project.

- **Figure 3-3** shows the locations of Site Nos. 1 and 2. An existing dirt road connects Avenue K and Avenue L. Site Nos. 1 and 2 are located adjacent to this dirt road. Site No. 1 is located mid-way between Avenues K and L. Site No. 2 is approximately 300 to 400 feet north of Avenue L.
- **Figure 3-4** shows the location of Site No. 3. Site No. 3 is located on the west side of Division Street approximately 1,500 feet south of Avenue K.
- **Figure 3-5** shows the location of Site No. 4. Site No. 4 is located on the north side of Avenue M approximately 700 feet east of 10th Street West.
- **Figure 3-6** shows the location of Site No. 5. Site No. 5 is located on the south side of Avenue M just east of 5th Street.

3.3 Environmental Setting

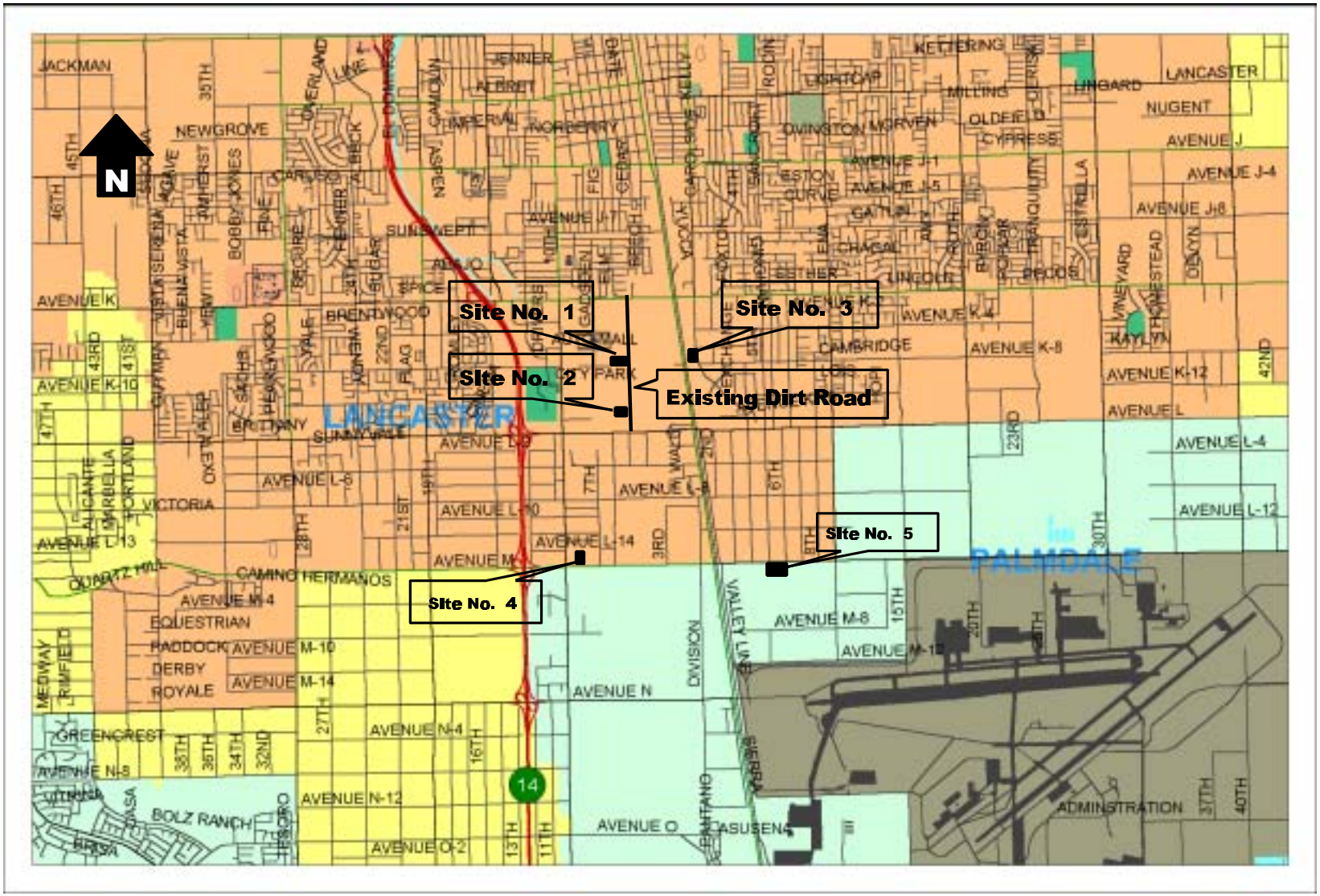
Regional Setting

The Antelope Valley groundwater basin is located in the westernmost part of the Mojave Desert. It is approximately 2,400 square miles in size. Antelope Valley is separated from the San Joaquin Valley on the northwest by the Tehachapi Mountains. The San Gabriel Mountains are located to the southwest. Isolated buttes form the north and east boundaries of Antelope Valley. The Antelope Valley is shown in **Figure 3-7**.



Source: Thomas Bros. Maps

Figure 3-1
Regional Location Map



Source: Thomas Bros. Maps

Figure 3-2
Local Vicinity Map

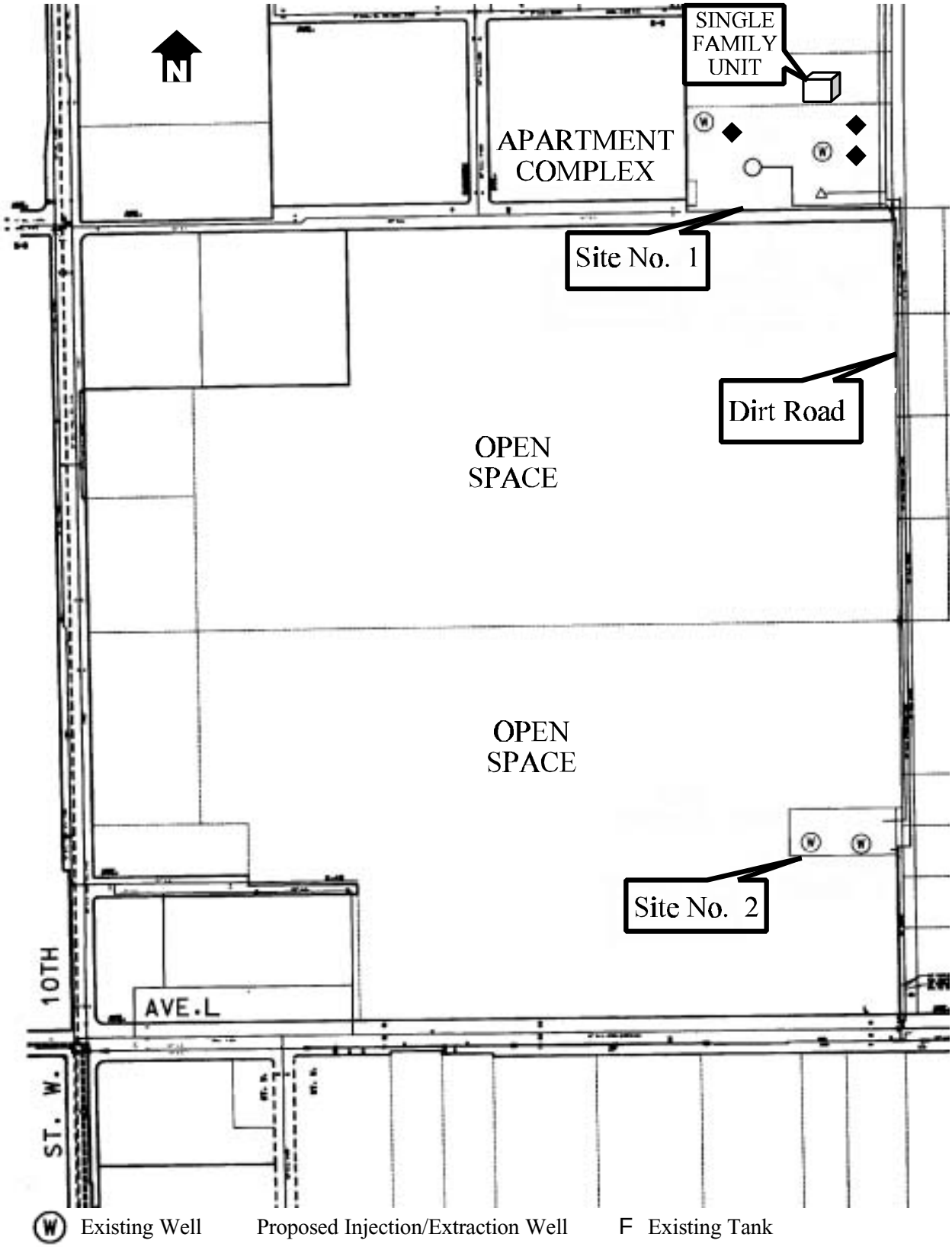


Figure 3-3
Sites No. 1 and 2

Source: Dept. of Public Works

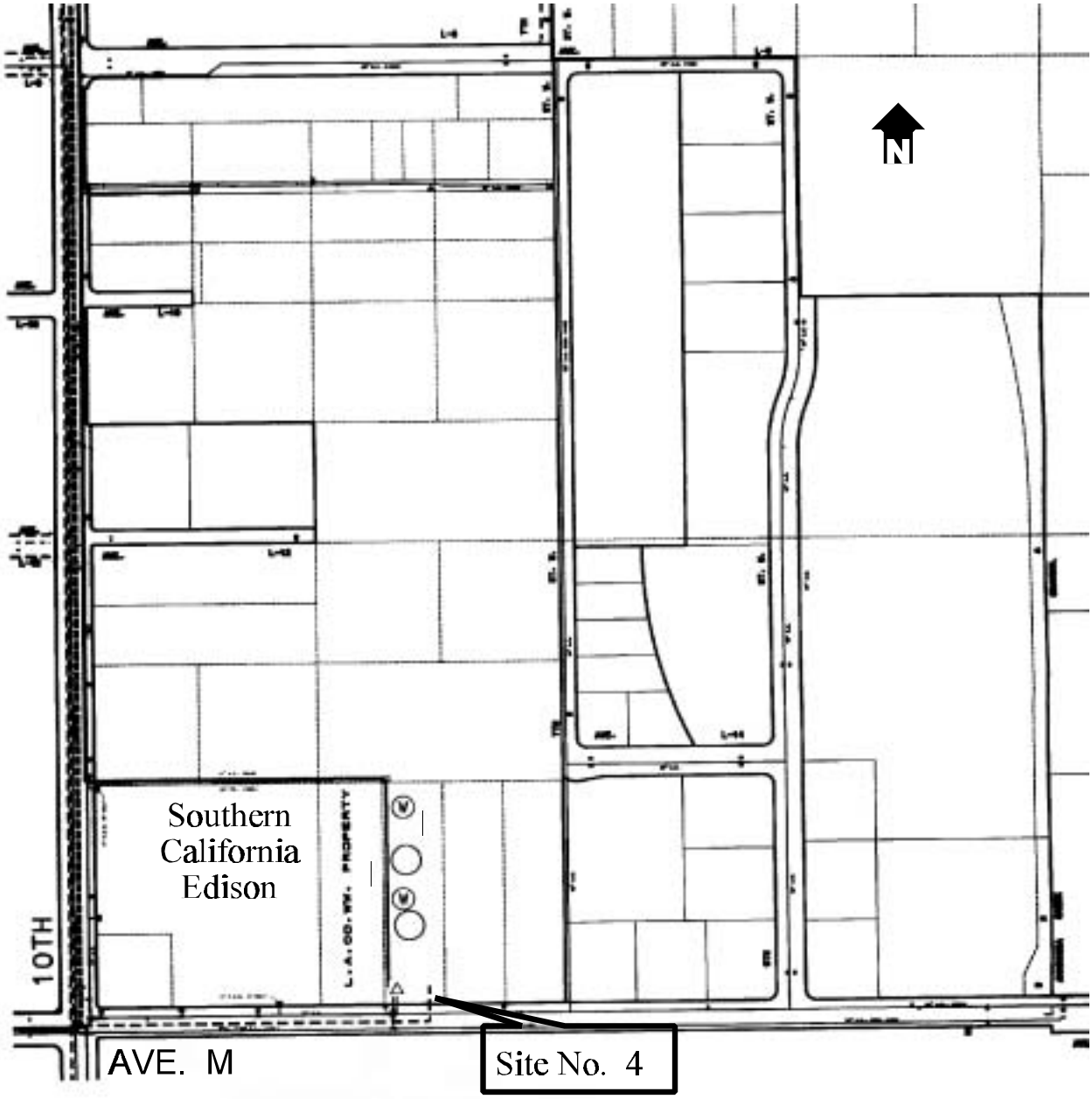
Ⓦ Existing Water Well

♦ Proposed Injection/Extraction Well

○ Existing Water Tank

Figure 3-4
Site No. 3

Source: Dept. of Public Works



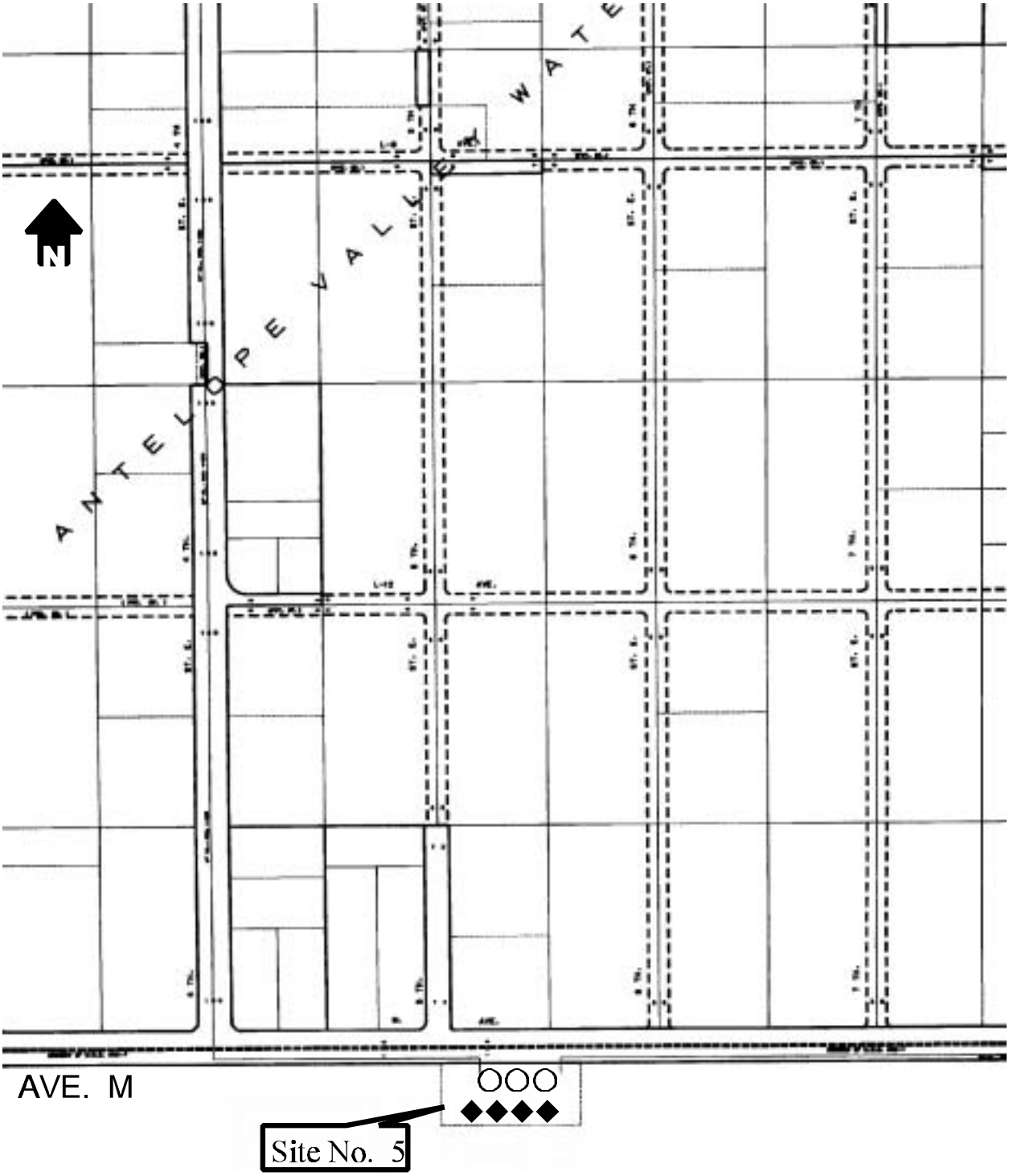
(W) Existing Well

Proposed Injection/Extraction Well

F Existing Water Tank

Figure 3-5
Site No. 4

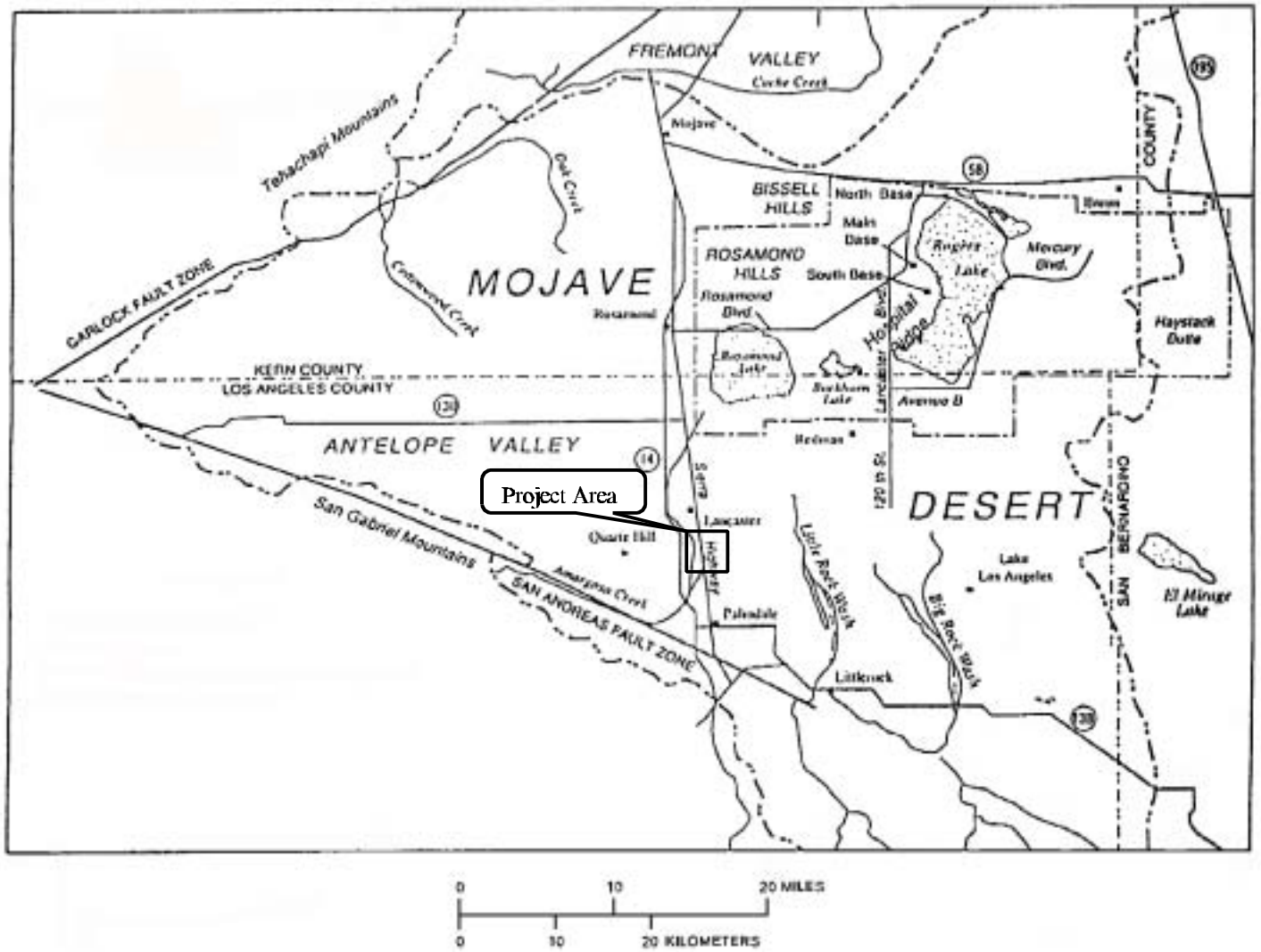
Source: Dept. of Public Works



F Existing Water Tank
Proposed Injection/Extraction Well

Source: Dept. of Public Works

Figure 3-6
Site No. 5



Source: Dept. of Public Works

Figure 3-7
Antelope Valley

The valley is semi-arid, receiving 5 inches of precipitation annually along the northern boundaries of the valley and 10 inches of precipitation along the southern boundaries (Kennedy/Jenks, 1995). The Antelope Valley is a closed basin; that is, it has no outlet for its surface streams. Surface water from the surrounding hills and from the valley floor flow towards three dry lakes. All the dry lakes are located on Edwards Air Force and include Rosamond Lake, Buckhorn Lake and Rogers Lake. Surface water flows that reach the dry lakes are generally lost to evaporation. The most hydrologically significant streams include Big Rock Creek, Little Rock Creek, and Amargosa Creek. The Little Rock Creek is the only developed surface water supply in the valley. Except during the biggest rainfall events of a season, surface water flows towards the valley from the mountains, quickly percolating into the stream bed and recharging the ground-water basin (Kennedy/Jenks, 1995).

The Antelope Valley groundwater basin is subdivided by various faults and subsurface structural features into twelve subbasins. The Lancaster subbasin, one of the twelve ground-water subbasins, underlies the central portion of the valley in the vicinity of Lancaster. The aquifer system of the Lancaster subbasin consists of two alluvial aquifers - the Principal and the Deep aquifer - which are separated by a confining bed (Londquist and others, 1993). The Principal aquifer is unconfined and overlies lacustrine clay sediments. The subsurface lithology of both aquifers has been logged as interbedded heterogeneous mixtures of clay, silt, sand and gravel (Rewis, 1993). The Deep aquifer is confined by a massive bed of blue clay, except in the northeastern part of Antelope Valley where the clay intersects land surface and thins to extinction (Durbin, 1978). The confining clay bed is at depths greater than 600 ft near Lancaster, which is in the south center of the Lancaster subbasin and surfaces between Redman and Buckhorn Lake. The Principal aquifer extends to just north of the southern boundary of Edwards Air Force Base where the deep aquifer becomes unconfined in the northeastern part of the Valley. (USGS, 94-4184)

Local Setting

The project area is located in the southern area of the Antelope Valley basin. State Route 14 parallels the western side of the project area, and Sierra Highway bisects the project area in a north/south direction. The Palmdale International Airport is located southeast of the project area.

Site No. 1 has an existing water tank, two wells, and a building that houses equipment. There is an apartment complex adjacent to its western boundary and a single-family residence adjacent to its northern boundary. Open space uses are to the east and south of Site No. 1. **Figure 3-8** shows two photos of Site No. 1. One photo is of an existing well and one of an equipment building. The apartment complex is visible in the background of both photos.

Site No. 2 consists of two separately fenced areas that are surrounded by open space. Amargosa Creek runs to the west of Site No. 2. **Figure 3-9** shows two views of Site No. 2. The fenced area closest to the dirt road (shown in Photo 3) contains one existing well, a Global Positioning System Marker, an equipment bunker housing a piezometer (used to monitor groundwater quality and level), and facilities belonging to the Southern California Edison Company. The second fenced-in area well site is visible in the background. Photo 4 shows the existing well within the second fenced area. There are no other uses within the second fenced area.

Photo 1: View looking northwest at the existing well on Site No. 1. The apartment complex is visible in the background.

Photo 2: View looking southwest at an equipment building on Site No. 1. The apartment complex is visible in the background.

Figure 3-8
Photographs of Site No. 1

Source: Ultrasystems Environmental Incorporated

Photo 3: View looking southwest at an existing well. The support of the Global Positioning System Marker is visible in the lower right corner of the picture. The open space nature of the surrounding land is visible in the background.

Photo 4: View of the second existing well on Site No. 2.

Figure 3-9
Photographs of Site No. 2

Source: Ultrasystems Environmental Incorporated

Site No. 3 is located in an industrial/commercial area. **Figure 3-10** shows two views of existing wells on Site No. 3. A third existing well is located on the west side of the site. **Figure 3-11** shows several pictures of pipes and other devices stored in the yard of Site No. 3. Adjacent industrial buildings are visible in the background of these photos.

Site No. 4 is located in an industrial/commercial area. There is a Southern California Edison facility and yard immediately to the west (see **Figure 3-13**). There are industrial/commercial uses to the north and east, and open space uses to the south across Avenue M. **Figure 3-12** shows two views of the two existing wells on Site No. 4. There are also two water tanks on this site. The adjacent industrial uses are visible in the background of Photo 10. All of the existing uses on this site are located on the eastern half of the property. There are no facilities on the western half of the site.

Site No. 5 has three existing water tanks that border the northern portion of the property, but there are no existing wells on this site. The land to the west, south, and east is in open space use. **Figure 3-14** shows two views of the open space nature of the southern portion of this site.

3.4 Project Background

Groundwater storage is becoming a major alternative for water supply. Conjunctive use of surface and groundwater resources has been recognized as one of the few optimal solutions to basin managers who must find ways to provide a reliable supply of water. The California State Legislature, recognizing the importance of conjunctive use programs, adopted the California Water Plan. In-lieu of the pumping program it was initiated to decrease the overdraft and subsequent land subsidence in the basin. The main motivation for the proposed project is to meet growing water demand for the area, provide maximum drought and emergency supply capability, and to avoid additional land subsidence without negatively impacting the existing system.

3.4.1 Water Demands and Water Supplies

Current and Projected Demand

The population of the Antelope Valley grew substantially over the years, particularly in the 1980's. Starting the decade with 107,000 residents, this part of the Los Angeles County had grown to over 240,000 by 1990. Most of the growth occurred in the central part of the Valley, within and around the cities of Lancaster and Palmdale (Los Angeles County Regional Planning, 1994).

In 1980 and 1990, the population of the City of Lancaster was 48,103 and 97,291 respectively. Currently, with the largest percent growth in Los Angeles County, the City of Lancaster has a population of about 118,718 (Southern California Association of Governments, 2000 Census Data), making it the largest city in the valley, followed closely by the City of Palmdale.

Photo 5: View looking northeast at an existing well in the northeast corner of Site No. 3.

Photo 6: View looking southeast at an existing well on Site No. 3.

Figure 3-10
Photographs of Site No. 3

Source: Ultrasystems Environmental Incorporated

Photo 7: View looking northeast at pipe being stored on Site No. 3.

Photo 8: View looking north at pipe being stored on Site No. 3.

Figure 3-11
Photographs of Site No. 3

Source: Ultrasystems Environmental Incorporated

Photo 9: View looking north at an existing well on Site No. 4. A water tank is immediately behind the well.

Photo 10: View looking northeast at the open area and an existing well on Site No. 4.

Figure 3-12
Photographs of Site No. 4

Source: Ultrasystems Environmental Incorporated

Photo 11: View looking southeast at the wall that separates Site No. 4 into two halves. One of the new injection/extraction wells would be located near this wall.

Photo 12: View looking east at the western half of Site No. 4. The SC Edison facility is visible in the background.

Figure 3-13
Photographs of Site No. 4

Source: Ultrasystems Environmental Incorporated

Photo 13: View looking southeast at the open space on the south side of Site No. 5.

Photo 14: View looking east at the open space on the south side of Site No. 5.

Figure 3-14
Photographs of Site No. 5

Source: Ultrasystems Environmental Incorporated

The population within the Districts service area has increased steadily over the past several years from about 108,00 persons in 1990 to about 128,000 persons in 2000. Population is expected to increase significantly over the next 20 years. The Districts Urban Water Management Plan estimates the population growth within the service area to be 362,300 by 2020. Supply requirements are also estimated to increase to 113,407 AF by 2020.

Currently, water delivered to residents and businesses by the District comprise of a mixture of groundwater and imported SWP water. During 2002, the District supplied 23,635 AF of groundwater and 33,440 AF of SWP water to its customers representing 41% and 59% of supply, respectively.

Current and Projected Demands

Projections were based on the summation of the individual water demand projections for the City of Palmdale, City of Lancaster, Rosamond Community Services District (RCSD), Other and Agricultural. Projections are adopted from the Antelope Valley Water Resource Study prepared by Kennedy/Jenks Consultants.

City of Palmdale: Water demand projections for the City of Palmdale are based on per capita demand of 0.32 acre-feet per person per year derived from 1993 population and water use data from Palmdale Water District and applied to the low, medium, and high population projections.

City of Lancaster: Water demand projections for the City of Lancaster are based on per capita demand of 0.35 acre-feet per person per year derived from information provided in the City of Lancaster 1992 State of the City report and applied to the low, medium, and high population projections.

RCSD: Water demand projections for the RCSD are based on a per capita demand of 0.17 acre-feet per person per year derived from 1993 population and water use data from RCSD and applied to the low, medium, and high population projections.

Other: Water demand projections for the "Other" category are based on a per capita demand of 0.41 acre-feet per person per year derived from 1990 population and water use data provided by the Antelope Valley United Water Purveyors Association.

Agricultural: Current and projected 2020 agricultural water uses in the Antelope Valley are approximately 59,000 acre-feet and 39,100 acre-feet respectively.

Available Water Supplies

Available water resources in the Antelope Valley consist of local groundwater, surface water from Little Rock Reservoir, imported water from the SWP, and reclaimed water. Stormwater runoff, although not presently managed or used, is a resource that has potential for greater use in the Antelope Valley.

Groundwater: Historically, groundwater has been the primary water supply source for the Antelope Valley. Reported ground-water pumpage for the Los Angeles County portion of the Antelope Valley peaked in 1956 with 270,000 AF, followed by a decline to 53,200 AF in 1983. Since 1983, ground-water use increased to a high of 91,743 AF in 1991 (USGS 94-4208).

State Water Project: SWP deliveries to the Antelope Valley began in 1972. The AVEK, PWD, and Littlerock Creek Irrigation District (LCID) provide SWP water to the Antelope Valley. Deliveries peaked in 1981 with approximately 80,000 AF. However, since 1981 deliveries have ranged between 14,000 and 58,000 AF per year. Between 1976 and 1982, total deliveries ranged between 19 and 92 percent of the total entitlements. Between 1983 and 1992, total deliveries ranged between 9 and 69 percent of the total entitlements.

Littlerock Reservoir: The Littlerock dam has a storage capacity of 3,500 AF.

Reclaimed Water: Wastewater influent reached nearly 21,000 AF in 1990. The combined wastewater flows from Edwards AFB, the City of Palmdale and the City of Lancaster contributed to approximately 92 percent of the 21,000 AF. According to the USGS, approximately 6,000 AF was reused for irrigation and wetlands in 1990, and nearly 5,500 AF was used for land disposal (USGS, 94-4208).

Current and Projected Supplies

The potential current water supply ranges between 212,900 and 240,800 AF, and the potential 2020 water supply ranges between 275,700 and 303,600 AF. The only difference between the current and the 2020 potential water supply is the increased availability of reclaimed water. ~~supply, which is~~ The amount of available reclaimed water is expected to increase as the population in Antelope Valley increases. There are no other potential new sources to supply water to the District.

Groundwater: Historically, the groundwater storage capacity for the Antelope Valley was estimated to be 68 million AF; in 1975 groundwater remaining in storage was estimated to be 55 million AF (California Department of Water Resources, 1980). The principal source of recharge of the basin is runoff, recharged in the foothills of the mountains. Contribution to recharge of the basin from precipitation on the Valley floor is considered negligible. Average groundwater recharge is estimated to be about 40,000 to 58,000 AF per year (Snyder, 1955[1]; Bloyd, 1967[2]; Durbin, 1978[3]).

State Water Project: SWP entitlements for the Antelope Valley are currently estimated to be approximately 165,000 AF. The entitlements of AVEK, PWD and LCID are 141,400, 21,300, and 2,300 AF per year, respectively.

[1] Snyder, J.H., 1955, Groundwater in California, The Experience of the Antelope Valley: University of California Berkeley, Gianninni Foundation Ground Water Studies No. 2.
[2] Bloyd, R.M., Jr., 1967, Water Resources of the Antelope Valley-East Kern Water Agency Area, California: U.S. Geological Survey Open File Report.
[3] Durbin, T.J., 1978, Calibration of a mathematical Model of the Antelope Valley Groundwater Basin, California, U.S. Geological Survey Open File Report.

Littlerock Reservoir: The Littlerock Dam has a storage capacity of approximately 3,500 AF.

Reclaimed Water: Reclaimed water would come from the wastewater treatment facilities in the Antelope Valley. Reclaimed water flows for 1993 and projected 2020 reclaimed water flows are estimated to be approximately 19.29 million gallons per day (mgd) (21,600 AF per year) and 76.09 mgd (85,200 AF per year) respectively. Reclaimed water from the Palmdale Water Reclamation Plant (WRP) is currently used on the Department of Airport (DOA) property. A portion of the flow is used at various farms on the property. The remaining flow is currently spread over the 2,600 acres of DOA land. Reclaimed water from the Lancaster WRP is used at Nebeker Ranch to irrigate alfalfa crops. A small portion is used at the Apollo Lake County Park, and the remaining flow is currently diverted to Piute Ponds.

The Palmdale, Lancaster, Rosamond, Edwards AFB, and Mojave WRPs represent the plants with the highest probability of developing a reclaimed water system. The combined 1993 and projected 2020 flow from these five plants represent nearly 98 percent of the total potential reclaimed water supply for the entire Antelope Valley and is estimated to be 18.7 mgd (20,900 AF per year) and 74.7 mgd (83,700 AF per year), respectively.

Reliability of Water Supplies

SWP Water Supply: The most significant factors that affect the SWP supply estimates are the future demand, Delta environmental requirements, and future SWP facilities. Total entitlement of all SWP contractors is 4.2 million acre-feet per year. DWR reports that SWP facilities currently have no chance of making full entitlement deliveries and will have a less than 10% chance of making full entitlement deliveries for projected 2021[4].

According to the DWR, additional future SWP facilities are anticipated to increase the estimated SWP supply, however, until the various Delta issues are resolved, the feasibility of constructing additional SWP facilities and accurately estimating the increased water supply from such facilities is difficult to determine. It is anticipated that new facilities will increase the reliability and delivery capability of the SWP supply.

Littlerock Reservoir Supply: Based on 1954 to 1993 hydrology data, the analysis projects annual diversions ranging from 1,170 to 25,300 AF per year. PWD estimates an annual average yield of 7,000 AF from the Reservoir. Therefore, although the analysis indicated potential diversions greater than 7,000 AF, the Kennedy/Jenks report assumes 7,000 AF as the maximum annual yield.

Reclaimed Water Supply: The wastewater treatment plants in Antelope Valley could reliably produce 60,000 AF per year in the year 2020.

Overall Water Supply: Because groundwater and reclaimed water have 100 percent reliability, weighted averages were used to compute the reliability of the aggregate water supply. As mentioned previously, the potential water supply is 225,900 AF per year (assuming a high

[4] The State Water Project Delivery Reliability Report, Department of Water Resources, Bay Delta Office, Draft 2002.

estimate for the groundwater supply). Current forecasts indicate ~~It is expected~~ that only 83,000 AF would be available 100 percent of the time. This amount is equivalent to approximately 37 percent of the potential water supplies being available 100 percent of the time.

3.5 Project Characteristics / Operations

Injection/Extraction Wells

The injection/extraction wells and appurtenant facilities would be constructed at five different locations within Antelope Valley. The five sites are owned by the District, and are in use. Each of the five locations is an existing site for wells, tanks, and/or pumping plants. The proposed project calls for the installation of eleven new wells and modification of four existing wells. The project would also require the installation of pump/hydroelectric stations, pipelines, and related facilities.

The proposed ASR wells would be installed in the Principal aquifer system of the Lancaster subbasin. In order to provide maximum flexibility with regard to hydraulic parameters, the precise location of individual facilities has not yet been determined. Rather, general areas of potential installation on each site have been identified based upon hydrologic conditions, proximity to existing infrastructure, and simulation/optimization models. Given the size of each site, however, the area in which the wells may be installed is relatively narrow. All proposed wells would be installed to a depth of approximately 500-700 feet below ground surface, penetrating the Principal aquifer and terminating at the Blue Clay layer.

Three new injection/extraction wells would be installed at Site No. 1 (see **Figure 3-8**, Photo 1). The wells would be located no closer than 50 feet of the western and northern site boundaries, which abut residential uses. Two of the new wells would replace existing wells onsite.

No new facilities would be installed at Site No. 2. The existing two wells would be used for injection purposes (see **Figure 3-9**).

Two new injection/extraction wells would be installed at Site No. 3, both wells would replace existing wells on site (see **Figure 3-11**, Photo 7-8).

Two new injection/extraction wells would be installed at Site No. 4 (see **Figure 3-12**, Photo 10 and **Figure 3-13**, Photo 11).

Four new injection/extraction wells would be installed within the southern portion of the property at Site No. 5 (see **Figure 3-14**, Photos 13 and 14). These wells would be separated from Avenue M by the three existing water tanks that occupy the northern portion of this site.

Project Injection / Extraction Quantities

All of the selected injection / extraction wells are or would be connected to a network of pipelines that allow routing AVEK water to the wells for injection, and widespread distribution of pumped water to District customers.

The proposed project calls for the ASR wells to be operated in an injection mode for up to 5 months in a year, depending upon water availability of imported water supplies from AVEK. Based upon an average injection / extraction scenario of 5 months of injection and 7 months of extraction, and assuming 24-hour operations, the wells are capable of injecting 6,843 AF and extracting 13,282 AF.

The maximum extraction capacity of each well shown in **Table 3-1** was determined from a combination of existing capacity-test data and historical records. ~~Long-term injection capacities shown in **Table 3-1** are assumed to be 72% of the extraction capacity. The wells could potentially be operated in an extraction mode up to 12 months a year, depending on the need to meet drought and emergency demands. Based upon the extraction capacities and assuming 12 months of 24-hour extraction operations, the maximum extraction capacity of the proposed project would be approximately 23,085 AF.~~

Neither the maximum average annual extraction nor the maximum extraction capacity would be sustainable on a yearly basis, as customers increase and peak hour demands fluctuate. Likewise, the amount of injection per year would be dependent upon the availability of surplus AVEK water, which would fluctuate from year to year based upon the availability of SWP water and water demand factors within the Antelope Valley area.

Table 3-1
INJECTION/EXTRACTION CAPACITIES OF EXISTING AND PROPOSED WELLS

Well(s)	Well Site Designation	Maximum Extraction Capacity (ft^3/d)	~~Long-Term Injection Capacity (ft^3/d)~~
Proposed (3)	K-8 & 5th West (1)	525,000	~~378,000~~
Existing (2)	Ave. L & 5th West (2)	350,000	~~252,000~~
Proposed (2)	K-8 & Division (3)	280,000	~~205,200~~
Existing (2)	Ave. M & 7th West (4)	400,000	~~288,000~~
Proposed (2)		400,000	~~288,000~~
Proposed (4)	Ave. M & 5th East (5)	800,000	~~576,000~~
TOTAL		2,755,000	~~1,987,200~~

Note: The "Long-term Injection Capacity" column was removed because the table contained unrealistic scenarios that originated from a USGS report that investigated many "what ifs;" as such it did not present a balanced view. It presented a potential scenario where the wells would be used 24 hours/day for 12 months in an extraction mode. However, the same potential available for the wells to be used in an injection mode for 12 months 24 hours/day was not included.

3.6 ASR Demonstration Project

3.6.1 Introduction

Though finite, groundwater has been a major source of water supply in the Antelope Valley mainly because of limited surface water sources in the area. The region has observed a steady decline of groundwater levels in the Principal aquifer as a result of years of development. When production of groundwater exceeds the natural and / or artificial replenishment, it results in adverse effects such as subsidence and degradation of the groundwater basin (movement of poor quality waters into the otherwise clean basin). Groundwater depletion was estimated by the USGS (Templin and Phillips 1995 p63). Land subsidence resulting from overdraft due to high demand for water supply and scarcity of surface water sources was also identified as a problem in parts of the Antelope Valley (Templin et al, 1992, p. 2). Degradation of groundwater and subsidence not only threaten to hinder the use of existing potable water but also prevents the use of extremely valuable underground storage in future years.

Groundwater use should be limited to minimize this depletion. However, under emergency or drought conditions in which imported water supply is reduced or no longer available, it will be necessary to meet demand from the groundwater. This increased production will adversely impact the groundwater basin unless existing available basin storage can be utilized for seasonal storage. Investigation of various alternative water supply sources for long term planning identified conjunctive use of imported SWP water and groundwater as a good option. Identifying ways to meet growing water demand for the area without negatively impacting the existing system including the groundwater basin was greatly needed given the scarcity of this limited resource. Therefore, the District in cooperation with USGS and AVEK, conducted the demonstration project to evaluate the feasibility using available storage capacity of the groundwater basin to increase the dependability of the presently developed surface water supplies of the State.

The demonstration project sought to evaluate institutional, legal, and economic issues associated with the injection of SWP water into the lower section of the Principal Aquifer, the storage of this water and its recovery. The following paragraphs present a short account of the demonstration project activities and findings that have provided the technical foundation and / or management strategy for the region's broader water resources management.

3.6.2 Project Facilities

SWP water provided by AVEK was injected in the Principal aquifer, stored for various lengths of time and extracted. The recharge facilities used were Waterworks wells #4-8, and #4-42 for Phase I and # 4-32 and # 4-34 for Phase II of the demonstration project. The wells in each phase of the test were selected because of the availability of infrastructure for conveying surface water to the site and because of the absence of nearby buildings, or other features that could possibly be affected by the tests or interfere with data collection. Other facilities used for the demonstration project include: production wells and peizometers used for monitoring, transducers, data loggers, microgravity monuments and survey equipment, survey leveling bench marks GPS station, and extensometer.

3.6.3 Monitoring Network for Groundwater Levels and Simulation Model Development

Both water quality and hydrogeologic effects of the treated SWP water injection were monitored during the life of the demonstration project. ~~A~~ Water-level ground surface movement monitoring networks were established in the Study Area using active and abandoned production wells and nested piezometers~~.~~, extensometers, microgravity monuments, leveling survey bench marks and permanent GPS antenna. Electronic monitoring system including pressure transducers and data loggers were used to record continuous measurements of flows, water levels, aquifer system compaction, barometric pressure, temperature levels in all network piezometers. Two borehole extensometers were constructed to measure land-surface deformation during and beyond this-study.

Groundwater flow simulation model was developed to help address the fate of artificially recharged water and offsite effects, for use in designing and later managing an injection program. The model was calibrated to observe head responses for three cycles including one with five months of injection.

3.6.4 Water Quality Monitoring

Water quality analyses during the demonstration project evaluated the effects of injected SWP water on the Lancaster subbasin. Water samples were obtained from project wells and monitoring wells for complete analysis. This was done before the start of injection, in the middle of the injection cycle and after injection was completed for each of the four injection/extraction cycles. Selected water quality parameters were monitored continuously during each injection and extraction cycle (see **Table 3-2**). It is these water quality parameters that were also considered as potential constituents of concern during the life of the ASR project.

Monitoring on these specific water quality parameters was also performed to ensure that the injected water was fully removed. Samples were tracked by the use chain-of-custody forms originated by every accompanied every sampler collecting the samples in the field and passed on (transferred) to lab personnel that handled the samples after delivery to the lab.

3.6.45 Project Operations

Treated SWP water provided by AVEK was injected in to the shallow (Principal) aquifer, stored for various lengths of time and then extracted. Following injection, the water levels were allowed to stabilize for two to three weeks before an extraction cycle was initiated.

Pre-injection Data Collection

Both hydrogeologic and water quality data was collected for benchmarking purposes prior to the start of the demonstration project. The following tasks were performed before the start of the demonstration project:

- Video survey and well cleaning, where necessary.
- Velocity log to identify high-producing parts of aquifer.

Table 3-2
Water Quality Parameters
(General Mineral, Physical, Inorganic & Organic Analysis)

Analyte	Method	Units	DLR	MCL
Total Hardness (as $CaCO_3$)	EPA 130-2	mg/L	5	
Calcium (Ca)	EPA 215-2	mg/L	2l	
Sodium (Na)	SM3500-Na	mg/L	5	
Potassium (K)	9M3500-K	mg/L	1	
Total Cations				
Total Alkalinity (as $CaCO_3$)	SM2320-B	mg/L	4	
Hydroxide (OH)	SM2320-B	mg/L	2	
Carbonate (CO_3)	SM2320-B	mg/L	2	
Bi carbonate (HCO_3)	SM2320-B	mg/L	2	
Sulfate (SO_4)	EPA300	mg/L+	0.5	
Chloride (Cl)	EPA300	mg/L+	2	
Nitrate (NO_3)	EPA300	mg/L	2.0	45
Flouride (F) Temp. dependent	EPA300	μg/L	0.1	2
Total Anions				
pH	EPA150.1	Std. Units+	0.01	
Specific Conductance (E.C.)	EPA120.1	μmho/cm+	1	1600
Total Filterable Residue at 180C (TDS)	EPA160.1	mg/L+	5	
Apparent Color (Unfiltered)	EPA110.2	Units	5	15
Odor Threshold at 60 C	EPA140.1	TON	0	3
Lab Turbidity	EPA180.1	NTU	0-1	5
MBAS	EPA425.1	mg/L+	0.05	0.5
Inorganic Chemicals				
Aluminum (Al)	SM3113B	μg/L	50.0	1000
Antimony	SM3113B	μg/L	6.0	6
Arsenic (As)	SM3113B	μg/L	2.0	50
Barium (Ba)	SM3113B	μg/L	100.0	1000

Analyte	Method	Units	DLR	MCL
Beryllium	SM3113B	µg/L	1.0	4
Cadmium (Cd)	SM3113B	µg/L	1.0	5
Chromium (Total Cr)	SM3113B	µg/L	10.0	50
Copper (Cu)	SM3113B	µg/L+	50.0	1000
Iron (Fe)	SM3113B	µg/L+	100.0	300
Lead (Pb)	SM3113B	µg/L	5.0	
Manganese (Mn)	SM3113B	µg/L+	30.0	50
Mercury (Hg)	SM3113B	µg/L	1.0	2
Nickel	SM3113B	µg/L	10.0	100
Selenium (Se)	SM3113B	µg/L	5.0	50
Silver (Ag)	SM3113B	µg/L+	10.0	100
Thallium	SM3113B	µg/L	1.0	2
Zinc (Zn)	SM3113B	µg/L	50.0	5000
Regulated Organic Chemicals				
Bromodichloromethane	524.2	µg/L	0.5	
Bromoform	524.2	µg/L	0.5	
Chloroform (Trichloromethane)	524.2	µg/L	0.5	
Dibromochloromethane	524.2	µg/L	0.5	
Total Trihalomethane	524.2	µg/L	0.5	80

- Full geophysical and lithologic logs were collected when drilling the holes for all the piezometers.
- Step-injection pre-test to determine injection capacity.
- Water quality sampling in production and injection wells, and in piezometers to establish a water quality baseline.
- Initial microgravity survey was performed to establish a baseline for the estimation of changes in water table elevation during the life of the project.
- Water-level measurements by hand within network to help determine water-level recovery period.
- Leveling survey.
- Started continuous GPS measurements.
- Installed tilt meters to characterize the shape of land surface uplifts during injection.
- Transducers in piezometers and extensometer for continuous water level and land surface compaction monitoring.

Summary Of Injection / Extraction Cycles

The demonstration project was conducted in two phases to evaluate both hydraulic and chemical compatibilities of an ASR program in the Lancaster subbasin.

Phase I consisted of a one month long two interference tests carried on March 31, through May 1, 1994 at the K8 and Division Well Field. The purpose of this test was to evaluate hydraulic compatibility of injection into the basin, to determine aquifer properties of the site as well as to evaluate the potential use of existing production wells and facilities. The results of Phase I tests indicated that there are probably two distinct aquifers, one confined and one unconfined and that the confined Deep aquifer in the vicinity of the test site has smaller transmissivity and storage properties than the unconfined Principal aquifer.

Phase II consisted of four cycles of somewhat longer periods of recharge and recovery that were conducted to determine aquifer properties and to evaluate the effects of injecting treated SWP water on the basin chemistry. Water quality data from the injection wells as well as selected monitoring wells before, in the middle and after injection were collected for all cycles. With the exception of THMs in injection wells, none of the detected levels from the monitoring wells, injection wells or injected water exceeds the maximum contaminant level (MCL) established for drinking water by the State of California Department of Health Services. The THMs levels in both injection wells initially exceeded the MCL but went down (below the MCL) after the first day of extraction.

The recharge and extraction cycles evaluated several issues including water quality and hydrogeologic impacts of the project. The general water quality criteria were designed to assess whether any long-term degradation was occurring to the well or the aquifer as a result of the injection / extraction process. This was accomplished by monitoring:

- Injection flow rates and injection duration.
- Water level changes in the injection wells and monitoring wells including the piezometers.
- The pressure at the wellhead.
- Water quality for both the source water and the extracted water.
- Water-level measurements, microgravity survey, leveling survey re-positioning and re-calibration of piezometer transducers, were accomplished and water quality samples were collected at the beginning of each cycle.

The periods for each cycle varied but flow rates were maintained constant for most part. Water quality samples were collected before the start of injection, at the middle of injection (only for second cycle), and after the end of injection. Mid- and late- injection microgravity surveys were performed and the values were used along with an approximate value for specific yield to estimate water level changes. Recording of GPS and tiltmeter data along with water levels and land surface deformation data from the network wells and the extensometer respectively were collected throughout the cycles. Following a cycle extraction, water levels were allowed to stabilize before the next round of injection process is started. Variable lengths of storage periods were applied ranging from 2 weeks to 4 weeks prior to the starting of extraction.

The four cycles of this phase are discussed in the following paragraphs.

Cycle I

Injection for this cycle was started on April 8, 1996 and ended on May 6, 1996. A total of 182.5-acre feet of SWP water were injected. Approximately half of the amount was injected into each of the project wells. Extraction was run between 05/22/96 and 07/19/96 with a total of 785-acre feet of water was pumped out from the two project wells. Water quality data from the project wells as well as selected monitoring wells before, and after injection were collected.

Cycle II

Injection for this cycle was started on November 12, 1996 and ended on April 17, 1997. Total of 983.78-acre feet of treated SWP water was injected into each of the two project wells. Approximately one-half of the amount was injected into each of the project wells. Extraction was run from 05/14/97 to 01/05/98. A total of 1,783 AF of water was extracted during this cycle.

Cycle III

Injection was started on April 15, 1998 and ended on June 16, 1998. A total of 182-acre feet of treated SWP were injected only into Well 4-32. As in the previous two cycles water quality constituents were tracked throughout the cycle by monitoring major cautions and anions to assess any changes in water chemistry. A total of 932 AF of water was extracted through the two project wells. A study on the fate and transport of THMs was initiated at the beginning of Cycle III. To further study the theory of the mixing of injected and groundwater a tracer study was also performed. Sulfur hexaflouride (SF_6) was chosen as the tracer since it is present in neither surface or groundwater, behaves conservatively, is non-reactive to chlorine, does it biodegrade or adsorb into sediments, and is detectable at low levels. Because of this, the tracer was taken to be a direct means of measuring the amounts of injected and groundwater present in an extracted sample. Added as a gas about 65 feet from the wellhead, the sulfur hexaflouride target solution was 100 pmol/L (picomoles per liter). Samples were then collected in the injection and extraction phase.

Cycle IV

Preliminary assessment of the data collected during the THM study in Cycle III indicated that residual chlorine continues to react with the dissolved organic carbons (DOCs) to form THMs in groundwater, and that the amount of residual chlorine appears to limit THM formation. It was, therefore, agreed that the test should be extended to include a short injection and extraction cycle to test the effect of dechlorinating the recharge water before it is injected. Recharge for this cycle was started on May 6, 1999 and ended on June 11, 1999. Total injected SWP was 114.5-acre feet and all was injected into Well number 4-32. A total of 428.22-acre feet of water were extracted from Well 4-32 during this cycle, which ended on November 17, 1999. No shifts in water quality that are considered detrimental were observed throughout the course of the demonstration project other than the temporary formation of THMs.

3.6.~~5~~6 The THM Study

One of the principal concerns at the initiation of the Demonstration Project was the existence of THMs in the treated SWP water and the potential for continued formation of THMs in the groundwater basin. Extensive water quality sampling was implemented during the course of the Demonstration Project, both source water being injected and the water being extracted. The results from all of the monitoring wells showed that constituents including chloride, TDS, sulfate, and nitrate levels from these monitoring wells stayed relatively constant after injection. However, these results indicated that formation and possible persistence of THMs poses a potential problem for use of stored water for drinking besides "degrading" the groundwater basin. Tests showed a significant rise in THMs, then a very rapid drop near the beginning of extraction followed by a long slow decline as time goes on.

The main objective of the study was to quantitatively assess the factors controlling the continued formation of THMs in injected water and the aquifers in order to identify potential means of altering ASR practices to limit THM formation and address the following questions:

1. What controls the continued formation of THM in the aquifer after injection?

2. What causes the continued presence of low levels of THM in the extracted water after all of the injection water has presumably been retrieved?

3. Are there natural attenuation mechanisms that can decrease the THM concentrations in the aquifer?

The THM study consisted of five components, which together addressed the three questions concerning the formation and fate of THM during the third ASR cycle.

1. **Monitoring**: Water quality samples were collected periodically from the ASR well to determine the composition of the injection and later, the extraction water. Water quality samples were also collected from a nearby observation well that contained four nested piezometers. These samples provided a time series of water quality data that was used to delineate the behavior of THM and other chemical analytes during the third ASR cycle.

2. **Tracer Study**: As discussed previously, a conservative tracer, sulfur hexaflouride (SF_6), was added to the injection water, and concentrations in the extraction water were monitored. The tracer study permitted construction of a mass balance for water volumes and THM in the injection and extraction waters.

3. **Sorption Study**: The potential sorption of THM onto aquifer sediments was investigated in laboratory experiments using sediments recovered during drilling of the observation well.

4. **Biodegradation Study**: The potential biodegradation of THM in the aquifer was investigated in laboratory microcosms using sediments from the cores and water

collected from the injection and native groundwaters. Bacterial counts in water samples also were performed periodically.

5. **THM Formation Study**: The potential for continuing formation of THM in the aquifer after injection was investigated in laboratory incubations of injection water for time periods up to 16 weeks. The potential for further THM formation after extraction and re-chlorination of the water also was investigated in laboratory experiments.

3.6.~~6~~7 Results and Findings

Hydraulic impacts of ASR were analyzed by the USGS and detailed in their reports. As mentioned in Section 1.1 the Draft REIR, these technical studies are incorporated by reference, and summarized where pertinent to reduce unnecessary duplication. The studies are available for public review at the District's Alhambra office, 900 Fremont, Alhambra, California.

The findings of the demonstration project and results of different tests run are the basis for this EIR and the design and implementation of the proposed ASR program. As stated, the demonstration project tested hydraulic compatibility of ASR and evaluated its impact on the basin water quality. The following paragraphs summarize the findings.

Hydraulic Compatibility

The District's groundwater management program includes minimizing groundwater use to avoid negative consequences of overdraft. The demonstration project and associated studies also have determined that the aquifer materials have adequate storage capacity and a good ability to accept and transmit water. Investigation of various alternative water supply sources for long term planning identified conjunctive use of imported SWP water and groundwater as a good option. The storage capacity of the Lancaster sub-unit has a great potential to be utilized to increase the dependability of SWP water. The water table in the Lancaster area is at an average depth of about 300 feet below ground surface. The demonstration project and associated studies concluded that an ASR program through well injection is an effective way of recharging the basin and will help raise groundwater levels in vicinity of the wells used for injection. The District can accomplish minimizing groundwater use by maximizing purchased water use and coupling in-lieu replenishment and ASR. ~~The demonstration project along other investigations of different alternatives have led to the conclusion that an ASR program through well injection will be a more effective way of recharging the basin.~~ The conjunctive use of this water with local groundwater will protect the groundwater basin and provide long-term reliable water supplies to the Antelope Valley. Other finding of the study include:

- That ASR through wells is hydraulically ~~achievable~~ feasible in the study area located within the Lancaster subbasin.
- That older, unrestored abandoned wells may not be suitable for direct well injection due to head losses caused by encrusted well screens and gravel packs;
- Injection may cause measurable changes in land-surface elevation; and

- Both the transmissivity and the storativity values in the Deep aquifer were found to be smaller than that in the Principal Aquifer.

Water Quality and Chemical Compatibility

Water quality criteria were designed to assess whether any long-term degradation would occur to the well or the aquifer as a result of the injection / extraction process. One of the findings of the demonstration project was that there are many significant differences between the chemistry of native groundwater and injected treated water, including pH, several major ions, trace metals, and THMs. Potential water quality concerns that were evaluated included chemical reactions causing precipitation that would result in screen encrustation, geochemical reactions that could result in clay dispersion, and the reduction in permeability or chemical reactions causing the changes in redox potential that could cause precipitation reactions to occur. There were no significant chemical reactions that would cause clogging of the screen and/or gravel pack. The water used for injection met drinking water standards and therefore no significant impacts to water quality were observed throughout the course of the demonstration project. All water produced from the aquifer and delivered to customers complied with the established State and Federal water quality standards for drinking water.

The water quality data of SWP water from 1985 to present also shows that the various constituents vary seasonally and from year to year. The design of a usable and cost-effective ASR system has to consider a number of hydrogeologic and geochemical factors that were monitored in the demonstration project (see Section 3.6.4). Of particular importance for the proposed project, were and still are chemical reactions induced by the injection of treated SWP water that may limit the quality and quantity of water stored and the length of time for storage. As previously mentioned the groundwater and the injected water are different in composition in many ways. Differences may work to improve the quality of the native ground water, in some cases, while they may degrade it in other. While ASR as proposed introduces THMs to the basin, it improves ground water quality with regards to other carcinogens such as Arsenic, Chromium VI and may retard the migration of lower quality water from the deep aquifer.

~~Since THMs are only one of many disinfection by-products formed by reaction between chlorine and DOC, no simple relation exists between chlorine consumption and THM formation. Therefore, Two direct experiments were devised to determine the THM formation; an incubation experiment and a THMFP experiment. The incubation experiment assessed the capacity of the water to form additional THM by consumption of all the residual chlorine, and the THM formation potential experiment assessed the maximum capacity of the DOC to form THM in the presence of excess free chlorine. An additional modeling experiment studied the presence and behavior of THMs in the aquifer.~~ The THM Study concluded that:

- The extent of THM formation was limited by the availability of free chlorine in the injected water;
- THMs behaved conservatively in the aquifer;
- Microbial degradation of THM did not appear to be significant;
- Sorption of THMs did not appear to be significant; and

- Mixing of injected water with groundwater may account for the low levels of THMs in recovered water.

~~In summary, the problem of THMs will be mitigated by minimizing the precursors for their formation and persistence. The USEPA's final Surface Water Treatment Rule and recent rules mandating reduced disinfectant byproducts (DBP) concentrations will generally improve the quality of water available for ASR by cutting down the organic concentrations of recharge waters and providing adequate disinfection residual at the same time. The DBP rule will regulate the concentration of THMs and other organic compounds in drinking water supplies.~~

3.7 ~~Future~~ Disposition of This Document

This Recirculated Draft EIR was ~~will be~~ publicly circulated for 45 days beginning on March 11, 2003 and ending April 25, 2003. Subsequently, all comments addressing the Recirculated Draft EIR environmental issues will be responded to and incorporated into the Final EIR. Pursuant to Section 15092 of the *State CEQA Guidelines* the County Planning Commission must review and recommend approval of the ASR project and certification of the Final EIR prior to the Board of Supervisors approving the proposed ASR project and certifying the Final EIR.

4.0 CUMULATIVE IMPACTS

4.1 Overview of Cumulative Impacts Assessment

Pursuant to Section 15130(a) of the *State CEQA Guidelines*, "An EIR shall discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable, as defined in section 15065(c). Where a lead agency is examining a project with an incremental effect that is not 'cumulatively considerable,' a lead agency need not consider that effect significant, but shall briefly describe its basis for concluding that the incremental effect is not cumulatively considerable."

As discussed in Section 15130(a)(1) of the *State CEQA Guidelines*, "As defined in Section 15355, a cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts. An EIR should not discuss impacts which do not result in part from the project evaluated in the EIR."

Pursuant to Section 15130(b) there are two acceptable methods for evaluating cumulative impacts. In the first method, a cumulative impact is the change in the environment that results when an impact of the proposed project is added to the impact(s) of other closely related past, present, and/or reasonably foreseeable probable future projects that are located close to the proposed project. The second method would replace the list of past, present, and reasonably foreseeable future projects with a summary of projections contained in an adopted general plan or related planning document that is designed to evaluate regional or area-wide conditions. ~~The best approach to analyze the cumulative impacts of the proposed project is by using the second method provided by CEQA.~~ The first method was the one used below to analyze the project's cumulative impacts.

~~4.2 Aspects of District Master Plan~~

~~The purpose of the Los Angeles County Water Works District No. 40 (Antelope Valley) Master Plan is to serve as a guide to system improvements during the next 20 years. The Master Plan evaluates existing water demands and supply sources, existing water system deficiencies, and future water demands and supply sources. The results of the evaluations serve as the basis for establishing recommended facilities required to meet current and future customer water demands within each of District's service areas. The Master Plan also addresses alternative sources for meeting future supply requirements.~~

~~According to the Master Plan, the District is at a water supply deficit both in terms of day-to-day demand and emergency storage needs. The proposed ASR project is part of the solution as outlined in the Master Plan to meet those needs. This analysis outlines the other water sources investigated to attain the goals of the Master Plan and the infrastructure needed to achieve them.~~

~~As part of the master plan a model was created to identify the Districts shortfalls. The results showed that deficiencies in the District were not those of infrastructure but of supply and storage. These were also based on current and future supply and demand.~~

~~4.2.1 Existing and Future Water Demands and Supply~~

~~The population of the Antelope Valley grew substantially over the years, particularly in the 1980's. Starting the decade with 107,000 residents, this part of the Los Angeles County had grown to over 240,000 by 1990. Most of the growth occurred in the central part of the Valley, within and around the cities of Lancaster and Palmdale (Los Angeles County Regional Planning, 1994).~~

~~In 1980 and 1990, the population of the City of Lancaster was 48,103 and 97,291, respectively. Currently, with the largest percent growth in Los Angeles County, the City of Lancaster has a population of about 118,718 in 2000 (Southern California Association of Governments, Census Data), making it the largest city in the valley, followed closely by the City of Palmdale.~~

~~The population within the Districts service area has increased steadily over the past several years from about 108,00 persons in 1990 to about 128,000 persons in 2000. Population is expected to increase significantly over the next 20 years. The Districts Urban Water Management Plan estimates the population growth within the service area to be 362,300 by 2020. Supply requirements are also estimated to increase to 113,407 AF by 2020.~~

~~Currently, water delivered to residents and businesses by the District comprise of a mixture of groundwater and imported State Water Project water (through AVEK). During 2002, the District supplied 23,635 AF of groundwater and 33,440 AF to its customers representing 41% and 59% of supply, respectively.~~

~~DWR reports that SWP facilities currently have no chance of making full entitlement deliveries and will have a less than 10% chance of making full entitlement deliveries for projected 2021[1]. Therefore, the Master Plan states, District ground water supplies must be adequate to ensure customer demands can be met. The need for water resources management that meets future demands with the minimum economic and environmental costs associated with overall use is unquestionable. To accomplish this goal, the Master Plan outlines a strategy for meeting the current and future demands.~~

~~Groundwater is an important but limited resource and has historically been the primary source in the region due to scarcity of surface water. The District's groundwater management program includes minimizing groundwater use to avoid negative consequences of overdraft. This is done by maximizing the use of imported (purchased) water coupled with in-lieu replenishment and ASR. ASR will provide the District with means for conjunctive use of SWP water, thereby increasing the reliability of District services. The ASR project is a key component for implementing the Master Plan.~~

~~4.2.2 Master Plan Strategies and Recommended Actions~~

~~In order to meet the anticipated demands and improve reliability, the District will need to implement a combination of recommended strategies. Those are to:~~

[1] The State Water Project Delivery Reliability Report, Department of Water Resources, Bay Delta Office, Draft 2002.

~~1. Reduce per capita demand.~~
~~2. Protect existing water resources – through in-lieu recharge, maintaining basin safe yield, and utilizing current available resources (SWP).~~
~~3. Develop additional resources to meet future demands.~~
~~4. The Master Plan recommends constructing additional wells and necessary related facilities for use in case of SWP supply interruption.~~
~~5. The Master Plan recommends constructing additional transmission and distribution facilities and possibly water treatment facilities.~~
~~6. The Master Plan recommends providing equalization storage, fire storage, and emergency storage. Part of this storage would be through the proposed ASR project as the aquifer would be used as a storage facility.~~

~~**4.3 Cumulative Impact Analysis**~~

~~During implementation and operation of the proposed project, population within the District service area is anticipated to conform to growth trends as discussed in Section 4.2.1. Individual development projects associated with this population increase would need to be consistent with the land use designations and holding capacities of adopted City and County General Plans, and would be regulated by policies contained within these General Plans.~~

~~Implementation of the proposed project would result in potential cumulative impacts to geology and soils, and groundwater hydrology. Potential impacts to geology and soils would be short-term and are considered to be at a level of less than significant. Potential long-term impacts to groundwater hydrology would be reduced but not to a level of insignificance and would contribute to a significant unavoidable impact as discussed in Section 5.~~

~~The introduction of injection/extraction wells at five existing sites in the Antelope Valley would not result in cumulative impacts to fire and police service. No recorded incidents of vandalism of similar well pump sites throughout the Antelope Valley have been recorded.[1] No significant cumulative impacts would occur as a result of implementing the proposed ASR project.~~

~~The District does recognize that the State of California is currently in a state of electrical power shortages. A mitigation measure has been included to address this statewide concern in Section 5.~~

4.2 Proposed Project Approach to Cumulative Impacts

Due to the nature of the proposed project (the construction and operation of injection/extraction facilities for an ASR project within the Lancaster Subbasin in Antelope Valley) no closely related past, present, and/or reasonably foreseeable probable future projects which would involve foreseeable impacts to groundwater quality in the aquifer have been identified that could result in cumulative impacts when combined with the proposed project. The ASR project would inject excess treated SWP water into the Lancaster Subbasin in Antelope Valley Groundwater Basin for subsequent recovery of the supplies during high demand periods or during drought cycles. Therefore, the potential significant impacts are all below ground. Surface impacts are limited to the construction and operation of injection/extraction facilities. These facilities are all located in

close proximity to other existing pumping/storage facilities currently owned and operated by Waterworks District No. 40. The surface impacts are not significant. The absence of future and related projects reflect known or probable development activities in close proximity to the proposed project and include no current or approved proposals that may impact the physical environment proximate to the project. Therefore, the incremental effects of the proposed project are not cumulatively considerable.

5.0 ENVIRONMENTAL IMPACT ANALYSIS

This Section describes the environmental setting, significance criteria, direct impacts and related mitigation measures for each environmental resource issue. For all resource issues, cumulative impacts and growth inducing impacts are discussed in Sections 4 and 6 respectively.

5.1 GEOLOGY AND SUBSURFACE CONDITIONS

This Section analyzes potential impacts of the proposed project to geology and subsurface conditions.

5.1.1 Environmental Setting

The project area is within the Antelope Valley, which is comprised of the southwestern portion of the Mojave Desert and is bordered by hills, ridges, and buttes in the northeast, the Tehachapi mountain range to the west, and the San Gabriel Mountains to the south and east. The Antelope Valley groundwater basin has no natural outlet, and runoff from the nearby mountains drains to the valley floor.

Regional Geology

Antelope Valley is an alluviated, fault-controlled valley that locally contains as much as 2000 feet of unconsolidated deposits. Bedrock that underlies the unconsolidated deposits and forms the bordering mountains consists of a variety of metamorphic, igneous and sedimentary rocks ranging in age from Precambrian to Tertiary.

Unconsolidated Quaternary sediments constitute the basin fill in the Antelope Valley. These sediments consist of alluvial fan and lacustrine deposits. The upper alluvial fan deposits, about 600 feet thick, consist of uncemented – unconsolidated, coarse- to medium-grained sand and gravel that become more consolidated and less permeable with depth. Lacustrine sediments were deposited in an ancestral lake that occupied the central portion of the basin. These lakebed deposits, which are burled at depths of a few feet to 600-800 feet, consist of clay and silt up to 400 feet thick, interbedded with layers of coarse sediment up to 20 feet thick.

Geohydrologic Framework

The San Gabriel Mountains along the southwestern margin of Lancaster Subbasin were uplifted tectonically along the San Andreas Fault Zone about 1-2 million years ago, and became the primary source of Quaternary-age sediments that make up the modern-day aquifer system (Ponti, 1985). The Tehachapi Mountains were uplifted simultaneously along the Garlock Fault and became an important, though smaller, source of sediments (Dibblee, 1967). Prior to the uplift of these mountains, surface drainage was toward the ocean, and degradation (transport of materials from the area, resulting in smaller slopes) occurred until gradients were relatively small, at which point significant late-Tertiary deposition may have occurred (Dibblee, 1967; Dutcher and Worts, 1963; Reed, 1933). Uplift of the San Gabriels and the smaller Tehachapi Mountains, and probable downwarping in between, formed the structurally closed Antelope Valley and greatly

altered directions and patterns of Quaternary deposition. (See **Figure 5-1**). More detailed accounts of regional geologic history can be found in Londquist and others (1993), Ponti (1985), Dibblee (1981, 1967), Dutcher and Worts (1963), Hewett (1954), and Thayer (1946).

Stratigraphy

About 5,000-10,000 feet of late-Tertiary and Quaternary sediments underlay the Lancaster area, which represents the thickest part of the Lancaster Subbasin (Morin, 1990; Mabey, 1960). The Quaternary sediments are primarily weathered materials from the San Gabriel and Tehachapi Mountains and scattered hills along the northeastern and eastern margins of Antelope Valley. These weathered materials were transported to the valley floor by one or more means, including streams, rivers, and wind, and were deposited within the streams and rivers, on dry land, or within large bodies of water. The stream-laid deposits formed fan-shaped mounds, called alluvial fans that slope away from the mountains, often coalescing with adjacent alluvial fans, or interfingering with intersecting fans. Modern alluvial fans exist in the Antelope Valley (Ponti, 1985).

During relatively wet periods, rivers may have significantly altered the stratigraphy by eroding the alluvial fans in places and re-depositing the materials in river channels. In addition relatively coarse-grained materials (e.g. boulders) were eroded from the mountains and transported long distances during high flows. These fluvial deposits, as they are called, can be important hydrologically, but little is known about their existence or distribution in Antelope Valley. There are currently no rivers in Antelope Valley, but this does not preclude their existence in the past.

The existence of sand dunes in some parts of Antelope Valley is evidence that wind does play a role in the modern depositional environment. Little is known, however, about the existence and distribution of older, subterranean eolian (wind-laid) deposits.

Given the evidence of modern alluvial deposition and the lack of evidence for fluvial or substantial eolian deposits, it is assumed that the primary Quaternary depositional environment was alluvial. Alluvial fans have three parts: the fanhead at the highest elevation, the midfan, and the distal fan at the lowest elevations (Blissenbach, 1954; Reineck and Singh, 1980). The texture of alluvium varies with position on the fan as the stream gradient changes. The fanhead represents a high-energy environment, where large stream gradients favor transport and deposition of coarse-grained materials (gravel, sand), whereas the distal fan is characterized by very small gradients, which favor deposition of fine-grained materials (silt, clay). Unweathered (modern) alluvium ranges from about 4 percent silt and clay near the San Gabriels to 25-70 percent silt and clay in the sandy to silty loam soils typical of the more distal areas (Ponti, 1985). Texture also varies with depth below land surface and radial position on the fans, as rates of tectonic uplift, climatic conditions, and stream locations changed over time. Changing climatic conditions appear to be responsible for about six episodes of rapid alluvial fan aggradation (growth) during the upper Quaternary Age (Ponti, 1985). These episodes are marked by relatively rapid deposition followed by soil development and varying degrees of erosion prior to the next episode of deposition. The resulting alluvial strata are texturally and geometrically complex.

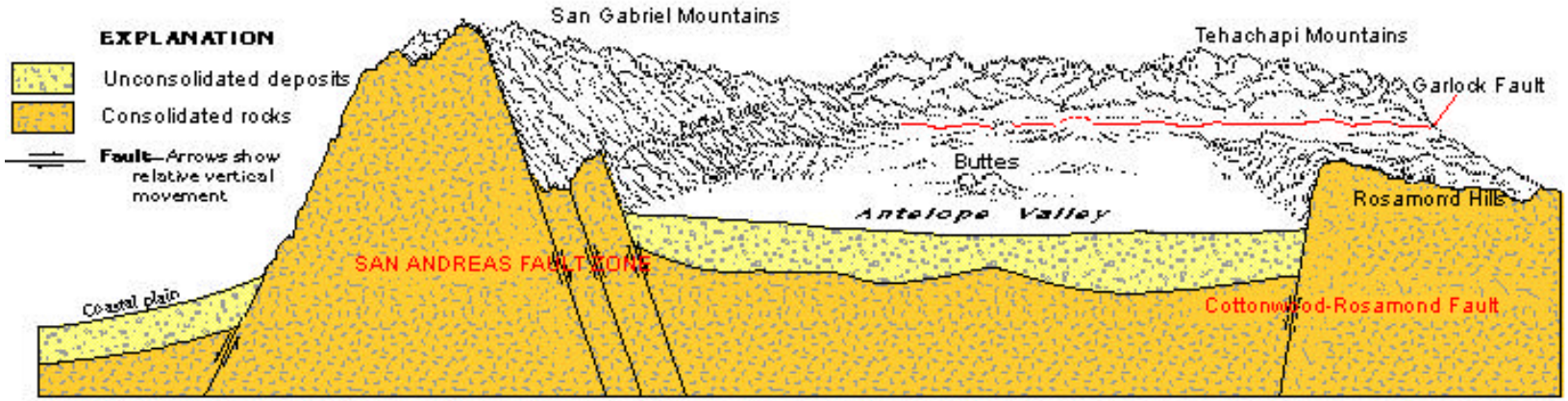


Figure 5-1
Generalized Geologic Section
Modified From Johnson, H.R. , 1911, Water Resources of Antelope Valley, California: U.S. Geological Water – Supply Paper 278, 92p.

Interwoven with alluvial and possibly fluvial and eolian strata are lacustrine deposits associated with deposition of fine-grained materials at the bottom of a really extensive lakes and/or marshes (Dibblee, 1967). These deposits are chemically reduced, indicative of a low-oxygen environment, and are characteristically gray to blueish- or greenish-gray. This is in contrast to the oxidized, brownish silty clays that comprise the modern playas (e.g. Rogers and Rosamond Lakes). The primary lacustrine unit, referred to locally and by previous investigators (e.g. Dutcher and Worts, 1963) as the "blue clay," is present throughout most of the Lancaster Subbasin, and is about 500-750 feet below land surface in the Lancaster area.

The elevation of the lacustrine unit increases to the north, and it crops out west of the southern end of Rogers Lake on Edwards AFB (Leighton and Phillips, 2000; Nishikawa and others, 2001). This configuration of the lacustrine unit suggests northward migration of the lake/marsh with time and accumulation of material eroded from the San Gabriel Mountains (Dutcher and Worts, 1963). Paleomagnetic analyses of core samples from southern Lancaster were used to provide information on the age of the lacustrine unit. Core samples from depths of 345 and 450 feet show a magnetic reversal between these depths (John W. Hillhouse, USGS, unpublished data, 1998). The polarity was normal at 345 feet and reversed at 450 feet, which Hillhouse interprets as the transition from the Brunhes to the Matuyama polarity chron. This transition occurred about 780,000 years ago; therefore the lacustrine deposits were deposited before that, since they occur at a depth of over 700 feet in the area. In contrast, the lacustrine deposits on Edwards Air Force Base interfinger with alluvial deposits that are less than 14,000 years old (Fonti, 1985).

Lithologic and geophysical logs show little evidence of coarse-grained materials within the lacustrine unit at Edwards Air Force Base and in the Lancaster area; however, driller's logs in the Palmdale area show extensive interfingering of fine-grained lacustrine deposits and coarser-grained alluvial deposits. The nature or presence of lacustrine deposits at the contact between unconsolidated sediments and the foot of the San Gabriel Mountains is unknown; however, results from the regional groundwater flow model suggest that there may be no significant gap between this confining unit and the San Gabriels (Leighton and Phillips, 2001).

Many geophysical logs of boreholes in Antelope Valley suggest a disconformity between younger, unconsolidated sediments and older, more compacted and indurated (hardened) sediments at about elevation 1,950 feet (Nishikawa and others, 2001; Leighton and Phillips, 2000).

Geologic Hazards

Faults and Seismicity

The tectonic environment of the Antelope Valley is dominated by the San Andreas Fault, which forms the southern boundary of the Valley. The San Andreas Fault is a right-lateral northwest trending active fault at the northern base of the San Gabriel Mountains. There are several other fault zones and fault traces in the western Mojave Desert, most notably the active Garlock Fault. It is a left-lateral, northeast-trending fault zone at the boundary between the valley and the Tehachapi Mountains. The western end of the Garlock Fault zone terminates at its intersection

with the San Andreas Fault zone near Gorman. In addition, there are several minor faults in Antelope Valley, but they are not considered active. (USGS, 94-4184)

Liquefaction

Liquefaction is a process by which water-saturated unconsolidated sediments lose their strength due to increased pore pressure during or after an earthquake. Liquefaction potential increases as the depth to groundwater decreases. Typically, in order for liquefaction to occur, the groundwater table must be less than 50 feet deep.

The near-surface alluvial soils within the project area consist of loosely consolidated silts and sands, which would be susceptible to liquefaction under high groundwater conditions. If, in a saturated state, these materials were subjected to earthquake shaking during a major seismic event (>8.0 magnitude) they would liquefy. Sand boils and ground fissures would likely to develop, and associated damage to structures and underground installations would be significant. However, the potential for high groundwater conditions within the project area are considered low.

Subsidence

Subsidence is the sinking or settling of surface sediment. Potential causes of subsidence within the project area include tectonic activity and groundwater extraction.

Tectonic subsidence may result from lateral spreading and seismic settlement. Lateral spreading usually occurs on slopes where loose deposits of soil occur. Seismic settlement may occur in areas with loose soil deposits. In these areas, ground shaking may cause a reduction in soil volume due to the realignment of soil grains. Differential compaction may occur due to variation in soil depth, soil density, and severity of ground shaking.

Groundwater extraction within the project area occurs throughout the Lancaster subbasin, and is utilized for agriculture, municipal and industrial purposes. All parts of an aquifer system are subject to compaction with groundwater extraction; however, fine-grained bodies, or aquitards are far more susceptible than coarse-grained materials to permanent compaction. Land subsidence in the Antelope Valley is caused by aquifer system compaction that is related to groundwater-level declines and the presence of fine grained, compressible sediment (USGS, 94-4184).

Studies conducted in the area by the USGS in 1968, and Los Angeles County in 1973, estimated the yearly subsidence average to be .01 to .02 feet/year[3]. In a more recent study conducted in 1992 by the USGS, a maximum magnitude of calculated land subsidence between 1926 and 1992 was 6.0 ft near Avenue I and Sierra Highway and a maximum magnitude of calculated or estimated land subsidence between 1930-81 was 6.6 ft at Avenue I and Division Street (USGS, 94-4184). (See **Figure 5-2**)

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[3]/ Geology & Soils Investigation-Antelope Valley Groundwater Recharge Study, Phase 2. County of Los Angeles Department of Public Works, Materials Engineering Division. March 13, 1991.

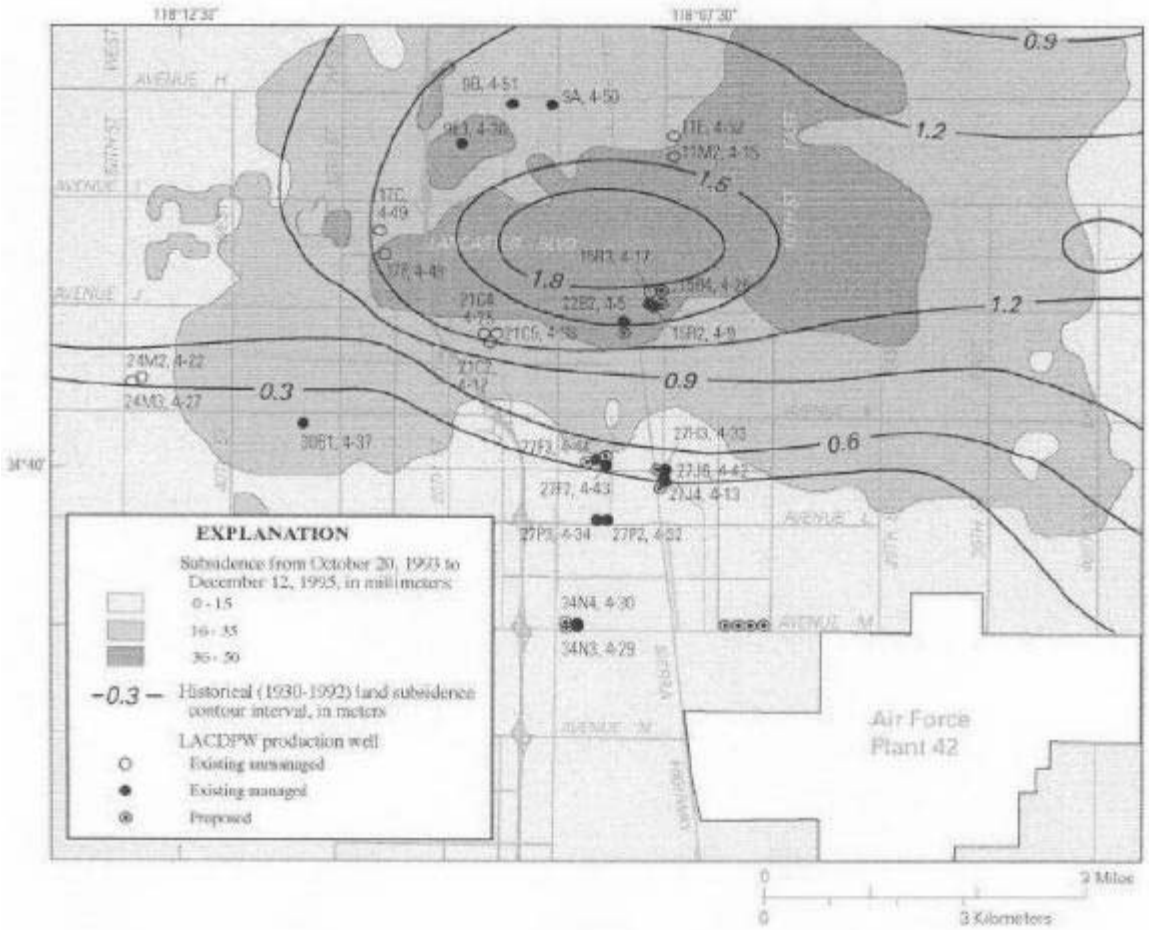

Figure 5-2
Land Sunsidence Near Proposed Site
Modified from Analysis of Tests of Subsurface Injection, Storage and Recovery of Freshwater in Lancaster, Antelope Valley, California, unpublished USGS report

Negative consequences of land subsidence that have occurred in Antelope Valley include altered drainage gradients, increased flooding and erosion, failed well casings, structural damage to roads and buildings, and development of earth fissures (Dinehart and McPherson, 1998, Prince and others, 1995; Kennedy/Jenks Consultants, 1995).

5.1.2 Thresholds of Significance

A project may have a significant effect in relation to geology and soils if it will:

- Expose people or occupied structures to geologic or soils hazards (including fault rupture, ground shaking, liquefaction, subsidence, landslides, erosion, expansive soils); or
- Facilitate damage to, or the destruction of, unique geologic features.

5.1.3 Environmental Impacts

Construction

Project construction would not have a significant effect on local geological formations. Potential impacts would include soil erosion during the drilling and construction of the wells. Project implementation would utilize standard erosion control measures and waste management as specified under the Los Angeles County Department of Public Works Best Management Practices (BMPs) Handbook for Construction Activities.

In addition the District and its contractors (if required) would procure discharge permits from the California Regional Water Quality Control Board for discharge of water from well construction operations, including development testing, and disinfection.

Operation

The project, which consists of the construction and operation of injection/extraction facilities at five separate existing District sites, would result in water being injected into the principal aquifer zone at a depth of 300 to 700 feet. ~~It is estimated that the acceptance rate of injected water into the principal aquifer to be 72% of the extraction rate.~~[4] Minimal impacts to project area geology are anticipated.

Faults and Seismicity

The section of the San Andreas Fault near the project area has not experienced a major earthquake in the past 134 years. Therefore, it is reasonable to assume that an earthquake of this size would occur during the design life of the recharge installation. The effects of a major earthquake on the injection/extraction well facilities are expected to be minor since the pumps are underground and very little "equipment" is exposed at the surface.

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[4]/ Geology & Soils Investigation-Antelope Valley Groundwater Recharge Study, Phase 2. County of Los Angeles Department of Public Works, Materials Engineering Division. March 13, 1991.

While the project area is subject to seismic activity and as such the existing water facilities on the five sites have withstood previous seismic activity. The proposed project injection/extraction wells are expected to be capable of withstanding similar seismic activity in the future.

Liquefaction

The unconsolidated soils in the project area may be subject to liquefaction during a major seismic event, if they are saturated by water recharge. If a liquefaction condition occurs, sand boils and fissures are likely to develop, and damage to project structures and underground installations can be significant.

Typically, in order for liquefaction to occur, the groundwater table must be less than 50 feet deep. The ASR project would help raise groundwater levels in the vicinity of the wells used for injection, however, the amount of water available for recharge compared to the estimated storage of the depression is such that the level would not cause saturated soil condition described that could increase liquefaction potential. This is the case because the groundwater level in the project area is at approximately 390-490 feet below ground surface. ~~However,~~ The potential for high groundwater conditions within the project area resulting from the proposed ASR project, are considered low. Therefore, there would not be any significant impacts to or from the ASR project regarding liquefaction.

Subsidence

Under drought or emergency conditions, ASR wells may be utilized as extraction wells. Extended extraction may result in insignificant impacts as a result of the inelastic compaction of the aquifer.

Injection of treated imported water into the aquifer system as proposed by the ASR project, when water is most available, for later use during peak demand periods and emergencies gives the District a tool to avoid/reduce subsidence which would otherwise be occurring. One of the main benefits of the proposed project is the possible reduction of subsidence. The ASR project wells would be utilized as injection wells during times when imported water is available, limiting their extraction capabilities. Usage of stored water for supply in lieu of natural groundwater would aide in reducing the potential for subsidence within the project area. Therefore, there would not be any significant impacts to or from the ASR project regarding subsidence.

5.1.4 Cumulative Impacts

No cumulative impacts are associated with this project. See Section 4.0 (Cumulative Impacts) for additional information.

5.1.5 Mitigation Measures

CEQA does not require mitigation of impacts that are not significant.

5.1.5 Level of Impact Significance After Mitigation

No significant adverse geology and soil impacts have been identified.

5.2 GROUNDWATER HYDROLOGY

This Section analyzes potential impacts of the proposed project to groundwater hydrology.

5.2.1 Environmental Setting

The Antelope Valley is semi-arid, receiving 5 inches of precipitation annually along the northern boundaries of the valley and 10 inches of precipitation along the southern boundaries (Kennedy/Jenks, 1995). It is a closed basin; with no outlet for its surface streams. Surface water from the surrounding hills and from the valley floor flow towards three dry lake. All the dry lakes are located on Edwards Air Force and include Rosamond Lake, Buckhorn Lake and Rogers Lake. Surface water flows that reach the dry lakes are generally lost to evaporation. The most hydrologically significant streams include Big Rock Creek, Little Rock Creek, and Amargosa Creek. The Little Rock Creek is the only developed surface water supply in the valley. Except during the biggest rainfall events of a season, surface water flows towards the valley from the mountains, quickly percolating into the stream bed and recharging the groundwater basin (Kennedy/Jenks, 1995).

The groundwater system in the Antelope Valley is a major source of supply. The storage capacity of the Antelope Valley groundwater basin was estimated to be 68 million AF; in 1975 groundwater remaining in storage was estimated to be 55 million AF (California Department of Water Resources, 1980[1]). However, this stored water may not be entirely accessible due to uneconomical pumping depths, distance to customers, and the potential for subsidence (Kennedy/Jenks, 1995). This leaves an estimated 13 million AF available for potential storage (DWR, 1980).

The principal source of recharge of the basin is runoff, recharged in the foothills of the mountains. Contribution to recharge of the basin from precipitation on the Valley floor is considered negligible. Average groundwater recharge is estimated to be about 40,000 to 58,000 AF per year (Snyder, 1955[2]; Bloyd, 1967[3]; Durbin, 1978[4]). In a more recent study conducted by USGS for Antelope Valley Water Group, total recharge was estimate to be 61,500 AF during 1995[5].

Groundwater has been the primary water supply source for the Antelope Valley. Reported groundwater pumpage for the Los Angeles County portion of the Antelope Valley peaked in 1956 with 270,000 AF, followed by a decline to 53,200 AF in 1983. Since 1983, groundwater use increased to a high of 91,743 acre-feet in 1991 (USGS 94-4208).

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[1] California Department of Water Resources, Southern District, 1980, Planned Utilization of Water Resources in the Antelope Valley.
[2] Snyder, J.H., 1955, Groundwater in California, The Experience of the Antelope Valley: University of California Berkeley, Gianninni Foundation Ground Water Studies No. 2.
[3] Bloyd, R.M., Jr., 1967, Water Resources of the Antelope Valley-East Kern Water Agency Area, California: U.S. Geological Survey Open File Report.
[4] Durbin, T.J., 1978, Calibration of a mathematical Model of the Antelope Valley Ground-Water Basin, California, U.S. Geological Survey Open File Report.
[5] Leighton, D.A., Phillips, S.P., Simulation of Ground-Water Flow and Land Subsidence in the Antelope Valley Ground-Water Basin, California, U.S. Geological Survey Water Resources Investigation Report 03-4016.

When groundwater extractions exceed recharge, water level declines and the finite source of supply becomes depleted. Ground-water depletion was estimated by the USGS (Templin and Phillips, 1995, p63).

The project is located in the Lancaster subbasin, one of twelve-groundwater subbasins identified in the Antelope Valley basin (See **Figure 5-3**). The subbasin is divided into two main aquifers separated by a "blue clay" layer. The aquifers are identified as the Principal aquifer and the Deep aquifer. Historically, the principal aquifer has been the dominant source of groundwater supply due to relative ease of production.

Hydrogeologic Units

The Antelope Valley Groundwater Basin is subdivided by various faults and subsurface structural features into twelve-subbasins. The Lancaster subbasin, one of the twelve-groundwater subbasins underlies the central portion of the valley in the vicinity of Lancaster. The aquifer system of the Lancaster subbasin consists of two alluvial aquifers - the Principal and the Deep Aquifer - which are separated by a confining bed (Londquist and others, 1993[6]). The Principal Aquifer is unconfined and overlies lacustrine clay sediments. The subsurface lithology of both aquifers has been logged as interbedded heterogeneous mixtures of clay, silt, sand and gravel (Rewis, 1993[7]). The Deep Aquifer is confined by a massive bed of blue clay, except in the northeastern part of Antelope Valley where the clay intersects land surface and thins to extinction (Durbin, 1978[3]). The confining clay bed is at depths greater than 600 feet near Lancaster, which is in the south center of the Lancaster subbasin and surfaces between Redman and Buckhorn Lake. The Principal Aquifer extends to just north of the southern boundary of Edwards Air Force Base where the Deep Aquifer becomes unconfined in the northeastern part of the valley. (USGS, 94-4184). In general, the Principal Aquifer is thickest in the southern portion of the valley near the San Gabriel Mountains, while the Deep Aquifer is thickest in the vicinity of the dry lakes on Edwards AFB. (See **Figure 5-4a and 5-4b**)

The principal aquifer consists of intermixed silty sands and gravels and is unconfined. It has historically been the dominant source of groundwater supply in the basin, due to its relative ease of producing, and better quality of water.[8]

Next, the lucastrine unit is a layer ranging from 200 feet thick to the south to 300 feet thick toward the north of the proposed project area at the center of the basin. Also known as the "blue clay," it separates the principal aquifer from the deep aquifer and consists mostly of fine-grained sediment. The blue clay creates a confining condition for the deep aquifer.

[6] Londquis, C.J., Rewis, D.L., Galloway, D.L., and McCaffrey, W.F., 1993, Hydrology and Land Subsidence, Edwards Air Force Base, Antelope Valley, California, January 1989 – December 1991: U.S. Geological Survey Water Resources Investigations Report 93-4114.

[7] Rewis, D.L., 1993, Drilling, Construction, and Subsurface Data for Piezometers on Edwards Air Force Base, Antelope Valley, California, 1991-92: U.S. Geological Survey Open File Report 93-148.

[8] Information on subsurface geology in the project area has been obtained by water wells that were drilled to depths between 690 and 1,100 feet.

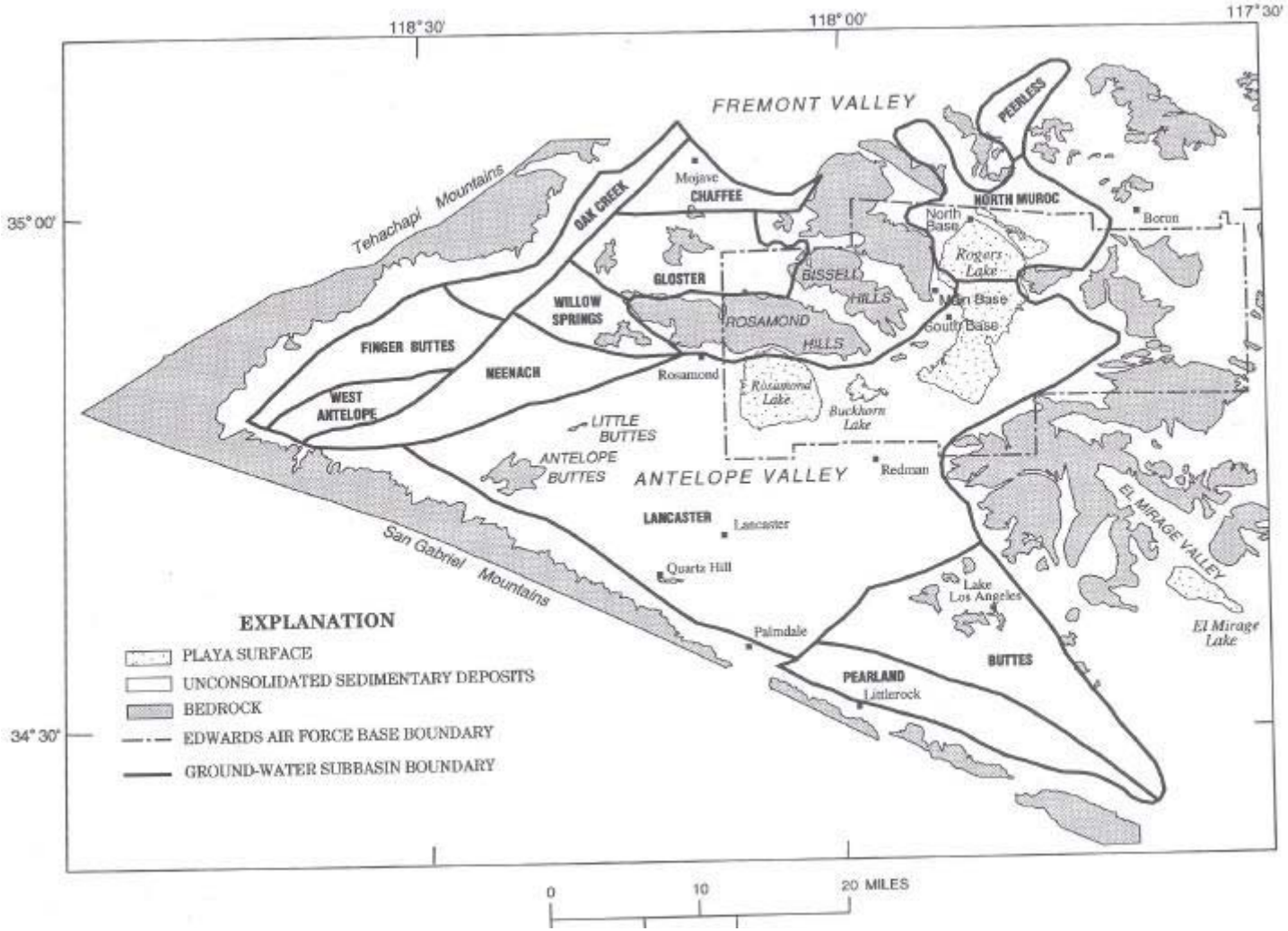


Figure 5-3
Groundwater Subbasins in the Antelope Valley
Modified from USGS Open-File Report 01-414

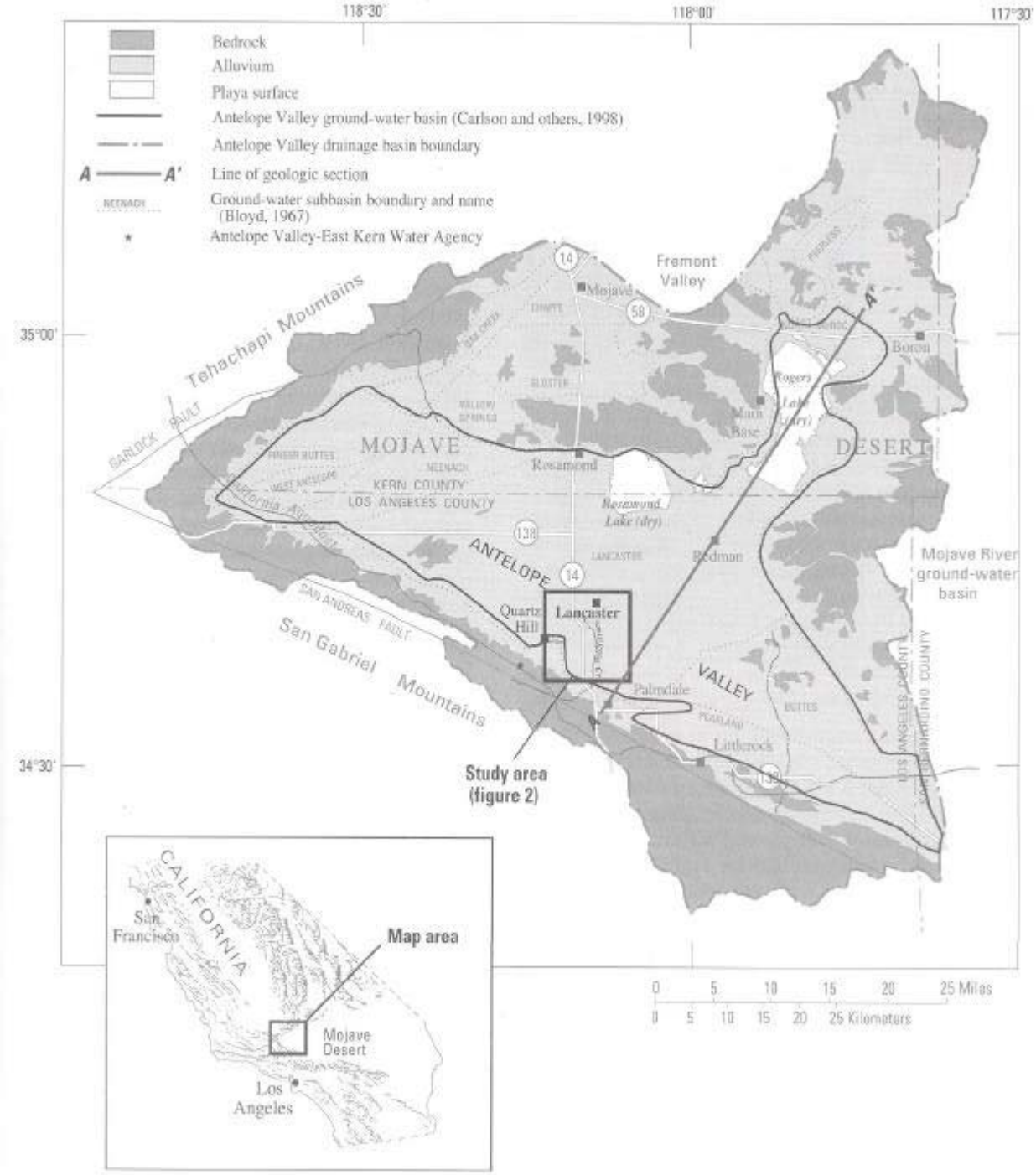
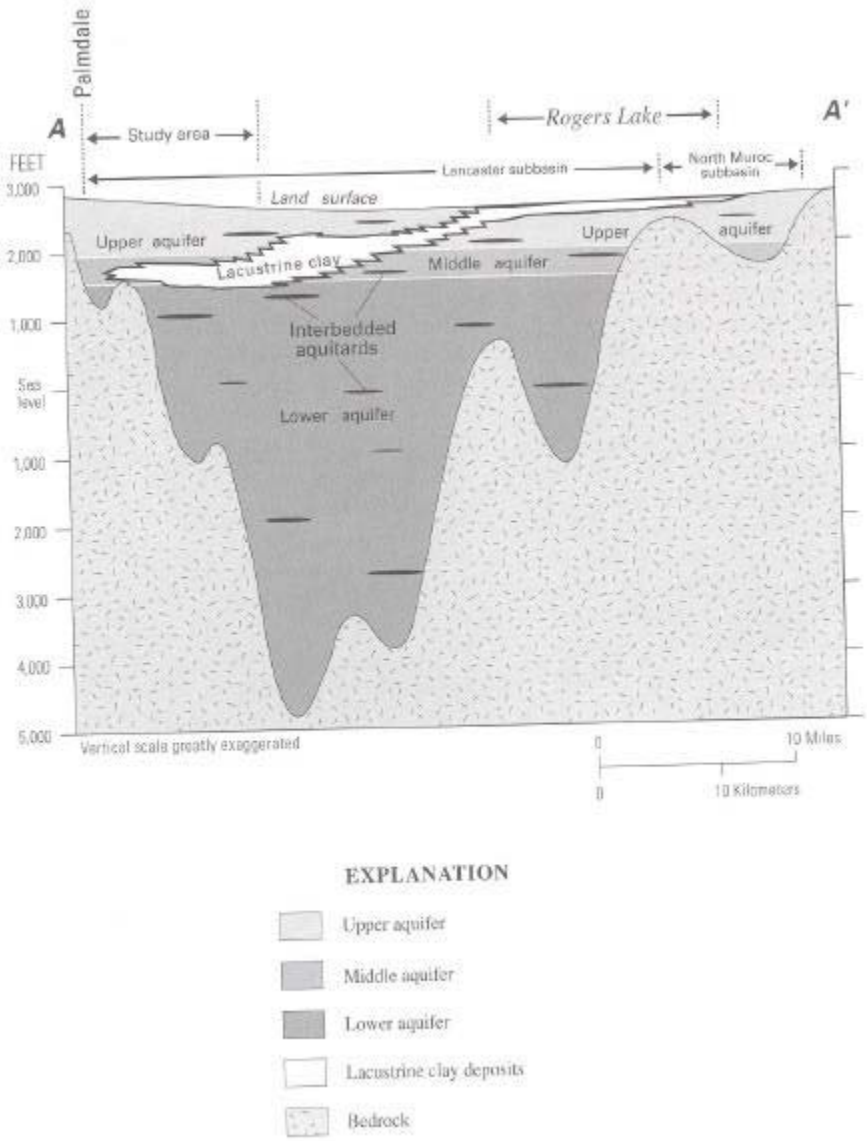


Figure 5-4a
Generalized Surficial Geology and Location of Study Area

Modified from USGS Open-File Report 01-414



Modified from USGS Open File Report 01-414

Figure 5-4b
Generalized Geologic Section

The Deep Aquifer consists of interbedded coarse-grained sand with clay lenses, and its lower boundary is defined by bedrock. This aquifer's capacity for storage and rate of flow are not as high as the Principal Aquifer and so is therefore, not suited for the injection and recovery project.

Hydraulic Characteristics

Hydraulic characteristics of an aquifer system, govern its response to pumping and recharge of water. The primary hydraulic characteristics of interest are the hydraulic conductivity and storage available in the aquifer media.

Hydraulic conductivity describes the aquifer's ability to transmit water. In multi-layered aquifer systems such as the Antelope Valley, the horizontal hydraulic conductivity is governed by coarse-grained materials and is higher than the vertical hydraulic conductivity, which is governed by the fine-grained materials.

Transmissivity is the ability of the aquifer system to transmit water laterally. Storage coefficient is the volume of water released by the aquifer from storage per unit surface area of aquifer per unit decline in hydraulic head.

Both hydraulic conductivity and transmissivity values are a good measure of the ability of the aquifer to accept additional water. Estimates of hydraulic conductivity, transmissivity, and storage in the antelope Valley have been obtained through pump tests conducted in and around Edwards Air Force Base. Values range from 4,600 to 26,800 square feet per day for transmissivity, 0.017 to 0.13 feet per day for vertical hydraulic conductivity in the lacustrine clay, and 0.00036 to 0.13 for the storage coefficient (Kennedy/Jenks, 1995).

Groundwater Levels

Water levels in Antelope Valley are presently lower than they were prior to groundwater development in the early 1900's. Previously, water levels in the proposed project area were affected primarily by agricultural activity through the 1960's, but are now mostly affected by pumping for urban use (USGS, 94-4208). Water levels in Lancaster and Palmdale have declined about 110 and 185 feet, respectively, since about 1965. Longer-term records show drawdowns exceeding 200 feet in the Lancaster area, and 300 feet in the vicinity of Palmdale since the early 1900s.

Studies performed by the USGS and the DWR indicate that groundwater levels appear to be generally dropping in the eastern areas of the basin and rising in the western areas. The groundwater table within the Lancaster subbasin dips gently to the north-northwest at a gradient of approximately 4 to 5 feet per mile. However, local depressions occur adjacent to overpumped wells. In fact, these local depressions serve to impound the injected water and, therefore, the project area has been chosen in close proximity to a local depression (See **Figure 5-5**).

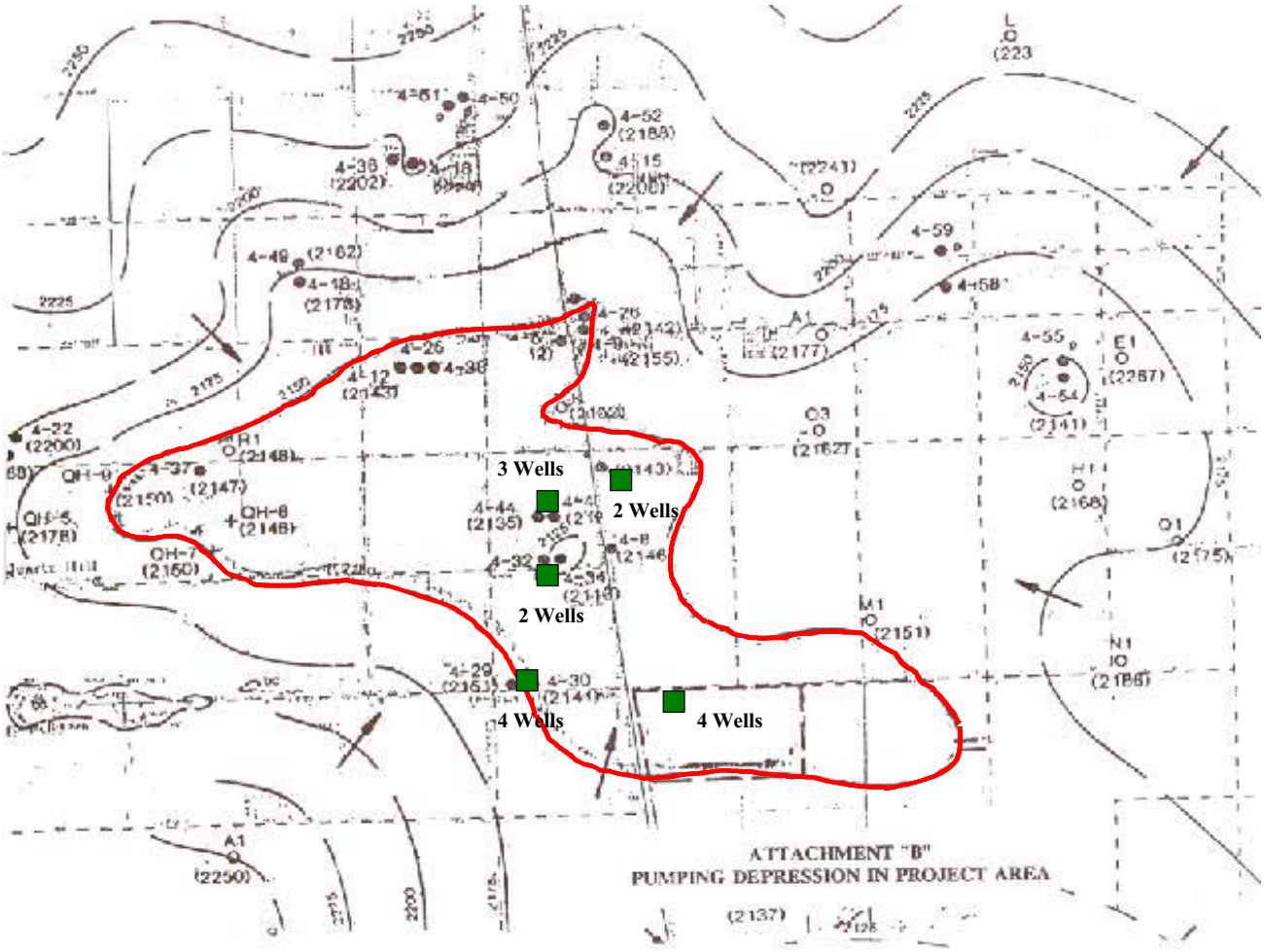


Figure 5-5
Groundwater Contours Near Injection Sites

Modified from

The general trend of groundwater movement was studied in recent USGS studies of the Lancaster/Palmdale area. In general, flows tend toward the southeast from Lancaster to Palmdale. However, there is a significant local depression (an area where the water table is lower than the surrounding areas) near the proposed project site that would serve to contain the injected water.

Groundwater Quality

According to the Kennedy/Jenks study, the water quality of the Antelope Valley Groundwater Basin is generally good (Kennedy/Jenks Consultants, 1995, p. 7.6). The Total Dissolved Solids (TDS) for the study area are less than 1,000 parts per million (ppm). Poorer water quality, according to this study, generally appears to be associated with hardrock outcrops and areas underlain by shallow playa deposits where evaporation has concentrated solutes. The exception to good quality water is some concentration of boron associated with naturally occurring boron deposits and high nitrates associated with fertilizer and poultry farming in the Quartz Hill and Littlerock areas (LACDPW, 2000).

Arsenic, radon and hexavalent chromium are three of the naturally occurring carcinogens found in the Antelope Valley basin. These contaminants have been the focus of recent and significant regulatory actions taken by the USEPA and California DHS. These contaminants could have a significant impact on groundwater supplies and District pumping strategies.[9]

Surface Water Quality

The proposed water for injection originates in northern California and is imported via the California Aqueduct. It is treated to drinking water standards by AVEK.

Water delivered by AVEK contains Trihalomethanes (THMs) not found in local groundwater. THMs are disinfection by-products formed from Dissolved Organic Carbon (DOC) and bromide, both present in the imported SWP water, and dissolved chlorine (used for disinfection). Dissolved chlorine, which is added at the end of the treatment process, is disproportionate to hypochlorous acid (HOCl) and chlorine. HOCl reacts with ammonia and bromine to form chloramines and hypobromous acid (HOBr), which then react with DOC to form THMs and other disinfection by-products (Fujii and others, 2001;1998):

DOC + chloramines + HOC1 +HOBr –> THMs + other disinfection by-products

The THMs produced in the above reaction range from chloroform ($CHCl_3$) to bromoform ($CHBr_3$). The MCL for total THMs was recently lowered by the U.S. Environmental Protection Agency from 100 to 80 µg/L.

[9] McGuire Environmental Consultants, Inc., Prepared for Los Angeles County Department of Public Works, Action Plan for Removal of Carcinogens From Drinking Water, July 2002.

5.2.2 Threshold of Significance

The proposed project would result in a significant adverse impact to hydrology and/or water quality if it were to:

- Regarding ~~Otherwise~~ all regulated constituents including disinfection byproducts, substantially degrade groundwater quality below State Drinking Water Standards (Title 22 of the California Code of Regulations).
- Regarding THMs - violate ~~any water quality standards or waste discharge requirements~~ the RWQCB's Anti-Degradation Policy (Resolution 68-16) maintaining Groundwater Beneficial Uses for the Antelope Valley Basin. The introduction of any THMs into the groundwater would be a violation of the Anti-Degradation Policy.
- Substantially deplete groundwater supplies or interfere substantially with groundwater-recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level;
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site;
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;
- Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;

5.2.3 Environmental Impacts

The purpose of the proposed project is to store water during times of abundance to meet water demand within the Antelope Valley during times of scarcity. Implementation of the proposed ASR program is a cost-effective way to maximize the area's available water supply. The proposed ASR program in the Lancaster subbasin is technically, and economically feasible.

The proposed ASR Project would inject SWP water into the Principal Aquifer. No water would be injected into the Deep Aquifer. ~~Artificial groundwater recharge method~~ ASR is an effective tool to meet increasing water-supply demands, to take maximum advantage of surface-water supplies when they are available, and to reduce the impact of additional withdrawals of local groundwater resources. The proposed project would recharge the groundwater system in years of surplus water availability, and the stored groundwater may be used to meet peak demands when surface-water sources are in short supply. The proposed project would have an overall positive effect on water demands within the Antelope Valley.

Construction Impacts

The proposed ASR project would install new injection/extraction wells at five different locations within Antelope Valley. The five sites are owned by the District, and are in use. Each of the five locations (shown in Figures 3-3 through 3-6) is an existing site for wells, tanks, and/or pumping plants. The proposed project calls for the installation of eleven new wells and

modification of four existing wells. The project would also require the installation of pump/hydroelectric stations, pipelines, and related facilities.

The requirements for such impacts in most areas of the state are Waste Discharge Requirements (WDRs) and general National Pollutant Discharge Elimination System (NPDES) permits. The discharge of water from the development, testing and disinfection of wells could degrade surface or groundwater quality during the construction phase of the ASR project. The District shall ~~is required to~~ monitor compliance with both WDRs and NPDES permits from the Regional Water Quality Control Board. Nonetheless, the construction portion of the project may cause temporary potential adverse impacts at these five sites.

Hydrology

Groundwater Levels

Under proposed project conditions, groundwater levels in the project area will be higher on average than current conditions. ~~However, the direction of the hydraulic gradient will not is not expected to be altered over the subbasin. Therefore, the project implementation would result in a beneficial residual impact.~~ The water table in the Lancaster area is at an average depth of about 300 feet below ground surface. South and southeast of the proposed project area (the location of the Air Force Base) wells generally show a water table level of about 390 feet to 490 feet below ground surface. The District's production records indicate that 18 of our existing wells are within the pumping depression and extract close to 48 percent of the total groundwater extractions.

The ASR project would help raise groundwater levels in vicinity of the wells used for injection. However, the amount of water available for recharge compared to the estimated storage of the depression is such that the groundwater level will not cause waterlogged soils that could increase liquefaction potential, or result in malfunctioning septic systems, floating foundations, or differential settlement. Water levels rises attributed to ASR activities will not be high enough to alter the direction of flow over the subbasin.

Long-term injection and storage of water supplies would raise the groundwater levels within the project area, thereby benefiting existing groundwater users. A decrease in pumping costs is expected due to increasing groundwater levels. As the pumping lift decreases so does the power cost to lift the water. As groundwater increases, additional pump bowls and larger motors would not be necessary. This is a potential beneficial environmental impact of the proposed project.

~~During the operations of the proposed project, the District would monitor groundwater levels to ensure no detrimental effects result from injection. The monitoring program would be reviewed and approved by the RWQCB.~~

Ground Water Movement

Investigation of how the proposed project affects local groundwater flow and water levels helps determine the fate of injected water constituents and recovery efficiency. A model or some

visualization of what happens to the water once it is injected into the aquifer is useful and critically important in terms of aquifer water quality. Most models and theories suggest that the injected water creates a discreet dome or balloon type formation around the injection well. The model supposes that extraction of the well then deflates the balloon. However, the "balloon" model of fluid flow during the injection and extraction phases of ASR is probably much too simplistic and ignores other important geohydrologic and biogeochemical processes.

In the demonstration project, two methods were used to determine a more accurate visualization of the injected water shape within the aquifer. The first method simply measured the water table level within the network of wells and peizometers consistently throughout the demonstration project. The second method measured changes in gravity due to small, but measurable net changes in mass proportional to the volume of water that fills or drains the pore spaces within the sediments.

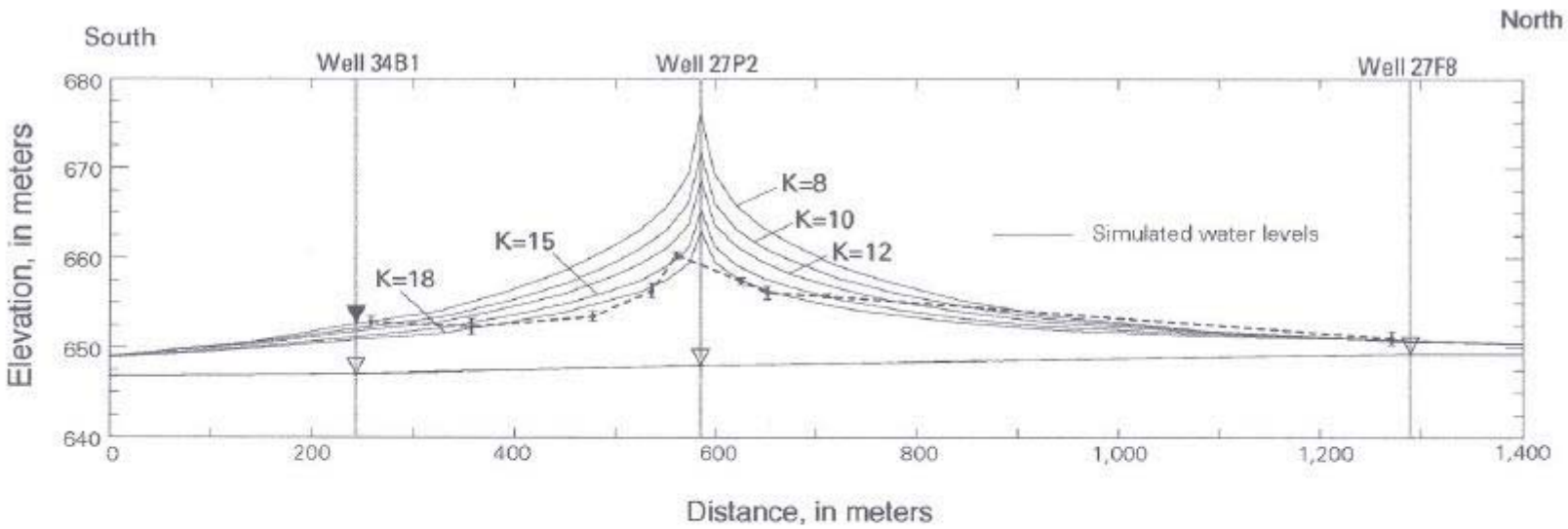
Gravity measurements were made before and during injection over a network of gravity stations. During the second injection / extraction cycle, changes in gravity were determined along a north-south line. Results of the gravity changes indicate a rise in water table levels that form a conical shape with its apex at the injection site that slopes downward in a radial fashion. A general rise and fall of this shape occurred before injection and prior to extraction during the second phase (see **Figure 5-6**).

Water level data also gives some indication of groundwater flow. Since water levels are generally sloping downward from north to south around the project area water flows from north to south also. Water levels in April 1996, prior to injection show water levels being 4-9 feet higher than those of a well at Palmdale. This suggests that during periods of low extraction in Lancaster, there exists a very slight gradient from the injection site to the southeast. However, there may be a temporary groundwater flow divide between the Palmdale area and the injection site that would prohibit injection water flow southward. Water levels at wells greater than a mile from the injection site did not show any changes.

Water Supplies

Concerns over the depletion of groundwater resources in the Lancaster area of the Antelope Valley have increased in recent years because of rapid population growth and the resulting demand imposed on existing water supplies. Historically, groundwater withdrawal has exceeded natural replenishment, resulting in as much as 200 feet of water-level declines throughout the Lancaster area and more than 6 feet of land subsidence in parts of Lancaster since the 1920's (Ikehara and Phillips, 1994). Reliance on groundwater eased somewhat in the 1970's with the introduction of imported surface water from the SWP California Aqueduct. However, because of the climactic influence on surface-water availability and steadily increasing demand, local groundwater sources are still an important part of the water supply.

This project serves to augment supplies by providing additional water during periods of drought. The potential for future withdrawal of water during droughts and emergencies enhances the reliability of the District's service, as well as, helps sustain the future growth in the service area.



EXPLANATION

———	Simulated water levels for a range of hydraulic conductivities (K, in ft/d)
--+---	Gravity inferred water level; circle shows value based on measured change in gravity and two standard deviation error bars
▼	Near completion of injection water level measurement
▽	Pre-injection water level measurement and projected water table surface

Figure 5-6
Gravity Inferred Water Levels
Modified from Analysis of Subsurface Injection, Storage, and Recovery of Freshwater in Lancaster, Antelope Valley, California , Unpublished USGS

The proposed ASR project would result in beneficial impacts to water supplies in the Antelope Valley.

~~The proposed project would result in a positive effect on groundwater due to conjunctive use of the SWP water. Utilization of conjunctive use would also reduce demands on the Sacramento / San Joaquin Delta during drought periods, thereby benefiting biological resources in that region.~~

Water Quality

The design of a usable and cost-effective ASR system has to consider a number of hydrogeologic and geochemical factors. Of particular importance for this ASR project are chemical reactions induced by the injection of treated SWP water that may limit the quality and quantity of water stored and the length of time for storage. Potential water quality concerns that were evaluated included chemical reactions causing precipitation that would result in screen encrustation, geochemical reactions that could result in clay dispersion, and the reduction in permeability or chemical reactions causing the changes in redox potential that could cause precipitation reactions to occur. There were no significant chemical reactions that would cause clogging of the screen and/or gravel pack. The water used for injection met drinking water standards and therefore no significant shifts in water quality that are considered adverse were observed throughout the course of the demonstration project. All water produced from the aquifer and delivered to customers complied with the established State and Federal water quality standards for drinking water.

Disinfection byproducts (DBPs) do not occur naturally in the groundwater. A condition of degradation in accordance with RWQCB's Anti-degradation Policy (Resolution 68-16) for THMs is defined as exceeding the Laboratory detection limit. The only DBPs presently regulated besides THMs are the five Haloacetic acids compounds (HAA5). The maximum contaminant level (MCL) set by the Stage 1 DBP Rule is 60 ppb and the effective dates for the District's system in Lancaster was January 1, 2002. The demonstration project did not analyze the effect of injecting water with HAA5 because it occurred prior to HAA5 being regulated. The annual average concentration of HAA5 in water the District served their customers for year 2002 was 17.05 ppb with typical quarterly average values ranging between 15 and 23 ppb. The presence of HAA5 at the levels below the MCL set by the USEPA and California State DHS does not pose a threat to human health or safety, and does not threaten to impact the beneficial uses of the Lancaster subbasin groundwater.

~~Regarding all DBPs except THMs, the proposed ASR project would not substantially degrade groundwater quality below State Drinking Water Standards (Title 22 of the California Code of Regulations). Therefore, the proposed ASR project would not result in a significant adverse impact in regard to all DBPs, excluding THMs.~~

~~All discharges associated with project implementation and long-term operations would be accomplished in accordance with RWQCB guidelines.~~

Potential long-term impacts on groundwater quality include those associated with mixing of injected water with groundwater. The introduction of ~~chlorine and~~ THMs to the aquifer would have a potential significant impact on the environment.

Concentrations of THMs in extracted water during the Demonstration Project showed an abrupt rise in THMs, followed by a very rapid drop and then a long slow decline as time goes on. Seasonal operation of an injection program would likely have a residual effect on groundwater chemistry given the same chemical and hydrologic conditions, and a similar ratio of injection to extraction volume. Results from an analytical mixing model, assuming complete mixing, are in agreement with this conclusion (Fujii and Bergamaschi, 2001). Although the imported water and groundwater are both of drinking-water quality, and are both delivered to customers in Lancaster, imported water ~~does~~ contains ~~constituents, including chloride and~~ THMs, with concentrations greater than those in native groundwater. ~~On the other hand, groundwater contains some constituents at higher concentrations than imported water, including arsenic and hexavalent chromium, which are both constituents of concern locally.~~

The demonstration project showed that THMs continued to form in the groundwater system after injection. Formation of THMs requires the presence of chlorine, the presence of organic precursors, and conditions favorable to the reactions forming THMs. In light of this, and with current available water treatment technology, the District would implement measures to improve injection water quality by limiting THM precursors during the proposed project.

~~While, the proposed project would have significant unavoidable impacts as a result of the introduction of THMs to the groundwater, it would produce beneficial water quality impacts.~~

The proposed ASR project would comply with State Drinking Water Standards (Title 22 of the California Code of Regulations). Therefore, the proposed ASR project would not result in a significant adverse impact in regard to all regulated constituents including DBPs, with the exception of THMs. The proposed ASR project would increase the level of THMs in the groundwater by the amount present in the injected water. The amount of THMs in the injected water would vary over time, but the exact amount of THMs at any given time is not known. The increase in the level of THMs in the groundwater would violate the RWQCB's Anti-Degradation Policy (Resolution 68-16). Any increase in THMs in the groundwater would exceed the anti-degradation threshold. Therefore, the proposed ASR project would result in a significant adverse impact in regards to the increase in the level of THMs in the groundwater.

5.2.4 Cumulative Impacts

No cumulative impacts are associated with this project. See Section 4.0 (Cumulative Impacts) for additional information.

5.2.5 Mitigation Measures

The USEPA has indicated that the best available technology for THM removal or THM control is Granular Activated Carbon 10 (GAC10), also known as enhanced coagulation or enhanced softening. GAC10 is granular activated carbon with an empty bed contact time with

contaminated water of 10 minutes and reactivation frequency for GAC of no more than six months. A properly designed GAC filter will also remove chlorine, bad tastes and odor, color, chemicals and other organics found in both treated and raw water supplies. The mechanism by which GAC removes contaminants is both adsorption, as well as catalytic reduction (chlorine). Since the adsorptive force of carbon is greater than that of the water, and since most organic contaminants are hydrophobic, they have a tendency to adhere to the surfaces of the GAC. This adsorption removes these contaminants from the water as it passes the carbon column. Most inorganic species do not adsorb onto the carbon and will remain in solution and pass the carbon column unaffected. Published capital costs for GAC systems range from $0.20 to $0.80/1000 gallons ($65 to $260/AF). The District will purchase water for injection from AVEK at approximately $210/AF. The District will sell the extracted water to its customers to recover the District's costs. Those costs include the cost of purchasing the water, as well as the construction, and operation and maintenance of the system. To include a GAC system could more than double the cost to the District and to the District's customers of the extracted water, making the District's use of injected water cost-prohibitive. For these reasons, implementation of the GAC system is economically infeasible.

AVEK is currently conducting pilot studies to identify the feasibility of GAC and membrane filtration. Although AVEK's THM levels vary considerably throughout their system, they currently meet the standards established by Stage 1 of the DBP Rule. AVEK is required by a state mandate to meet Stage 2 requirements by its implementation date of June 2006.

The following measures shall be conducted to ensure that potential impacts to well construction and groundwater are avoided or minimized.

GW-1 ~~All discharge associated with the project implementation and long-term operation, including well discharges, shall be accomplished in accordance with RWQCB permit guidelines to ensure no degradation of surface or groundwater quality.~~

This measure mitigates the temporary potential adverse impact that the construction portion of the project may cause. The requirements for such impacts in most areas of the state are Waste Discharge Requirements (WDRs) and general National Pollutant Discharge Elimination System (NPDES) permits. In order to avoid the impacts of the discharge of water from the development, testing and disinfection of wells and ensure no degradation of surface or groundwater quality during the construction phase of the ASR project, the District shall monitor compliance with both WDRs and NPDES permits from the Regional Water Quality Control Board. All discharges are proposed to be conveyed by a combination of piped and/or storm channel overland flow to confined / bermed areas for dissipation by evaporation / percolation with no discharge occurring to surface waters. The mechanism to be followed prior to discharge includes confining the water to tanks for sedimentation treatment and holding the water in the tanks during the disinfection phase until the results confirm a reduction of chlorine residual concentration to 0.5 mg/L or less. The process of development / testing / disinfection may last about a week for each well being constructed.

GW-2 ~~The District shall operate the proposed project in compliance with the RWQCB's Anti-degradation Policy (Resolution 68-16), and applicable DHS regulations regarding drinking water quality.~~

During the life of the ASR Project, the District shall operate the ASR project in compliance with the RWQCB's Anti-degradation Policy (Resolution 68-16) maintaining present and potential beneficial uses for the Antelope Valley Basin as described in Chapter 2 of the Water Quality Control Plan for the Lahontan Region (Basin Plan). Beneficial uses for the Antelope Valley Basin as described in the Basin Plan are:

- Municipal and Domestic Supply – beneficial uses of water used for community, military, individual water supply systems including, but not limited to, drinking water supply.
- Agricultural Supply – beneficial uses of waters used for farming, horticulture, or ranching, including, but not limited to, irrigation, stock watering, and support of vegetation for range grazing.
- Industrial Service Supply – beneficial uses of waters used for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, geothermal energy production, hydraulic conveyance, gravel washing, fire protection, and oil well re-pressurization.
- Freshwater Replenishment – beneficial uses of waters used for natural or artificial maintenance of surface water quantity or quality.

The District shall operate the ASR project in compliance with drinking water regulatory program established by the California Legislature. The California Legislature established drinking water regulatory program (Title 22 Code of Regulations) within the State Department of Health Services (DHS) in order to provide the orderly and efficient delivery of safe drinking water. The District shall operate the ASR project in compliance with primary and secondary drinking water standards established by DHS.

- Primary Standards are maximum contaminant levels (MCLs) of contaminants that, in the judgment of DHS, may have an adverse effect on the health of persons.
- Secondary Standards are MCLs of contaminants that, in the judgment of DHS, are necessary to protect the public welfare.

Table 5-1 lists the constituents and their MCLs that shall be used for compliance purposes.

Table 5-1
Drinking Water Standards - Maximum Contaminant Levels (MCLs)

Parameters		Units	MCL
Weekly Injection Water Monitoring			
	Combined Chlorine Residual	mg/L	4 (MRDL*)
	pH	N/A	N/S
	Trihalomethanes	ug/L	80
	Turbidity	NTU	5
General Minerals			
	Total Dissolved Solids (TDS)	mg/L	1000
	Specific Conductance	micromhos	1600
	Sulfate (SO4)	mg/L	500
	Chloride (Cl)	mg/L	500
	Fluoride (F)	mg/L	2
	Nitrate (as NO3)	mg/L	45
	Nitrite (N)	mg/L	1
	Iron (Fe)	mg/L	0.3
	Manganese (Mn)	mg/L	0.05
Total Metals			
	Aluminum (Al)	mg/L	1
	Antimony (Sb)	mg/L	0.006
	Arsenic (As)	mg/L	0.05
	Barium (Ba)	mg/L	1
	Beryllium (Be)	mg/L	0.004
	Boron (B)	mg/L	1
	Cadmium (Cd)	mg/L	0.005
	Total Chromium (Cr)	mg/L	0.05
	Hexavalent Chromium (Cr VI)	mg/L	N/A
	Copper (Cu)	mg/L	1
	Lead (Pb)	mg/L	0.015
	Mercury (Hg)	mg/L	0.002
	Nickel (Ni)	mg/L	0.1
	Selinium (Se)	mg/L	0.05
	Thallium (Th)	mg/L	0.002
	Zinc (Zn)	mg/L	5
General Physical Parameters			
	Taste	N/A	N/S
	pH	N/A	N/S
	Temperature	Degrees C^0	N/S
	Apparent Color	Units	15
	Odor	Units	3
	Turbidity	NTU	5

	Parameters	Units	MCL
	Methylene Blue Active Substances (MBAS)	mg/L	0.5
Other Constituents			
	Total Organic Carbon	N/A	N/S
	Trihalomethane Formation Potential	N/A	N/S
	Total Trihalomethane Compounds	ug/L	80
	Coliform	% of positive samples	5%

Constituents listed on Table 5-3, but do not have an MCL or other standard.

* Maximum Residual Disinfectant Level

N/S - No Standard

N/A - Not Applicable

GW-3 ~~Groundwater conditions shall be tracked and a monitoring program shall be established under conditions of the approval by the RWQCB. In the event that any adverse impacts to groundwater conditions occur, the District shall take appropriate steps to mitigate those impacts under conditions of a contingency plan. The District shall implement the monitoring program to track injected water movement through simulation models and subsidence throughout the lifetime of the project.~~

The District shall monitor injection rates, volume of injected SWP water, and groundwater levels during the lifetime of the ASR project.

Water flow monitoring shall include taking continuous measurements of the rate and amounts of injection and extraction through flow meters, which will be located at each ASR well. Flow meters will be calibrated as specified by the manufacturer, and the results will be logged in a flow meter instrument maintenance logbook.

The District shall also monitor groundwater levels. Depth to static groundwater measurements shall be obtained at each of the monitoring sites (See **Table 5-2**) using an electric water level sounder. The sounder shall be calibrated at the manufacturer's specifications.

To obtain a depth to water measurement, the electric sounder cable shall be lowered slowly into the well via the water level sounding tube or equivalent orifice until the sounder indicates submergence by either a beeping sound or light depending on the type of signal installed for that particular model. At this point, the designated District personnel shall note the number of feet from the established and/or surveyed measuring point for that well to the groundwater surface by using gradations on the electric sounder cable. The height of the water column in the well shall be calculated by subtracting the depth to water measurement from the total well depth and shall be entered in a field notebook.

Table 5-2
Monitoring Wells

State Well Number	USGS Site Indentificaiton Number	Local Well Name	Altitude of Land Surface	Use of Well	Year of Construction	Depth Drilled	Well Casing Diameter (inches)	Well Casing Depth	Screened Interval Depth	Aquifer Zone Perforated	Type of Data Included in this Report
COUNTY WELLS											
INJECTION WELLS											
7N/13W -27P2	343943118081801	4-32	2,463	PS	1969	735	16	727	282-717	U	F,WC,WL
7N/13W -27P3	343943118082101	4-34	2,462	PS	1972	740	16	720	280-710	U	F,WC,WL
7N/12W -34N3	343848118083801	4-29	2,522	PS	1967	792	14	740	350-728	U	F,WC,WL
7N/12W -34N4	343858118083801	4-30	2,517	PS	1968	800	16	770	350-760	U	F,WC,WL
-	-	4-63	-	PS	2001	745	16	725	290-400; 450-550; 595-705	U	F,WC,WL
-	-	4-64	-	PS	2001	730	16	710	300-490; 530-690	U	F,WC,WL
-	-	4-66*	-	PS	-	-	-	-	-	U	F,WC,WL
-	-	4-69*	-	PS	-	-	-	-	-	U	F,WC,WL
-	-	4-70*	-	PS	-	-	-	-	-	U	F,WC,WL
-	-	4-71*	-	PS	-	-	-	-	-	U	F,WC,WL
-	-	4-72*	-	PS	-	-	-	-	-	U	F,WC,WL
MONITORING WELLS											
7N/12W-26K3	343951118065902	4-31	2,459	AB	1969	770	16	687	310-674	U	WL
7N/12W-27F01	344006118082601	4-43	2,440	PS	1988	1210	16	1202	600-1202	L	WC,WL
7N/12W-27F3	344006118082601	4-44	2,440	PS	1988	1220	16	1202	400-1202	U,L	WC,WL
7N/12W -27J5	343903118074801	4-8	2,449	AB	1953	700	14	700	350-700	U	WL
7N/12W-27H3	344008118074701	4-33	2,443	PS	1971	730	16	710	260-700	U	WC
7N/12W-27J4	344002118074701	4-13	2,448	PS	1956	1108	14	1102	362-1102	U	WC
7N/12W-27J6	344003118074901	4-42	2,449	PS	1987	1174	16	1150	400-1140	U,L	WC
OTHER WELLS											
7N/12W-27F5	344005118082201	5K8-PZ1	2,441.60	PIEZ	1996	1183	2	935	905-925	L	WC,WL,BP
7N/12W-27F6	344005118082202	5K8-PZ2	2,441.60	PIEZ	1996	1183	2	735	705-725	U	WC,WL
7N/12W-27F7	344005118082203	5K8-PZ3	2,441.60	PIEZ	1996	1183	2	535	505-525	U	WC,WL
7N/12W-27F8	344005118082204	5K8-PZ4	2,441.60	PIEZ	1996	1183	2	425	395-415	U	WC,WL
7N/12W-27F9	344005118082205	5K8-EX1	2,441.60	EXTM	1996	735	2	725	--	--	C

State Well Number	USGS Site Indentificaiton Number	Local Well Name	Altitude of Land Surface	Use of Well	Year of Construction	Depth Drilled	Well Casing Diameter (inches)	Well Casing Depth	Screened Interval Depth	Aquifer Zone Perforated	Type of Data Included in this Report
7N/12W-27F10	344005118082206	5K8-EX2	2,441.60	EXTM	1996	1205	7	1190	--	--	C
7N/12W-27H5	344003118074801	DK8-PZ1	2,449	PIEZ	1992	1120	2	1120	1,080-1,100	L	WC,WL
7N/12W-27H7	344003118074803	DK8-PZ3	2,449	PIEZ	1992	1120	2	724	684-704	U	WL
7N/12W -27P5	343943118081701	5L-PZ1	2,462.70	PIEZ	1998	918	2	910	890-910	L	WL
7N/12W -27P6	343943118081702	5L-PZ2	2,462.70	PIEZ	1998	918	2	560	540-560	U	WL
7N/12W -27P7	343943118081703	5L-PZ3	2,462.70	PIEZ	1998	918	2	460	440-460	U	WL
7N/12W -27P8	343943118081704	5L-PZ4	2,462.70	PIEZ	1998	918	2	390	330-370	U	WL

* Proposed ASR wells

USGS site identification number: The unique number for each site is based on the latitude and longitude of the site, which is referenced to the North American Datum of 1927 (NAD27). First six digits are latitude , next seven digits are longitude, and final two digits are a sequence number to uniquely identify each site. Altitude of land surface in feet above sea level. Use of well: AB, abandoned; EXTM, extensometer; INDS, industrial supply; PIEZ, piezometer; PS, public supply. Depth drilled, casing depth, and screened (perforated) interval in feet below land surface. Screened (perforated) interval: depth of top and botton of well screen or perforations; screened or perforated throughout entire interval unless denoted by aserisk(*). The extensometers and piezometers were installed by the US geological Survey.

Aquifer zones: U, upper; L, lower; UNK, unknown. Type of data included in this report for each well: BP, barometric pressure; C, compaction; F, flow; WC, water chemistry; WL, water level. --, no data]

Groundwater measurement for piezometers shall be taken electronically from the pressure transducers. The pressure transducers shall be calibrated semi-annually with the electric sounder.

The District shall utilize the simulation model developed during the demonstration project to estimate aquifer characteristics, calculate directions and quantities of groundwater flow, and to analyze resulting effects on water levels.

GW-4 ~~The District shall implement water quality monitoring throughout the life of the proposed project, for both source water being injected and the water being extracted.~~

The District shall implement water quality monitoring throughout the life of the proposed project, for both source water being injected and the water being extracted. The District shall implement the following Sampling and Analysis Plan (SAP).

The District appointed ASR project manager shall be responsible for the overall administration and implementation of the SAP. The Environmental Toxicology Laboratory (Lab) of the Los Angeles County Department of Agricultural Commissioner / Weights and Measures, or a comparable state-certified laboratory, shall perform the water quality analysis.

Monitoring Program

The Monitoring Program addresses water quality monitoring for both groundwater and SWP water used for recharge, and responsibilities for analysis and reporting.

Background Groundwater Quality

Background groundwater quality shall be developed for each monitoring point prior to initiation of the project. This one time sampling event is intended to confirm that background groundwater quality at the ASR well sites is consistent with historical groundwater quality data. The chemical and physical constituents to be to be analyzed and frequency of testing are listed in **Table 5-1**. The monitoring points are listed in **Table 5-2**.

Pre-Injection SWP Water Quality Monitoring

Analysis shall be performed on treated SWP water that is being injected at the beginning of each injection cycle to establish background water quality data for recharged water. The chemical and physical constituents to be to be analyzed and frequency of testing are listed in **Table 5-3**. The monitoring points are listed in **Table 5-2**.

Groundwater Extraction Water Quality Monitoring

In order to document potential groundwater quality changes in the aquifer due to injection and extraction operations, sampling and analysis shall be performed on groundwater collected at monitoring sites established by the District. Monitoring wells were selected so that this monitoring plan successfully confines the injected water to the depression area (see **Figure 5-7**).

Tables 5-3 and **5-1** presents the complete list of constituents and parameters that shall be monitored, and the respective MCL.

Reporting Program

The District shall maintain water quality data and make it available to the RWQCB upon request. The monitoring and project operating data that the District shall maintain, include all above mentioned water quality data and Chain-of-custody (COC) forms with pertinent field information for water quality sampling and analysis done (see **Figure 5-7**.

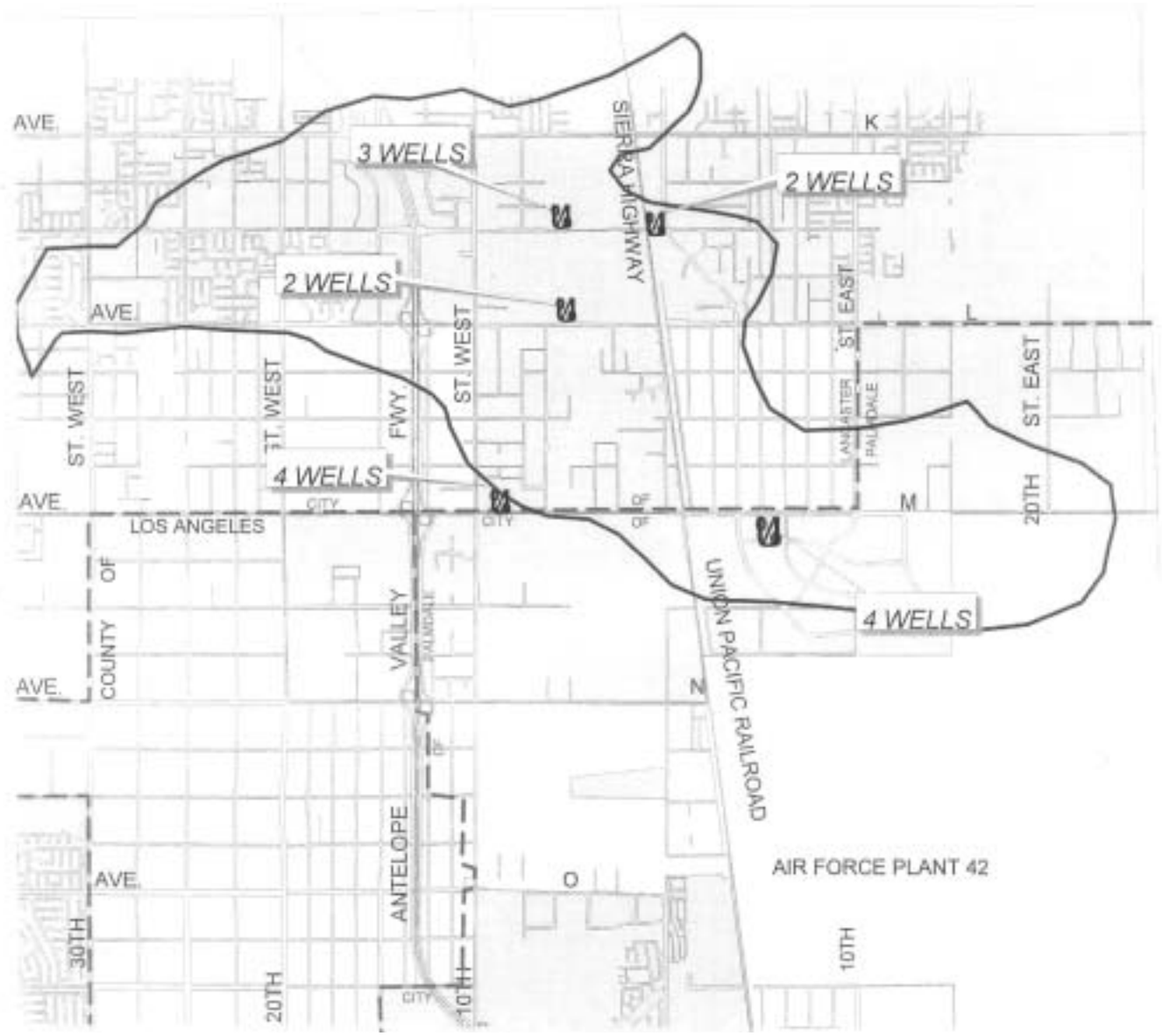
The District shall also identify and report problems related to well sampling including temporary lack of access to well(s), inoperable or malfunctioning purging and sampling equipment, and unsafe working conditions.

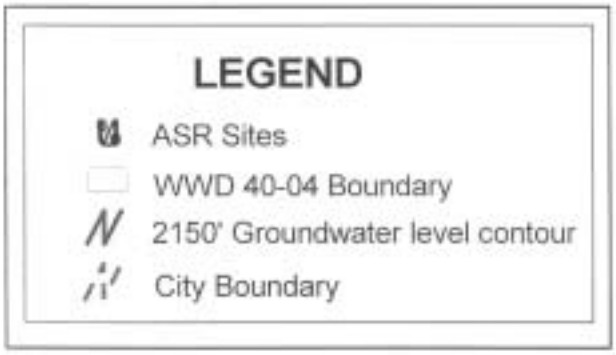
Field Water Quality Sampling Methods And Procedures

Sample Containers

The Lab shall prepare appropriately selected containers with both preservative and container type in accordance with the requirements presented in **Table 5-4**. Extra containers of each type shall be provided in the event of breakage or loss. Each container shall have a pre-printed identification label clearly showing the group or type of analysis to be performed. The Lab shall assign a laboratory sample number upon receiving the sample for proper identification and tracking.

Sample containers shall be laboratory cleaned prior to use based in the analyte of interest in accordance with standard United States Environmental Protection Agency (USEPA) protocol. Sample containers shall be stored in a fashion that prevents dust or other contaminant accumulations. The Lab shall be responsible for verifying the cleanliness and integrity of the sample containers prior to shipment to the District pursuant to their sample container quality control (QC) procedures.





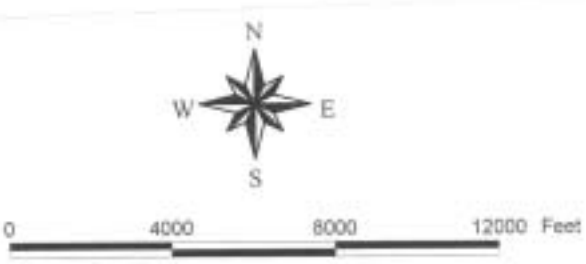


Figure 5-7
ASR Sites

Table 5-3
Aquifer and Storage Recovery Project - Sampling Frequency

Parameters	Units	Back-ground Ground water	SWP / Injection Water Frequency	Groundwater Frequency (During Storage & Extraction)
Weekly Injection Water Monitoring				
Combined Chlorine Residual	mg/L	X	Weekly	Quarterly
PH	Units	X	Weekly	Quarterly
Total Dissolved Solids (TDS)	mg/L	X	Weekly	Quarterly
Total Trihalomethane Compounds (THM)	ug/L	X	Weekly	Quarterly
Trihalomethane Formation Potential (THMFP)	ug/L	X	Weekly	Quarterly
Turbidity	NTU	X	Weekly	Semi-Annually
Flow Monitoring				
Average flow rate	Gal/min	X	Continuous	Continuous
Cumulative flow	Gallons	X	Continuous	Continuous
Injection / Extraction Flow	Gal/min/day	X	Continuous	Continuous
General Minerals				
Alkalinity (as CaCO3)	mg/L	X	Semi-Annually	Semi-Annually
Specific Conductance	umhos/cm	X	Semi-Annually	Semi-Annually
Sulfate (SO4)	mg/L	X	Semi-Annually	Semi-Annually
Chloride (Cl)	mg/L	X	Semi-Annually	Semi-Annually
Calcium (Ca)	mg/L	X	Semi-Annually	Semi-Annually
Magnesium (Mg)	mg/L	X	Semi-Annually	Semi-Annually
Sodium (Na)	mg/L	X	Semi-Annually	Semi-Annually
Potassium (K)	mg/L	X	Semi-Annually	Semi-Annually
Bicarbonate (HCO3)	mg/L	X	Semi-Annually	Semi-Annually
Hardness (as CaCO3)	mg/L	X	Semi-Annually	Semi-Annually
Fluoride (F)	mg/L	X	Semi-Annually	Semi-Annually
Nitrate (as NO3)	mg/L	X	Semi-Annually	Semi-Annually
Nitrite (N)	mg/L	X	Semi-Annually	Semi-Annually
Iron (Fe)	mg/L	X	Semi-Annually	Semi-Annually
Manganese (Mn)	mg/L	X	Semi-Annually	Semi-Annually
Total Dissolved Solids (TDS)	mg/L	X	Weekly	Quarterly
Total Metals				
Aluminum (Al)	mg/L	X	Semi-Annually	Semi-Annually
Antimony (Sb)	mg/L	X	Semi-Annually	Semi-Annually
Arsenic (As)	mg/L	X	Semi-Annually	Semi-Annually
Barium (Ba)	mg/L	X	Semi-Annually	Semi-Annually

Parameters	Units	Back-ground Ground water	SWP / Injection Water Frequency	Groundwater Frequency (During Storage & Extraction)
Beryllium (Be)	mg/L	X	Semi-Annually	Semi-Annually
Boron (B)	mg/L	X	Semi-Annually	Semi-Annually
Cadmium (Cd)	mg/L	X	Semi-Annually	Semi-Annually
Total Chromium (Cr)	mg/L	X	Semi-Annually	Semi-Annually
Hexavalent Chromium (Cr VI)	mg/L	X	Semi-Annually	Semi-Annually
Copper (Cu)	mg/L	X	Semi-Annually	Semi-Annually
Lead (Pb)	mg/L	X	Semi-Annually	Semi-Annually
Mercury (Hg)	mg/L	X	Semi-Annually	Semi-Annually
Nickel (Ni)	mg/L	X	Semi-Annually	Semi-Annually
Selenium (Se)	mg/L	X	Semi-Annually	Semi-Annually
Thallium (Th)	mg/L	X	Semi-Annually	Semi-Annually
Zinc (Zn)	mg/L	X	Semi-Annually	Semi-Annually
General Physical Parameters				
Apparent Color	units	X	Semi-Annually	Semi-Annually
Methylene Blue Active Substances (MBAS)	mg/L	X	Semi-Annually	Semi-Annually
Odor	units	X	Semi-Annually	Semi-Annually
PH	units	X	Weekly	Quarterly
Temperature	degrees C^0	X	Semi-Annually	Semi-Annually
Turbidity	NTU	X	Weekly	Semi-Annually
Other Constituents				
Coliform	mpn/100ml	X	Semi-Annually	Semi-Annually
Combined Chlorine Residual	mg/L	X	Weekly	Quarterly
Total Organic Carbon	mg/L	X	Semi-Annually	Quarterly
Trihalomethane Formation Potential (THMFP)	ug/L	X	Weekly	Quarterly
Total Trihalomethane Compounds (THM)	mg/L	X	Weekly	Quarterly
Aquifer Characteristics				
Depth of Ground Water	feet bgs	X		Annually
Direction of water gradient	degrees	X		Annually
Electrical Conductivity	microumhos/cm	X		Annually
Slope of Grade of water table	ft/mile	X		Annually
Static H_2O level	ft above msl	X		Annually

Table 5-4
Field Sampling Methods and Procedures

Constituent	Analytical Testing Method	California DLR (mg/L, unless specified)	Maximum Holding Time	Sample Container Bottle Type	Sample Container Size Set	Perservation
General Parameters						
pH	EPA 150.1	0*	Immediate	plastic	250 mL	None Required
specific conductance	SM 2510-b	0*	28 days	plastic or glass	250mL	Cool to 4 ^{0}C, measure 25 ^{0}C
turbidity	EPA 180.1	0*	48 hours	glass	500mL	Cool to 4 ^{0}C
combined chlorine residual	SM 4500-CL-G	0*	Immediate	amber glass	250mL	Cool to 4 ^{0}C
temperature		0*				None Required
color	SM 2120-b	0*	48 hours	glass	500mL	Cool to 4 ^{0}C
odor	EPA 140.1	0*	24 days	glass or plastic	500mL	Cool to 4 ^{0}C
dissolved solids	SM 2450-c	0.004	7 days	plastic	250mL	Cool to 4 ^{0}C
Major Minerals						
sulfate (SO_4)	EPA 300.0	500	28 days	plastic or glass	250mL	Cool to 4 ^{0}C
chloride (Cl)	EPA 300.0	0*	28 days	plastic or glass	250mL	Cool to 4 ^{0}C
calcium (Ca)	SM 3500-Ca D	0*	6 months	plastic	1 Liter	HNO_3, cool to 4 ^{0}C
magnesium (Mg)	SM 3500-Mg E	0.0005	6 months	plastic	1 Liter	HNO_3, cool to 4 ^{0}C
sodium (Na)	SM 3500-Na D	0*	6 months	plastic	1 Liter	HNO_3, cool to 4 ^{0}C
potassium (K)	SM 3500-K D	0*	6 months	plastic	1 Liter	Cool to 4 ^{0}C
bicarbonate (HCO_3)	SM 2320-E	0*	14 days	plastic or glass	250mL	Cool to 4 ^{0}C
hardness (as $CaCO_3$)	SM 2340-C	0*	6 months	plastic or glass	250mL	Cool to 4 ^{0}C
alkalinity (as CaCO3)	SM 2320-B	0*	14 days	plastic or glass	250mL	Cool to 4 ^{0}C
fluoride (F)	EPA 300.0	0.1	28 days	plastic or glass	250mL	Cool to 4 ^{0}C
nitrate (as NO_3)	EPA 300.0	2	48 hours	plastic or glass	250mL	Cool to 4 ^{0}C
Nitrite (N)	EPA 300.0	0.4	48 hours	plastic or glass	250mL	Cool to 4 ^{0}C
Iron	EPA 200.7	0.1	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
Manganese	EPA 200.7	0.02	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
Total Metals						
aluminum	EPA 200.7	0.05	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
antimony	SM 3113-B	0.006	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
arsenic	SM 3113-B	0.002	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
barium	EPA 200.7	0.1	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
beryllium	SM 3113-B	0.001	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C

Constituent	Analytical Testing Method	California DLR (mg/L, unless specified)	Maximum Holding Time	Sample Container Bottle Type	Sample Container Size Set	Perservation
boron	EPA 200.8	**	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
cadmium	SM 3113-B	0.001	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
total chromium	SM 3113-B	0.01	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
hexavalet chromium	EPA 218.6	0.001	24 hours	plastic	500mL	Cool to 4 ^{0}C
copper	EPA 200.7	0.05	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
lead	SM 3113-B	0.005	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
silver	SM 3113-B	0.01	6 months	Dark Plastic	500mL	HNO_3, cool to 4 ^{0}C, store in the dark
mercury	EPA 245.1	0.001	28 days	plastic	500mL	HNO_3, cool to 4 ^{0}C
nickel	SM 3113-B	0.01	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
selenium	SM 3113-B	0.005	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
thallium	EPA 200.9	0.001	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
zinc	EPA 200.8	0.05	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
TOC	SM 5310-B	0.001	28 days	glass w/Teflon cap	40mL	HNO_3, cool to 4 ^{0}C
trihalomethane formation potential	EPA 510.1	0*	7 days	amber glass	250mL	Cool to 4 ^{0}C
total trihalomethane compounds	EPA 524.2	0*	14 days	glass w/Teflon cap	2x40 mL	Sodium thiosulfate, per method, cool to 4 ^{0}C
total coliform	SM 9221-B	0*	30 hours	sterile polyethlene	1 Liter	Cool to 4 ^{0}C
MBAS	SM 5540-C	0.0005	48 hours	plastic	250 mL	Cool to 4 ^{0}C

Well and Sample Line Purging

Prior to sampling, each well shall, to the extent possible, be pumped by the District for a sufficient period of time to evacuate any standing water in the well, ensure movement of "fresh" groundwater in the well and ensure pH, specific conductance, and temperature stabilization.

Water discharge from the production wells shall be conveyed directly to waste. The sample line flow shall remain constant and continuous during sample collection to minimize the potential for particulate matter becoming dislodged in the discharge pipe and entering sample container(s).

Sample Collection and Preparation

The District shall contact the Lab and arrange to have ice chests of prepared sample bottles delivered to the appropriate location requested by the District at least one week prior to the sampling event. Upon receipt of the sample bottles, designated District sampling personnel shall make an inventory of the bottles received to assure that adequate number and types of sample bottles required for the upcoming sampling event have been provided.

Prior to each sampling event the designated District personnel shall inventory, restock, replace, clean, calibrate, maintain, and test water quality monitoring equipment as needed. Sampling equipment shall include portable specific conductance meter, pH meter, residual chlorine test kit and thermometer, including pH buffer solutions and specific conductance calibration solutions. At a minimum, the frequency and nature of equipment maintenance shall be consistent with the manufacturer's recommendations.

Total Organic Carbon samples shall be collected with as little aeration as possible to ensure that no air bubbles are incorporated into the sample containers after they are capped. If air bubbles are observed in a sample container, re-sampling shall be performed.

Sample Preservation

Designated sampling personnel shall use "clean sampling techniques" to minimize potential contamination of water samples. Sample containers and lids shall not touch the ground, the sampling personnel's clothing, or any other potential source of contamination. Sample container lids shall not be removed from a particular container until that container is to be filled. Sampling containers shall be rinsed three times with the sample prior to collection unless the container contains a preservative. The sample container shall be filled to the top of the rim to minimize air space between the liquid level and the lid. The container lid shall also be rinsed with the sample before use. The lid shall be tightened securely to the container immediately after sample collection is completed.

Chemical preservatives and refrigeration shall be used to maintain sample integrity prior to analysis. After sample collection, water samples shall be stored in insulated coolers or ice chests at a temperature of 4 ^{0}C, or 39 ^{0}F, until delivery to the Lab. Samples to be analyzed for total metals shall be filtered using a 0.45-micron filter then acidified with nitric acid by the Lab immediately on arrival.

Designated sampling personnel shall exercise extreme care at all times during the handling of acid-preserved sample containers to minimize spillage, damage and/or injury to the sampler(s) or the field equipment. In addition to nitrile sampling gloves, the designated sampling personnel shall wear safety glasses or goggles to minimize potential eye injury.

Water Quality Sample Record Keeping

All sample containers shall be pre-labeled, to the extent possible, prior to each sampling event to facilitate sampling activities. Sample containers provided by the Lab shall contain waterproof labels and pre-marked information such as analyte and laboratory identification number. To the extent possible, the designated Lab / District sampling personnel shall inscribe the well identification and sampler(s) name or initials on the labels under dry conditions using a waterproof marker pen prior to each sampling event. Immediately prior to collection of water samples, the designated District sampling personnel shall inscribe on the sample bottle label the date and time of sample collection and the name of any preservatives used with a waterproof marker pen. The designated District sampling personnel shall maintain a record showing:

- Site name and/or well number
- Name(s) of sampling personnel
- Measured depth to groundwater
- Discharge rate [in gallons per minute (gpm)]
- Number of minutes of well purging
- Field measurements of pH, specific conductance, residual chlorine and temperature
- Date and time(s) of sample collection
- Weather conditions
- Other significant field or sampling conditions

In addition, a COC form indicating the well name(s) or well number, sampler's name, date and time sampled, any special observations, and laboratory sample number shall be filled out by the designated sampling personnel and placed in a sealed plastic bag (e.g., Ziplocs) with the sample(s) in the ice chest to provide a COC record. A sample COC form is presented as **Figure 5-8**. The lab shall submit the completed COC record to the designated District sampling personnel upon delivery of the sample(s) to the lab.

Sample Results

The Lab shall use a standard reporting form for all water sources listing date(s) of analysis, name(s) of person who analyzed the samples, USEPA analytical method(s) used, name of analytical method used, name of parameter analyzed, detection limit and result of the analysis. Any analytical result less than detectable shall be reported as less than the method detection limit.

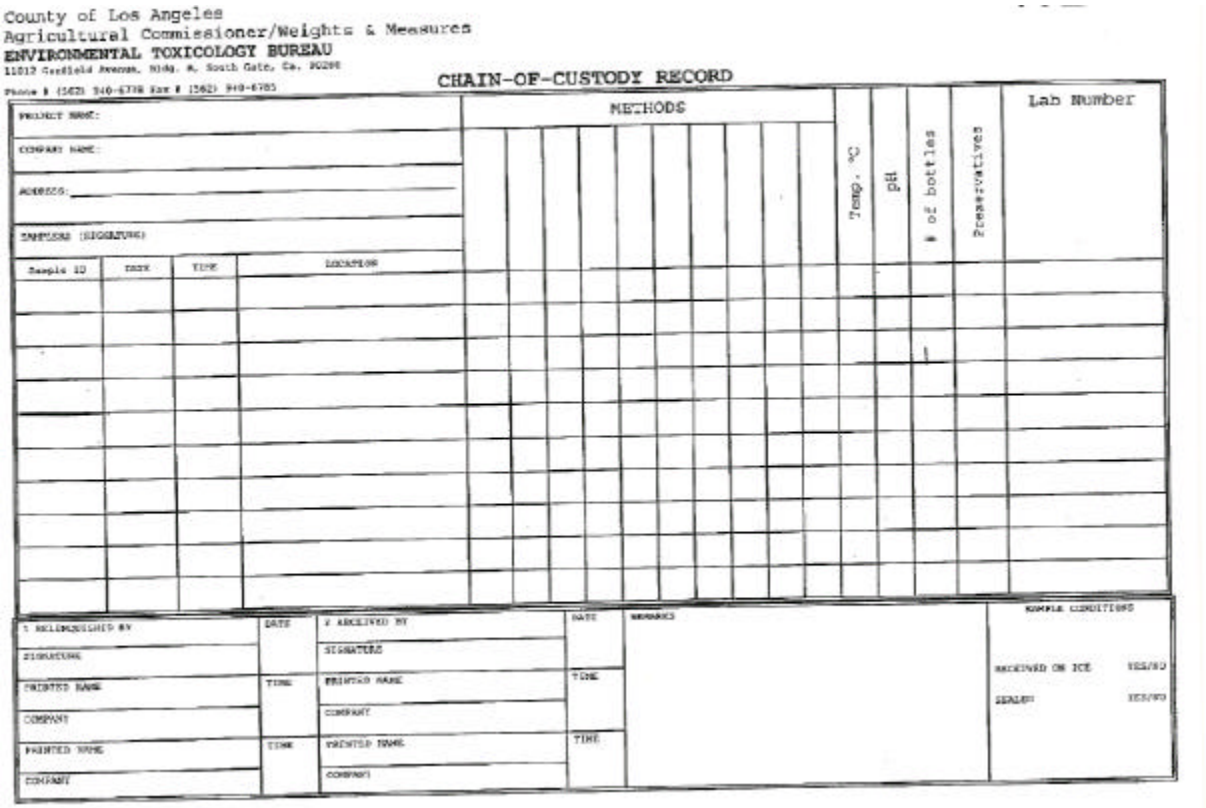
The Lab shall submit paper or electronic copies of laboratory results and written reports to the Water Quality Senior Civil Engineer. Unusual spikes, questionable results, or detection of chemicals not on the list of required constituents shall be promptly reported to the designated District sampling personnel. Nitrate analytical results shall be reported as mg/L as NO_3. Hardness and alkalinity shall be reported as mg/L as $CaCO_3$. The Lab shall maintain records for at least three years from the date the analytical reports were submitted to the designated sampling personnel made showing the calibration of equipment used in the various analyses.

GW-5 ~~The District shall minimize precursors for continued THM formation.~~

The District shall maintain THM levels in stored water below the MCL, thus not negatively affecting the District's or any other purveyor's ability to pump and serve groundwater from the regional aquifer for beneficial uses as described in Water Quality Control Plan for the Lahontan Region. The District shall achieve this through the reduction of free chlorine and/or organic compounds by implementing best practicable treatment or control methods.

5.2.6 Level of Impact Significance After Mitigation

The introduction of THMs to the groundwater basin would not be mitigated to a level of less than significant. Implementation of the above mentioned mitigation measures would reduce any other potential groundwater impacts to a less than significant level. ~~It is anticipated that the long-term injection of supplies would benefit existing groundwater users within the Lancaster Subbasin through reduce pumping lifts and associated costs. Therefore, the project implementation would result in a beneficial residual impact.~~


County of Los Angeles
Agricultural Commissioner/Weights & Measures
ENVIRONMENTAL TOXICOLOGY BUREAU
11012 Garfield Avenue, Bldg. 4, South Gate, Ca. 90280
Phone # (562) 940-6778 Fax # (562) 940-6785

CHAIN-OF-CUSTODY RECORD

PROJECT NAME:
COMPANY NAME:
ADDRESS:
SAMPLER (SIGNATURE)

Sample ID	DATE	TIME	LOCATION	METHODS									Temp. °C	pH	# of bottles	Preservatives	Lab Number

1. RELINQUISHED BY	DATE	2. RECEIVED BY	DATE	REMARKS	SAMPLE CONDITIONS
SIGNATURE		SIGNATURE			RECEIVED ON ICE YES/NO
PRINTED NAME	TIME	PRINTED NAME	TIME		SEALED? YES/NO
COMPANY		COMPANY			
PRINTED NAME	TIME	PRINTED NAME	TIME		
COMPANY		COMPANY			

Figure 5-8
Chain-of-Custody Record

5.3 PUBLIC SERVICES

The information in this section is derived from correspondence received from the Los Angeles County Fire Department and Los Angeles County Sheriff's Department during May and June 2001.

5.3.1 Environmental Setting

Sheriff's Department

The Antelope Valley is located within the jurisdiction of the Los Angeles County Sheriff's Department. The Sheriff's Department is responsible for maintaining law and order services for the populace of the Antelope Valley. The Lancaster Sheriff's Station is located in the City of Lancaster, within 6 miles of the furthest ASR well site. Manpower and equipment are adequate to handle the proposed project's needs.

Fire Department

The Antelope Valley is located within the jurisdiction of the County of Los Angeles Fire Department. Fire protection services for the Antelope Valley, and for the proposed well sites are handled by Fire Station 129, located in Lancaster, which houses a 1,000 gallon per minute engine, 1 emergency support team, and 1 paramedic squad, with a total of 7 men. Current staffing levels are adequate to handle existing service requirements.

5.3.2 Thresholds of Significance

The following criteria have been identified as thresholds for determining the significance of public services impacts.

The proposed ASR well project would result in a significant adverse fire and emergency medical services, or law enforcement impact if it were to:

- Directly or indirectly create a need for additional staffing, equipment, or facilities that cannot be addressed through an existing funding mechanism.

- Increase emergency response times beyond 5 minute emergency response time for 90% of all alarms for fire suppression units and advanced life support emergency medical response of 7 minutes for 90% of all alarms.

- Increase law enforcement response time beyond an emergency response time average of 7 minutes and 10 minutes, respectively.

5.3.3 Environmental Impacts

Sheriff's Department

Based on correspondence received by the Lancaster Sheriff's Station, the proposed project would not create any significant impacts on the department's ability to provide protective services to the Antelope Valley. Specifically, the police department does not regard the presence of the proposed well sites as being an attraction that would encourage vandalism or other acts which would require the use of police resources. Additionally, as mentioned in the setting above, manpower and equipment are adequate at the present time at the Lancaster Sheriff's Station. Therefore, the ASR project would not directly or indirectly create a need for additional staffing, equipment, or facilities that cannot be addressed through an existing funding mechanism. Implementation of the proposed ASR project would not result in a significant impact to law enforcement services because they would not create a need for additional staffing, equipment, or facilities.

Fire Department

As mentioned in the setting above, manpower and equipment are adequate at the present time at the Los Angeles County Fire Station 129. Therefore, the ASR project would not directly or indirectly create a need for additional staffing, equipment, or facilities that cannot be addressed through an existing funding mechanism.

The fire department has no concerns regarding the proposed project, primarily because of the non-flammable nature of the pumping wells and the security around the wells. Fire Department staffing is adequate at Fire Station 129, and the proposed ASR project would not hinder the ability of the Fire Departments to provide services to the public. Implementation of the proposed ASR project would not result in a significant impact to fire services because they would not create a need for additional staffing, equipment, or facilities.

5.3.4 Cumulative Impacts

No cumulative impacts are associated with this project. See Section 4.0 (Cumulative Impacts) for additional information.

5.3.5 Mitigation Measures

Sheriff's Department

Mitigation measures are not required since no significant adverse impacts were identified.

Fire Department

Mitigation measures are not required since no significant adverse impacts were identified.

5.3.5 Level of Impact Significance After Mitigation

Sheriff's Department

No significant adverse impacts on police services would occur during construction or operation of the proposed ASR project.

Fire Department

No significant adverse impacts on fire services would occur during construction or operation of the proposed ASR project.

5.4 ENERGY CONSERVATION[10]

This Section analyzes potential impacts of the proposed project related to energy conservation.

5.4.1 Environmental Setting

The goal of conserving energy implies the wise and efficient use of energy. The means of achieving this goal include:

(1) decreasing overall per capita energy consumption,
(2) decreasing reliance on natural gas and oil, and
(3) increasing reliance on renewable energy resources.

In order to assure that energy implications are considered in project decisions, ~~the~~ CEQA requires that EIRs include a discussion of the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful and unnecessary consumption of energy.

Energy conservation implies that a project's cost effectiveness be reviewed not only in dollars, but also in terms of energy requirements. For many projects, lifetime costs may be determined more by energy efficiency than by initial dollar costs.

Electrical power facilities are available on each of the five project sites. Electrical power is currently used on the project sites to operate the pumps on the wells, lighting, and other ancillary equipment.

5.4.2 Thresholds of Significance

The *State CEQA Guidelines* indicates that the following impacts would normally be considered significant:

- Using fuel or energy in a wasteful manner; and
- Using large amounts of fuel or energy.

The uses of technologies that consume substantially more energy than readily available comparable technologies would be considered to be wasteful, absent some compelling reason for use of a particular technology (e.g., use of electrical construction equipment to reduce air pollution). Failure to institute energy conservation measures now in general use in the region (e.g., waste recycling, building energy management systems) could also be considered wasteful.

The determination of what constitutes a "large" amount of energy is subjective. However, a change that would:

[10] / Information provided in this section is from Appendix F of the *State CEQA Guidelines*, as amended February 6, 2001.

- Result in local shortages of fuels or energy;
- Increase peak electrical demand in LACDWP's service area by more than one percent;
- Require substantial upgrades of the existing electrical distribution system; or
- Would be considered a large amount.

5.4.3 Environmental Impacts

Energy consumption for the project includes both the one-time expenditures of energy for project construction and the continuing commitment of energy for system operations and maintenance. Energy consumption can be addressed in terms of the following project elements:

- Equipment manufactured during construction;
- Injection/extraction facilities construction;
- Injection/extraction facility operations; and
- Equipment maintenance.

The electrical power demand of the equipment that run the motors (etc.) that operate the injection / extraction well pumps and other operational equipment on the five sites would not utilize a significant amount of electrical power.

5.4.4 Cumulative Impacts

No cumulative impacts are associated with this project. See Section 4.0 (Cumulative Impacts) for additional information.

5.4.5 Mitigation Measures

The Los Angeles County Department of Public Works shall specify that all electrical equipment purchased to operate the injection/extraction wells will be as energy efficient as is possible without sacrificing the quality necessary to ensure the equipment operates properly over time.

5.4.6 Level of Impact Significance After Mitigation

No significant adverse energy impacts have been identified.

6.0 GROWTH-INDUCING IMPACTS

Section 15126.2(d) of the *State CEQA Guidelines* describes the manner in which the "Growth-Inducing Impact of the Proposed Project" is to be discussed in an EIR. This section states,

> "Discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth (a major expansion of a waste water treatment plant might, for example, allow for more construction in service areas). Increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects. Also discuss the characteristic of some projects which may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment."

This section of the Draft EIR evaluates whether the proposed project would directly or indirectly induce economic, population, or housing growth in the surrounding environment.

The population of the Antelope Valley grew substantially over the years, particularly in the 1980's. Starting the decade with 107,000 residents, this part of the Los Angeles County had grown to over 240,000 by 1990. Most of the growth occurred in the central part of the Valley, within and around the cities of Lancaster and Palmdale (Los Angeles County Regional Planning, 1994).

In 1980 and 1990, the population of the City of Lancaster was 48,103 and 97,291, respectively. Currently with the largest percent growth in Los Angeles County, the City of Lancaster has a population of about 118,718 in 2000 (Southern California Association of Governments, Census Data), making it the largest city in the valley, followed closely by the City of Palmdale.

The population within the Districts service area has increased steadily over the past several years from about 108,00 persons in 1990 to about 128,000 persons in 2000. Population is expected to increase significantly over the next 20 years. The Districts Urban Water Management Plan estimates the population growth within the service area to be 362,300 by 2020.

Due to the population growth in the Antelope Valley, water demands are increasing. Concerns over the depletion of groundwater resources in the Lancaster area of the Antelope Valley have also increased in recent years because of rapid population growth and the resulting demand imposed on existing water supplies.

Pursuant to Section 15124(b) of the *State CEQA Guidelines* the following is the statement of objectives sought by the proposed project as discussed in Section 3.

1. **Enhance the reliability of water supply in the Antelope Valley <u>by storing SWP water</u> in a manner that is cost effective and easily accessible for use by the District during**

high demand times. ~~**and to support current demand and future growth in the area**~~**.** The development of the additional local storage facilities will provide a greater measure of water supply reliability in the event of emergencies and drought periods. The development of the additional storage using seasonally available water supplies can be utilized to either augment imported supplies or to meet total demand during outages of SWP facilities.

2. **Increase level of conjunctive use in a cost-effective manner by storing SWP water in the** ~~**. The**~~ **Lancaster subbasin** ~~would be used to store water supplies~~ **that can be extracted during periods when demand exceeds regular supply** ~~of below average precipitation when surface water supplies are below normal~~. Conjunctive use of the subbasin would further improve the overall reliability of the District system by augmenting water supplies during peak demand periods.

3. **Provide greater operational flexibility by increasing local storage and allowing the District to better maintain its entire system.** Increase in local storage would provide greater water system flexibility in that key system components could be placed out of service for inspection and maintenance activities without interruption in water service.

As analyzed in Section 3 ~~4~~, a substantial water storage shortfall currently exists within the District service area, and will continue to occur based on projected water demand. The proposed project would provide additional storage to alleviate the existing and future shortfall.

The proposed project is considered to be growth accommodating because it would serve to meet existing and future water shortage requirements of already foreseen and planned growth within the Districts service area. The project would not alter the location or amount of planned growth in the service area that is allowed under adopted City and County General Plans, and is therefore not considered growth inducing. The Project would develop additional local storage facilities that will provide a greater measure of water supply reliability in the event of drought periods and emergencies, and increase the operational flexibility of the water system to serve planned growth. However, to the extent that the project may allow for additional service that could not have been provided without it, it may be considered indirectly growth-inducing.

7.0 ALTERNATIVES TO THE PROPOSED PROJECT

7.1 CEQA Requirements

In accordance with Section 15126.6(a) of the *State CEQA Guidelines*, EIRs are required to include a discussion of alternatives to the proposed action. In Section 15126.6(a) the Guidelines state that, "An EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a project. Rather it must consider a reasonable range of potentially feasible alternatives that will foster informed decision-making and public participation. An EIR is not required to consider alternatives that are infeasible. The lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives. There is no ironclad rule governing the nature or scope of the alternatives to be discussed other than the rule of reason."

Section 15126.6(b) states, "Because an EIR must identify ways to mitigate or avoid the significant effects that a project may have on the environment (Public Resources Code Section 21002.1), the discussion of alternatives shall focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede, to some degree, the attainment of the project objectives, or would be more costly."

Section 15126.6(c) describes the selection process for a range of reasonable alternatives. "The range of potential alternatives to the proposed project shall include those that could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects. The EIR should briefly describe the rationale for selecting the alternatives to be discussed. The EIR should also identify any alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process and briefly explain the reasons underlying the lead agency's determination. Additional information, explaining the choice of alternatives may be included in the administrative record. Among the factors that may be used to eliminate alternatives from detailed consideration in an EIR are:(i) failure to meet most of the basic project objectives, (ii) infeasibility, or (iii) inability to avoid significant environmental impacts."

7.2 Rationale for Selecting Project Alternatives

Based on the Lead Agency's independent analysis of the project and comments received following the release of the Initial Study and NOP, the County has identified and considered a range of potential project alternatives. In formulating a range of alternatives, the following factors were initially considered by the County: 1) alternatives capable of fulfilling applicable CEQA requirements; 2) alternatives capable of obtaining most of the project's basic objectives; and 3) alternatives capable of reducing or avoiding the project's significant or potentially significant adverse environmental effects.

7.3 Alternatives Examined by the Lead Agency

The following alternatives have been identified and analyzed in this Draft EIR: (1) No Project; and (2) Spreading Grounds/Infiltration. Other alternatives that have also been considered by the lead agency but were rejected as infeasible during the scoping process include storage alternatives such as storage tanks and surface reservoirs. In order to meet existing and future annual proposed storage amounts, any storage alternative would have to provide a minimum 6,843 AF of recoverable storage.

Long-term storage of this scale could not be achieved by individual storage tanks, as are currently utilized to provide operational flexibility within the system. Assuming an average reservoir storage capacity of six million gallons (18.4 AF), roughly 372 new storage tanks would be required. Also, assuming an average depth of 100 feet, a surface reservoir utilizing imported water supply would require a surface area of at least 69 acres. Clearly, this option is infeasible due to lack of suitable sites, environmental concerns associated with storage tank facilities, and costs related to installation and maintenance.

As required under Section 15126.6(d) of the *State CEQA Guidelines*, "The EIR shall include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project. A matrix displaying the major characteristics and significant environmental effects of each alternative may be used to summarize the comparison. If an alternative would cause one or more significant effects in addition to those that would be caused by the project as proposed, the significant effects of the alternative shall be discussed, but in less detail than the significant effects of the project as proposed." As required, the following is a discussion of the two most viable options of the project.

The two most viable alternatives to the proposed ASR project are:

- No Project
- Spreading Grounds/Infiltration

7.4 No Project

The "no project" alternative and its environmental impacts are evaluated in this section. Section 15126.6(e) of the *State CEQA Guidelines* describes the requirements for the discussion of the "no project" alternative. Pursuant to Section 15126.6(e)(1), "The specific alternative of 'no project' shall also be evaluated along with its impact. The purpose of describing and analyzing a no project alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project."

The "No Project" alternative would maintain the existing environmental conditions within the Lancaster Subbasin.

No Project would result in adverse impacts in the environment by allowing water levels to continue to decline, which would perpetuate the overdraft condition within the Lancaster Subbasin.

Under the No Project alternative, the District would continue to operate the water delivery system in its current manner. Implementation of the No Project alternative would result in the continued exposure of the County's service area to potential water delivery interruption or curtailment associated with a number of scenarios. Foremost among these is the complete interruption or curtailment of SWP water due to seismic activity affecting the Delta system or the California Aqueduct. Another scenario is drought conditions that would exhaust storage supplies due to reduced available water from the State Water Project.

In conclusion, the No project alternative would result in the continued utilization and depletion of local groundwater resources. Overall, the detrimental effects to the environment and potential curtailment of service to district customers occurring as a result of the No Project alternative would far outweigh any adverse effects of the proposed ASR Project.

7.4.1 Environmental Evaluation

Geology: Implementation of the No Project alternative would result in the proposed injection / extraction and transfer facilities not being constructed and operated within the District service area. Therefore, potential short-term impacts associate with their construction would be avoided.

However, the No Project Alternative would have detrimental effects on the environment. The No Project alternative would result in the continuation of land subsidence caused by aquifer-system compaction. Aquifer compaction in the Antelope Valley has resulted in a reduced volume of void space within the compressed sediments that comprise the solid matrix of the aquifer system. Consequently, the porosity of the compressed sediments and the groundwater storage capacity of the aquifer system also have been reduced (Ikehara & Phillips, USGS 94-4184).

Hydrology: Implementation of the No Project alternative would avoid the introduction of THMs into the groundwater basin, eliminating any significant impacts that the proposed project would cause. However, groundwater quality would continue to deteriorate due to vertical movement of poorer quality water from the Deep Aquifer to the Principal aquifer as a result of local basin overdraft.

The groundwater system in the Antelope Valley is major source of supply. Implementation of the No Project alternative would continue utilization and depletion of native groundwater resources, leading to further decline of groundwater levels. The development and utilization of the additional basin storage and the optimization of alternative water supplies would avoid or reduce overdraft in the basin. The No Project Alternative would have detrimental effects on the environment and the aquifer system.

7.4.2 Attainment of Project Objectives

The No Project alternative would not meet any of the objectives of the proposed project. Below is each of the ASR project objectives and benefits. Following each objective is an analysis of how the No Project alternative would or would not meet the particular objective.

1. **Enhance the reliability of water supply in the Antelope Valley by storing SWP water in a manner that is cost effective and easily accessible for use by the District during high demand times. ~~and to support current demand and future growth in the area~~.** The development of the additional local storage facilities will provide a greater measure of water supply reliability in the event of emergencies and drought periods. The development of the additional storage using seasonally available water supplies can be utilized to either augment imported supplies or to meet total demand during outages of SWP facilities.

2. **Increase level of conjunctive use in a cost-effective manner by storing SWP water in the ~~. The~~ Lancaster subbasin ~~would be used to store water supplies~~ that can be extracted during periods when demand exceeds regular supply ~~of below average precipitation when surface water supplies are below normal~~.** Conjunctive use of the subbasin would further improve the overall reliability of the District system by augmenting water supplies during peak demand periods.

3. **Provide greater operational flexibility by increasing local storage and allowing the District to better maintain its entire system.** Increase in local storage would provide greater water system flexibility in that key system components could be placed out of service for inspection and maintenance activities without interruption in water service.

In conclusion, the No Project Alternative, although not introducing THMs into the aquifer, has several significant environmental and District impacts. Therefore the proposed project is considered to be superior to the No Project alternative.

7.5 Spreading Grounds / Infiltration

The utilization of spreading grounds for aquifer recharge presents alternative technology to the utilization of injection / extraction wells. Under this type of program recharge and storage would occur through the direct percolation of imported water supplies and stream discharge via spreading basins. Subsequent extraction of supplies would require installation and utilization of groundwater extraction wells near the spreading basin.

The District as well as other local agencies have examined the feasibility of developing spreading grounds in the Antelope Valley. These feasibility studies include:

1. *Study of Potential Recharge Sites in The Antelope Valley,* Stetson Engineers Inc., September, 2002.

2. *Antelope Valley Water Resource Study, Final Report, Antelope Valley Water Group,* Kennedy/Jenks Consultants, November 1995.

3. *Antelope Valley Groundwater Recharge Concept Plan, Air Force Site Along Amargosa Creek,* Anthony Wilkins and John Burton, Los Angeles County Department of Public Works, Hydraulic/Water Conservation Division, February 1992.

4. *Antelope Valley Groundwater Recharge Study, Phase 2, Air Force Site Along Amargosa Creek,* Los Angeles County Department of Public Works, Materials Engineering Division, March 1991.

5. *Antelope Valley Spreading Grounds Study, Phase 1 – Preliminary Report,* Los Angeles County Department of Public Works, Land Development Division, February 1989.

These studies have developed a number of potential spreading grounds that could be feasibly implemented within the Antelope Valley (See **Figure 7-1**). Prospective areas in the various reports were identified as:

1. Mescal Creek

2. Big Rock Creek

3. Littlerock Creek

4. Amargosa Creek

5. Kings Canyon Percolation Basin

6. Tehachapi Afterbay/Alamos Creek

7.5.1 Environmental Evaluation

Geology: Spreading grounds would have minimal effects on local geological formations. This alternative project would possibly involve excavating top soils and replacing them with more permeable material. The underlying layers would become increasingly saturated as percolation rate equalizes. Operation would involve drainage of surface storage and then intermittent excavation of top soils.

Hydrology: The spreading grounds would, within a lengthy time, help raise water table levels and therefore have a positive effect on subsidence in the basin. Long-term operation of the proposed project would dilute and block potential migration of high arsenic content groundwater associated with the Deep Aquifer, thereby benefiting existing groundwater users.

Over time, the spreading grounds would increase water supplies. Since this would not occur from the project's inception, demand on current resources would continue to increase. Also, since the recharge water is percolating in a miniscule fashion, immediate extraction would not be possible if an emergency or sudden drought occurred.

No THMs would be introduced to the groundwater basin. However, water quality of recharged water would be dependant on water quality of the supply water and the effects of adsorption and biological degradation through the spreading ground recharge process. The recharge water may dissolve more minerals from formations as it migrates, thereby reducing its quality.

Prospective Spreading Grounds

Figure 7-1
Prospective Recharge and Spreading Grounds

7.5.2 Attainment of Project Objectives

The Spreading Grounds / Infiltration alternative would not meet the objectives of the proposed ASR project. Following is an analysis of how the Spreading Grounds / Infiltration alternative would or would not meet the particular objective.

1. **Enhance the reliability of water supply in the Antelope Valley by storing SWP water in a manner that is cost effective and easily accessible for use by the District during high demand times. ~~and to support current demand and future growth in the area.~~** The development of the additional local storage facilities will provide a greater measure of water supply reliability in the event of emergencies and drought periods. The development of the additional storage using seasonally available water supplies can be utilized to either augment imported supplies or to meet total demand during outages of SWP facilities.

2. **Increase level of conjunctive use in a cost-effective manner by storing SWP water in the ~~. The~~ Lancaster subbasin ~~would be used to store water supplies~~ that can be extracted during periods when demand exceeds regular supply ~~of below average precipitation when surface water supplies are below normal~~.** Conjunctive use of the subbasin would further improve the overall reliability of the District system by augmenting water supplies during peak demand periods.

3. **Provide greater operational flexibility by increasing local storage and allowing the District to better maintain its entire system.** Increase in local storage would provide greater water system flexibility in that key system components could be placed out of service for inspection and maintenance activities without interruption in water service.

7.6 Environmentally Superior Alternative

The No Project alternative is not environmentally superior to the proposed ASR project. The No Project alternative would produce greater environmental impacts in the area of groundwater because it would cause the existing decline in water level condition to continue within the Lancaster Subbasin. The No Project alternative would also result in a continuation of the land subsidence problem that is associated with the decline in groundwater levels of the Lancaster Subbasin. In addition, the No Project alternative would result in water shortages in meeting the future water demand due to the forecasted growth in population in the Antelope Valley. Due to these three reasons the No Project alternative is not environmentally superior to the proposed ASR project.

The Spreading Grounds / Infiltration alternative project is environmentally superior to the proposed ASR project. The proposed ASR project results in the presence and formation of THMs in the Lancaster Subbasin groundwater and the Spreading Grounds / Infiltration alternative project would not result in the presence or formation of THMs.

Utilization of spreading basin technology would present several operational constraints. One of the main constraints is the inefficiency associated with utilizing percolation for recharge of an aquifer system. Percolation rates, and therefore, recharge efficiency for spreading basins are limited by soil type and geologic properties of individual sites. Site characteristics that would denote ideal spreading grounds can be broadly defined as surficial course alluvial deposits and fans having good vertically permeable soils. They should be close to existing infrastructure and supply waters, and possess relatively high runoff or stream discharge.

Due in part to percolation rates, large amounts of surface area are required in order to provide significant recharge of supplies. Subsequently, spreading basins are subject to evaporative losses, which further reduce recharge efficiency. These reductions in recharge efficiency would reduce the amount of storage available in the event of supply interruption. In addition, evaporative losses would require the District to purchase additional imported water supplies from AVEK in order to develop the storage required.

Generally, in the Antelope Valley Basin, the depth to groundwater is great and water would also be lost in wetting the now dry pore spaces between the ground surface and the water table in the aquifer.

Implementation of spreading basins would have environmental concerns associated with installation and maintenance facilities. The acreage required may impact sensitive habitats. An introduction of a large body of water may change flight patterns or habits of migratory birds. Consequently, this may have a domino effect on the rest of the environment inhabitants. Operationally, spreading basins require periodic removal of soil layers to maintain adequate percolation rates. Potential noise, air quality, and traffic impacts would be associated with this periodic maintenance.

Further, use of spreading basins would require extensive investigations and an extensive monitoring network to track the recharge water. Extraction wells would have to be placed near the spreading grounds in areas where production capacity is limited or uncertain. Additional pipelines would have to be constructed to convey water to the spreading grounds and from the extraction wells.

In conclusion, the Spreading Ground Alternative, although not introducing THMs into the aquifer, has several environmental and operational constraints. Therefore, although the Spreading Grounds / Infiltration alternative project is environmentally superior to the proposed ASR project, it does not meet the necessary requirements to replace the proposed ASR project as the project to improve water supply reliability in the Antelope Valley to support the projected growth in population in the area.

8.0 ORGANIZATIONS AND PERSONS CONSULTED

County of Los Angeles Fire Department

Captain Bennett, Fax dated May 31, 2001.

Los Angeles County Sheriff's Department

Captain Pigott, Fax dated June 4, 2001.

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9.0 LIST OF PREPARERS

Los Angeles County Department of Public Works

Waterworks & Sewer Maintenance Division
Eleni Hailu, Senior Civil Engineer
Ramy T. Gindi, Principal Civil Engineering Assistant

Ultrasystems Environmental Incorporated

Senior Project Manager
Gene Anderson, Director of Environmental Services

Technical Staff
Ole Barre, Associate Planner
Craig Neslage, Director of Operations

Production Staff
Sandi Honer, Word Processor

Law Crandall

Project Manager
William J. O'Braitis, Principal Geologist

Technical Staff
Sandy Britt, Senior Geologist
Carman Mendoza, Staff Geologist
Steve Esmond, PE, RPLS, Senior Engineer

Montgomery Laboratories

Technical Staff
Dr. Andrew Eaton, THM Review

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APPENDIX A

Notice of Preparation and Initial Study

NOTICE OF PREPARATION
DRAFT ENVIRONMENTAL IMPACT REPORT

TO: All Interested Agencies, Organizations and Individuals

FROM: County of Los Angeles
Department of Public Works
Waterworks & Sewer Maintenance Division
900 S. Fremont Avenue
Alhambra, CA 91803

Subject: **Notice of Preparation of a Draft Environmental Impact Report**

The County of Los Angeles Department of Public Works, Waterworks & Sewer Maintenance Division, will be the Lead Agency and will prepare an environmental impact report for the project identified below. We need to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency will need to use the EIR prepared by our agency when considering your permit or other approval for the project.

The project description, location, and the potential environmental effects are contained in the attached materials. A copy of the Initial Study is attached.

Due to time limits mandated by State law, your response must be sent at the earliest possible date, but not later than 30 days after receipt of this notice.

Please send your response to:

Ramy T. Gindi, Civil Engineering Assistant
County of Los Angeles
Department of Public Works
Waterworks & Sewer Maintenance Division
P.O. Box 1460
Alhambra, CA 91802-1460

Project Title: Antelope Valley Aquifer Storage and Recovery Project

Project Applicant: County of Los Angeles Department of Public Works, Waterworks & Sewer Maintenance Division

Date:_____

Signature:_____
Title: Civil Engineering Assistant
Telephone: (626) 300-3357

Reference: California Code of Regulations, Title 14, (CEQA Guideelines) Sections 15082(a), 15103, 15375

Environmental Checklist Form

1.	**Project title:**	Antelope Valley Aquifer Storage and Recovery Project
2.	**Lead agency name and address:**	County of Los Angeles Department of Public Works Waterworks & Sewer Maintenance Division 900 S. Fremont Avenue Alhambra, CA 91803
3.	**Contact person and phone number:**	Mr. Ramy T. Gindi, Civil Engineering Assistant (626) 300-3357.
4.	**Project location:**	See attached **Figure 1-1** (Regional Location Map), **Figure 1-2** (Local Vicinity Map), and **Figures 1-3** through **1-6** (Five Project Sites)
5.	**Project sponsor's name and address:**	County of Los Angeles Department of Public Works Waterworks & Sewer Maintenance Division 900 S. Fremont Avenue Alhambra, CA 91803

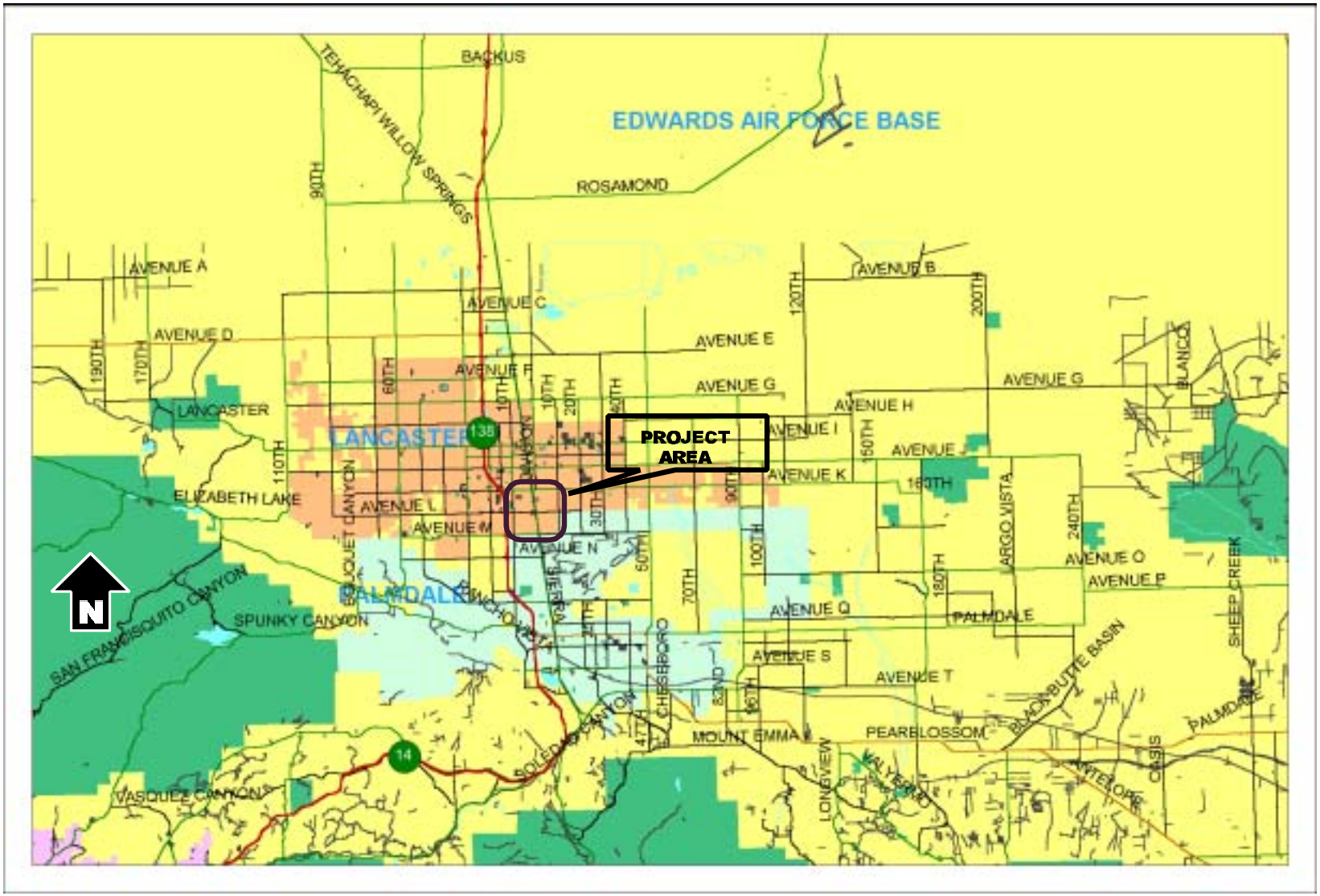
6. **General plan designation:** Public Facilities.

7. **Zoning:** W (Watershed Zone).

8. **Description of project:** Los Angeles County Waterworks District No. 40 is proposing to construct and operate injection/extraction facilities for an aquifer storage and recovery (ASR) project within the Lancaster Subbasin in Antelope Valley. The injection/extraction wells (ASR wells) and appurtenant facilities would be constructed at five different locations within Antelope Valley. Each of the five locations are developed sites with existing wells, tanks, and/or pumping plants. The plans call for the installation and modification of new and existing wells. The project would also require the installation of pump stations, pipelines, and related facilities.

Eleven new ASR wells are proposed for installation as a part of this project. Three new ASR wells would be installed at Site No. 1, no new wells would be installed at Site No. 2 (the two existing wells would be used for water injection), two new ASR wells would be installed at Site No. 3, two new ASR wells would be installed at Site No. 4, and four new ASR wells would be installed at Site No. 5.

A new 12-inch water main would be installed within the dirt road which leads to Site No. 1 past Site No. 2. This new 12-inch water main would connect to an existing 24-inch water line that runs along Avenue L.



Source: Thomas Bros. Maps

Figure 1-1
Regional Location Map

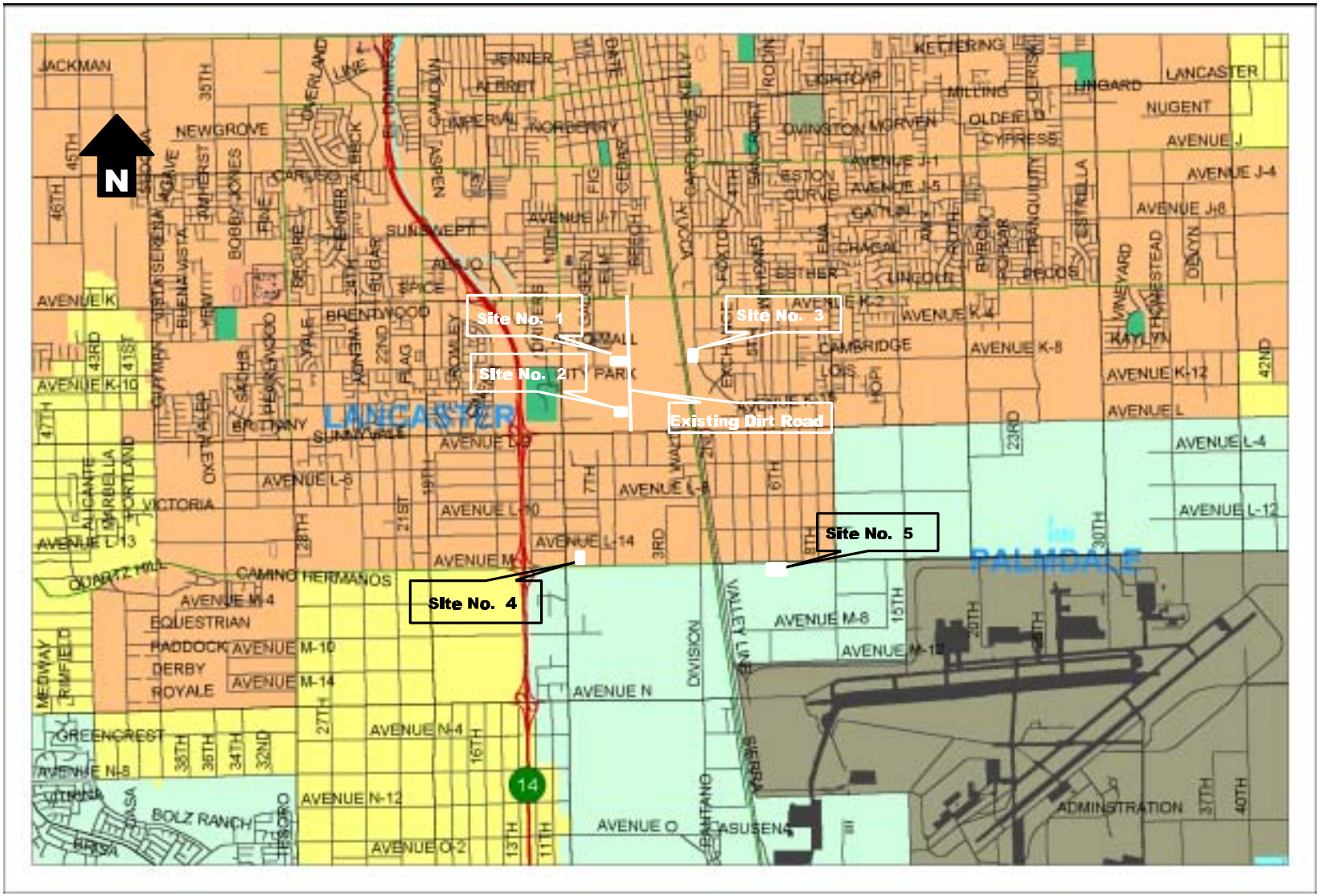
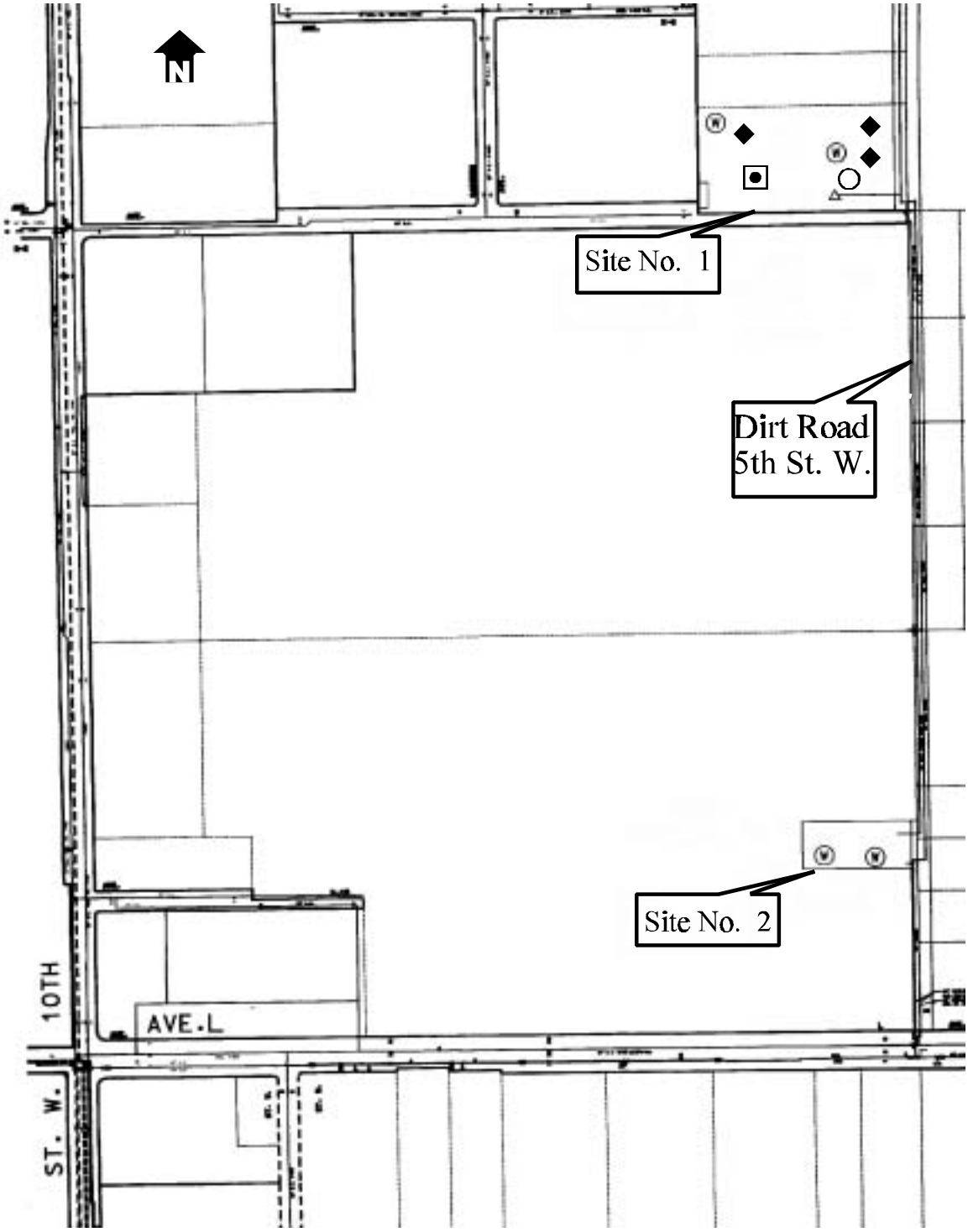


Figure 1-2
Local Vicinity Map

Source: Thomas Bros. Maps



(W) Existing Well Proposed Injection/Extraction Well F Water Tank
} Extensometer Building a Pump Station

Figure 1-3
Sites No. 1 and 2

Source: Dept. of Public Works

Ⓦ Existing Water Well

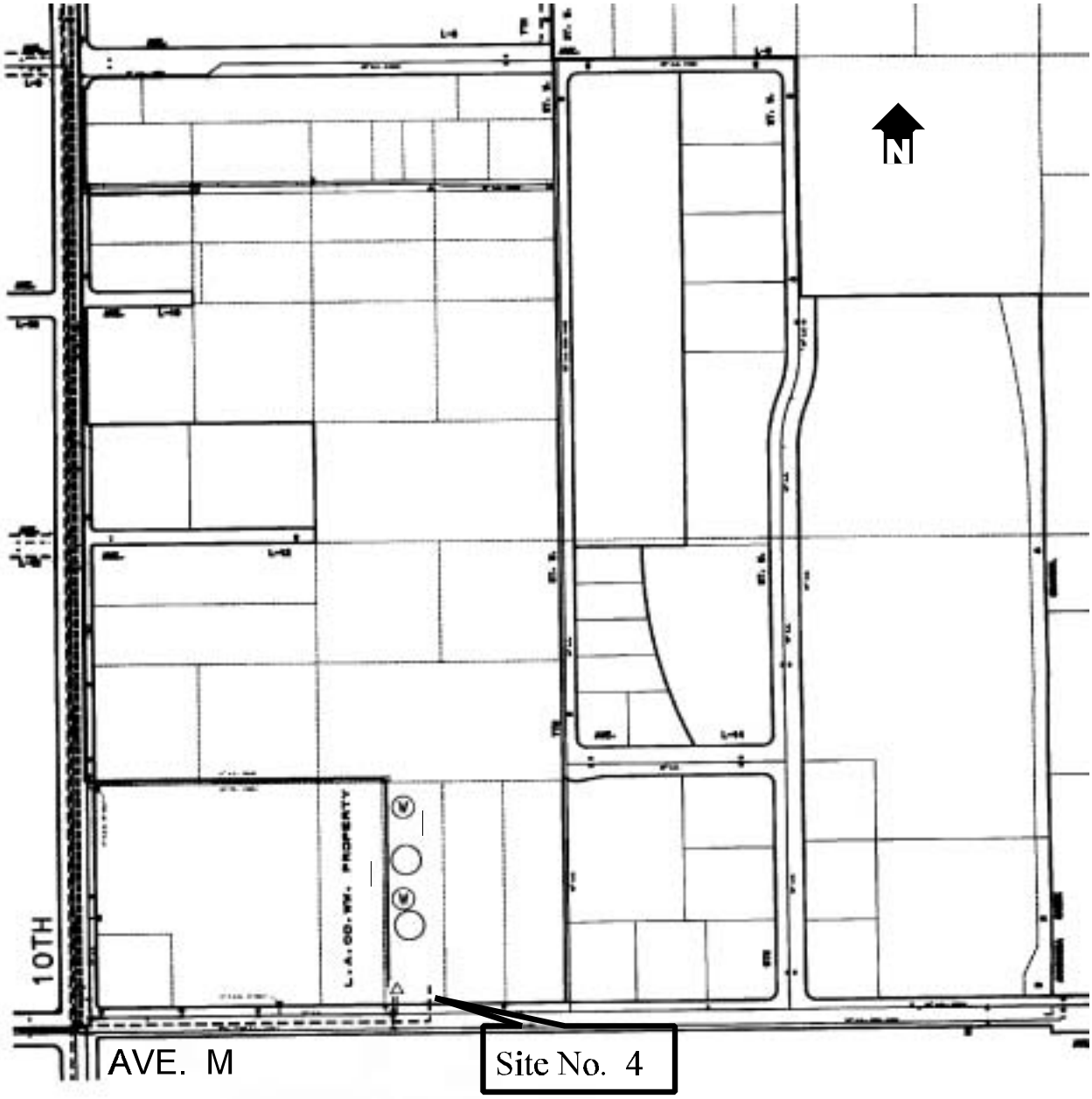
♦ Proposed Injection/Extraction Well

○ Existing Water Tank

a Pump Station

Figure 1-4
Site No. 3

Source: Dept. of Public Works



(W) Existing Well

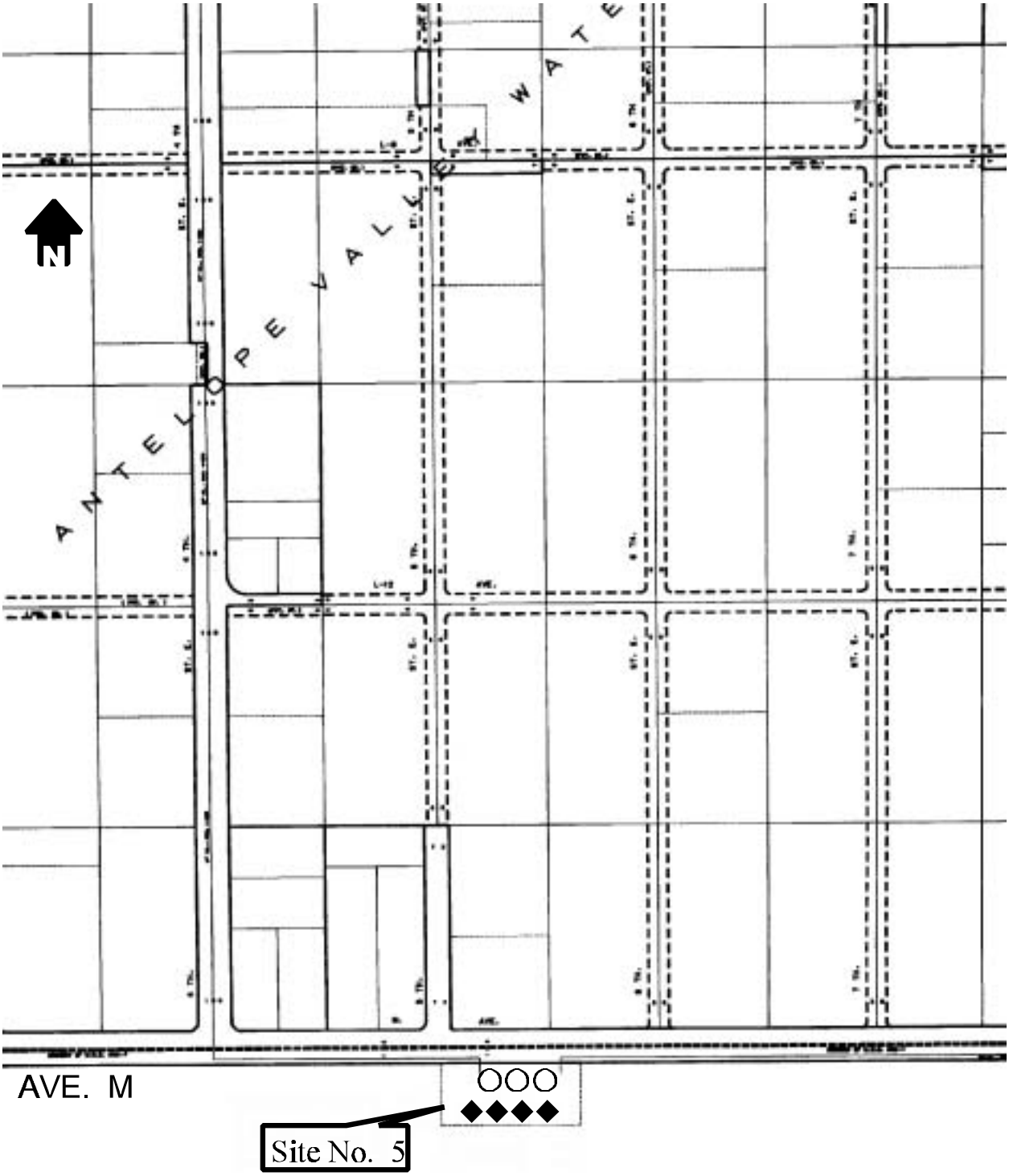
Proposed Injection/Extraction Well

F Existing Water Tank

a Pump Station

Figure 1-5
Site No. 4

Source: Dept. of Public Works



F Existing Water Tank
Proposed Injection/Extraction Well

Source: Dept. of Public Works

Figure 1-6
Site No. 5

9. **Surrounding land uses and setting: Briefly describe the project's surroundings:** The five different project sites are located in varying environmental settings. Site No. 1 (see **Figure 1-3**) has multi-family apartments immediately to the west, a single residential unit to the north, and open space to the east and south. Site No. 2 (see **Figure 1-3**) has open space on all four sides. Site No. 3 (see **Figure 1-4**) has industrial/commercial uses to the north and east, and open space to the west and south. Site No. 4 (see **Figure 1-5**) has industrial uses to the west, north, and east, and open space to the south across Avenue M. Site No. 5 (see **Figure 1-6**) has open space to the west, south, and east, and three water tanks to the north side of the site which separate the proposed location of the four ASR wells from Avenue M.

10. **Other public agencies whose approval is required** (e.g., permits, financing approval, or participation agreement). See **Table 1-1** (Project Approvals and Agency Reviews).

Table 1-1
PROJECT APPROVALS AND AGENCY REVIEWS

Agency	Permit/Action
Local	
County of Los Angeles Department of Public Works Department of County Health	• Building Permit • Demolition Permit • Health Department Permit
County of Los Angeles, Fire Department	• Review and approve plans, including fire safety plans, for purposes of issuing building permits.
Regional/State	
State of California Department of Health Services	• Operational Permit
California Regional Water Quality Control Board, Lahontan Region (Responsible Agency) Victorville, CA	• Waste Discharge Requirements Permit • National Pollutant Discharge Elimination System (NPDES) Notice of Intent to be covered under a General Construction Activities and General Industrial Activities Permit. • Stormwater Pollution Prevention Plan (SWPPP) for control of pollutants in stormwater runoff during construction

Environmental Factors Potentially Affected:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

Aesthetics	Agriculture 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	Mandatory Findings of Significance	

Determination: (To be completed by the Lead Agency)

On the basis of this initial evaluation:

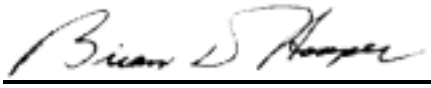
I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.



Signature	May 10, 2001 Date
Brain D. Hooper Printed name	Los Angeles County Dept. of Public Works For

Evaluation of Environmental Impacts:

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3) Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4) "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from Section XVII, "Earlier Analyses," may be cross-referenced).

5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:

   a) Earlier Analysis Used. Identify and state where they are available for review.

   b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

   c) Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.

9) The explanation of each issue should identify:

a) the significance criteria or threshold, if any, used to evaluate each question; and

b) the mitigation measure identified, if any, to reduce the impact to less than significance.

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
I. AESTHETICS — Would the project:				
a) Have a substantial adverse effect on a scenic vista?				
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?				
c) Substantially degrade the existing visual character or quality of the site and its surroundings?				
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?				
II. AGRICULTURE RESOURCES: In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?				
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				
c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?				

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
III. AIR QUALITY — Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?				
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?				
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?				
d) Expose sensitive receptors to substantial pollutant concentrations?				
e) Create objectionable odors affecting a substantial number of people?				
IV. BIOLOGICAL RESOURCES — Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?				
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?				
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?				

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?				
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?				
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?				
V. CULTURAL RESOURCES — Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?				
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?				
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?				
d) Disturb any human remains, including those interred outside of formal cemeteries?				
VI. GEOLOGY AND SOILS — Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.				
ii) Strong seismic ground shaking?				
iii) Seismic-related ground failure, including liquefaction?				
iv) Landslides?				

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
b) Result in substantial soil erosion or the loss of topsoil?				
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?				
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?				
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?				
VII. HAZARDS AND HAZARDOUS MATERIALS — Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?				
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?				
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?				
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?				

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?				
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?				
VIII. HYDROLOGY AND WATER QUALITY — Would the project:				
a) Violate any water quality standards or waste discharge requirements?				
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?				
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?				
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?				
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?				
f) Otherwise substantially degrade water quality?				
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?				
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?				
j) Inundation by seiche, tsunami, or mudflow?				
IX. LAND USE AND PLANNING — Would the project:				
a) Physically divide an established community?				
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?				
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?				
X. MINERAL RESOURCES — Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?				
XI. NOISE — Would the project result in:				
a) Exposure of persons to or generation of noise levels **during construction** in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?				
b) Exposure of persons to or generation of noise levels **during operation** in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?				
c) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?				

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
d) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?				
e) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?				
f) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?				
g) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?				
XII. POPULATION AND HOUSING — Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?				
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?				
XIII. PUBLIC SERVICES —				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire protection?				
Police protection?				

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
Schools?				
Parks?				
Other public facilities?				
XIV. RECREATION —				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?				
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?				
XV. TRANSPORTATION/TRAFFIC — Would the project:				
a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?				
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?				
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?				
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?				
e) Result in inadequate emergency access?				
f) Result in inadequate parking capacity?				

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?				
XVI. UTILITIES AND SERVICE SYSTEMS — Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?				
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?				
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?				
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?				
g) Comply with federal, state, and local statutes and regulations related to solid waste?				
XVII. MANDATORY FINDINGS OF SIGNIFICANCE –				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?				

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?				
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?				

SOURCES:

County of Los Angeles Antelope Valley Areawide General Plan
County of Los Angeles Zoning Code

ENVIRONMENTAL EVALUATION

The following analysis contains the supportive information utilized by the County of Los Angeles Department of Public Works – Waterworks & Sewer Maintenance Division – in its role as Lead Agency, to derive those preliminary conclusions contained in the Environmental Checklist. Information concerning the proposed project was obtained from the material provided by the County, and from those technical studies listed at the end of the Environmental Checklist form.

Based upon information assembled as part of this environmental evaluation, the proposed project was analyzed against each topical issue categorized under one of four column headings:

Potentially Significant Impact. Indicates the proposed project has the potential to produce a significant environmental impact.

Less than Significant with Mitigation Incorporated. Indicates that a significant impact could occur, but implementation of mitigation measures would reduce that impact below a level of significance.

Less than Significant Impact. The implementation of the proposed project would result in impacts that would be below the identified threshold of significance.

No Impact. Indicates that no environmental impacts are envisioned to either directly or indirectly result from project implementation.

I. AESTHETICS

Thresholds of Significance

A project may have a significant effect on aesthetics if it affects a scenic vista or scenic highway; has a demonstrable negative aesthetic effect; or creates obtrusive light or glare.

Would the project:

a) Have a substantial adverse effect on a scenic vista?

No Impact. The proposed project would not result in any substantial visual changes over existing conditions since the project sites are already developed and located within an urbanized area. None of the five project sites are located within the viewshed of a designated scenic vista, nor or any of the sites located adjacent to or near a designated scenic highway.

b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

No Impact. The structures presently located on the five project sites are all water tanks, well facilities, or other appurtenant facilities and are not considered historically significant. There are no other scenic resources such as trees or rock outcroppings which would be damaged by the proposed project. None of the five project sites are within a state scenic highway.

c) Substantially degrade the existing visual character or quality of the site and its surroundings?

Less than Significant with Mitigation Incorporation. Project Site No. 1 is located immediately adjacent to a residential apartment complex (to the west) and a single-family residence to the north. The addition of three new injection/extraction wells would result in the intensification of the existing uses on the site, however, existing onsite uses would not substantially change. The aesthetic effects of the proposed project at Site No. 1 will be evaluated in the Draft EIR.

d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

No Impact. The proposed project would not result in a substantial amount of additional lighting above current conditions. The existing lighting sources would be used for the proposed project. Exterior lighting on the Site No. 1 is shielded and directed away from the residential areas to the west and north.

II. AGRICULTURE RESOURCES

Thresholds of Significance

A project may have a significant impact on Agricultural Resources if it were to convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural uses, or conflict with existing zoning for agricultural use, or a Williamson Act contract.

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

No Impact. The five project sites are presently developed with water facilities, and therefore the proposed project would not result in the conversion of existing agricultural land to another use.

b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?

No Impact. The project sites are currently zoned W (Watershed Zone). The five sites have been used for water pumping and storage for many years, and therefore the proposed project would not conflict with any agricultural uses or a Williamson Act contract.

c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?

No Impact. Refer to Response II (a), above.

III. AIR QUALITY

Thresholds of Significance

The following criteria are identified as thresholds for determining the significance of air quality impacts if it were to:

< Result in an adverse effect on existing air quality (e.g, 500 or more dwelling units).

< Result in an adverse effect to a sensitive use (e.g., school) located near a major air pollutant emission source.

Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:

a) Conflict with or obstruct implementation of the applicable air quality plan?

No Impact. A consistency determination plays an essential role in local agency project review by linking local planning and unique individual projects to the AQMP in the following ways. It fulfills the CEQA goal of fully informing lead agency decision-makers of the environmental effects of the project under consideration at a stage early enough to ensure that air quality concerns are fully addressed. And, it provides the lead agency with ongoing information assuring lead agency decision-makers that they are making real contributions to clean air goals contained in the AQMP. Only new or amended General Plan elements, Specific Plans, and significant projects need to undergo a consistency review. This is because the AQMP strategy is based on projections from local General Plans. The proposed project would not require a general plan amendment or an amendment to a specific plan. The proposed project is also not a significant project, from an air quality perspective, since very little ground-surface area would be affected during its construction or its operation. Based on this information, the proposed project is determined to be in conformity with the AQMP.

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?

No Impact. This question is evaluated from both short-term construction and long-term operational perspectives.

Short-Term Air Quality Impacts

Short-term impacts on air quality attributable to the proposed project are construction-related and associated with the exhaust emissions from construction equipment, vehicles and/or the generation of fugitive dust associated with trenching operations for installing the water line within the dirt road that connects Site Nos. 1 and 2 to Avenue L. With regard to short-term construction equipment/ vehicle/machinery-related emissions attributable to the proposed project, it is determined that the emission quantities would not measurably increase existing ambient air quality pollutant levels and as a result, not pose a significant impact on the air environment.

With regard to short-term construction-related emissions attributable to trenching associated with the proposed project, it is determined that the total area of land to be disturbed would be less than ½-acre. Based on this

limited amount of trenching, it os determined that the proposed project would not result in significant adverse air quality impacts.

Long-Term Air Quality Impacts

With regard to long-term, operations-related emissions are primarily related to vehicular traffic, and to a lesser extent, off-site electricity generation. Vehicular traffic is limited to trips associated with maintenance and operation of the injection/extraction wells. The number of trips would be less than two per day on average. This limited number of trips would have no effect on long-term air quality. Electricity is used to operate the pumps on the injection/extraction wells, and some appurtenant facilities. The amount of electrical usage is regarded as insufficient to result in a significant adverse air quality impact.

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non- attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

No Impact. As indicated above, project construction and operation activities would not generate emissions that would exceed AQMD daily thresholds. There are no known cumulative projects in close proximity to the proposed project sites that are producing air quality emissions that when added to the minimal air quality emissions of the proposed project would result in a significant adverse cumulative air quality impact.

d) Expose sensitive receptors to substantial pollutant concentrations?

No Impact. Project Site No. 1 is located adjacent to a residential apartment complex (to the west), and one single family dwelling unit (to the north). There are no sensitive receptors located adjacent to the other four project sites. As described above, in the response to III.b, there are no substantial pollutant concentrations being created by the proposed project. As such, the proposed project would not expose sensitive receptors to substantial pollutant concentrations.

e) Create objectionable odors affecting a substantial number of people?

No Impact. The proposed project would not create any objectionable odors during construction or operation of the injection/extraction wells.

IV. BIOLOGICAL RESOURCES

Thresholds of Significance

A project may have a significant effect on Biological Resources if it will result in a loss of individuals, populations, or habitat of a federal or State designated threatened, endangered, or rare species, a loss of locally designated species (such as heritage trees), a loss of locally designated natural communities (such as coastal sage scrub), a loss of wetland habitat, or an interference with wildlife dispersal or migration corridors.

Project actions are also evaluated in terms of impacts to species that do not fall into one of the above categories, but which nevertheless are protected by federal or State regulations. Most often such cases involve nests of birds such as red-tailed hawks that are not rare, but are still protected under the federal Migratory Bird Treaty Act and the California Department of Fish and Game Code.

The term "rare" species is usually interpreted to mean species that are on lists prepared by federal, State, or private organizations, but are of lower sensitivity status than threatened or endangered species. Thus, the term "rare" refers to species listed by the California Native Plant Society, federal/State Species of Special Concern, or species considered sensitive by a local jurisdiction.

Evaluation of significance is typically different between threatened/endangered species as compared to non-listed or rare species. Any loss of threatened or endangered species or their habitat is considered a significant impact in relation to federal and State endangered species regulations. However, thresholds of significance for loss of rare species have not been codified in federal or State regulations. Generally, the term is interpreted in terms of whether the project action would jeopardize the continued persistence or viability of individuals or populations of the species in question.

Would the project:

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

No Impact. All five of the project sites are currently owned by the County, and are used for various operational activities associated with water wells and/or storage tanks. Site No. 1 has two existing wells and one storage tank, Site No. 2 has two existing wells, Site No. 3 has three existing wells and two storage tanks, Site No. 4 has two existing wells and two storage tanks, and Site No. 5 has three existing storage tanks. The natural vegetation on all of the sites has been removed, except for one Joshua Tree on Site No. 4. The Joshua Tree is located on the western edge of the site, and would not be affected by the proposed project.

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?

No Impact. Refer to Response IV.a, above. No riparian habitat or other sensitive natural habitat exists on the five sites, therefore no impacts on these resources would occur.

c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

No Impact. No Section 404 wetland habitat exists on the five sites, therefore no impacts would occur.

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

No Impact. The five project sites are currently developed and located in an urbanized area with no known sensitive biological resources. In addition, there is no wildlife dispersal or migration corridors identified within the vicinity, therefore no impacts would occur.

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

No Impact. The five project sites are currently developed and do not contain any significant biological resources.

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

No Impact. Refer to Response IV.a, above. The Conservation Plan of the County's Antelope Valley Areawide General Plan does not identify any of the five project areas as being in an "Ecologically Important Area" for plants or animals and is outside of the coastal habitat area. The five project sites are developed and do not contain any areas of natural or sensitive-habitat, therefore no impact on conservation plans would occur.

V. CULTURAL RESOURCES

Thresholds of Significance

A project may significantly impact Cultural Resources if it disrupts or adversely affects a prehistoric or historic archaeological site or a property of historic significance to a community, ethnic or social group, or a paleontological site except as part of a scientific study.

Would the project:

a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?

No Impact. All five of the project sites have been previously disturbed by activities associated with drilling wells, operating wells, and construction and operation of water storage tanks. No historical structures are located on any of the five project sites.

b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

No Impact. The five project sites are presently developed and there are no known or recorded archaeological sites in the vicinity. Therefore, due to previous site disturbance, no impacts on archaeological resources are expected to occur. Should any suspected resources be uncovered during construction and drilling of the injection/extraction wells, all work would be halted until a certified archaeologist could conduct an evaluation, per County standards.

c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

No Impact. The five project sites are presently developed and there are no known or recorded paleontological sites in the vicinity. Therefore, due to previous site disturbance, no impacts on paleontological resources are expected to occur. Should any suspected resources be uncovered during construction and drilling of the injection/extraction wells, all work would be halted until a certified paleontologist could conduct an evaluation, per County standards.

d) Disturb any human remains, including those interred outside of formal cemeteries?

No Impact. The project site is presently developed and there are no known or recorded human remains on the five project sites, therefore, no significant impacts on these resources would occur.

VI. GEOLOGY AND SOILS

Thresholds of Significance

A project may have a significant effect in relation to Geology and Soils if it will expose people or occupied structures to geologic or soils hazards (including fault rupture, ground shaking, liquefaction, subsidence, landslides, erosion, expansive soils) or facilitate damage to, or the destruction of, unique geologic features.

Introduction

A *Geology & Soils Investigation* was prepared by County of Los Angeles, Department of Public Works, Materials Engineering Division in March 1991 which evaluated subsurface conditions in the project area. Additional geology and soil information is provided in County of Los Angeles, Department of Public Works, Waterworks and Sewer Maintenance Division report entitled *Waterworks District 40 Antelope Valley, Lancaster Aquifer Storage and Recovery Demonstration Program* dated January 2000. The responses to the following questions are based in part on this report. These studies are on file at the County of Los Angeles, Department of Public Works, Waterworks and Sewer Maintenance Division, 900 S. Fremont Avenue, Alhambra, California.

Would the project:

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? (Refer to Division of Mines and Geology Special Publication 42.)

No Impact. According to the County's General Plan Safety Element, the five project sites are not within an Alquist-Priolo Special Study Area. Therefore, although it is in a seismically active region, the five project sites are not expected to be directly impacted by fault rupture.

ii) Strong seismic ground shaking?

Less than Significant With Mitigation Incorporation. Although all of Southern California is subject to seismic activity, the existing water facilities on the five sites have withstood the seismic activity that has occurred during their lifetime. The proposed project injection/extraction wells are expected to be capable of withstanding similar seismic activity in the future. The Geology and Soils within the project area is being evaluated in the Draft EIR being prepared on the proposed project.

iii) Seismic-related ground failure, including liquefaction?

Less than Significant With Mitigation Incorporation. The near surface alluvial soils on the five sites consist mainly of loosely consolidated silts and sands. In a saturated state, and if they are subject to a major seismic

event (>8.0 magnitude) they will liquefy. This issue is being evaluated in the Draft EIR being prepared on the proposed project.

iv) Landslides?

No Impact. Each of the five project sites is relatively flat. Therefore, there is no potential for impacts related to landslides to occur at any of the five project sites.

b) Result in substantial soil erosion or the loss of topsoil?

No Impact. Each of the five project sites is relatively flat. Therefore, development of the proposed project would not result in loss of topsoil or substantial erosion.

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

Less than Significant Impact. With the incorporation of the recommendations contained in the geotechnical evaluation the proposed project would not result in unstable soil conditions. This issue is being evaluated in the Draft EIR being prepared on the proposed project.

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

Less than Significant Impact. The geotechnical evaluation confirmed that onsite soils are sufficient to support the proposed structures. No impacts related to expansive soils are anticipated.

e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?

No Impact. Waste water in the project area is presently discharged to County sewer lines and no septic systems are proposed.

f) Be located on contaminated soils?

No Impact. No contaminated soils are located on any of the five project sites.

VII. HAZARDS AND HAZARDOUS MATERIALS --Would the project:

Thresholds of Significance

A project may cause significant Hazards and Hazardous Materials impacts if it will create a potential public health hazard or involve the use, production or disposal of materials which pose a hazard to people or animal or plant populations in the area affected; or, interfere with emergency response plans or emergency evacuation plans.

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

No Impact. There would be no activities associated with or storage of hazardous materials at any of the five project sites, which would involve the routine use, transport or disposal of hazardous materials.

b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

No Impact. Refer to Response VII.a, above.

c) *Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?*

No Impact. The project would not involve the release of any hazardous emissions, materials or other hazardous waste.

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

No Impact. Each of the five project sites is currently occupied by injection/extraction wells and water storage tanks. There are no hazardous materials stored on any of the sites that would create a significant hazard to the public or the environment.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

No Impact. The project site is not within an airport land use plan, but is less than two miles from the Palmdale Airport. No safety hazards associated with the operations at this airport are anticipated to occur at the five project sites. The five project sites have operated for more than 30 years without any hazards attributed to this airport and no additional hazards with proposed uses are expected.

f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?

No Impact. The five project sites are not located in the vicinity of a private airstrip.

g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

No Impact. The five project sites are already developed and are not designated as an emergency staging area, and would not involve any uses that would interfere with major emergency evacuation routes out of the area.

h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

No Impact. The five project sites are already developed and located in an urbanized area not subject to wildland fires.

VIII. HYDROLOGY AND WATER QUALITY

Thresholds of Significance

A project may be deemed to have a significant effect on Hydrology and Water Quality if it will significantly affect absorption rates, drainage patterns, the rate and amount of surface runoff, alter the course or direction of surface and/or groundwater movements or would expose of people or property to water-related hazards such as flooding.

Thresholds of significance with regard to water quality are typically interpreted in relation to specific water quality standards of regional, State, and/or federal agencies.

Would the project:

a) Violate any water quality standards or waste discharge requirements?

Less Than Significant With Mitigation Incorporation. Water quality is an issue associated with the proposed project. This issue will be evaluated in the Draft EIR.

b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

Less Than Significant With Mitigation Incorporation. The proposed project would be installing injection/extraction wells at four different locations and it would utilize existing wells at another site. The use of these wells would interfere with groundwater recharge. This issue will be evaluated in the Draft EIR.

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?

No Impact. The proposed project would not result in a substantial change in the existing drainage patterns. The five project sites have established drainage systems. No significant impacts are anticipated.

d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?

No Impact. The proposed project is an intensification of current uses on the five project sites and it is not expected to significantly increase the amount of surface water runoff introduced into the local or regional storm drain system. No significant impacts are anticipated.

e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

No Impact. Refer to Response VIII.c regarding drainage systems and Response VIII.d regarding stormwater runoff.

f) Otherwise substantially degrade water quality?

Less Than Significant With Mitigation Incorporation. See Response VIII.a.

g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

No Impact. No residential uses are proposed as part of this project.

h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?

No Impact. Amargosa Creek runs in a north-south direction immediately west of Site Nos. 1 and 2, and drains this area of Lancaster. The injection/extraction wells that would be installed as a part of this project are not of a size that they would impede or redirect flood flows.

i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

No Impact. The project site is not within an inundation area of any levees or dams. Refer also to Response VIII.h, above.

j) Inundation by seiche, tsunami, or mudflow?

No Impact. A tsunami is a large ocean wave associated with a seismic event. The project sites are not within an area that could potentially be affected by a tsunami, and is not within or adjacent to a hillside area subject to mudflows. Seiche is an oscillation of a land-locked water body, such as a lake and may cause wave action associated with a seismic event. No such bodies of water exist in the vicinity of the five project sites. Therefore, no impacts associated seiche, tsunami or mudflow are expected to occur at the five project sites.

IX. LAND USE AND PLANNING

Thresholds of Significance

A project may have a significant effect on Land Use and Planning if it will conflict with adopted general plans, policies, goals and/or zoning ordinances, be incompatible with surrounding land uses or physically divide or disrupt an existing community.

Would the project:

a) Physically divide an established community?

No Impact. The proposed project is an intensification of an existing use and will be confined within the boundaries of the existing developed area. Therefore, the neighboring communities will not be physically divided by the implementation of the project.

b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

No Impact. The five project sites are designated Public Facilities on the County's land use map for Antelope Valley. The proposed project is consistent with this land use designation, therefore, it would not conflict with any applicable land use plan, policy, or regulations contained in the Antelope Valley Areawide General Plan. The project site is currently zoned W (Watershed Zone). According to Section 22.40.250 of the County of Los Angeles Zoning Code, permitted uses in the W zone include water wells, reservoirs, tanks, treatment plants, pumping stations and any use normal and appurtenant to the obtainment, storage and distribution of water. The proposed project is consistent with this zoning and, therefore, it would not conflict with the zoning ordinance.

c. Conflict with any applicable habitat conservation plan or natural community conservation plan?

No Impact. The five project sites are developed and within an urbanized area. Therefore, there is no habitat conservation plan or natural community plan in effect in the project area, and no conflict with such a plan would occur.

X. MINERAL RESOURCES

Thresholds of Significance

A project may have a significant effect upon Mineral Resources if it will result in the loss of a known mineral resource of value to the state, region or loss of a locally important mineral resource recovery site delineated on a local general plan.

Would the project:

a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

No Impact. The five project sites are currently developed and, therefore would not result in the loss of an available resource. Furthermore, the Conservation and Open Space Plan of the County's General Plan does not identify the project area as having mineral resources. Therefore, no impacts related to the loss of mineral resources would occur.

b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

No Impact. See Response X.a, above.

XI. NOISE

Thresholds of Significance

The proposed project would result in a significant adverse noise impact if it were to expose existing residents to stationary noise sources in excess of those levels established under applicable public policies by creating noise levels that would cause the following Interior/Exterior Noise Level Standards to be exceeded:

Residential Interior Noise Level Standard	45 dBA CNEL
Residential Exterior Noise Level Standard	60 dBA CNEL - during operation of the facilities
Residential Exterior Noise Level Standard	The criterion as established is that construction equipment cannot be operated so as to cause noise at a level in excess of 75 decibels for more than eight hours during any 24-hour period when measured at or within the property line of any property that is developed and used in part or in whole for residential purposes.

Notes:
1. CNEL (Community Noise Equivalent Level)

Would the project result in:

a) Exposure of persons to or generation of noise levels during construction in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Less Than Significant With Mitigation Incorporation. Site Nos. 2 through 5 are not located in noise sensitive environments, and noise generated during construction would not create a significant impact at any of these sites. There are noise sensitive uses adjacent to the western and northern sides of Site No. 1. Construction activities would generate increased noise levels at the apartment residences (located to the west) and the single family residence (to the north) adjacent to Site No. 1. Noise would be generated during the drilling of the three injection/extraction wells on Site No. 1. It is expected that one of the wells would be located in the area near the existing well located in the western portion of Site No. 1. The other two wells would be located on the eastern portion of Site No. 1 north of the existing water tank and closer to the dirt road. The implementation of the noise mitigation measures (see below) would ensure that there are no significant adverse noise impacts during construction.

Standard County Mitigation Measures

< Noise suppression shall be practiced at all times to minimize disturbance to occupants of nearby residences and facilities and to the general public. The measures to be used for noise suppression shall include, but are not limited to, equipping all internal combustion engines with critical or residential silencers (mufflers), shielding noise-producing equipment from the nearest areas of human occupancy by positioning shields to direct noise emissions away from such areas, installing sound walls around the drilling site, and conducting operations in the most effective manner to minimize noise generation consistent with the execution of the contract documents.

The Contractor shall meet the requirements of Chapter 12.08 of Los Angeles County Code (see Appendix C). Sound level measurements shall be made at the nearest area of human occupancy. Further, the Contractor shall develop a method of sound attenuation and submit the proposed method to the Engineer for review and approval prior to the start of work. The sound attenuation devices shall be in place and approved before the Contractor begins drilling operations.

< Construction activities shall be limited to weekdays and Saturday between 7 a.m. and 7 p.m.

< No construction activities shall be conducted on Sundays.

Additional Mitigation Measure

< Construction equipment shall not be operated so as to cause noise at a level in excess of 75 decibels for more than eight hours during any 24-hour period when measured at or within the property line of any property that is developed and used in part or in whole for residential purposes.

b) Exposure of persons to or generation of noise levels during operation in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

No Impact. Site Nos. 2 through 5 are not located in noise sensitive environments, and noise generated during operation would not create a significant impact at any of these sites. There are noise sensitive uses adjacent to the western and northern sides of Site No. 1. Operation of the injection/extraction wells would not result in noise being generated when they are "pumping" water because submersible pumps would be used. Submersible pumps are located underground, and the ground acts as a muffler for noise from these pumps. Based on existing noise measurements of the existing injection/extraction wells at Site No. 1, the noise generated during operation of the new injection/extraction wells at Site No. 1 would not exceed the Residential Exterior Noise Level Standard of 60 dBA CNEL.

c) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

No Impact. There is no component of the project associated with operation that will result in groundborne vibration or noise. Construction activities may generate discernable groundborne vibration and noise at the residences near Site No. 1. However, the levels generated by construction and demolition activities will not be excessive. Drilling the wells is the construction activity with the greatest potential to result in excessive groundborne vibration and noise. Construction hours will be limited by the mitigation measures (cited above) which designates the hours of the day when construction activities are appropriate and the noise levels generated by the construction activities that are acceptable. Conformance with these mitigation measures would ensure there is no generation of excessive groundborne vibration or groundborne noise.

d) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

No Impact. A substantial permanent increase in noise is identified as a minimum 3 dB increase in the CNEL levels within the project area. A noise increase less than 3 dB is not clearly audible by the human ear. Only Site No. 1 has noise sensitive uses adjacent to the site. The other four sites do not have any noise sensitive uses in close proximity to them. It is not expected that a 3 dB increase would occur off-site at Site No. 1 even if all five injection/extraction wells were to be in operation at once. During the operation of the injection/extraction wells the only noise generated is from the "pumping" action. It is not expected that the project would result in a noise level increase on any adjacent residential property in the vicinity of project Site No. 1 greater than 3 dB.

e) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

No Impact. See Response XI.b.

f) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

No Impact. The five project sites are located approximately 1.5 miles northwest of the Palmdale Airport. They are outside of the Palmdale Airport Land Use Plan. The project sites are well outside of the 60 CNEL aircraft noise contour.

g) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

Not Applicable. The project is not located within the vicinity of a private airstrip.

XII. POPULATION AND HOUSING

Thresholds of Significance

A project may be deemed to have a significant effect on Population and Housing if it will induce substantial growth or concentration of population, or, displace a large number of people.

Would the project:

a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

No Impact. The proposed project would not directly or indirectly induce growth. The purpose of the proposed project is to store water during periods of water availability so that there will be water during times of water shortages.

b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

No Impact. No existing housing is located on the five project sites nor would any housing be displaced by the implementation of the proposed project.

c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

No Impact. No people currently reside on the five project sites nor would any people be caused to be displaced by the implementation of the proposed project either directly or indirectly.

XIII. PUBLIC SERVICES

Thresholds of Significance

A project may significantly impact Public Services if it requires an alteration or expansion of such facilities.

Would the proposal have an effect upon, or result in a need for new or altered government services in any of the following areas:

a. Fire protection?

Less Than Significant With Mitigation Incorporation. The Los Angeles County Fire Department will be contacted to evaluate if the proposed project will have a significant adverse impact on any fire services currently provided by the County.

b. Police protection?

Less Than Significant With Mitigation Incorporation. The Los Angeles County Sheriff Department will be contacted to evaluate if the proposed project will have a significant adverse impact on any police services currently provided by the County.

c. Schools?

No Impact. The proposed project will have no impact on school facilities.

d. Parks?

No Impact. The proposed project will have no impact on park facilities.

e. Other public facilities?

No Impact. Since the proposed project is an intensification of an existing use, minimal impacts to other public facilities are expected to occur as a result of the project.

XIV. RECREATION

Thresholds of Significance

A project may have a significant effect on Recreation if it increases demand for neighborhood parks, regional parks, open space, or other recreational facilities; or affects existing recreational opportunities.

a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

No Impact. The proposed project would have no impact on any recreational facilities.

b. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

No Impact. The proposed project would not construct any recreational facilities nor would it have an impact on any recreational facilities.

XV. TRANSPORTATION/TRAFFIC Would the project:

Thresholds of Significance

A project may have a significant effect on Transportation/Traffic if:

< It would cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system, and/or

< It would result in significance traffic congestion due to blocking streets during construction of pipelines or other water related facilities.

a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?

No Impact. The proposed project would not create any new trips on a daily basis, nor is the project installing any pipelines within existing streets. The only pipeline extension would be within a dirt road north of Avenue L.

b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?

No Impact. See Response XV.a, above.

c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

No Impact. See Response XV.a, above.

d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

No Impact. See Response XV.a, above.

e) Result in inadequate emergency access?

No Impact. See Response XV.a, above.

f) Result in inadequate parking capacity?

No Impact. See Response XV.a, above.

g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?

No Impact. See Response XV.a, above.

XVI. UTILITIES AND SERVICE SYSTEMS

Thresholds of Significance

A project may have a significant impact on Utilities and Service Systems if the project were to result in a violation of solid waste standards, encourages activities which would utilize large amounts of resources, or expands the capacity and network of service systems to serve new development.

Would the project:

a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?

No Impact. The proposed project would have no effect on the local and regional wastewater treatment systems.

b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

No Impact. Project implementation would not result in any wastewater generation as discussed above (Response XVI.a), and therefore would not create a need for new or expanded wastewater treatment facilities. With regard to water treatment facilities, the proposed project is an expansion of the water facilities. The proposed project would result in a positive effect on water availability by storing water during times of water availability for use during times of water shortages.

c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

No Impact. The proposed project would have no effect on the local and regional stormwater drainage facilities.

d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?

No Impact. The proposed project is an expansion of existing water facilities. The proposed project would result in a positive effect on water availability by storing water during times of water availability for use during times of water shortages.

e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

No Impact. Refer to Response XVI.b, above.

f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?

No Impact. The proposed project would have no effect on local landfills or on solid waste disposal.

g) Comply with federal, state, and local statutes and regulations related to solid waste?

No Impact. All local, state, and federal guidelines regarding solid waste will be complied with during project construction and operation. As discussed above, the proposed project would not generate solid waste and no significant impacts related to solid waste would occur.

XVII. MANDATORY FINDINGS OF SIGNIFICANCE

a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

No Impact. Based on the preceding analysis, the pending project does not have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory.

b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?

No Impact. Implementation of the proposed project is not expected to either directly or indirectly result in other onsite or offsite development activities that, in combination with the project, have the potential to produce cumulatively significant environmental impacts.

c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

No Impact. With the implementation of permit and code requirements as well as adoption of the recommended mitigation measures no direct or indirect adverse effects would occur on human beings.

d) Does the project have the potential to achieve short-term environmental goals to the disadvantage of long-term goals?

No Impact. The environmental evaluation in this Initial Study has determined that the project would not achieve short-term environmental goals to the disadvantage of long-term goals.

APPENDIX B

Responses Received to Notice of Preparation and Initial Study

COUNTY OF LOS ANGELES
DEPARTMENT OF HEALTH SERVICES
Public Health

MARK FINUCANE
Director of Health Services

JONATHAN E. FIELDING, M.D., M.P.H.
Director of Public Health and Health Officer

Environmental Health
ARTURO AGUIRRE, Director

Bureau of Environmental Protection
2525 Corporate Place, Suite 150
Monterey Park, California 91754
TEL (323) 881-4011 • FAX (323) 269-4327

www.lapublichealth.org/eh

BOARD OF SUPERVISORS

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Fifth District

June 29, 2001

Ramy T. Gindi, Senior Civil Engineering Assistant
Department of Public Works
Waterworks and Sewer Maintenance Division
Post Office Box 1460
Alhambra, California 91802-1460

Re: Antelope Valley Aquifer Storage and Recovery Project

Dear Mr. Gindi:

This is in response to the Notice of Preparation of a Draft Environmental Impact Report for the above referenced project.

The Department of Health Services is involved with the siting and construction of all wells. We should be consulted at the commencement of the design phase to insure that State and County standards are appropriately incorporated into the project.

If you have any questions or require further information, please contact me at 323-881-4011.

Very truly yours,

Richard Wagener, Acting Director
Bureau of Environmental Protection

STATE OF CALIFORNIA

Governor's Office of Planning and Research

State Clearinghouse

Gray Davis
GOVERNOR

Steve Nissen
DIRECTOR

Notice of Preparation

May 17, 2001

To: Reviewing Agencies

Re: Antelope Valley Aquifer Storage and Recovery Project
SCH# 2001051091

Attached for your review and comment is the Notice of Preparation (NOP) for the Antelope Valley Aquifer Storage and Recovery Project draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

Ramy T. Gindi
Los Angeles County Department of Public Works
Waterworks & Sewer Maintenance Division
900 South Fremont Avenue
Alhambra, CA 91803

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Robert Hull for Scott Morgan

Scott Morgan
Project Analyst, State Clearinghouse

Attachments
cc: Lead Agency

DEPARTMENT OF TRANSPORTATION
OFFICE OF REGIONAL PLANNING
DISTRICT 7, IGR/CEQA 1-10C
120 SO. SPRING ST.
LOS ANGELES, CA 90012
TEL: (213) 897-6696 ATSS: 8- 647-6696
FAX: (213) 897-6317

June 14, 2001

IGR/CEQA cs/010604
NOP
Antelope Valley
Water Wells/5 sites
Vic. LA-14-65.68
SCH# 2001051091

Mr. Ramy T. Gindi
County of Los Angeles
Department of Public Works
County Waterworks District No. 40
900 S. Fremont Ave.
Alhambra, CA 91803

Dear Mr. Gindi:

Thank you for including Caltrans in the environmental review process for the above-mentioned project. Based on the information received, we have the following comments:

A traffic study will be needed to evaluate construction traffic impacts on the State transportation system including State Route 14 (Antelope Valley Freeway) and all affected freeway on/off ramps. The traffic study should include, but not be limited to: existing traffic volumes and level-of-service (LOS), project trip generation and level-of-service, cumulative plus project traffic volumes and level-of-service for all affected freeway ramp intersections.

Any mitigation measures proposed to alleviate traffic impact should include, but not be limited to the following:

Financing
Scheduling considerations
Implementation responsibilities
Monitoring plan

We recommend that construction related truck trips on State highways be limited to off-peak commute periods.

If you have any questions regarding our comments, refer to Caltrans IGR/CEQA Record # cs/010604, and please do not hesitate to contact me at (213) 897-4429.

Sincerely,

STEPHEN BUSWELL
IGR/CEQA Program Manager

cc: Mr. Scott Morgan, State Clearinghouse

APPENDIX C

Written Response to the Letter from Caltrans

Written Response to Caltrans letter dated June 14, 2002

The proposed project will not have traffic impacts on the State transportation system including State Route 14 (Antelope Valley Freeway). All impacts will occur on sites currently owned and operated by Waterworks District No. 40. Therefore, a traffic study is not required.

Section D

Mitigation Monitoring and Reporting Program

D. MITIGATION MONITORING AND REPORTING PROGRAM

D.1 INTRODUCTION

CEQA requires all state and local agencies to establish mitigation monitoring programs for projects approved by a public agency whenever approval involves the adoption of specific findings related to environmental impact reports (EIR) (Public Resources Code Section 21081.6). The Board certifies the Final REIR and adopts a MMRP as part of the approval process for the Antelope Valley ASR Project.

To satisfy the requirements of CEQA this MMRP has been prepared by the District. The MMRP will be used by the District staff responsible for ensuring compliance with mitigation measures associated with implementing and operating the approved ASR project.

The mitigation measures are designed to avoid or lessen the significant impacts of the approved ASR project. This MMRP also identifies the specific mitigation monitoring and reporting requirements including the party responsible for implementing the mitigation measure, the implementation phase, the monitoring activity, the monitoring period, the frequency of monitoring, the party responsible for monitoring the mitigation, and any required outside agency coordination.

D.2 MITIGATION MEASURES AND MONITORING REQUIREMENTS

The following section describes the mitigation measures and the monitoring requirements for the hydrology and groundwater quality issue in which the proposed ASR project may have a significant or potentially significant adverse impact. Monitoring is to be ongoing throughout the life of the proposed ASR project.

The proposed ASR Project specifies the following mitigation measures, which are discussed in Section 5.2.5 of the Final Recirculated Environmental Impact Report:

GW-1 This measure mitigates the temporary potential adverse impact that the construction portion of the project may cause. The requirements for such impacts in most areas of the state are Waste Discharge Requirements (WDRs) and general National Pollutant Discharge Elimination System (NPDES) permits. In order to avoid the impacts of the discharge of water from the development, testing and disinfection of wells and ensure no degradation of surface or groundwater quality during the construction phase of the ASR project, the District shall monitor compliance with both WDRs and NPDES permits from the Regional Water Quality Control Board. All discharges are proposed to be conveyed by a combination of piped and/or storm channel overland flow to confined / bermed areas for dissipation by evaporation / percolation with no discharge occurring to surface waters. The mechanism to be followed prior to discharge includes confining the water to tanks for sedimentation treatment and holding the water in the tanks during the disinfection phase until the results confirm a reduction of chlorine residual concentration to 0.5 mg/L or less. The process of development / testing / disinfection may last about a week for each well being constructed.

GW-2 During the life of the ASR Project, the District shall operate the ASR project in compliance with the RWQCB's Anti-degradation Policy (Resolution 68-16) maintaining present and potential beneficial uses for the Antelope Valley Basin as described in Chapter 2 of the Water Quality Control Plan for the Lahontan Region (Basin Plan). Beneficial uses for the Antelope Valley Basin as described in the Basin Plan are:

- Municipal and Domestic Supply – beneficial uses of water used for community, military, individual water supply systems including, but not limited to, drinking water supply.
- Agricultural Supply – beneficial uses of waters used for farming, horticulture, or ranching, including, but not limited to, irrigation, stock watering, and support of vegetation for range grazing.
- Industrial Service Supply – beneficial uses of waters used for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, geothermal energy production, hydraulic conveyance, gravel washing, fire protection, and oil well re-pressurization.
- Freshwater Replenishment – beneficial uses of waters used for natural or artificial maintenance of surface water quantity or quality.

The District shall operate the ASR project in compliance with drinking water regulatory program established by the California Legislature. The California Legislature established drinking water regulatory program (Title 22 Code of Regulations) within the State Department of Health Services (DHS) in order to provide the orderly and efficient delivery of safe drinking water. The District shall operate the ASR project in compliance with primary and secondary drinking water standards established by DHS.

- Primary Standards are maximum contaminant levels (MCLs) of contaminants that, in the judgment of DHS, may have an adverse effect on the health of persons.
- Secondary Standards are MCLs of contaminants that, in the judgment of DHS, are necessary to protect the public welfare.

Table D-3 lists the constituents and their MCLs that shall be used for compliance purposes.

GW-3 The District shall monitor injection rates, volume of injected SWP water, and groundwater levels during the lifetime of the ASR project.

Water flow monitoring shall include taking continuous measurements of the rate and amounts of injection and extraction through flow meters, which will be located at each ASR well. Flow meters will be calibrated as specified by the manufacturer, and the results will be logged in a flow meter instrument maintenance logbook.

Table D-3
Drinking Water Standards - Maximum Contaminant Levels (MCLs)

	Parameters	Units	MCL
Weekly Injection Water Monitoring			
	Combined Chlorine Residual	mg/L	4 (MRDL*)
	pH	N/A	N/S
	Trihalomethanes	ug/L	80
	Turbidity	NTU	5
General Minerals			
	Total Dissolved Solids (TDS)	mg/L	1000
	Specific Conductance	micromhos	1600
	Sulfate (SO4)	mg/L	500
	Chloride (Cl)	mg/L	500
	Fluoride (F)	mg/L	2
	Nitrate (as NO3)	mg/L	45
	Nitrite (N)	mg/L	1
	Iron (Fe)	mg/L	0.3
	Manganese (Mn)	mg/L	0.05
Total Metals			
	Aluminum (Al)	mg/L	1
	Antimony (Sb)	mg/L	0.006
	Arsenic (As)	mg/L	0.05
	Barium (Ba)	mg/L	1
	Beryllium (Be)	mg/L	0.004
	Boron (B)	mg/L	1
	Cadmium (Cd)	mg/L	0.005
	Total Chromium (Cr)	mg/L	0.05
	Hexavalent Chromium (Cr VI)	mg/L	N/A
	Copper (Cu)	mg/L	1
	Lead (Pb)	mg/L	0.015
	Mercury (Hg)	mg/L	0.002
	Nickel (Ni)	mg/L	0.1
	Selinium (Se)	mg/L	0.05
	Thallium (Th)	mg/L	0.002
	Zinc (Zn)	mg/L	5
General Physical Parameters			
	Taste	N/A	N/S
	pH	N/A	N/S
	Temperature	Degrees C^0	N/S
	Apparent Color	Units	15
	Odor	Units	3
	Turbidity	NTU	5

	Parameters	Units	MCL
	Methylene Blue Active Substances (MBAS)	mg/L	0.5
Other Constituents			
	Total Organic Carbon	N/A	N/S
	Trihalomethane Formation Potential	N/A	N/S
	Total Trihalomethane Compounds	ug/L	80
	Coliform	% of positive samples	5%

Constituents listed on Table D-1, but do not have an MCL or other standard.

* Maximum Residual Disinfectant Level

N/S - No Standard

N/A - Not Applicable

The District shall also monitor groundwater levels. Depth to static groundwater measurements shall be obtained at each of the monitoring sites (See **Table D-2**) using an electric water level sounder. The sounder shall be calibrated at the manufacturer's specifications.

To obtain a depth to water measurement, the electric sounder cable shall be lowered slowly into the well via the water level sounding tube or equivalent orifice until the sounder indicates submergence by either a beeping sound or light depending on the type of signal installed for that particular model. At this point, the designated District personnel shall note the number of feet from the established and/or surveyed measuring point for that well to the groundwater surface by using gradations on the electric sounder cable. The height of the water column in the well shall be calculated by subtracting the depth to water measurement from the total well depth and shall be entered in a field notebook.

Groundwater measurement for piezometers shall be taken electronically from the pressure transducers. The pressure transducers shall be calibrated semi-annually with the electric sounder.

The District shall utilize the simulation model developed during the demonstration project to estimate aquifer characteristics, calculate directions and quantities of groundwater flow, and to analyze resulting effects on water levels.

Table D-2
Monitoring Wells

State Well Number	USGS Site Indentificaiton Number	Local Well Name	Altitude of Land Surface	Use of Well	Year of Construction	Depth Drilled	Well Casing Diameter (inches)	Well Casing Depth	Screened Interval Depth	Aquifer Zone Perforated	Type of Data Included in this Report
COUNTY WELLS											
INJECTION WELLS											
7N/13W -27P2	343943118081801	4-32	2,463	PS	1969	735	16	727	282-717	U	F,WC,WL
7N/13W -27P3	343943118082101	4-34	2,462	PS	1972	740	16	720	280-710	U	F,WC,WL
7N/12W -34N3	343848118083801	4-29	2,522	PS	1967	792	14	740	350-728	U	F,WC,WL
7N/12W -34N4	343858118083801	4-30	2,517	PS	1968	800	16	770	350-760	U	F,WC,WL
-	-	4-63	-	PS	2001	745	16	725	290-400; 450-550; 595-705	U	F,WC,WL
-	-	4-64	-	PS	2001	730	16	710	300-490; 530-690	U	F,WC,WL
-	-	4-66*	-	PS	-	-	-	-	-	U	F,WC,WL
-	-	4-69*	-	PS	-	-	-	-	-	U	F,WC,WL
-	-	4-70*	-	PS	-	-	-	-	-	U	F,WC,WL
-	-	4-71*	-	PS	-	-	-	-	-	U	F,WC,WL
-	-	4-72*	-	PS	-	-	-	-	-	U	F,WC,WL
MONITORING WELLS											
7N/12W-26K3	343951118065902	4-31	2,459	AB	1969	770	16	687	310-674	U	WL
7N/12W-27F01	344006118082601	4-43	2,440	PS	1988	1210	16	1202	600-1202	L	WC,WL
7N/12W-27F3	344006118082601	4-44	2,440	PS	1988	1220	16	1202	400-1202	U,L	WC,WL
7N/12W -27J5	343903118074801	4-8	2,449	AB	1953	700	14	700	350-700	U	WL
7N/12W-27H3	344008118074701	4-33	2,443	PS	1971	730	16	710	260-700	U	WC
7N/12W-27J4	344002118074701	4-13	2,448	PS	1956	1108	14	1102	362-1102	U	WC
7N/12W-27J6	344003118074901	4-42	2,449	PS	1987	1174	16	1150	400-1140	U,L	WC
OTHER WELLS											
7N/12W-27F5	344005118082201	5K8-PZ1	2,441.60	PIEZ	1996	1183	2	935	905-925	L	WC,WL,BP
7N/12W-27F6	344005118082202	5K8-PZ2	2,441.60	PIEZ	1996	1183	2	735	705-725	U	WC,WL
7N/12W-27F7	344005118082203	5K8-PZ3	2,441.60	PIEZ	1996	1183	2	535	505-525	U	WC,WL
7N/12W-27F8	344005118082204	5K8-PZ4	2,441.60	PIEZ	1996	1183	2	425	395-415	U	WC,WL
7N/12W-27F9	344005118082205	5K8-EX1	2,441.60	EXTM	1996	735	2	725	--	--	C

State Well Number	USGS Site Indentificaiton Number	Local Well Name	Altitude of Land Surface	Use of Well	Year of Construction	Depth Drilled	Well Casing Diameter (inches)	Well Casing Depth	Screened Interval Depth	Aquifer Zone Perforated	Type of Data Included in this Report
7N/12W-27F10	344005118082206	5K8-EX2	2,441.60	EXTM	1996	1205	7	1190	--	--	C
7N/12W-27H5	344003118074801	DK8-PZ1	2,449	PIEZ	1992	1120	2	1120	1,080-1,100	L	WC,WL
7N/12W-27H7	344003118074803	DK8-PZ3	2,449	PIEZ	1992	1120	2	724	684-704	U	WL
7N/12W -27P5	343943118081701	5L-PZ1	2,462.70	PIEZ	1998	918	2	910	890-910	L	WL
7N/12W -27P6	343943118081702	5L-PZ2	2,462.70	PIEZ	1998	918	2	560	540-560	U	WL
7N/12W -27P7	343943118081703	5L-PZ3	2,462.70	PIEZ	1998	918	2	460	440-460	U	WL
7N/12W -27P8	343943118081704	5L-PZ4	2,462.70	PIEZ	1998	918	2	390	330-370	U	WL

* Proposed ASR wells

USGS site identification number: The unique number for each site is based on the latitude and longitude of the site, which is referenced to the North American Datum of 1927 (NAD27). First six digits are latitude , next seven digits are longitude, and final two digits are a sequence number to uniquely identify each site. Altitude of land surface in feet above sea level. Use of well: AB, abandoned; EXTM, extensometer; INDS, industrial supply; PIEZ, piezometer; PS, public supply. Depth drilled, casing depth, and screened (perforated) interval in feet below land surface. Screened (perforated) interval: depth of top and botton of well screen or perforations; screened or perforated throughout entire interval unless denoted by aserisk(*). The extensometers and piezometers were installed by the US geological Survey.

Aquifer zones: U, upper; L, lower; UNK, unknown. Type of data included in this report for each well: BP, barometric pressure; C, compaction; F, flow; WC, water chemistry; WL, water level. --, no data]

GW-4 The District shall implement water quality monitoring throughout the life of the proposed project, for both source water being injected and the water being extracted. The District shall implement the following Sampling and Analysis Plan (SAP).

The District appointed ASR project manager shall be responsible for the overall administration and implementation of the SAP. The Environmental Toxicology Laboratory (Lab) of the Los Angeles County Department of Agricultural Commissioner / Weights and Measures, or a comparable state-certified laboratory, shall perform the water quality analysis.

Monitoring Program

The Monitoring Program addresses water quality monitoring for both groundwater and SWP water used for recharge, and responsibilities for analysis and reporting.

Background Groundwater Quality

Background groundwater quality shall be developed for each monitoring point prior to initiation of the project. This one time sampling event is intended to confirm that background groundwater quality at the ASR well sites is consistent with historical groundwater quality data. The chemical and physical constituents to be to be analyzed and frequency of testing are listed in **Table D-1**. The monitoring points are listed in **Table D-2**.

Pre-Injection SWP Water Quality Monitoring

Analysis shall be performed on treated SWP water that is being injected at the beginning of each injection cycle to establish background water quality data for recharged water. The chemical and physical constituents to be to be analyzed and frequency of testing are listed in **Table D-1**. The monitoring points are listed in **Table D-2**.

Groundwater Extraction Water Quality Monitoring

In order to document potential groundwater quality changes in the aquifer due to injection and extraction operations, sampling and analysis shall be performed on groundwater collected at monitoring sites established by the District. Monitoring wells were selected so that this monitoring plan successfully confines the injected water to the depression area (see **Figure D-1**).

Tables D-1 and **D-3** presents the complete list of constituents and parameters that shall be monitored, and the respective MCL.

FIGURE D-1: ASR SITES

Table D-1
Aquifer and Storage Recovery Project - Sampling Frequency

Parameters	Units	Back-ground Ground water	SWP / Injection Water Frequency	Groundwater Frequency (During Storage & Extraction)
Weekly Injection Water Monitoring				
Combined Chlorine Residual	mg/L	X	Weekly	Quarterly
PH	Units	X	Weekly	Quarterly
Total Dissolved Solids (TDS)	mg/L	X	Weekly	Quarterly
Total Trihalomethane Compounds (THM)	ug/L	X	Weekly	Quarterly
Trihalomethane Formation Potential (THMFP)	ug/L	X	Weekly	Quarterly
Turbidity	NTU	X	Weekly	Semi-Annually
Flow Monitoring				
Average flow rate	Gal/min	X	Continuous	Continuous
Cumulative flow	Gallons	X	Continuous	Continuous
Injection / Extraction Flow	Gal/min/day	X	Continuous	Continuous
General Minerals				
Alkalinity (as CaCO3)	mg/L	X	Semi-Annually	Semi-Annually
Specific Conductance	umhos/cm	X	Semi-Annually	Semi-Annually
Sulfate (SO4)	mg/L	X	Semi-Annually	Semi-Annually
Chloride (Cl)	mg/L	X	Semi-Annually	Semi-Annually
Calcium (Ca)	mg/L	X	Semi-Annually	Semi-Annually
Magnesium (Mg)	mg/L	X	Semi-Annually	Semi-Annually
Sodium (Na)	mg/L	X	Semi-Annually	Semi-Annually
Potassium (K)	mg/L	X	Semi-Annually	Semi-Annually
Bicarbonate (HCO3)	mg/L	X	Semi-Annually	Semi-Annually
Hardness (as CaCO3)	mg/L	X	Semi-Annually	Semi-Annually
Fluoride (F)	mg/L	X	Semi-Annually	Semi-Annually
Nitrate (as NO3)	mg/L	X	Semi-Annually	Semi-Annually
Nitrite (N)	mg/L	X	Semi-Annually	Semi-Annually
Iron (Fe)	mg/L	X	Semi-Annually	Semi-Annually
Manganese (Mn)	mg/L	X	Semi-Annually	Semi-Annually
Total Dissolved Solids (TDS)	mg/L	X	Weekly	Quarterly
Total Metals				
Aluminum (Al)	mg/L	X	Semi-Annually	Semi-Annually
Antimony (Sb)	mg/L	X	Semi-Annually	Semi-Annually
Arsenic (As)	mg/L	X	Semi-Annually	Semi-Annually
Barium (Ba)	mg/L	X	Semi-Annually	Semi-Annually

	Parameters	Units	Back-ground Ground water	SWP / Injection Water Frequency	Groundwater Frequency (During Storage & Extraction)
	Beryllium (Be)	mg/L	X	Semi-Annually	Semi-Annually
	Boron (B)	mg/L	X	Semi-Annually	Semi-Annually
	Cadmium (Cd)	mg/L	X	Semi-Annually	Semi-Annually
	Total Chromium (Cr)	mg/L	X	Semi-Annually	Semi-Annually
	Hexavalent Chromium (Cr VI)	mg/L	X	Semi-Annually	Semi-Annually
	Copper (Cu)	mg/L	X	Semi-Annually	Semi-Annually
	Lead (Pb)	mg/L	X	Semi-Annually	Semi-Annually
	Mercury (Hg)	mg/L	X	Semi-Annually	Semi-Annually
	Nickel (Ni)	mg/L	X	Semi-Annually	Semi-Annually
	Selenium (Se)	mg/L	X	Semi-Annually	Semi-Annually
	Thallium (Th)	mg/L	X	Semi-Annually	Semi-Annually
	Zinc (Zn)	mg/L	X	Semi-Annually	Semi-Annually
General Physical Parameters					
	Apparent Color	units	X	Semi-Annually	Semi-Annually
	Methylene Blue Active Substances (MBAS)	mg/L	X	Semi-Annually	Semi-Annually
	Odor	units	X	Semi-Annually	Semi-Annually
	PH	units	X	Weekly	Quarterly
	Temperature	degrees C^0	X	Semi-Annually	Semi-Annually
	Turbidity	NTU	X	Weekly	Semi-Annually
Other Constituents					
	Coliform	mpn/100ml	X	Semi-Annually	Semi-Annually
	Combined Chlorine Residual	mg/L	X	Weekly	Quarterly
	Total Organic Carbon	mg/L	X	Semi-Annually	Quarterly
	Trihalomethane Formation Potential (THMFP)	ug/L	X	Weekly	Quarterly
	Total Trihalomethane Compounds (THM)	mg/L	X	Weekly	Quarterly
Aquifer Characteristics					
	Depth of Ground Water	feet bgs	X		Annually
	Direction of water gradient	degrees	X		Annually
	Electrical Conductivity	microumhos/cm	X		Annually
	Slope of Grade of water table	ft/mile	X		Annually
	Static H_2O level	ft above msl	X		Annually

Reporting Program

The District shall maintain water quality data and make it available to the RWQCB upon request. The monitoring and project operating data that the District shall maintain, include all above mentioned water quality data and Chain-of-custody (COC) forms with pertinent field information for water quality sampling and analysis done (see **Figure 5-8**).

The District shall also identify and report problems related to well sampling including temporary lack of access to well(s), inoperable or malfunctioning purging and sampling equipment, and unsafe working conditions.

Field Water Quality Sampling Methods And Procedures

Sample Containers

The Lab shall prepare appropriately selected containers with both preservative and container type in accordance with the requirements presented in **Table D-4**. Extra containers of each type shall be provided in the event of breakage or loss. Each container shall have a pre-printed identification label clearly showing the group or type of analysis to be performed. The Lab shall assign a laboratory sample number upon receiving the sample for proper identification and tracking.

Sample containers shall be laboratory cleaned prior to use based in the analyte of interest in accordance with standard United States Environmental Protection Agency (USEPA) protocol. Sample containers shall be stored in a fashion that prevents dust or other contaminant accumulations. The Lab shall be responsible for verifying the cleanliness and integrity of the sample containers prior to shipment to the District pursuant to their sample container quality control (QC) procedures.

Well and Sample Line Purging

Prior to sampling, each well shall, to the extent possible, be pumped by the District for a sufficient period of time to evacuate any standing water in the well, ensure movement of "fresh" groundwater in the well and ensure pH, specific conductance, and temperature stabilization.

Water discharge from the production wells shall be conveyed directly to waste. The sample line flow shall remain constant and continuous during sample collection to minimize the potential for particulate matter becoming dislodged in the discharge pipe and entering sample container(s).

Table D-4
Field Sampling Methods and Procedures

Constituent	Analytical Testing Method	California DLR (mg/L, unless specified)	Maximum Holding Time	Sample Container Bottle Type	Sample Container Size Set	Perservation
General Parameters						
pH	EPA 150.1	0*	Immediate	plastic	250 mL	None Required
specific conductance	SM 2510-b	0*	28 days	plastic or glass	250mL	Cool to 4 ^{0}C, measure 25 ^{0}C
turbidity	EPA 180.1	0*	48 hours	glass	500mL	Cool to 4 ^{0}C
combined chlorine residual	SM 4500-CL-G	0*	Immediate	amber glass	250mL	Cool to 4 ^{0}C
temperature		0*				None Required
color	SM 2120-b	0*	48 hours	glass	500mL	Cool to 4 ^{0}C
odor	EPA 140.1	0*	24 days	glass or plastic	500mL	Cool to 4 ^{0}C
dissolved solids	SM 2450-c	0.004	7 days	plastic	250mL	Cool to 4 ^{0}C
Major Minerals						
sulfate (SO_4)	EPA 300.0	500	28 days	plastic or glass	250mL	Cool to 4 ^{0}C
chloride (Cl)	EPA 300.0	0*	28 days	plastic or glass	250mL	Cool to 4 ^{0}C
calcium (Ca)	SM 3500-Ca D	0*	6 months	plastic	1 Liter	HNO_3, cool to 4 ^{0}C
magnesium (Mg)	SM 3500-Mg E	0.0005	6 months	plastic	1 Liter	HNO_3, cool to 4 ^{0}C
sodium (Na)	SM 3500-Na D	0*	6 months	plastic	1 Liter	HNO_3, cool to 4 ^{0}C
potassium (K)	SM 3500-K D	0*	6 months	plastic	1 Liter	Cool to 4 ^{0}C
bicarbonate (HCO_3)	SM 2320-E	0*	14 days	plastic or glass	250mL	Cool to 4 ^{0}C
hardness (as $CaCO_3$)	SM 2340-C	0*	6 months	plastic or glass	250mL	Cool to 4 ^{0}C
alkalinity (as CaCO3)	SM 2320-B	0*	14 days	plastic or glass	250mL	Cool to 4 ^{0}C
fluoride (F)	EPA 300.0	0.1	28 days	plastic or glass	250mL	Cool to 4 ^{0}C
nitrate (as NO_3)	EPA 300.0	2	48 hours	plastic or glass	250mL	Cool to 4 ^{0}C
Nitrite (N)	EPA 300.0	0.4	48 hours	plastic or glass	250mL	Cool to 4 ^{0}C
Iron	EPA 200.7	0.1	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
Manganese	EPA 200.7	0.02	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
Total Metals						
aluminum	EPA 200.7	0.05	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
antimony	SM 3113-B	0.006	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
arsenic	SM 3113-B	0.002	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
barium	EPA 200.7	0.1	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
beryllium	SM 3113-B	0.001	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C

Constituent	Analytical Testing Method	California DLR (mg/L, unless specified)	Maximum Holding Time	Sample Container Bottle Type	Sample Container Size Set	Perservation
boron	EPA 200.8	**	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
cadmium	SM 3113-B	0.001	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
total chromium	SM 3113-B	0.01	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
hexavalet chromium	EPA 218.6	0.001	24 hours	plastic	500mL	Cool to 4 ^{0}C
copper	EPA 200.7	0.05	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
lead	SM 3113-B	0.005	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
silver	SM 3113-B	0.01	6 months	Dark Plastic	500mL	HNO_3, cool to 4 ^{0}C, store in the dark
mercury	EPA 245.1	0.001	28 days	plastic	500mL	HNO_3, cool to 4 ^{0}C
nickel	SM 3113-B	0.01	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
selenium	SM 3113-B	0.005	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
thallium	EPA 200.9	0.001	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
zinc	EPA 200.8	0.05	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
TOC	SM 5310-B	0.001	28 days	glass w/Teflon cap	40mL	HNO_3, cool to 4 ^{0}C
trihalomethane formation potential	EPA 510.1	0*	7 days	amber glass	250mL	Cool to 4 ^{0}C
total trihalomethane compounds	EPA 524.2	0*	14 days	glass w/Teflon cap	2x40 mL	Sodium thiosulfate, per method, cool to 4 ^{0}C
total coliform	SM 9221-B	0*	30 hours	sterile polyethlene	1 Liter	Cool to 4 ^{0}C
MBAS	SM 5540-C	0.0005	48 hours	plastic	250 mL	Cool to 4 ^{0}C

Sample Collection and Preparation

The District shall contact the Lab and arrange to have ice chests of prepared sample bottles delivered to the appropriate location requested by the District at least one week prior to the sampling event. Upon receipt of the sample bottles, designated District sampling personnel shall make an inventory of the bottles received to assure that adequate number and types of sample bottles required for the upcoming sampling event have been provided.

Prior to each sampling event the designated District personnel shall inventory, restock, replace, clean, calibrate, maintain, and test water quality monitoring equipment as needed. Sampling equipment shall include portable specific conductance meter, pH meter, residual chlorine test kit and thermometer, including pH buffer solutions and specific conductance calibration solutions. At a minimum, the frequency and nature of equipment maintenance shall be consistent with the manufacturer's recommendations.

Total Organic Carbon samples shall be collected with as little aeration as possible to ensure that no air bubbles are incorporated into the sample containers after they are capped. If air bubbles are observed in a sample container, re-sampling shall be performed.

Sample Preservation

Designated sampling personnel shall use "clean sampling techniques" to minimize potential contamination of water samples. Sample containers and lids shall not touch the ground, the sampling personnel's clothing, or any other potential source of contamination. Sample container lids shall not be removed from a particular container until that container is to be filled. Sampling containers shall be rinsed three times with the sample prior to collection unless the container contains a preservative. The sample container shall be filled to the top of the rim to minimize air space between the liquid level and the lid. The container lid shall also be rinsed with the sample before use. The lid shall be tightened securely to the container immediately after sample collection is completed.

Chemical preservatives and refrigeration shall be used to maintain sample integrity prior to analysis. After sample collection, water samples shall be stored in insulated coolers or ice chests at a temperature of 4 ^{0}C, or 39 ^{0}F, until delivery to the Lab. Samples to be analyzed for total metals shall be filtered using a 0.45-micron filter then acidified with nitric acid by the Lab immediately on arrival.

Designated sampling personnel shall exercise extreme care at all times during the handling of acid-preserved sample containers to minimize spillage, damage and/or injury to the sampler(s) or the field equipment. In addition to nitrile sampling gloves, the designated sampling personnel shall wear safety glasses or goggles to minimize potential eye injury.

Water Quality Sample Record Keeping

All sample containers shall be pre-labeled, to the extent possible, prior to each sampling event to facilitate sampling activities. Sample containers provided by the Lab shall contain waterproof labels and pre-marked information such as analyte and laboratory identification number. To the extent possible, the designated Lab / District sampling personnel shall inscribe the well identification and sampler(s) name or initials on the labels under dry conditions using a waterproof marker pen prior to each sampling event. Immediately prior to collection of water samples, the designated District sampling personnel shall inscribe on the sample bottle label the date and time of sample collection and the name of any preservatives used with a waterproof marker pen. The designated District sampling personnel shall maintain a record showing:

- Site name and/or well number
- Name(s) of sampling personnel

- Measured depth to groundwater
- Discharge rate [in gallons per minute (gpm)]
- Number of minutes of well purging
- Field measurements of pH, specific conductance, residual chlorine and temperature
- Date and time(s) of sample collection
- Weather conditions
- Other significant field or sampling conditions

In addition, a COC form indicating the well name(s) or well number, sampler's name, date and time sampled, any special observations, and laboratory sample number shall be filled out by the designated sampling personnel and placed in a sealed plastic bag (e.g., Ziplocs) with the sample(s) in the ice chest to provide a COC record. A sample COC form is presented as **Figure 5-8**. The lab shall submit the completed COC record to the designated District sampling personnel upon delivery of the sample(s) to the lab.

Sample Results

The Lab shall use a standard reporting form for all water sources listing date(s) of analysis, name(s) of person who analyzed the samples, USEPA analytical method(s) used, name of analytical method used, name of parameter analyzed, detection limit and result of the analysis. Any analytical result less than detectable shall be reported as less than the method detection limit.

The Lab shall submit paper or electronic copies of laboratory results and written reports to the Water Quality Senior Civil Engineer. Unusual spikes, questionable results, or detection of chemicals not on the list of required constituents shall be promptly reported to the designated District sampling personnel. Nitrate analytical results shall be reported as mg/L as NO_3. Hardness and alkalinity shall be reported as mg/L as $CaCO_3$. The Lab shall maintain records for at least three years from the date the analytical reports were submitted to the designated sampling personnel made showing the calibration of equipment used in the various analyses.

GW-5 The District shall maintain THM levels in stored water below the MCL, thus not negatively affecting the District's or any other purveyor's ability to pump and serve groundwater from the regional aquifer for beneficial uses as described in Water Quality Control Plan for the Lahontan Region. The District shall achieve this through the reduction of free chlorine and/or organic compounds by implementing best practicable treatment or control methods.

GROUNDWATER HYDROLOGY

ADVERSE IMPACT This measure mitigates the temporary potential adverse impact that the construction portion of the project may cause.

MONITORING AND REPORTING PLAN

Reference Number: **(GW-1)**

Mitigation: This measure mitigates the temporary potential adverse impact that the construction portion of the project may cause. The requirements for such impacts in most areas of the state are Waste Discharge Requirements (WDRs) and general National Pollutant Discharge Elimination System (NPDES) permits. In order to avoid the impacts of the discharge of water from the development, testing and disinfection of wells and ensure no degradation of surface or groundwater quality during the construction phase of the ASR project, the District shall monitor compliance with both WDRs and NPDES permits from the Regional Water Quality Control Board. All discharges are proposed to be conveyed by a combination of piped and/or storm channel overland flow to confined / bermed areas for dissipation by evaporation / percolation with no discharge occurring to surface waters. The mechanism to be followed prior to discharge includes confining the water to tanks for sedimentation treatment and holding the water in the tanks during the disinfection phase until the results confirm a reduction of chlorine residual concentration to 0.5 mg/L or less. The process of development / testing / disinfection may last about a week for each well being constructed.

Party Responsible for Implementing Mitigation: The District

Implementation Phase: Construction

Monitoring Activity: Confirm that all discharges are conveyed by a combination of piped and/or storm channel overland flow to confined / bermed areas for dissipation by evaporation / percolation with no discharge occurring to surface waters; that prior to discharge all water is confined to tanks for sedimentation treatment; and that water is held in the tanks during the disinfection phase until the results confirm a reduction of chlorine residual concentration to 0.5 mg/L or less.

GROUNDWATER HYDROLOGY

ADVERSE IMPACT The proposed ASR project would result in a significant adverse impact in regards to the increase in the level of THMs in the groundwater.

MONITORING AND REPORTING PLAN

Reference Number: **(GW-2)**

Mitigation: During the life of the ASR Project, the District shall operate the ASR project in compliance with the RWQCB's Anti-degradation Policy (Resolution 68-16) maintaining present and potential beneficial uses for the Antelope Valley Basin as described in Chapter 2 of the Water Quality Control Plan for the Lahontan Region (Basin Plan). Beneficial uses for the Antelope Valley Basin as described in the Basin Plan are:

- Municipal and Domestic Supply – beneficial uses of water used for community, military, individual water supply systems including, but not limited to, drinking water supply.
- Agricultural Supply – beneficial uses of waters used for farming, horticulture, or ranching, including, but not limited to, irrigation, stock watering, and support of vegetation for range grazing.
- Industrial Service Supply – beneficial uses of waters used for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, geothermal energy production, hydraulic conveyance, gravel washing, fire protection, and oil well re-pressurization.
- Freshwater Replenishment – beneficial uses of waters used for natural or artificial maintenance of surface water quantity or quality.

The District shall operate the ASR project in compliance with drinking water regulatory program established by the California Legislature. The California Legislature established drinking water regulatory program (Title 22 Code of Regulations) within the State Department of Health Services (DHS) in order to provide the orderly and efficient delivery of safe drinking water. The District shall operate the ASR project in compliance with primary and secondary drinking water standards established by DHS.

- Primary Standards are maximum contaminant levels (MCLs) of contaminants that, in the judgment of DHS, may have an adverse effect on the health of persons.
- Secondary Standards are MCLs of contaminants that, in the judgment of DHS, are necessary to protect the public welfare.

Table D-3 lists the constituents and their MCLs that shall be used for compliance purposes.

Party Responsible for Implementing Mitigation: The District

Implementation Phase: Operation

Monitoring Activity: Confirm that the District operates the ASR project in compliance with the RWQCB's Anti-degradation Policy (Resolution 68-16) maintaining present and potential beneficial uses for the Antelope Valley Basin as described in Chapter 2 of the Water Quality Control Plan for the Lahontan Region (Basin Plan), and that the District operates the ASR project in compliance with primary and secondary drinking water standards established by DHS.

GROUNDWATER HYDROLOGY

ADVERSE IMPACT The proposed ASR project would result in a significant adverse impact in regards to the increase in the level of THMs in the groundwater.

MONITORING AND REPORTING PLAN

Reference Number: **(GW-3)**

Mitigation: The District shall monitor injection rates, volume of injected SWP water, and groundwater levels during the lifetime of the ASR project.

Water flow monitoring shall include taking continuous measurements of the rate and amounts of injection and extraction through flow meters, which will be located at each ASR well. Flow meters will be calibrated as specified by the manufacturer, and the results will be logged in a flow meter instrument maintenance logbook.

The District shall also monitor groundwater levels. Depth to static groundwater measurements shall be obtained at each of the monitoring sites (See **Table D-2**) using an electric water level sounder. The sounder shall be calibrated at the manufacturer's specifications.

To obtain a depth to water measurement, the electric sounder cable shall be lowered slowly into the well via the water level sounding tube or equivalent orifice until the sounder indicates submergence by either a beeping sound or light depending on the type of signal installed for that particular model. At this point, the designated District personnel shall note the number of feet from the established and/or surveyed measuring point for that well to the groundwater surface by using gradations on the electric sounder cable. The height of the water column in the well shall be calculated by subtracting the depth to water measurement from the total well depth and shall be entered in a field notebook.

Groundwater measurement for piezometers shall be taken electronically from the pressure transducers. The pressure transducers shall be calibrated semi-annually with the electric sounder.

The District shall utilize the simulation model developed during the demonstration project to estimate aquifer characteristics, calculate directions and quantities of groundwater flow, and to analyze resulting effects on water levels.

Party Responsible for Implementing Mitigation: The District

Implementation Phase: Operation

Monitoring Activity: Confirm that the District monitors the injection rates, volume of injected SWP water, and groundwater levels during the lifetime of the ASR project.

Confirm that the District also monitors the groundwater levels.

Confirm that the District utilizes the simulation model developed during the demonstration project to estimate aquifer characteristics, calculate directions and quantities of groundwater flow, and to analyze resulting effects on water levels.

GROUNDWATER HYDROLOGY

ADVERSE IMPACT The proposed ASR project would result in a significant adverse impact in regards to the increase in the level of THMs in the groundwater.

MONITORING AND REPORTING PLAN

Reference Number: **(GW-4)**

Mitigation: The District shall implement water quality monitoring throughout the life of the proposed project, for both source water being injected and the water being extracted. The District shall implement the following Sampling and Analysis Plan (SAP).

The District appointed ASR project manager shall be responsible for the overall administration and implementation of the SAP. The Environmental Toxicology Laboratory (Lab) of the Los Angeles County Department of Agricultural Commissioner / Weights and Measures, or a comparable state-certified laboratory, shall perform the water quality analysis.

Monitoring Program

The Monitoring Program addresses water quality monitoring for both groundwater and SWP water used for recharge, and responsibilities for analysis and reporting.

Background Groundwater Quality

Background groundwater quality shall be developed for each monitoring point prior to initiation of the project. This one time sampling event is intended to confirm that background groundwater quality at the ASR well sites is consistent with historical groundwater quality data. The chemical and physical constituents to be to be analyzed and frequency of testing are listed in **Table D-1**. The monitoring points are listed in **Table D-2**.

Pre-Injection SWP Water Quality Monitoring

Analysis shall be performed on treated SWP water that is being injected at the beginning of each injection cycle to establish background water quality data for recharged water. The chemical and physical constituents to be to be analyzed and frequency of testing are listed in **Table D-1**. The monitoring points are listed in **Table D-2**.

Groundwater Extraction Water Quality Monitoring

In order to document potential groundwater quality changes in the aquifer due to injection and extraction operations, sampling and analysis

shall be performed on groundwater collected at monitoring sites established by the District. Monitoring wells were selected so that this monitoring plan successfully confines the injected water to the depression area (see **Figure D-1**).

Tables D-1 and **D-3** presents the complete list of constituents and parameters that shall be monitored, and the respective MCL.

Reporting Program

The District shall maintain water quality data and make it available to the RWQCB upon request. The monitoring and project operating data that the District shall maintain, include all above mentioned water quality data and Chain-of-custody (COC) forms with pertinent field information for water quality sampling and analysis done (See **Figure D-2**).

The District shall also identify and report problems related to well sampling including temporary lack of access to well(s), inoperable or malfunctioning purging and sampling equipment, and unsafe working conditions.

Field Water Quality Sampling Methods And Procedures

Sample Containers

The Lab shall prepare appropriately selected containers with both preservative and container type in accordance with the requirements presented in **Table D-4**. Extra containers of each type shall be provided in the event of breakage or loss. Each container shall have a pre-printed identification label clearly showing the group or type of analysis to be performed. The Lab shall assign a laboratory sample number upon receiving the sample for proper identification and tracking.

Sample containers shall be laboratory cleaned prior to use based in the analyte of interest in accordance with standard United States Environmental Protection Agency (USEPA) protocol. Sample containers shall be stored in a fashion that prevents dust or other contaminant accumulations. The Lab shall be responsible for verifying the cleanliness and integrity of the sample containers prior to shipment to the District pursuant to their sample container quality control (QC) procedures.

Well and Sample Line Purging

Prior to sampling, each well shall, to the extent possible, be pumped by the District for a sufficient period of time to evacuate any standing water in the well, ensure movement of "fresh" groundwater in the well and ensure pH, specific conductance, and temperature stabilization.

Water discharge from the production wells shall be conveyed directly to waste. The sample line flow shall remain constant and continuous during sample collection to minimize the potential for particulate matter becoming dislodged in the discharge pipe and entering sample container(s).

Sample Collection and Preparation

The District shall contact the Lab and arrange to have ice chests of prepared sample bottles delivered to the appropriate location requested by the District at least one week prior to the sampling event. Upon receipt of the sample bottles, designated District sampling personnel shall make an inventory of the bottles received to assure that adequate number and types of sample bottles required for the upcoming sampling event have been provided.

Prior to each sampling event the designated District personnel shall inventory, restock, replace, clean, calibrate, maintain, and test water quality monitoring equipment as needed. Sampling equipment shall include portable specific conductance meter, pH meter, residual chlorine test kit and thermometer, including pH buffer solutions and specific conductance calibration solutions. At a minimum, the frequency and nature of equipment maintenance shall be consistent with the manufacturer's recommendations.

Total Organic Carbon samples shall be collected with as little aeration as possible to ensure that no air bubbles are incorporated into the sample containers after they are capped. If air bubbles are observed in a sample container, re-sampling shall be performed.

Sample Preservation

Designated sampling personnel shall use "clean sampling techniques" to minimize potential contamination of water samples. Sample containers and lids shall not touch the ground, the sampling personnel's clothing, or any other potential source of contamination. Sample container lids shall not be removed from a particular container until that container is to be filled. Sampling containers shall be rinsed three times with the sample prior to collection unless the container contains a preservative.

The sample container shall be filled to the top of the rim to minimize air space between the liquid level and the lid. The container lid shall also be rinsed with the sample before use. The lid shall be tightened securely to the container immediately after sample collection is completed.

Chemical preservatives and refrigeration shall be used to maintain sample integrity prior to analysis. After sample collection, water samples shall be stored in insulated coolers or ice chests at a temperature of 4 ^{0}C, or 39 ^{0}F, until delivery to the Lab. Samples to be analyzed for total metals shall be filtered using a 0.45-micron filter then acidified with nitric acid by the Lab immediately on arrival.

Designated sampling personnel shall exercise extreme care at all times during the handling of acid-preserved sample containers to minimize spillage, damage and/or injury to the sampler(s) or the field equipment. In addition to nitrile sampling gloves, the designated sampling personnel shall wear safety glasses or goggles to minimize potential eye injury.

Water Quality Sample Record Keeping

All sample containers shall be pre-labeled, to the extent possible, prior to each sampling event to facilitate sampling activities. Sample containers provided by the Lab shall contain waterproof labels and pre-marked information such as analyte and laboratory identification number. To the extent possible, the designated Lab / District sampling personnel shall inscribe the well identification and sampler(s) name or initials on the labels under dry conditions using a waterproof marker pen prior to each sampling event. Immediately prior to collection of water samples, the designated District sampling personnel shall inscribe on the sample bottle label the date and time of sample collection and the name of any preservatives used with a waterproof marker pen. The designated District sampling personnel shall maintain a record showing:

- Site name and/or well number
- Name(s) of sampling personnel
- Measured depth to groundwater
- Discharge rate [in gallons per minute (gpm)]
- Number of minutes of well purging
- Field measurements of pH, specific conductance, residual chlorine and temperature
- Date and time(s) of sample collection
- Weather conditions
- Other significant field or sampling conditions

In addition, a COC form indicating the well name(s) or well number, sampler's name, date and time sampled, any special observations, and laboratory sample number shall be filled out by the designated sampling personnel and placed in a sealed plastic bag (e.g., Ziplocs) with the sample(s) in the ice chest to provide a COC record. A sample COC form is presented as **Figure D-2**. The lab shall submit the completed COC record to the designated District sampling personnel upon delivery of the sample(s) to the lab.

Sample Results

The Lab shall use a standard reporting form for all water sources listing date(s) of analysis, name(s) of person who analyzed the samples, USEPA analytical method(s) used, name of analytical method used, name of parameter analyzed, detection limit and result of the analysis. Any analytical result less than detectable shall be reported as less than the method detection limit.

The Lab shall submit paper or electronic copies of laboratory results and written reports to the Water Quality Senior Civil Engineer. Unusual spikes, questionable results, or detection of chemicals not on the list of required constituents shall be promptly reported to the designated District sampling personnel. Nitrate analytical results shall be reported as mg/L as NO_3. Hardness and alkalinity shall be reported as mg/L as $CaCO_3$. The Lab shall maintain records for at least three years from the date the analytical reports were submitted to the designated sampling personnel made showing the calibration of equipment used in the various analyses.

Party Responsible for Implementing Mitigation: The District

Implementation Phase: Operation

Monitoring Activity: Confirm that the District implements water quality monitoring throughout the life of the proposed project, for both source water being injected and the water being extracted.

Confirm that the Monitoring Program addresses water quality monitoring for both groundwater and SWP water used for recharge.

Confirm that the District maintains water quality data and makes it available to the RWQCB upon request.

GROUNDWATER HYDROLOGY

ADVERSE IMPACT	The proposed ASR project would result in a significant adverse impact in regards to the increase in the level of THMs in the groundwater.
MONITORING AND REPORTING PLAN	
Reference Number:	**(GW-5)**
Mitigation:	The District shall maintain THM levels in stored water below the MCL, thus not negatively affecting the District's or any other purveyor's ability to pump and serve groundwater from the regional aquifer for beneficial uses as described in Water Quality Control Plan for the Lahontan Region. The District shall achieve this through the reduction of free chlorine and/or organic compounds by implementing best practicable treatment or control methods.
Party Responsible for Implementing Mitigation:	The District
Implementation Phase:	Operation
Monitoring Activity:	Confirm that the District maintains the THM levels in the stored water below the MCL.

ENCLOSURE B

FINDINGS OF FACT AND STATEMENT OF OVERRIDING CONSIDERATIONS

Waterworks District No. 40
Antelope Valley
Aquifer Storage and Recovery Project

Findings of Fact
and
Statement of Overriding Considerations

Lead Agency:

County of Los Angeles
Department of Public Works
Waterworks and Sewer Maintenance Division

Environmental Consultant:

UltraSystems Environmental

July 2003

Waterworks District No. 40
Antelope Valley
Aquifer Storage and Recovery Project

Findings of Fact
and Statement of Overriding Considerations

Lead Agency

County of Los Angeles
Department of Public Works
Waterworks and Sewer Maintenance Division
900 S. Fremont Ave.
Alhambra, CA 91802

Prepared by

UltraSystems Environmental
100 Pacifica, Suite 250
Irvine, CA 92618
(949) 788-4900

July 2003

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1.0 INTRODUCTION

The Final Recirculated Environmental Impact Report (Final REIR) evaluates the potential environmental impacts associated with the Antelope Valley Aquifer Storage and Recovery (ASR) Project proposed by the County of Los Angeles Department of Public Works Waterworks and Sewer Maintenance Division, Waterworks District No. 40 (District). The County of Los Angeles (County) is the lead agency for this Final REIR (i.e., the public agency with primary responsibility for preparing and certifying the California Environmental Quality Act (CEQA) compliance document along with approving the project).

The District is evaluating a proposal to construct and operate injection/extraction facilities for the ASR Project within the Lancaster subbasin in Antelope Valley. The project would involve the construction and operation of a total of fifteen injection/extraction wells at five different project sites that are currently owned and in use by the District. The proposed ASR Project would inject State Water Project (SWP) water obtained from the Antelope Valley East Kern Water Agency (AVEK) in the Principal Aquifer of the Lancaster subbasin, and extract the water when the demand arises. Injected SWP water would be treated to drinking water standards in accordance with Title 22 provisions of the California Code of Regulations by AVEK prior to injection.

2.0 PROJECT DESCRIPTION

The District proposes to construct water injection/extraction facilities in the Antelope Valley Basin, Lancaster subbasin in the City of Lancaster. The project consists of the installation of eleven new ASR wells (four of which would be replacement wells), the modification of four existing wells and the addition of appurtenant facilities. The facilities would deliver water supply to the wells for injection, as well as deliver water extracted from storage to existing District distribution facilities.

The ASR project would inject and store excess treated SWP water into the Lancaster subbasin for subsequent recovery of the supplies during high demand periods or during drought cycles.

Injection/Extraction Wells

The District is proposing to construct and operate injection/extraction facilities for an ASR project within the Lancaster Subbasin in Antelope Valley groundwater basin. The ASR project would inject excess treated SWP water into the Lancaster Subbasin for subsequent recovery of the supplies during high demand periods or during drought cycles.

The injection/extraction wells and appurtenant facilities would be constructed at five different locations within the Lancaster/Palmdale area. The five sites are owned by the County, and are in use by the District. Each of the five locations is an existing site for wells, tanks, and/or pumping plants. The proposed project calls for the installation of eleven new wells (four of which would be replacement wells) and modification of four existing wells. The project would also require the installation of pump/hydroelectric stations, pipelines, and related facilities.

The proposed ASR wells would be installed in the Principal Aquifer system of the Lancaster subbasin. In order to provide maximum flexibility with regard to hydraulic parameters, the precise location of individual facilities has not been determined. Rather, general areas of potential installation have been identified based upon hydrologic conditions, proximity to existing infrastructure, and simulation/optimization models. All proposed wells would be installed to a depth of approximately 500-700 feet below ground surface, penetrating the Principal Aquifer and terminating at the Blue Clay layer.

Three new injection/extraction wells would be installed at Site No. 1. The wells would be located no closer than 50 feet of the western and northern site boundaries, which abut residential uses. Two of the new wells would replace existing wells on site.

No new facilities would be installed at Site No. 2. The existing two wells would be modified for injection/extraction purposes.

Two new injection/extraction wells would be installed at Site No. 3, both wells would replace existing wells onsite.

Two new injection/extraction wells would be installed at Site No. 4.

Four new injection/extraction wells would be installed within the southern portion of the property at Site No. 5. These wells would be separated from Avenue M by the three existing water tanks that occupy the northern portion of this site.

Injection/Extraction Quantities

All of the selected injection/extraction wells are or would be connected to a network of pipelines that allow routing AVEK water to the wells for injection, and widespread distribution of pumped water to District customers.

The proposed project calls for the ASR wells to be operated in an injection mode of up to 5 months in a year, depending upon water availability of imported water supplies from AVEK. Based upon an average injection/extraction scenario of 5 months of injection and 7 months of extraction, and assuming 24-hour operations, the wells are capable of injecting 6,843 acre-feet (AF) and extracting 13,282 AF.

The amount of injection per year would be dependent upon the availability of surplus AVEK water, which would fluctuate from year to year based upon the availability of SWP water and water demand factors within the Antelope Valley area.

3.0 BACKGROUND

As required under CEQA, a notice of preparation (NOP) was prepared and circulated for the ASR Project on May 17, 2001. The NOP indicated that the proposed project had the potential to cause a significant effect on the environment and that an EIR should be prepared. The NOP is included in Appendix A of the Draft REIR.

The 30-day review period for the NOP ended on or about June 15, 2001. During this public review period, comments and input were solicited from state and local government agencies, which would affect or be affected by the project as well as private organizations and individuals that may have an interest in the project. Comment letters to the NOP were received from the State Clearinghouse, Caltrans, and the County of Los Angeles Department of Health Services.

In compliance with CEQA, the County prepared and circulated a Draft EIR for the Lancaster subbasin Aquifer Storage and Recovery Project in May 2002. The 45-day public review period for this document extended from May 17, 2002 to July 1, 2002, and a public meeting on the proposed project was held on June 18, 2002. Due to the alteration of the mitigation measures, and in order to ensure complete compliance with CEQA requirements, the County recirculated the Draft EIR (REIR) from March 11, 2003 through April 25, 2003. Another public meeting was held on April 1, 2003.

4.0 RECORD OF PROCEEDINGS

The custodian of the documents comprising the record of proceedings is the County of Los Angeles Department of Public Works Waterworks and Sewer Maintenance Division, 1000 South Fremont Avenue, Suite A-9 East, 4th Floor, Alhambra, California 91803.

5.0 FINDINGS REQUIRED UNDER CEQA

Under CEQA, for each significant environmental effect identified in an EIR for a proposed project, the approving agency must issue a written finding reaching one or more of three allowable conclusions. The first allowable finding is that "[c]hanges or alterations have been required in, or incorporated into, the project which avoid or substantially lessen the significant environmental effect as identified in the final EIR." (*State CEQA Guidelines*, § 15091, subd. [a][1].) The second allowable finding is that "[s]uch changes or alterations are within the responsibility and jurisdiction of another public agency and not the agency making the finding. Such changes have been adopted by such other agency or can and should be adopted by such other agency." (*State CEQA Guidelines*, § 15091, subd. [a][2].) The third allowable conclusion is that "[s]pecific economic, legal, social, technological, or other considerations, including provision of employment opportunities for highly trained workers, make infeasible the mitigation measures or project alternatives identified in the final EIR." (*State CEQA Guidelines*, § 15091, subd. [a][3].) CEQA requires that the lead agency adopt mitigation measures or alternatives, where feasible, to avoid or substantially reduce significant environmental impacts that would otherwise occur. Project modification or alternatives are not required, however, where they are infeasible or where the responsibility for modifying the project lies with some other agency. (*State CEQA Guidelines*, § 15091, subd. [a][3][c].)

In cases in which significant impacts are not mitigated to below a level of significance, the agency, after adopting the findings, may approve the project if it first adopts a statement of overriding considerations setting forth the specific reasons why the agency found that the project's benefits outweigh the unavoidable adverse environmental effects. (*State CEQA Guidelines*, §§ 15093, 15043, subd. [b].)

This document presents the County's findings as required by CEQA, cites substantial evidence in the record in support of each of these findings, and presents an explanation to supply the logical step between the finding and the facts in the record. (*State CEQA Guidelines*, § 15091.)

The County herein finds that: (1) the Final REIR has been completed in compliance with CEQA; (2) the Final REIR was presented to the County and the County reviewed and considered that information in the Final REIR prior to approving the ASR Project; and (3) the Final REIR reflects the County's independent judgment and analysis. (*State CEQA Guidelines*, § 15090.)

6.0 MITIGATION MONITORING AND REPORTING PROGRAM

A Mitigation Monitoring and Reporting Program (MMRP) has been prepared for the project (refer to Public Resources Code, § 21081.6). The County will implement the MMRP to comply with project mitigation measures. The County's Board of Supervisors will consider the MMRP during the certification hearing for the Final REIR. The final MMRP will incorporate all mitigation measures adopted for the project.

7.0 LESS THAN SIGNIFICANT EFFECTS, SIGNIFICANT EFFECTS, MITIGATION MEASURES AND FINDINGS

Pursuant to the requirements of *State CEQA Guidelines*, an Initial Study and Notice of Preparation was distributed on May 17, 2001. The Initial Study determined that impacts to the following resources would be less than significant without requiring mitigation, and concluded that further analysis of these issues was not warranted:

- Agricultural Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Hazards and Hazardous Materials
- Land Use and Planning
- Mineral Resources
- Population and Housing
- Recreation
- Transportation/Traffic
- Utilities and Service Systems

The Initial Study also determined that there were no mandatory findings of significance associated with the proposed project. The Initial Study determined that the proposed project would potentially have impacts to the following resources, but that impacts to these resources would be less than significant with mitigation incorporated, and therefore no further analysis of these issues was warranted:

- Aesthetics
- Noise

See Initial Study, pp. 11 to 20.

The Initial Study identified four environmental categories that required impact analyses: Geology and Subsurface Conditions, Groundwater Hydrology, Public Services, and Energy Conservation. These four categories of potential impacts were analyzed in the Final REIR. Three of the four environmental categories did not result in significant adverse impacts. The Final REIR identified one environmental category that would result in significant environmental impacts. The one significant impact cannot be avoided by the adoption of feasible mitigation measures or alternatives; however, these effects can be reduced by the adoption of feasible mitigation measures, and are outweighed by overriding considerations discussed in the Statement of Overriding Considerations in section 10 below.

This section presents in greater detail the District's findings with respect to the environmental effects of the project. It also summarizes the evidence relied upon by the District in making these findings. This evidence is drawn from the Final REIR, the comments and responses to comments on the Draft REIR, and other evidence presented to the District, including all other information in the administrative record.

According to the Final REIR, the environmental effect that is significant and cannot be avoided is: The introduction of trihalomethanes (THMs) to the groundwater basin.

The following discussion examines the environmental impact deemed significant or potentially significant in the Final REIR.

7.1 Geology and Subsurface Conditions

7.1.1 Less Than Significant Effects

Construction

Project construction would not have a significant effect on local geological formations. Potential impacts would include soil erosion during the drilling and construction of the wells. Project implementation would utilize standard erosion control measures and waste management as specified under the Los Angeles County Department of Public Works Best Management Practices (BMPs) Handbook for Construction Activities.

In addition the District and its contractors (if required) would procure discharge permits from the California Regional Water Quality Control Board for discharge of water from well construction operations, including development testing, and disinfection.

See Final REIR, section 5.1.3, p. 5-7.

Operation

The project, which consists of the construction and operation of injection/extraction facilities at five separate existing District sites, would result in water being injected into the principal aquifer zone at a depth of 300 to 700 feet. Minimal impacts to project area geology are anticipated.

See Final REIR, section 5.1.3, p. 5-7.

Faults and Seismicity

The section of the San Andreas Fault near the project area has not experienced a major earthquake in the past 134 years. Therefore, it is reasonable to assume that an earthquake of this size would occur during the design life of the recharge installation. The effects of a major earthquake on the injection/extraction well facilities are expected to be minor since the pumps are underground and very little "equipment" is exposed at the surface.

While the project area is subject to seismic activity and as such the existing water facilities on the five sites have withstood previous seismic activity. The proposed project injection/extraction wells are expected to be capable of withstanding similar seismic activity in the future.

See Final REIR, section 5.1.3, pp. 5-7 to 5-8.

Liquefaction

The unconsolidated soils in the project area may be subject to liquefaction during a major seismic event, if they are saturated by water recharge. If a liquefaction condition occurs, sand boils and fissures are likely to develop, and damage to project structures and underground installations can be significant.

Typically, in order for liquefaction to occur, the groundwater table must be less than 50 feet deep. The ASR project would help raise groundwater levels in the vicinity of the wells used for injection, however, the amount of water available for recharge compared to the estimated storage of the depression is such that the level would not cause saturated soil condition described that could increase liquefaction potential. This is the case because the groundwater level in the project area is at approximately 390-490 feet below ground surface. The potential for high groundwater conditions within the project area resulting from the proposed ASR project, are considered low. Therefore, there would not be any significant impacts to or from the ASR project regarding liquefaction.

See Final REIR, section 5.1.3, p. 5-8.

Subsidence

Under drought or emergency conditions, ASR wells may be utilized as extraction wells. Extended extraction may result in insignificant impacts as a result of the inelastic compaction of the aquifer.

Injection of treated imported water into the aquifer system as proposed by the ASR project, when water is most available, for later use during peak demand periods and emergencies gives the District a tool to avoid/reduce subsidence which would otherwise be occurring. One of the main benefits of the proposed project is the possible reduction of subsidence. The ASR project wells would be utilized as injection wells during times when imported water is available, limiting their extraction capabilities. Usage of stored water for supply in lieu of natural groundwater would

aide in reducing the potential for subsidence within the project area. Therefore, there would not be any significant impacts to or from the ASR project regarding subsidence.

See Final REIR, section 5.1.3, p. 5-8.

Cumulative Impacts

Due to the nature of the proposed project (the construction and operation of injection/extraction facilities for an ASR project within the Lancaster Subbasin in Antelope Valley) no closely related past, present, and/or reasonably foreseeable probable future projects which would involve foreseeable impacts to geology and subsurface conditions have been identified that could result in cumulative impacts when combined with the proposed project. Impacts to geology and subsurface conditions in general tend to be site-specific. In this case, impacts from the ASR project wells will be discrete and will not radiate beyond the project boundaries. Therefore, the incremental effects of the proposed project on geology and subsurface conditions are not cumulatively considerable.

7.1.2 Significant Effect

The environmental analysis for Geology and Subsurface Conditions did not identify any significant adverse impacts for this category, including cumulative adverse impacts.

See Final REIR, section 5.1.5, p. 5-9.

7.2 Groundwater Hydrology

7.2.1 Less Than Significant Effects

Groundwater Levels

Under proposed project conditions, groundwater levels in the project area will be higher on average than current conditions. The water table in the Lancaster area is at an average depth of about 300 feet below ground surface. South and southeast of the proposed project area (the location of the Air Force Base) wells generally show a water table level of about 390 feet to 490 feet below ground surface. The District's production records indicate that 18 of our existing wells are within the pumping depression and extract close to 48 percent of the total groundwater extractions.

The ASR project would help raise groundwater levels in vicinity of the wells used for injection. However, the amount of water available for recharge compared to the estimated storage of the depression is such that the groundwater level will not cause waterlogged soils that could increase liquefaction potential, or result in malfunctioning septic systems, floating foundations, or differential settlement. Water levels rises attributed to ASR activities will not be high enough to alter the direction of flow over the subbasin.

Long-term injection and storage of water supplies would raise the groundwater levels within the project area, thereby benefiting existing groundwater users. A decrease in pumping costs is expected due to increasing groundwater levels. As the pumping lift decreases so does the power cost to lift the water. As groundwater increases, additional pump bowls and larger motors would not be necessary. This is a potential beneficial environmental impact of the proposed project.

See Final REIR, section 5.2.3, p. 5-19.

Groundwater Movement

Gravity measurements were made before and during injection over a network of gravity stations. During the second injection/extraction cycle, changes in gravity were determined along a north-south line. Results of the gravity changes indicate a rise in water table levels that form a conical shape with its apex at the injection site that slopes downward in a radial fashion. A general rise and fall of this shape occurred before injection and prior to extraction during the second phase.

Water level data also gives some indication of groundwater flow. Since water levels are generally sloping downward from north to south around the project area water flows from north to south also. Water levels in April 1996, prior to injection show water levels being 4-9 feet higher than those of a well at Palmdale. This suggests that during periods of low extraction in Lancaster, there exists a very slight gradient from the injection site to the southeast. However, there may be a temporary groundwater flow divide between the Palmdale area and the injection site that would prohibit injection water flow southward. Water levels at wells greater than a mile from the injection site did not show any changes.

See Final REIR, section 5.2.3, pp. 5-19.

Water Supplies

Concerns over the depletion of groundwater resources in the Lancaster area of the Antelope Valley have increased in recent years because of rapid population growth and the resulting demand imposed on existing water supplies. Historically, groundwater withdrawal has exceeded natural replenishment, resulting in as much as 200 feet of water-level declines throughout the Lancaster area and more than 6 feet of land subsidence in parts of Lancaster since the 1920's (Ikehara and Phillips, 1994). Reliance on groundwater eased somewhat in the 1970's with the introduction of imported surface water from the SWP California Aqueduct. However, because of the climactic influence on surface-water availability and steadily increasing demand, local groundwater sources are still an important part of the water supply.

This project serves to augment supplies by providing additional water during periods of drought. The potential for future withdrawal of water during droughts and emergencies enhances the reliability of the District's service, as well as, helps sustain the future growth in the service area. The proposed ASR project would result in beneficial impacts to water supplies in the Antelope Valley.

See Final REIR, section 5.2.3, p. 5-20 to 5-22.

Cumulative Impacts

Due to the nature of the proposed project (the construction and operation of injection/extraction facilities for an ASR project within the Lancaster Subbasin in Antelope Valley) no closely related past, present, and/or reasonably foreseeable probable future projects which would involve foreseeable impacts to groundwater hydrology in the aquifer have been identified that could result in cumulative impacts when combined with the proposed project. Therefore, the incremental effects of the proposed project on groundwater hydrology are not cumulatively considerable.

7.2.2 Significant Effect

Construction Impacts

The requirements to mitigate impacts from construction of injection or extraction wells in most areas of the state are Waste Discharge Requirements (WDRs) and general National Pollutant Discharge Elimination System (NPDES) permits. The discharge of water from the development, testing and disinfection of wells could degrade surface or groundwater quality during the construction phase of the ASR project. The District shall monitor compliance with both WDRs and NPDES permits from the Regional Water Quality Control Board. Nonetheless, the construction portion of the project may cause temporary potential adverse impacts at these five sites.

See Final REIR, section 5.2.3, p. 5-18 to 5-19.

Mitigation: The County shall implement the following mitigation measure:

GW-1 This measure mitigates the temporary potential adverse impact that the construction portion of the project may cause. The requirements for such impacts in most areas of the state are Waste Discharge Requirements (WDRs) and general National Pollutant Discharge Elimination System (NPDES) permits. In order to avoid the impacts of the discharge of water from the development, testing and disinfection of wells and ensure no degradation of surface or groundwater quality during the construction phase of the ASR project, the District shall monitor compliance with both WDRs and NPDES permits from the Regional Water Quality Control Board. All discharges are proposed to be conveyed by a combination of piped and/or storm channel overland flow to confined / bermed areas for dissipation by evaporation / percolation with no discharge occurring to surface waters. The mechanism to be followed prior to discharge includes confining the water to tanks for sedimentation treatment and holding the water in the tanks during the disinfection phase until the results confirm a reduction of chlorine residual concentration to 0.5 mg/L or less. The process of development / testing / disinfection may last about a week for each well being constructed.

See Final REIR, section 5.2.5, p. 5-24.

With Mitigation the Effects are Found to be:

( ) Significant (X) Not Significant

Finding(s) per *State CEQA Guidelines* Section 15091:

(X) Changes or alterations have been required in, or incorporated into, the project which avoid or substantially lessen the significant environmental effect. (Subd. [a][1].)

( ) Such changes or alterations are within the responsibility and jurisdiction of another public agency and not the agency making the finding. Such changes have been adopted by such other agency or can and should be adopted by such other agency. (Subd. [a][2].)

( ) Specific economic, legal, social, technological, or other considerations, including provision of employment opportunities for highly trained workers, make infeasible the mitigation measures or project alternatives identified in the final EIR. (Subd. [a][3].)

Rationale: Implementation of mitigation measure GW-1 presented here will reduce impacts due to the discharge of water from the development, testing and disinfection of wells during construction to below a level of significance.

Reference: Draft REIR, section 5.2.

Water Quality

Potential long-term impacts on groundwater quality include those associated with mixing of injected water with groundwater. The introduction of THMs to the aquifer would have a potential significant impact on the environment.

Concentrations of THMs in extracted water during the Demonstration Project showed an abrupt rise in THMs, followed by a very rapid drop and then a long slow decline as time goes on. Seasonal operation of an injection program would likely have a residual effect on groundwater chemistry given the same chemical and hydrologic conditions, and a similar ratio of injection to extraction volume. Results from an analytical mixing model, assuming complete mixing, are in agreement with this conclusion (Fujii and Bergamaschi, 2001). Although the imported water and groundwater are both of drinking-water quality, and are both delivered to customers in Lancaster, imported water contains THMs, with concentrations greater than those in native groundwater.

The demonstration project showed that THMs continued to form in the groundwater system after injection. Formation of THMs requires the presence of chlorine, the presence of organic precursors, and conditions favorable to the reactions forming THMs. In light of this, and with current available water treatment technology, the District would implement measures to improve injection water quality by limiting THM precursors during the proposed project.

The proposed ASR project would comply with State Drinking Water Standards (Title 22 of the California Code of Regulations). Therefore, the proposed ASR project would not result in a significant adverse impact in regard to all regulated constituents including DBPs, with the

exception of THMs. The proposed ASR project would increase the level of THMs in the groundwater by the amount present in the injected water. The amount of THMs in the injected water would vary over time, but the exact amount of THMs at any given time is not known. The increase in the level of THMs in the groundwater would violate the RWQCB's Anti-Degradation Policy (Resolution 68-16). Any increase in THMs in the groundwater would exceed the anti-degradation threshold. Therefore, the proposed ASR project would result in a significant adverse impact in regards to the increase in the level of THMs in the groundwater.

See Final REIR, section 5.2.3, p. 5-22.

Mitigation Determined to be Infeasible

The USEPA has indicated that the best available technology for THM removal or THM control is Granular Activated Carbon 10 (GAC10), also known as enhanced coagulation or enhanced softening. GAC10 is granular activated carbon with an empty bed contact time with contaminated water of 10 minutes and reactivation frequency for GAC of no more than six months. A properly designed GAC filter will also remove chlorine, bad tastes and odor, color, chemicals and other organics found in both treated and raw water supplies. The mechanism by which GAC removes contaminants is both adsorption, as well as catalytic reduction (chlorine). Since the adsorptive force of carbon is greater than that of the water, and since most organic contaminants are hydrophobic, they have a tendency to adhere to the surfaces of the GAC. This adsorption removes these contaminants from the water as it passes the carbon column. Most inorganic species do not adsorb onto the carbon and will remain in solution and pass the carbon column unaffected. Published capital costs for GAC systems range from $0.20 to $0.80/1000 gallons ($65 to $260/AF). The District will purchase water for injection from AVEK at approximately $210/AF. The District will sell the extracted water to its customers to recover the District's costs. Those costs include the cost of purchasing the water, as well as the construction, and operation and maintenance of the system. To include a GAC system could more than double the cost to the District and to the District's customers of the extracted water, making the District's use of injected water cost-prohibitive. For these reasons, implementation of the GAC system is economically infeasible.

AVEK is currently conducting pilot studies to identify the feasibility of GAC and membrane filtration. Although AVEK's THM levels vary considerably throughout their system, they currently meet the standards established by Stage 1 of the DBP Rule. AVEK is required by a state mandate to meet Stage 2 requirements by its implementation date of June 2006.

See Final REIR, section 5.2.5, pp. 5-23 to 5-24.

Mitigation: The County shall implement the following mitigation measures:

GW-2 During the life of the ASR Project, the District shall operate the ASR project in compliance with the RWQCB's Anti-degradation Policy (Resolution 68-16) maintaining present and potential beneficial uses for the Antelope Valley Basin as described in Chapter 2 of the Water Quality Control Plan for the Lahontan Region (Basin Plan). Beneficial uses for the Antelope Valley Basin as described in the Basin Plan are:

- Municipal and Domestic Supply – beneficial uses of water used for community, military, individual water supply systems including, but not limited to, drinking water supply.
- Agricultural Supply – beneficial uses of waters used for farming, horticulture, or ranching, including, but not limited to, irrigation, stock watering, and support of vegetation for range grazing.
- Industrial Service Supply – beneficial uses of waters used for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, geothermal energy production, hydraulic conveyance, gravel washing, fire protection, and oil well re-pressurization.
- Freshwater Replenishment – beneficial uses of waters used for natural or artificial maintenance of surface water quantity or quality.

The District shall operate the ASR project in compliance with drinking water regulatory program established by the California Legislature. The California Legislature established drinking water regulatory program (Title 22 Code of Regulations) within the State Department of Health Services (DHS) in order to provide the orderly and efficient delivery of safe drinking water. The District shall operate the ASR project in compliance with primary and secondary drinking water standards established by DHS.

- Primary Standards are maximum contaminant levels (MCLs) of contaminants that, in the judgment of DHS, may have an adverse effect on the health of persons.
- Secondary Standards are MCLs of contaminants that, in the judgment of DHS, are necessary to protect the public welfare.

Table 7-1 lists the constituents and their MCLs that shall be used for compliance purposes.

Table 7-1
Drinking Water Standards - Maximum Contaminant Levels (MCLs)

	Parameters	Units	MCL
Weekly Injection Water Monitoring			
	Combined Chlorine Residual	mg/L	4 (MRDL*)
	pH	N/A	N/S
	Trihalomethanes	ug/L	80
	Turbidity	NTU	5

	Parameters	Units	MCL
General Minerals			
	Total Dissolved Solids (TDS)	mg/L	1000
	Specific Conductance	micromhos	1600
	Sulfate (SO4)	mg/L	500
	Chloride (Cl)	mg/L	500
	Fluoride (F)	mg/L	2
	Nitrate (as NO3)	mg/L	45
	Nitrite (N)	mg/L	1
	Iron (Fe)	mg/L	0.3
	Manganese (Mn)	mg/L	0.05
Total Metals			
	Aluminum (Al)	mg/L	1
	Antimony (Sb)	mg/L	0.006
	Arsenic (As)	mg/L	0.05
	Barium (Ba)	mg/L	1
	Beryllium (Be)	mg/L	0.004
	Boron (B)	mg/L	1
	Cadmium (Cd)	mg/L	0.005
	Total Chromium (Cr)	mg/L	0.05
	Hexavalent Chromium (Cr VI)	mg/L	N/A
	Copper (Cu)	mg/L	1
	Lead (Pb)	mg/L	0.015
	Mercury (Hg)	mg/L	0.002
	Nickel (Ni)	mg/L	0.1
	Selinium (Se)	mg/L	0.05
	Thallium (Th)	mg/L	0.002
	Zinc (Zn)	mg/L	5
General Physical Parameters			
	Taste	N/A	N/S
	pH	N/A	N/S
	Temperature	Degrees C^0	N/S
	Apparent Color	Units	15
	Odor	Units	3
	Turbidity	NTU	5
	Methylene Blue Active Substances (MBAS)	mg/L	0.5

	Parameters	Units	MCL
Other Constituents			
	Total Organic Carbon	N/A	N/S
	Trihalomethane Formation Potential	N/A	N/S
	Total Trihalomethane Compounds	ug/L	80
	Coliform	% of positive samples	5%

Constituents listed on Table 7-3, but do not have an MCL or other standard.

* Maximum Residual Disinfectant Level

N/S - No Standard

N/A - Not Applicable

See Final REIR, section 5.2.5, p. 5-25 to 5-27.

GW-3 The District shall monitor injection rates, volume of injected SWP water, and groundwater levels during the lifetime of the ASR project.

Water flow monitoring shall include taking continuous measurements of the rate and amounts of injection and extraction through flow meters, which will be located at each ASR well. Flow meters will be calibrated as specified by the manufacturer, and the results will be logged in a flow meter instrument maintenance logbook.

The District shall also monitor groundwater levels. Depth to static groundwater measurements shall be obtained at each of the monitoring sites (See **Table 7-2**) using an electric water level sounder. The sounder shall be calibrated at the manufacturer's specifications.

To obtain a depth to water measurement, the electric sounder cable shall be lowered slowly into the well via the water level sounding tube or equivalent orifice until the sounder indicates submergence by either a beeping sound or light depending on the type of signal installed for that particular model. At this point, the designated District personnel shall note the number of feet from the established and/or surveyed measuring point for that well to the groundwater surface by using gradations on the electric sounder cable. The height of the water column in the well shall be calculated by subtracting the depth to water measurement from the total well depth and shall be entered in a field notebook.

Groundwater measurement for piezometers shall be taken electronically from the pressure transducers. The pressure transducers shall be calibrated semi-annually with the electric sounder.

The District shall utilize the simulation model developed during the demonstration project to estimate aquifer characteristics, calculate directions and quantities of groundwater flow, and to analyze resulting effects on water levels.

See Final REIR, section 5.2.5, p. 5-27 to 5-30.

GW-4 The District shall implement water quality monitoring throughout the life of the proposed project, for both source water being injected and the water being extracted. The District shall implement the following Sampling and Analysis Plan (SAP).

The District appointed ASR project manager shall be responsible for the overall administration and implementation of the SAP. The Environmental Toxicology Laboratory (Lab) of the Los Angeles County Department of Agricultural Commissioner / Weights and Measures, or a comparable state-certified laboratory, shall perform the water quality analysis.

Monitoring Program

The Monitoring Program addresses water quality monitoring for both groundwater and SWP water used for recharge, and responsibilities for analysis and reporting.

Background Groundwater Quality

Background groundwater quality shall be developed for each monitoring point prior to initiation of the project. This one time sampling event is intended to confirm that background groundwater quality at the ASR well sites is consistent with historical groundwater quality data. The chemical and physical constituents to be to be analyzed and frequency of testing are listed in **Table 7-1**. The monitoring points are listed in **Table 7-2**.

Pre-Injection SWP Water Quality Monitoring

Analysis shall be performed on treated SWP water that is being injected at the beginning of each injection cycle to establish background water quality data for recharged water. The chemical and physical constituents to be to be analyzed and frequency of testing are listed in **Table 7-3**. The monitoring points are listed in **Table 7-2**.

Table 7-2
Monitoring Wells

State Well Number	USGS Site Indentificaiton Number	Local Well Name	Altitude of Land Surface	Use of Well	Year of Construction	Depth Drilled	Well Casing Diameter (inches)	Well Casing Depth	Screened Interval Depth	Aquifer Zone Perforated	Type of Data Included in this Report
COUNTY WELLS											
INJECTION WELLS											
7N/13W -27P2	343943118081801	4-32	2,463	PS	1969	735	16	727	282-717	U	F,WC,WL
7N/13W -27P3	343943118082101	4-34	2,462	PS	1972	740	16	720	280-710	U	F,WC,WL
7N/12W -34N3	343848118083801	4-29	2,522	PS	1967	792	14	740	350-728	U	F,WC,WL
7N/12W -34N4	343858118083801	4-30	2,517	PS	1968	800	16	770	350-760	U	F,WC,WL
-	-	4-63	-	PS	2001	745	16	725	290-400; 450-550; 595-705	U	F,WC,WL
-	-	4-64	-	PS	2001	730	16	710	300-490; 530-690	U	F,WC,WL
-	-	4-66*	-	PS	-	-	-	-	-	U	F,WC,WL
-	-	4-69*	-	PS	-	-	-	-	-	U	F,WC,WL
-	-	4-70*	-	PS	-	-	-	-	-	U	F,WC,WL
-	-	4-71*	-	PS	-	-	-	-	-	U	F,WC,WL
-	-	4-72*	-	PS	-	-	-	-	-	U	F,WC,WL
MONITORING WELLS											
7N/12W-26K3	343951118065902	4-31	2,459	AB	1969	770	16	687	310-674	U	WL
7N/12W-27F01	344006118082601	4-43	2,440	PS	1988	1210	16	1202	600-1202	L	WC,WL
7N/12W-27F3	344006118082601	4-44	2,440	PS	1988	1220	16	1202	400-1202	U,L	WC,WL
7N/12W -27J5	343903118074801	4-8	2,449	AB	1953	700	14	700	350-700	U	WL
7N/12W-27H3	344008118074701	4-33	2,443	PS	1971	730	16	710	260-700	U	WC
7N/12W-27J4	344002118074701	4-13	2,448	PS	1956	1108	14	1102	362-1102	U	WC
7N/12W-27J6	344003118074901	4-42	2,449	PS	1987	1174	16	1150	400-1140	U,L	WC
OTHER WELLS											
7N/12W-27F5	344005118082201	5K8-PZ1	2,441.60	PIEZ	1996	1183	2	935	905-925	L	WC,WL,BP
7N/12W-27F6	344005118082202	5K8-PZ2	2,441.60	PIEZ	1996	1183	2	735	705-725	U	WC,WL
7N/12W-27F7	344005118082203	5K8-PZ3	2,441.60	PIEZ	1996	1183	2	535	505-525	U	WC,WL
7N/12W-27F8	344005118082204	5K8-PZ4	2,441.60	PIEZ	1996	1183	2	425	395-415	U	WC,WL

State Well Number	USGS Site Indentificaiton Number	Local Well Name	Altitude of Land Surface	Use of Well	Year of Construction	Depth Drilled	Well Casing Diameter (inches)	Well Casing Depth	Screened Interval Depth	Aquifer Zone Perforated	Type of Data Included in this Report
7N/12W-27F9	344005118082205	5K8-EX1	2,441.60	EXTM	1996	735	2	725	--	--	C
7N/12W-27F10	344005118082206	5K8-EX2	2,441.60	EXTM	1996	1205	7	1190	--	--	C
7N/12W-27H5	344003118074801	DK8-PZ1	2,449	PIEZ	1992	1120	2	1120	1,080-1,100	L	WC,WL
7N/12W-27H7	344003118074803	DK8-PZ3	2,449	PIEZ	1992	1120	2	724	684-704	U	WL
7N/12W -27P5	343943118081701	5L-PZ1	2,462.70	PIEZ	1998	918	2	910	890-910	L	WL
7N/12W -27P6	343943118081702	5L-PZ2	2,462.70	PIEZ	1998	918	2	560	540-560	U	WL
7N/12W -27P7	343943118081703	5L-PZ3	2,462.70	PIEZ	1998	918	2	460	440-460	U	WL
7N/12W -27P8	343943118081704	5L-PZ4	2,462.70	PIEZ	1998	918	2	390	330-370	U	WL

* Proposed ASR wells

USGS site identification number: The unique number for each site is based on the latitude and longitude of the site, which is referenced to the North American Datum of 1927 (NAD27). First six digits are latitude , next seven digits are longitude, and final two digits are a sequence number to uniquely identify each site. Altitude of land surface in feet above sea level. Use of well: AB, abandoned; EXTM, extensometer; INDS, industrial supply; PIEZ, piezometer; PS, public supply. Depth drilled, casing depth, and screened (perforated) interval in feet below land surface. Screened (perforated) interval: depth of top and botton of well screen or perforations; screened or perforated throughout entire interval unless denoted by aserisk(*). The extensometers and piezometers were installed by the US geological Survey.

Aquifer zones: U, upper; L, lower; UNK, unknown. Type of data included in this report for each well: BP, barometric pressure; C, compaction; F, flow; WC, water chemistry; WL, water level. --, no data]

Table 7-3
Aquifer and Storage Recovery Project - Sampling Frequency

	Parameters	Units	Back-ground Ground water	SWP / Injection Water Frequency	Groundwater Frequency (During Storage & Extraction)
Weekly Injection Water Monitoring					
	Combined Chlorine Residual	mg/L	X	Weekly	Quarterly
	PH	Units	X	Weekly	Quarterly
	Total Dissolved Solids (TDS)	mg/L	X	Weekly	Quarterly
	Total Trihalomethane Compounds (THM)	ug/L	X	Weekly	Quarterly
	Trihalomethane Formation Potential (THMFP)	ug/L	X	Weekly	Quarterly
	Turbidity	NTU	X	Weekly	Semi-Annually
Flow Monitoring					
	Average flow rate	Gal/min	X	Continuous	Continuous
	Cumulative flow	Gallons	X	Continuous	Continuous
	Injection / Extraction Flow	Gal/min/day	X	Continuous	Continuous
General Minerals					
	Alkalinity (as CaCO3)	mg/L	X	Semi-Annually	Semi-Annually
	Specific Conductance	umhos/cm	X	Semi-Annually	Semi-Annually
	Sulfate (SO4)	mg/L	X	Semi-Annually	Semi-Annually
	Chloride (Cl)	mg/L	X	Semi-Annually	Semi-Annually
	Calcium (Ca)	mg/L	X	Semi-Annually	Semi-Annually
	Magnesium (Mg)	mg/L	X	Semi-Annually	Semi-Annually
	Sodium (Na)	mg/L	X	Semi-Annually	Semi-Annually
	Potassium (K)	mg/L	X	Semi-Annually	Semi-Annually
	Bicarbonate (HCO3)	mg/L	X	Semi-Annually	Semi-Annually
	Hardness (as CaCO3)	mg/L	X	Semi-Annually	Semi-Annually
	Fluoride (F)	mg/L	X	Semi-Annually	Semi-Annually
	Nitrate (as NO3)	mg/L	X	Semi-Annually	Semi-Annually
	Nitrite (N)	mg/L	X	Semi-Annually	Semi-Annually
	Iron (Fe)	mg/L	X	Semi-Annually	Semi-Annually
	Manganese (Mn)	mg/L	X	Semi-Annually	Semi-Annually
	Total Dissolved Solids (TDS)	mg/L	X	Weekly	Quarterly
Total Metals					
	Aluminum (Al)	mg/L	X	Semi-Annually	Semi-Annually
	Antimony (Sb)	mg/L	X	Semi-Annually	Semi-Annually
	Arsenic (As)	mg/L	X	Semi-Annually	Semi-Annually
	Barium (Ba)	mg/L	X	Semi-Annually	Semi-Annually

	Parameters	Units	Back-ground Ground water	SWP / Injection Water Frequency	Groundwater Frequency (During Storage & Extraction)
	Beryllium (Be)	mg/L	X	Semi-Annually	Semi-Annually
	Boron (B)	mg/L	X	Semi-Annually	Semi-Annually
	Cadmium (Cd)	mg/L	X	Semi-Annually	Semi-Annually
	Total Chromium (Cr)	mg/L	X	Semi-Annually	Semi-Annually
	Hexavalent Chromium (Cr VI)	mg/L	X	Semi-Annually	Semi-Annually
	Copper (Cu)	mg/L	X	Semi-Annually	Semi-Annually
	Lead (Pb)	mg/L	X	Semi-Annually	Semi-Annually
	Mercury (Hg)	mg/L	X	Semi-Annually	Semi-Annually
	Nickel (Ni)	mg/L	X	Semi-Annually	Semi-Annually
	Selenium (Se)	mg/L	X	Semi-Annually	Semi-Annually
	Thallium (Th)	mg/L	X	Semi-Annually	Semi-Annually
	Zinc (Zn)	mg/L	X	Semi-Annually	Semi-Annually
General Physical Parameters					
	Apparent Color	units	X	Semi-Annually	Semi-Annually
	Methylene Blue Active Substances (MBAS)	mg/L	X	Semi-Annually	Semi-Annually
	Odor	units	X	Semi-Annually	Semi-Annually
	PH	units	X	Weekly	Quarterly
	Temperature	degrees C^0	X	Semi-Annually	Semi-Annually
	Turbidity	NTU	X	Weekly	Semi-Annually
Other Constituents					
	Coliform	mpn/100ml	X	Semi-Annually	Semi-Annually
	Combined Chlorine Residual	mg/L	X	Weekly	Quarterly
	Total Organic Carbon	mg/L	X	Semi-Annually	Quarterly
	Trihalomethane Formation Potential (THMFP)	ug/L	X	Weekly	Quarterly
	Total Trihalomethane Compounds (THM)	mg/L	X	Weekly	Quarterly
Aquifer Characteristics					
	Depth of Ground Water	feet bgs	X		Annually
	Direction of water gradient	degrees	X		Annually
	Electrical Conductivity	microumhos/cm	X		Annually
	Slope of Grade of water table	ft/mile	X		Annually
	Static H_2O level	ft above msl	X		Annually

Groundwater Extraction Water Quality Monitoring

In order to document potential groundwater quality changes in the aquifer due to injection and extraction operations, sampling and analysis shall be performed on groundwater collected at monitoring sites established by the District. Monitoring wells were selected so that this monitoring plan successfully confines the injected water to the depression area (see **Figure 7-1**).

Tables 7-3 and **7-1** presents the complete list of constituents and parameters that shall be monitored, and the respective MCL.

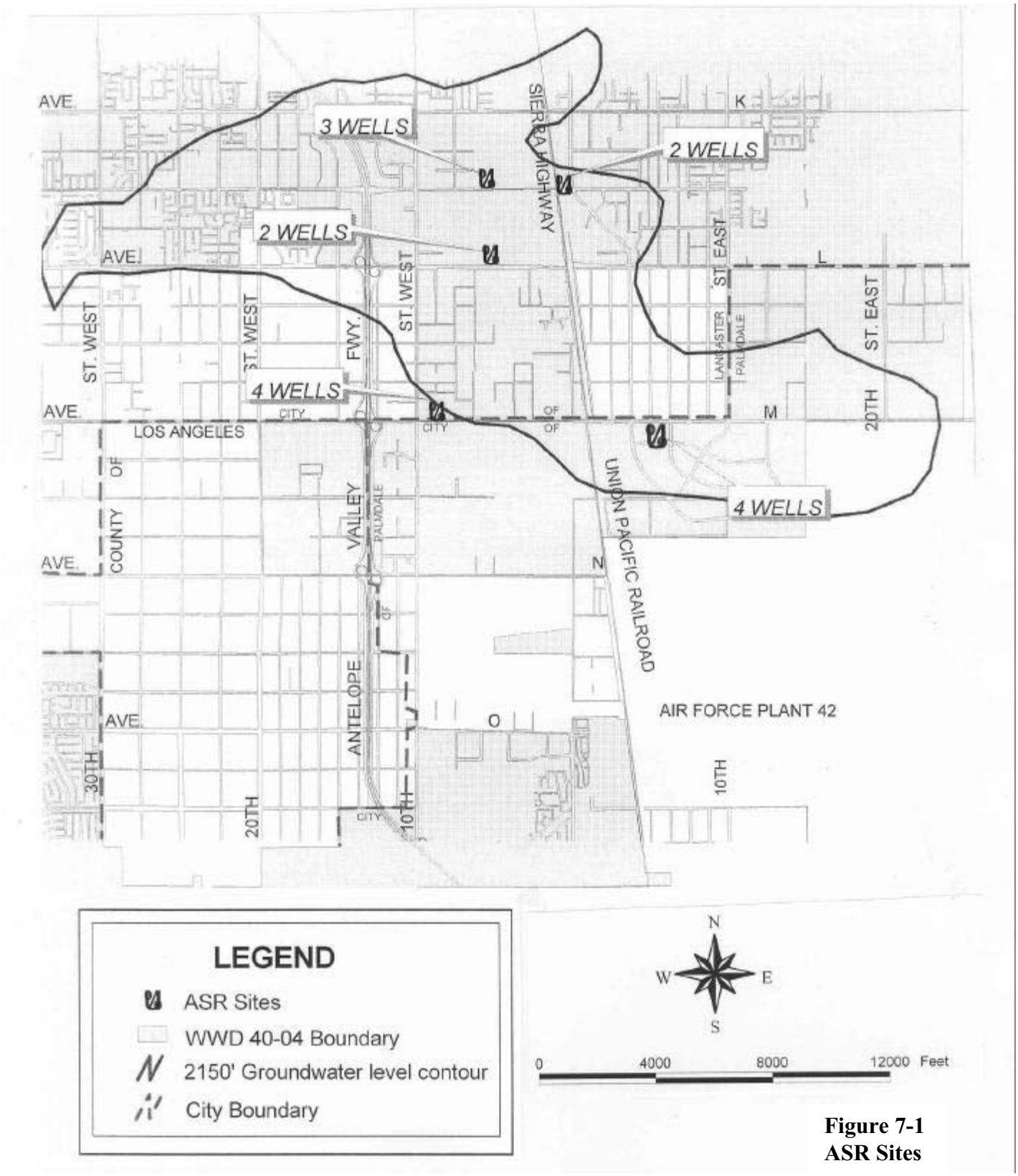

Figure 7-1
ASR Sites

Reporting Program

The District shall maintain water quality data and make it available to the RWQCB upon request. The monitoring and project operating data that the District shall maintain, include all above mentioned water quality data and Chain-of-custody (COC) forms with pertinent field information for water quality sampling and analysis done (see **Figure 7-2)**.

The District shall also identify and report problems related to well sampling including temporary lack of access to well(s), inoperable or malfunctioning purging and sampling equipment, and unsafe working conditions.

Field Water Quality Sampling Methods And Procedures

Sample Containers

The Lab shall prepare appropriately selected containers with both preservative and container type in accordance with the requirements presented in **Table 7-4**. Extra containers of each type shall be provided in the event of breakage or loss. Each container shall have a pre-printed identification label clearly showing the group or type of analysis to be performed. The Lab shall assign a laboratory sample number upon receiving the sample for proper identification and tracking.

Table 7-4
Field Sampling Methods and Procedures

Constituent	Analytical Testing Method	California DLR (mg/L, unless specified)	Maximum Holding Time	Sample Container Bottle Type	Sample Container Size Set	Preservation
General Parameters						
pH	EPA 150.1	0*	Immediate	plastic	250 mL	None Required
specific conductance	SM 2510-b	0*	28 days	plastic or glass	250mL	Cool to 4 ^{0}C, measure 25 ^{0}C
turbidity	EPA 180.1	0*	48 hours	glass	500mL	Cool to 4 ^{0}C
combined chlorine residual	SM 4500-CL-G	0*	Immediate	amber glass	250mL	Cool to 4 ^{0}C
temperature		0*				None Required
color	SM 2120-b	0*	48 hours	glass	500mL	Cool to 4 ^{0}C
odor	EPA 140.1	0*	24 days	glass or plastic	500mL	Cool to 4 ^{0}C
dissolved solids	SM 2450-c	0.004	7 days	plastic	250mL	Cool to 4 ^{0}C
Major Minerals						
sulfate (SO_4)	EPA 300.0	500	28 days	plastic or glass	250mL	Cool to 4 ^{0}C
chloride (Cl)	EPA 300.0	0*	28 days	plastic or glass	250mL	Cool to 4 ^{0}C

Constituent	Analytical Testing Method	California DLR (mg/L, unless specified)	Maximum Holding Time	Sample Container Bottle Type	Sample Container Size Set	Preservation
calcium (Ca)	SM 3500-Ca D	0*	6 months	plastic	1 Liter	HNO_3, cool to 4 ^{0}C
magnesium (Mg)	SM 3500-Mg E	0.0005	6 months	plastic	1 Liter	HNO_3, cool to 4 ^{0}C
sodium (Na)	SM 3500-Na D	0*	6 months	plastic	1 Liter	HNO_3, cool to 4 ^{0}C
potassium (K)	SM 3500-K D	0*	6 months	plastic	1 Liter	Cool to 4 ^{0}C
bicarbonate (HCO_3)	SM 2320-E	0*	14 days	plastic or glass	250mL	Cool to 4 ^{0}C
hardness (as $CaCO_3$)	SM 2340-C	0*	6 months	plastic or glass	250mL	Cool to 4 ^{0}C
alkalinity (as CaCO3)	SM 2320-B	0*	14 days	plastic or glass	250mL	Cool to 4 ^{0}C
fluoride (F)	EPA 300.0	0.1	28 days	plastic or glass	250mL	Cool to 4 ^{0}C
nitrate (as NO_3)	EPA 300.0	2	48 hours	plastic or glass	250mL	Cool to 4 ^{0}C
Nitrite (N)	EPA 300.0	0.4	48 hours	plastic or glass	250mL	Cool to 4 ^{0}C
Iron	EPA 200.7	0.1	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
Manganese	EPA 200.7	0.02	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
Total Metals						
aluminum	EPA 200.7	0.05	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
antimony	SM 3113-B	0.006	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
arsenic	SM 3113-B	0.002	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
barium	EPA 200.7	0.1	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
beryllium	SM 3113-B	0.001	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
boron	EPA 200.8	**	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
cadmium	SM 3113-B	0.001	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
total chromium	SM 3113-B	0.01	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
hexavalet chromium	EPA 218.6	0.001	24 hours	plastic	500mL	Cool to 4 ^{0}C
copper	EPA 200.7	0.05	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
lead	SM 3113-B	0.005	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
silver	SM 3113-B	0.01	6 months	Dark Plastic	500mL	HNO_3, cool to 4 ^{0}C, store in the dark
mercury	EPA 245.1	0.001	28 days	plastic	500mL	HNO_3, cool to 4 ^{0}C
nickel	SM 3113-B	0.01	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
selenium	SM 3113-B	0.005	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
thallium	EPA 200.9	0.001	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
zinc	EPA 200.8	0.05	6 months	plastic	500mL	HNO_3, cool to 4 ^{0}C
TOC	SM 5310-B	0.001	28 days	glass w/Teflon cap	40mL	HNO_3, cool to 4 ^{0}C

Constituent	Analytical Testing Method	California DLR (mg/L, unless specified)	Maximum Holding Time	Sample Container Bottle Type	Sample Container Size Set	Preservation
trihalomethane formation potential	EPA 510.1	0*	7 days	amber glass	250mL	Cool to 4 ^{0}C
total trihalomethane compounds	EPA 524.2	0*	14 days	glass w/Teflon cap	2x40 mL	Sodium thiosulfate, per method, cool to 4 ^{0}C
total coliform	SM 9221-B	0*	30 hours	sterile polyethlene	1 Liter	Cool to 4 ^{0}C
MBAS	SM 5540-C	0.0005	48 hours	plastic	250 mL	Cool to 4 ^{0}C

Sample containers shall be laboratory cleaned prior to use based in the analyte of interest in accordance with standard United States Environmental Protection Agency (USEPA) protocol. Sample containers shall be stored in a fashion that prevents dust or other contaminant accumulations. The Lab shall be responsible for verifying the cleanliness and integrity of the sample containers prior to shipment to the District pursuant to their sample container quality control (QC) procedures.

Well and Sample Line Purging

Prior to sampling, each well shall, to the extent possible, be pumped by the District for a sufficient period of time to evacuate any standing water in the well, ensure movement of "fresh" groundwater in the well and ensure pH, specific conductance, and temperature stabilization.

Water discharge from the production wells shall be conveyed directly to waste. The sample line flow shall remain constant and continuous during sample collection to minimize the potential for particulate matter becoming dislodged in the discharge pipe and entering sample container(s).

Sample Collection and Preparation

The District shall contact the Lab and arrange to have ice chests of prepared sample bottles delivered to the appropriate location requested by the District at least one week prior to the sampling event. Upon receipt of the sample bottles, designated District sampling personnel shall make an inventory of the bottles received to assure that adequate number and types of sample bottles required for the upcoming sampling event have been provided.

Prior to each sampling event the designated District personnel shall inventory, restock, replace, clean, calibrate, maintain, and test water quality monitoring equipment as needed. Sampling equipment shall include portable specific conductance meter, pH meter, residual chlorine test kit and thermometer, including pH buffer solutions and

specific conductance calibration solutions. At a minimum, the frequency and nature of equipment maintenance shall be consistent with the manufacturer's recommendations.

Total Organic Carbon samples shall be collected with as little aeration as possible to ensure that no air bubbles are incorporated into the sample containers after they are capped. If air bubbles are observed in a sample container, re-sampling shall be performed.

Sample Preservation

Designated sampling personnel shall use "clean sampling techniques" to minimize potential contamination of water samples. Sample containers and lids shall not touch the ground, the sampling personnel's clothing, or any other potential source of contamination. Sample container lids shall not be removed from a particular container until that container is to be filled. Sampling containers shall be rinsed three times with the sample prior to collection unless the container contains a preservative. The sample container shall be filled to the top of the rim to minimize air space between the liquid level and the lid. The container lid shall also be rinsed with the sample before use. The lid shall be tightened securely to the container immediately after sample collection is completed.

Chemical preservatives and refrigeration shall be used to maintain sample integrity prior to analysis. After sample collection, water samples shall be stored in insulated coolers or ice chests at a temperature of 4 ^{0}C, or 39 ^{0}F, until delivery to the Lab. Samples to be analyzed for total metals shall be filtered using a 0.45-micron filter then acidified with nitric acid by the Lab immediately on arrival.

Designated sampling personnel shall exercise extreme care at all times during the handling of acid-preserved sample containers to minimize spillage, damage and/or injury to the sampler(s) or the field equipment. In addition to nitrile sampling gloves, the designated sampling personnel shall wear safety glasses or goggles to minimize potential eye injury.

Water Quality Sample Record Keeping

All sample containers shall be pre-labeled, to the extent possible, prior to each sampling event to facilitate sampling activities. Sample containers provided by the Lab shall contain waterproof labels and pre-marked information such as analyte and laboratory identification number. To the extent possible, the designated Lab / District sampling personnel shall inscribe the well identification and sampler(s) name or initials on the labels under dry conditions using a waterproof marker pen prior to each sampling event. Immediately prior to collection of water samples, the designated District sampling personnel shall inscribe on the sample bottle label the date and time of sample collection and the name of any preservatives used with a waterproof marker pen. The designated District sampling personnel shall maintain a record showing:

- Site name and/or well number
- Name(s) of sampling personnel
- Measured depth to groundwater
- Discharge rate [in gallons per minute (gpm)]
- Number of minutes of well purging
- Field measurements of pH, specific conductance, residual chlorine and temperature
- Date and time(s) of sample collection
- Weather conditions
- Other significant field or sampling conditions

In addition, a COC form indicating the well name(s) or well number, sampler's name, date and time sampled, any special observations, and laboratory sample number shall be filled out by the designated sampling personnel and placed in a sealed plastic bag (e.g., Ziplocs) with the sample(s) in the ice chest to provide a COC record. A sample COC form is presented as **Figure 7-2**. The lab shall submit the completed COC record to the designated District sampling personnel upon delivery of the sample(s) to the lab.

Sample Results

The Lab shall use a standard reporting form for all water sources listing date(s) of analysis, name(s) of person who analyzed the samples, USEPA analytical method(s) used, name of analytical method used, name of parameter analyzed, detection limit and result of the analysis. Any analytical result less than detectable shall be reported as less than the method detection limit.

The Lab shall submit paper or electronic copies of laboratory results and written reports to the Water Quality Senior Civil Engineer. Unusual spikes, questionable results, or detection of chemicals not on the list of required constituents shall be promptly reported to the designated District sampling personnel. Nitrate analytical results shall be reported as mg/L as NO_3. Hardness and alkalinity shall be reported as mg/L as $CaCO_3$. The Lab shall maintain records for at least three years from the date the analytical reports were submitted to the designated sampling personnel made showing the calibration of equipment used in the various analyses.

See Final REIR, section 5.2.5, p. 5-30 to 5-38.

County of Los Angeles
Agricultural Commissioner/Weights & Measures
ENVIRONMENTAL TOXICOLOGY BUREAU
11012 Garfield Avenue, Bldg. B, South Gate, Ca. 90280
Phone # (562) 940-6778 Fax # (562) 940-6785

CHAIN-OF-CUSTODY RECORD

PROJECT NAME:
COMPANY NAME:
ADDRESS:
SAMPLERS (SIGNATURE)

Sample ID	DATE	TIME	LOCATION	METHODS										Temp. °C	pH	# of bottles	Preservatives	Lab Number

1 RELINQUISHED BY	DATE	2 RECEIVED BY	DATE	REMARKS	SAMPLE CONDITIONS
SIGNATURE		SIGNATURE			
PRINTED NAME	TIME	PRINTED NAME	TIME		RECEIVED ON ICE YES/NO
COMPANY		COMPANY			SEALED YES/NO
PRINTED NAME	TIME	PRINTED NAME	TIME		
COMPANY		COMPANY			

Figure 7-2

GW-5 The District shall maintain THM levels in stored water below the MCL, thus not negatively affecting the District's or any other purveyor's ability to pump and serve groundwater from the regional aquifer for beneficial uses as described in Water Quality Control Plan for the Lahontan Region. The District shall achieve this through the reduction of free chlorine and/or organic compounds by implementing best practicable treatment or control methods.

See Final REIR, section 5.2.5, p. 5-39.

With Mitigation the Effects are Found to be:

(X) Significant ( ) Not Significant

Finding(s) per *State CEQA Guidelines* Section 15091:

( ) Changes or alterations have been required in, or incorporated into, the project which avoid or substantially lessen the significant environmental effect. (Subd. [a][1].)

( ) Such changes or alterations are within the responsibility and jurisdiction of another public agency and not the agency making the finding. Such changes have been adopted by such other agency or can and should be adopted by such other agency. (Subd. [a][2].)

(X) Specific economic, legal, social, technological, or other considerations, including provision of employment opportunities for highly trained workers, make infeasible the mitigation measures or project alternatives identified in the final EIR. (Subd. [a][3].)

Rationale: Introduction of THMs by the proposed ASR Project will not lead to a violation of any drinking water standards, and will thus not negatively affect the District's or any other purveyor's ability to pump and serve groundwater from the regional aquifer for domestic use. The introduction of THMs into the groundwater would violate the RWQCB's Anti-Degradation Policy (Resolution 68-16) maintaining Groundwater Beneficial Uses for the Antelope Valley Basin. The introduction of any THMs into the groundwater would be a violation of the Anti-Degradation Policy.

Implementation of the mitigation measures presented here will reduce groundwater impacts to the maximum extent feasible. Nonetheless, groundwater impacts will remain significant and adverse as a result of implementing the ASR Project and injecting SWP water that contains THMs; therefore, a statement of overriding considerations is required (refer to Section 10). As a result, the cumulative impacts of the project are also significant.

7.3 Public Services

7.3.1 Less Than Significant Effects

Sheriff's Department

Implementation of the proposed ASR project would not result in a significant impact to law enforcement services because they would not create a need for additional staffing, equipment, or facilities.

See Final REIR, section 5.3.3, p. 5-41.

Fire Department

Implementation of the proposed ASR project would not result in a significant impact to fire services because they would not create a need for additional staffing, equipment, or facilities.

See Final REIR, section 5.3.3, p. 5-41.

Cumulative Impacts

Due to the nature of the proposed project (the construction and operation of injection/extraction facilities for an ASR project within the Lancaster Subbasin in Antelope Valley) no closely related past, present, and/or reasonably foreseeable probable future projects which would involve foreseeable impacts to public services have been identified that could result in cumulative impacts when combined with the proposed project. Therefore, the incremental effects of the proposed project on public services are not cumulatively considerable.

7.3.1 Significant Effect

The environmental analysis for Public Services did not identify any significant adverse impacts for this category, including cumulative adverse impacts.

See Final REIR, section 5.3.5, p. 5-42.

7.4 Energy Conservation

7.4.1 Less Than Significant Effects

The electrical power demand of the equipment that run the motors (etc.) that operate the injection/extraction well pumps and other operational equipment on the five sites would not utilize a significant amount of electrical power.

See Final REIR, section 5.4.3, p. 5-44.

Cumulative Impacts

Due to the nature of the proposed project (the construction and operation of injection/extraction facilities for an ASR project within the Lancaster Subbasin in Antelope Valley) no closely related past, present, and/or reasonably foreseeable probable future projects which would involve foreseeable impacts to energy resources have been identified that could result in cumulative

impacts when combined with the proposed project. Therefore, the incremental effects of the proposed project on energy resources are not cumulatively considerable.

7.4.2 Significant Effect

The environmental analysis for Energy Conservation did not identify any significant adverse impacts for this category, including cumulative adverse impacts

See Final REIR, section 5.4.6, p. 5-44.

8.0 FEASIBILITY OF PROJECT ALTERNATIVES

Because the proposed project will potentially cause unavoidable, significant environmental effects, as stated above in subsection 7.2.2, the District must consider the feasibility of any environmentally superior alternatives to the project. The District must evaluate whether one or more of these alternatives could avoid or substantially lessen the project's unavoidable significant environmental effects. (*Citizens for Quality Growth v. City of Mount Shasta* (1988) 198 Cal.App.3d 433, 443-445 [243 Cal.Rptr. 727]; see also Public Resources Code, § 21002.)

The Draft REIR examined a reasonable range of alternatives to the proposed project to determine whether any of these alternatives could meet the project's objectives, while avoiding or substantially lessening the one significant, unavoidable impact (Draft REIR, Section 7.0).

To comply with CEQA and the *State CEQA Guidelines*, the following alternatives were examined:

- No Project Alternative
- Spreading Grounds/Infiltration

These findings examine the two project alternatives to the extent they lessen or avoid the project's significant environmental effects and to the extent they could meet most of the basic project objectives.

Neither of the two alternatives could meet the project's objectives and avoid or substantially lessen significant, unavoidable impacts.

8.1 No Project Alternative

The "No Project" alternative would maintain the existing environmental conditions within the Lancaster subbasin. No Project would result in adverse impacts in the environment by allowing water levels to continue to decline, which would perpetuate the overdraft condition within the Lancaster subbasin.

Under the No Project alternative, the District would continue to operate the water delivery system in its current manner. Implementation of the No Project alternative would result in the

continued exposure of the County's service area to potential water delivery interruption or curtailment associated with a number of scenarios. Foremost among these is the complete interruption or curtailment of SWP water due to seismic activity affecting the Delta system or the California Aqueduct. Another scenario is drought conditions that would exhaust storage supplies due to reduced available water from the State Water Project.

In conclusion, the No project alternative would result in the continued utilization and depletion of local groundwater resources. Overall, the detrimental effects to the environment and potential curtailment of service to district customers occurring as a result of the No Project alternative would far outweigh any adverse effects of the proposed ASR Project.

The No Project alternative would not meet any of the objectives of the proposed project. Below is each of the ASR project objectives and benefits. Following each objective is an analysis of how the No Project alternative would or would not meet the particular objective.

1. **Enhance the reliability of water supply in the Antelope Valley by storing SWP water in a manner that is cost effective and easily accessible for use by the District during high demand times.** The development of the additional local storage facilities will provide a greater measure of water supply reliability in the event of emergencies and drought periods. The development of the additional storage using seasonally available water supplies can be utilized to either augment imported supplies or to meet total demand during outages of SWP facilities.

2. **Increase level of conjunctive use in a cost-effective manner by storing SWP water in the Lancaster subbasin that can be extracted during periods when demand exceeds regular supply**. Conjunctive use of the subbasin would further improve the overall reliability of the District system by augmenting water supplies during peak demand periods.

3. **Provide greater operational flexibility by increasing local storage and allowing the District to better maintain its entire system.** Increase in local storage would provide greater water system flexibility in that key system components could be placed out of service for inspection and maintenance activities without interruption in water service.

In conclusion, the No Project Alternative, although not introducing THMs into the aquifer, has several significant environmental and District impacts. Therefore the proposed project is considered to be superior to the No Project alternative.

See Final REIR, section 7.4, pp. 7-2 to 7-4.

8.2 Spreading Grounds/Infiltration

The utilization of spreading grounds for aquifer recharge presents alternative technology to the utilization of injection/extraction wells. Under this type of program recharge and storage would occur through the direct percolation of imported water supplies and stream discharge via

spreading basins. Subsequent extraction of supplies would require installation and utilization of groundwater extraction wells near the spreading basin.

The Spreading Grounds/Infiltration alternative would not meet the objectives of the proposed ASR project. Following is an analysis of how the Spreading Grounds/Infiltration alternative would or would not meet the particular objective.

1. **Enhance the reliability of water supply in the Antelope Valley by storing SWP water in a manner that is cost effective and easily accessible for use by the District during high demand times.** The development of the additional local storage facilities will provide a greater measure of water supply reliability in the event of emergencies and drought periods. The development of the additional storage using seasonally available water supplies can be utilized to either augment imported supplies or to meet total demand during outages of SWP facilities.

2. **Increase level of conjunctive use in a cost-effective manner by storing SWP water in the Lancaster subbasin that can be extracted during periods when demand exceeds regular supply**. Conjunctive use of the subbasin would further improve the overall reliability of the District system by augmenting water supplies during peak demand periods.

3. **Provide greater operational flexibility by increasing local storage and allowing the District to better maintain its entire system.** Increase in local storage would provide greater water system flexibility in that key system components could be placed out of service for inspection and maintenance activities without interruption in water service.

Implementation of spreading basins would have environmental concerns associated with installation and maintenance facilities. The acreage required may impact sensitive habitats. An introduction of a large body of water may change flight patterns or habits of migratory birds. Consequently, this may have a domino effect on the rest of the environment inhabitants. Operationally, spreading basins require periodic removal of soil layers to maintain adequate percolation rates. Potential noise, air quality, and traffic impacts would be associated with this periodic maintenance.

Further, use of spreading basins would require extensive investigations and an extensive monitoring network to track the recharge water. Extraction wells would have to be placed near the spreading grounds in areas where production capacity is limited or uncertain. Additional pipelines would have to be constructed to convey water to the spreading grounds and from the extraction wells.

In conclusion, the Spreading Ground Alternative, although not introducing THMs into the aquifer, has several environmental and operational constraints. Therefore, although the Spreading Grounds/Infiltration alternative project is environmentally superior to the proposed ASR project, it does not meet the necessary requirements to replace the proposed ASR project as the project to improve water supply reliability in the Antelope Valley to support the projected growth in population in the area.

See Final REIR, sections 7.5, 7.6, pp. 7-4 to 7-8.

9.0 GROWTH-INDUCING IMPACTS

The population of the Antelope Valley grew substantially over the years, particularly in the 1980's. Starting the decade with 107,000 residents, this part of the Los Angeles County had grown to over 240,000 by 1990. Most of the growth occurred in the central part of the Valley, within and around the cities of Lancaster and Palmdale (Los Angeles County Regional Planning, 1994).

In 1980 and 1990, the population of the City of Lancaster was 48,103 and 97,291, respectively. Currently with the largest percent growth in Los Angeles County, the City of Lancaster has a population of about 118,718 in 2000 (Southern California Association of Governments, Census Data), making it the largest city in the valley, followed closely by the City of Palmdale.

The population within the Districts service area has increased steadily over the past several years from about 108,00 persons in 1990 to about 128,000 persons in 2000. Population is expected to increase significantly over the next 20 years. The Districts Urban Water Management Plan estimates the population growth within the service area to be 362,300 by 2020.

Due to the population growth in the Antelope Valley, water demands are increasing. Concerns over the depletion of groundwater resources in the Lancaster area of the Antelope Valley have also increased in recent years because of rapid population growth and the resulting demand imposed on existing water supplies.

Pursuant to Section 15124(b) of the *State CEQA Guidelines* the following is the statement of objectives sought by the proposed project as discussed in Section 3.

1. **Enhance the reliability of water supply in the Antelope Valley by storing SWP water in a manner that is cost effective and easily accessible for use by the District during high demand times.** The development of the additional local storage facilities will provide a greater measure of water supply reliability in the event of emergencies and drought periods. The development of the additional storage using seasonally available water supplies can be utilized to either augment imported supplies or to meet total demand during outages of SWP facilities.

2. **Increase level of conjunctive use in a cost-effective manner by storing SWP water in the Lancaster subbasin that can be extracted during periods when demand exceeds regular supply**. Conjunctive use of the subbasin would further improve the overall reliability of the District system by augmenting water supplies during peak demand periods.

3. **Provide greater operational flexibility by increasing local storage and allowing the District to better maintain its entire system.** Increase in local storage would provide greater water system flexibility in that key system components could be placed out of service for inspection and maintenance activities without interruption in water service.

As analyzed in Section 3, a substantial water storage shortfall currently exists within the District service area, and will continue to occur based on projected water demand. The proposed project would provide additional storage to alleviate the existing and future shortfall.

The proposed project is considered to be growth accommodating because it would serve to meet existing and future water shortage requirements of already foreseen and planned growth within the Districts service area. The project would not alter the location or amount of planned growth in the service area that is allowed under adopted City and County General Plans, and is therefore not considered growth inducing. The Project would develop additional local storage facilities that will provide a greater measure of water supply reliability in the event of drought periods and emergencies, and increase the operational flexibility of the water system to serve planned growth. However, to the extent that the project may allow for additional service that could not have been provided without it, it may be considered indirectly growth-inducing.

10.0 STATEMENT OF OVERRIDING CONSIDERATIONS

When a project results in a significant unavoidable adverse effect, CEQA requires the decision-making body of the lead agency to balance the benefit of the project against its unavoidable adverse effects in determining whether to approve the project. If the lead agency approves a project with significant environmental effects, which cannot be mitigated to below a level of significance, CEQA requires the lead agency to state in writing the specific reasons to support its action based on the Final EIR and/or information in the record. This written statement is known as the Statement of Overriding Considerations (*State CEQA Guidelines*, Section 15093). The Statement of Overriding Considerations for the ASR Project is presented below.

The proposed ASR Project would have the following significant, unavoidable, adverse impact:

1. The ASR Project would introduce THMs to the groundwater within the Principal Aquifer of the Lancaster subbasin through the injection of SWP water.

The County has adopted all feasible mitigation measures (GW-2 through GW-5) with respect to the impact identified above. Although these mitigation measures may lessen the impact, they would not reduce the potential impact to a level that is less than significant as a result of injecting SWP water into the Principal Aquifer of the Lancaster subbasin. The County has rejected as infeasible the mitigation measure regarding granular activated carbon filtering of the water prior to injection. Moreover, the County has examined a reasonable range of alternatives to the ASR Project. Based on this examination, the County has determined that none of the alternatives are feasible because the alternatives are clearly not environmentally preferable to the proposed ASR Project or do not meet most of the basic project objectives.

The County finds that as a result of implementing the proposed ASR Project, the District and the Lancaster subbasin would benefit from the following substantial environmental benefits:

1. The proposed project would enhance the reliability of water supply in the Antelope Valley and would help support current demand and future growth in the area.

2. The proposed project would increase the level of conjunctive use, which would improve the overall reliability of the District system by augmenting water supplies during peak demand periods.

3. The proposed project would provide greater operational flexibility, which would allow for key system components to be placed out of service for inspection and maintenance activities without interruption in water service.

4. The proposed project would avoid or reduce overdraft of the basin.

5. The proposed project would halt the decline of groundwater levels, and thereby reduce energy consumption required for pumping lifts.

6. The proposed project would reduce potential subsidence problems.

7. The "No project" alternative would perpetuate the depletion of local groundwater resources resulting in the detrimental environmental effects and potential curtailment of service to district customers. Negative impacts of the "No Project" alternative would far outweigh any adverse effects of the proposed ASR Project.

8. The Spreading Ground Alternative has several environmental and operational constraints. This alternative would have environmental concerns associated with:

   - Construction - Installation of delivery infrastructure and spreading facilities.
   - Land use - The acreage required may impact sensitive habitats.
   - Biological resources - An introduction of a large body of water may change flight patterns or habits of migratory birds. Consequently, this may have a domino effect on the rest of the environment inhabitants.
   - Operational - Spreading basins require periodic removal of soil layers to maintain adequate percolation rates. Potential noise, air quality, and traffic impacts would be associated with this periodic maintenance.

For the foregoing reasons, the County finds that the ASR Project's benefits outweigh, and therefore override, the Project's one unavoidable adverse environmental effect.

11.0 ACRONYMS AND DEFINITIONS

AF	acre-feet
ASR	Aquifer Storage and Recovery
AVEK	Antelope Valley East Kern Water Agency
CEQA	California Environmental Quality Act
County	County of Los Angeles Department of Public Works Waterworks and Sewer Maintenance Division

District	County of Los Angeles Department of Public Works Waterworks District No. 40
District 40	County of Los Angeles Department of Public Works Waterworks District No. 40
EIR	Environmental Impact Report
REIR	Recirculated Environmental Impact Report
Final REIR	Final Recirculated Environmental Impact Report
MCLs	Maximum Contaminant Levels
NOP	Notice of Preparation
RWQCB	Regional Water Quality Control Board
SWP	State Water Project
THMs	trihalomethanes
USGS	United States Geological Survey