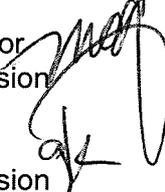
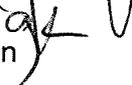


AGENDA ITEM NO.	1B
COUNCIL MEETING	03/07/13
APPROVED BY	
	
DEPARTMENT DIRECTOR	
	
CITY MANAGER	

March 7, 2013

FROM: PATRICK N. WIEMILLER, Director
Department of Public Utilities

THROUGH: MARTIN A. QUERIN, PE, Assistant Director
Department of Public Utilities – Water Division 

BY: GLENN A. KNAPP, Professional Engineer
Department of Public Utilities – Water Division 

SUBJECT: APPROVE THE FIRST AMENDMENT TO AGREEMENT WITH MWH AMERICA'S INC. INCREASING THE CONTRACT AMOUNT BY \$30,000 FOR A TOTAL CONTRACT AMOUNT OF \$324,016 FOR AQUIFER STORAGE AND RECOVERY AND GROUNDWATER BANKING FEASIBILITY STUDIES AND EXTEND THE PROJECT COMPLETION DATE TO JUNE 30, 2013 AND AUTHORIZE THE DIRECTOR OF PUBLIC UTILITIES OR HIS DESIGNEE TO SIGN THE AMENDMENT ON BEHALF OF THE CITY (CITYWIDE)

RECOMMENDATIONS

Staff recommends that City Council:

1. Approve the First Amendment to Agreement with MWH Americas Inc., increasing the contract amount by \$30,000 for a total contract amount of \$324,016 for Aquifer Storage and Recovery and Groundwater Banking Feasibility Studies (Studies), and
2. Approve extension of the project completion date to June 30, 2013, and
3. Authorize the Director of Public Utilities or his designee to sign the Amendment on behalf of the City.

EXECUTIVE SUMMARY

The City of Fresno (City) entered into Agreement with MWH Americas, Inc., (MWH) on April 30, 2012 to provide professional consultant services for Aquifer Storage and Recovery (ASR) and Groundwater Banking Feasibility Studies. Since that time, expansion of the study area has been found to be necessary in meeting project intent and development of existing and potential regional water resource opportunities. To perform these additional studies, Consultant's total fee for services rendered will be revised from a total fee of \$294,016 plus a contingency not to exceed \$30,000, to a total fee of \$324,016 plus a contingency amount not to exceed \$30,000. To complete these additional services, staff also requests the project completion date be extended to June 30, 2013. The professional services provided under this Agreement and Amendment investigates the feasibility and potential application of ASR and Groundwater Banking technologies, and provides the framework in meeting the City's water management goals to ensure a reliable and sustainable water supply.

REPORT TO THE CITY COUNCIL

Approve First Amendment to Agreement - ASR/Groundwater Banking Feasibility Studies

March 7, 2013

Page 2

BACKGROUND

The City of Fresno overlies the Kings Subbasin of the greater San Joaquin Valley Groundwater Basin (SJV Basin), from where it pumps groundwater. The City of Fresno currently owns, operates, and maintains approximately 275 water production wells and a 30-million gallon per day (30MGD) Surface Water Treatment Facility (SWTF) to provide service to a population of over 500,000 people. Water resources within this groundwater basin are limited, and currently in a state of overdraft as evidenced by falling groundwater levels and the formation of a cone of depression beneath the City. The operation of the City's SWTF and promotion of its intentional groundwater recharge program, have been the first steps towards relieving the overburdening strain that has been placed on the aquifer.

In combination with expansion of the City's groundwater recharge program, water use and storage methodologies such as ASR and/or groundwater banking will help facilitate aquifer recovery timelines in meeting the City's water management plan goals. These feasibility studies will investigate the potential applicability of incorporating ASR and groundwater banking technologies into the City's water management portfolio by evaluating appropriate regulatory requirements, existing hydrogeologic conditions, and groundwater recharge operations. These technologies also maintain significant potential for overall water supply reliability during dry years and peak day demands.

In brief summary of these technologies, ASR is the process where available potable water is injected by well into a suitable aquifer for storage, then recovered at the same facility through pumping water out of the aquifer during times of need. Groundwater banking is the process of percolating available surface water into the aquifer via spreading basin or pond, storing the water in the aquifer for a period of time, then extracting the water by groundwater well for delivery.

Through initial work performed by the consultant to date, it has been determined that expansion of the project study area (see Amendment, 'Exhibit A', Project Study Area Map) will provide additional benefit to the City as related to potential 'partnering', and the use and application of these technologies to meet water management plan goals.

The First Amendment to Agreement has been 'approved as to form' by the City Attorney's Office.

Council approval and completion of this project is an important initial step in meeting the City's Metropolitan Water Resources, and Urban Water Management Plan goals, achieving a balanced groundwater condition, and ensuring a sustainable and viable water supply is available for existing and future users.

FISCAL IMPACT

This project is funded in the FY2012 CIP Budget through the Water Enterprise Fund (Project ID # WC00068, Fund #40101). It will have no impact to the City's General Fund.

Attachment:

- First Amendment to Agreement

FIRST AMENDMENT TO AGREEMENT

THIS FIRST AMENDMENT of the agreement between MWH Americas, INC., a California corporation (MWH), and the CITY OF FRESNO, a municipal corporation (CITY) is effective as of the 15th day of February, 2013 ("Amendment").

WHEREAS, City and MWH entered into a professional consultant services Agreement, dated April 30, 2012, ("Agreement") for Aquifer Storage and Recovery (ASR) and Groundwater Banking Feasibility Studies ("Project"); and

WHEREAS, current professional consultant workloads associated with the original scope of services need to be modified and expanded to satisfy Project intent; and

WHEREAS, CITY now desires to modify the consultant's scope of work, compensation, and project completion timelines to meet such Project intent.

The parties therefore agree as follows:

1. Section 2, "Term of Agreement and Time for Performance" of the Agreement shall be replaced in its entirety with the following:

This Agreement shall be effective from April 30, 2012, and shall continue in full force and effect through the earlier of complete rendition of services hereunder or June 30, 2013 subject to any earlier termination in accordance with this Agreement.

Work shall be undertaken and completed in a sequence assuring expeditious completion, but in any event, all such services shall be completed within 402 consecutive calendar days from consultant's authorization to proceed dated May 24, 2012.

2. Section 3(a), "Compensation" amount shall be revised from a total fee of \$294,016 plus a contingency not to exceed \$30,000 to a total fee of \$324,016 PLUS contingency amount not to exceed \$30,000.

3. Exhibit A – SCOPE OF SERVICES to the Agreement shall be replaced in its entirety with the following:

"Exhibit A - Revised SCOPE OF SERVICES" which is attached hereto and incorporated herein.

Exhibit A

Revised SCOPE OF SERVICES

Amendment 1

Consultant Service Agreement between the City of Fresno ("City")

and MWH Americas Inc. ("Consultant")

Aquifer Storage and Recovery (ASR) and Groundwater Banking Feasibility Studies

Introduction

The City of Fresno's Metro Plan Update identified the need for additional water supply in the future. This project is being undertaken to identify possible methods to maximize the use of existing supplies and to develop additional water supplies for the City, primarily through the means of water banking. This project has been divided into four phases. The intent of Phase 1 is twofold:

- To make a rapid assessment of recharge technologies and groundwater banking opportunities for the City of Fresno using its existing supplies. This will include identifying locations that may be more conducive to the application of one or more particular recharge technology.
- To identify potential additional water supplies and water banking opportunities outside of the City's current water portfolio that the City could pursue.

Future phases will conduct focused investigations based on the results of Phase 1. Future phases have not been defined but are expected to consist of the following:

- Detailed feasibility investigations of specific water supply, recharge and banking opportunities
- Field testing of promising recharge technologies
- Implementation of preferred recharge and banking projects

Definition of Terms

The following terms are used in this scope of work:

- **Aquifer Storage and Recovery (ASR):** Technique for recharging and recovering water using a multi-purpose injection-extraction well.
- **Groundwater Banking:** Technique for increasing water supply reliability by intentionally storing water in groundwater basin(s) during wet/surplus years for recovery and use in dry/deficit years. Could be accomplished either within the Kings Subbasin or within the greater San Joaquin Valley via water exchanges. Uses
- **Groundwater Recharge:** Technique to replenish annual groundwater pumping that may use a variety of recharge techniques.

City of Fresno Groundwater Recharge /Banking Project
Amendment 1

- Groundwater Recovery: Recovery of water stored underground through extraction wells.
- Planning Period: Analytical period for evaluation of future water supply, recharge and banking needs. The planning period will be the 2060 planning horizon as described in Phase 1 of the Metro Plan Update.
- Recharge Techniques: Methods of replenishing water in the groundwater basin. Can be either direct via spreading basins or injection wells (vadose or deep), or indirect (in-lieu) via groundwater pumping reductions.
- Study Area: The study area consists of three levels: 1) The study area shown on the attached map for hydrogeologic investigation of recharge via surface spreading, 2) The study area for Aquifer Storage and Recovery (ASR), Dedicated injection, Vadose zone injection, and In-lieu recharge will cover the Fresno Irrigation District service area only, and 3) area wherein CVP water can be exchanged and other areas expressing an interest for groundwater banking opportunities.
- Vadose Zone Injection: Technique for recharging a groundwater basin using dedicated wells injecting into the unsaturated (vadose) zone of an aquifer by either gravity or pressure.

Task 1 – Data Collection and Compilation

Objectives

- Collect and compile readily accessible information and data on hydrogeology, water supply, water quality and major conveyance facilities in the study area needed to provide focus for the analysis of groundwater recharge technologies and banking opportunities.

Approach

- Document/confirm City's objectives priorities and target amounts for groundwater recharge and banking programs. The objectives will be based on the final Metro Plan Update as a starting point and modified based on discussions with and input from Fresno Water Division staff and MWH observations.
- Prepare a list of data needs and submit to Water Division.
- Collect the needed, readily accessible data and reports from the United States Geological Survey, California Geological Survey, California Department of Water Resources, State Water Resources Control Board, City of Fresno, Fresno Irrigation District, Fresno Metropolitan Flood Control District, Kings River Conservation District and other agencies as appropriate relative to study area hydrogeologic conditions and water conveyance capabilities.
- Compile collected data and reports on a secure FTP site (see Task 6).
- Review and extract pertinent information from the Metro Plan Update relative to water demand projections and supply availability through 2060.
- Summarize potential water surpluses/shortages relative to stated goals.
- Conduct a workshop with Water Division staff as defined in Task 6 to review the objectives, data, data gaps and preliminary findings.

City of Fresno Groundwater Recharge /Banking Project
Amendment 1

Deliverables

MWH will prepare a draft technical memorandum documenting the findings of Task 1 consisting of the following:

- Summary of the data sources and their relevance.
- City water resources management objectives.
- Chart or table showing projected demands, the amount of water supply currently available, desired amount of recharge and potential water needs from present through 2060 based on Phase 1 projections from the Metro Plan Update.

Assumptions

- Readily accessible data and reports consists of those data and reports that are within the possession of the Water Division, FID, the MWH Team or available on the internet.
- Water Division will supply shape files and relevant data on their facilities, land use/vacancy, hydrogeologic conditions and copies of relevant reports.
- MWH will obtain shape files of FID/FMFCF facilities including infiltration rates and conveyance capacities and copies of relevant reports.
- No hydrogeologic characterizations including the preparation of cross sections will be performed in Phase 1.

Task 2 – Evaluation of Groundwater Recharge Technologies

Objectives

- Compare the site-specific applicability of various recharge technologies to the hydrogeologic conditions and physical facilities of Study Area
- Develop relationship between cost versus potential recharge volume for each technology
- Identify potential benefits where groundwater recharge can assist in meeting water quality management, reduced major infrastructure investment and other objectives

Approach

- Describe and tabulate the advantages and disadvantages of the following recharge technologies:
 - Surface percolation (spreading),
 - Aquifer Storage and Recovery (ASR),
 - Dedicated injection,
 - Vadose zone injection, and
 - In-lieu recharge.
- Provide a preliminary assessment of regulatory/legal requirements for each technology in tabular format based on informal discussions with appropriate decision-makers at CDPH and RWQCB.
- Document the hydrogeologic conditions required for successful implementation of each recharge technology.
- Document the need for water pre-treatment for each recharge technology.

**City of Fresno Groundwater Recharge /Banking Project
Amendment 1**

- Identify potential secondary benefits of recharge locations (such as creation of hydraulic barriers to control water quality plumes, reduced major infrastructure investment and other City objectives).
- Develop typical costs of construction and O&M for each recharge technology.
- Compare requirements of each technology with site-specific conditions in various zones of the study area (zones to be determined)
- Develop GIS-based mapping showing those portions of the Study Area where each recharge technology is applicable. Maps for surface percolation will cover the entire study area. Maps for Aquifer Storage and Recovery (ASR), Dedicated injection, Vadose zone injection, and In-lieu recharge will cover the Fresno Irrigation District service area only.
- Develop a graph of the unit cost of recharge versus potential recharge volume for each technology.
- Identify data gaps that significantly affect feasibility of each technology in the Fresno area and provide recommendations for filling those gaps.
- Conduct a workshop with Water Division staff as defined in Task 6 to review preliminary findings.

Deliverables

MWH will prepare a draft technical memorandum summarizing the findings of Task 2 including:

- Maps showing zones where each recharge technology is potentially feasible (may overlap).
- Tabulation of advantages and disadvantages of each technology.
- Tabulation of typical costs (\$/AF) and potential recharge volume (AF/yr) for each technology with appropriate assumptions.
- Discuss the hydrology of flood and other short-tem flows and how they impact recharge facility location and capacity and required conveyance facility capacity.
- Initial recommendations regarding types, amounts and locations for additional recharge facilities.
- Maps showing:
 - Depth to groundwater
 - Contours of equal groundwater elevation
 - Characteristics of surface soils based on existing GIS-compatible data
 - Selected information on subsurface characteristics
 - Up to five roughly 2 mile by 2 mile areas recommended for further investigation for siting of future banking facilities. Selection of these recommended areas will consider hydrogeologic characteristics, proximity to a conveyance facility to get water into and out of the recharge facility, and a way to make use of the extracted water such as downstream users with sufficient demand along existing conveyances or users within a reasonable pumped distance. Identify who the potential banking partners might be for each of these five areas.

MWH will prepare a second technical memorandum presenting a simple spreadsheet for sizing of a groundwater banking facility with assumptions listed to give the City an idea of order of magnitude of facility to recharge and extract up to 55KAF/yr.

City of Fresno Groundwater Recharge /Banking Project
Amendment 1

Assumptions

- Water Division will provide labor and other O&M costs for existing recharge sites
- Typical costs are order-of-magnitude (AAE¹ Class 5 estimates) and not project-level cost estimates
- Where significant data gaps exist, MWH will make reasonable assumptions based on engineering judgment to avoid project delays.
- Regulatory feasibility based on informal discussion with DPH & CVRWQCB, expected to consist of not more than two phone conversations with staff from each of those agencies.

Task 3 – Initial Assessment of Water Resources Opportunities

Objectives

- Identify potential supplemental sources of water that Fresno could use for groundwater recharge, banking and future water needs in addition to its existing contracted supplies

Approach

- Review the assessment of currently available Fresno water supplies presented in the Metro Plan Update and document changes in supply availability and timing based on current San Joaquin River Restoration Program information.
- Identify potential supplemental water sources including:
 - Unused Fresno Class 1 water
 - Unused Fresno share of FID Kings River and Class 2 water
 - Section 215 water – may be limited in the future, changing to 16(b) water
 - Paragraph 16(b) San Joaquin River Settlement Recovered Water Account – with and without credits
 - Paragraph 16(a) San Joaquin River Settlement Recapture/Recirculation water
 - Kings River flood water
 - Recycled water exchange with FID
 - Other water sources and transfers identified in course of the investigation
- Document potential supply availability (annual volume, timing, conveyance constraints) based on long-term hydrologic data (1922-2003).
- Document potential water costs and delivery constraints.
- Conduct a workshop with Water Division staff as defined in Task 6 to review preliminary findings.

Deliverables

MWH will prepare a draft technical memorandum describing:

- Potential water supplies
- Existing supply constraints

¹ AACE – Association for the Advancement of Cost Engineering, AACE International.

City of Fresno Groundwater Recharge /Banking Project
Amendment 1

- Potential future supply availability
- Ranges of potential supply costs

Assumptions

- Assessment to be based on available information from Fresno, FID and MWH files.
- Planning horizon will be 2060 based on the supply and demand projections from Phase 1 of the Fresno Metro Plan Update.

Task 4 – Initial Assessment of Groundwater Banking Opportunities

Objectives

- Develop a list of potential groundwater banking opportunities between the City of Fresno and other CVP water contractors or other potential entities who might express interest.
- Identify and prioritize potential banking programs and partners.
- Develop a plan for more detailed investigations of promising opportunities.

Approach

- Conduct internal (MWH) brainstorming session to identify potential banking opportunities.
- Identify potential agencies that could participate in groundwater banking opportunities with Fresno. Agencies may be categorized as follows:
 - CVP Class 1 contractors requiring dry year supplies
 - CVP Class 1 contractors with groundwater access
 - CVP Class 2 contractors with groundwater access
 - CVP Class 2 contractors with access to SWP or other water
 - San Joaquin River Restoration opportunities (e.g., recapture/recirculate)
 - Others as appropriate
- Review list of 10 potential agencies with Fresno Water Division staff to obtain additional input and prioritize the list.
- Conduct telephone interviews with the 10 selected potential groundwater banking partners to explore opportunities and determine their interest in participating in a groundwater banking program with Fresno.
- Conduct a face-to-face meeting with each of up to two agencies that seem most promising as groundwater banking partners based on the results of the telephone interviews.
- Document the findings of the meetings and outline of the water banking concepts and water supply scenarios based on information obtained during the meetings.
- Prioritize potential opportunities based on capacity, proximity, ease of access, order of magnitude cost, institutional constraints and potential economic benefits.
- Prepare a list of subsequent actions required to further develop the most promising opportunities in future Phases such as:
 - Hydrogeologic investigations
 - Water resources and groundwater modeling
 - Facilities planning and costs
 - Environmental impact assessment

City of Fresno Groundwater Recharge /Banking Project
Amendment 1

- Third-party economic impacts
- Contractual concepts (potential term sheet)

Deliverables

MWH will prepare a draft technical memorandum documenting the findings of Task 4 consisting of:

- Summary of groundwater banking opportunities and agencies.
- Recommendations regarding the most promising opportunities.
- Steps to be taken in future phases to develop these opportunities.
- Discussion of what the arrangements are at other existing groundwater banks, i.e. general contract terms, payments, leave-behind water, and how existing groundwater users are protected.

Assumptions

- The primary area of investigation will consist of the CVP Friant Division contractors and adjacent water agencies, but will also include entities that may express an interest in groundwater banking as opportunities are identified through or independent of this study.

Task 5 – Prepare Summary Report and Recommendations

Objectives

- Summarize findings from previous tasks
- Make recommendations for future phases of recharge program implementation

Approach

- Prepare draft technical memorandum
- Water Division Review of draft
- Prepare final technical memorandum

Deliverables

MWH will prepare a technical memorandum summarizing:

- The general feasibility of various recharge techniques.
- The City's ability to meet minimum Metro Plan Update goals for 2025 and through 2060 using each recharge technology.
- Additional water supply opportunities to meet Metro Plan goals and long-term needs beyond 2025.
- Summary of potential groundwater banking opportunities to meet near term and long term needs.
- Discussion of the five suggested areas for investigation for siting of new large recharge facilities and a description of the additional information needed to determine suitability of the areas.

City of Fresno Groundwater Recharge /Banking Project
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- Data gaps that result in significant uncertainty and recommendations on how to fill those data gaps.
- Recommendations on next steps.
- Recommended scope of work for Phase II.

Assumptions

- None

Task 6 – Project Management and Meetings

Objectives

- Establish and implement project management plan to keep project on schedule and budget and to make sure the project achieves the Owner's objectives.
- Obtain City input during the evaluation process.

Approach

- Prepare project management plan.
- Establish coordination schedule with key milestones.
- Attend conference calls, meetings and workshops as described in the assumptions
- Monitor and report on project progress

Deliverables

- Meeting agendas, meeting notes, and action items for each conference call.

Assumptions

- Project schedule for Phase 1 is 49 months.
- One Kickoff meeting and one review meeting after the draft Summary Report is submitted.
- Three bi-weekly coordination conference calls between meetings.
- Three workshops involving key members of consultant team and Water Division staff – one after Task 1, one during Task 2 prior to completion of deliverables, and one during Task 3. The timing of workshops will be developed mutually by Water Division staff and MWH.
- MWH to establish a secure FTP site for project data exchange.
- Three meetings with City staff to determine revisions to project approach for Amendment 1.

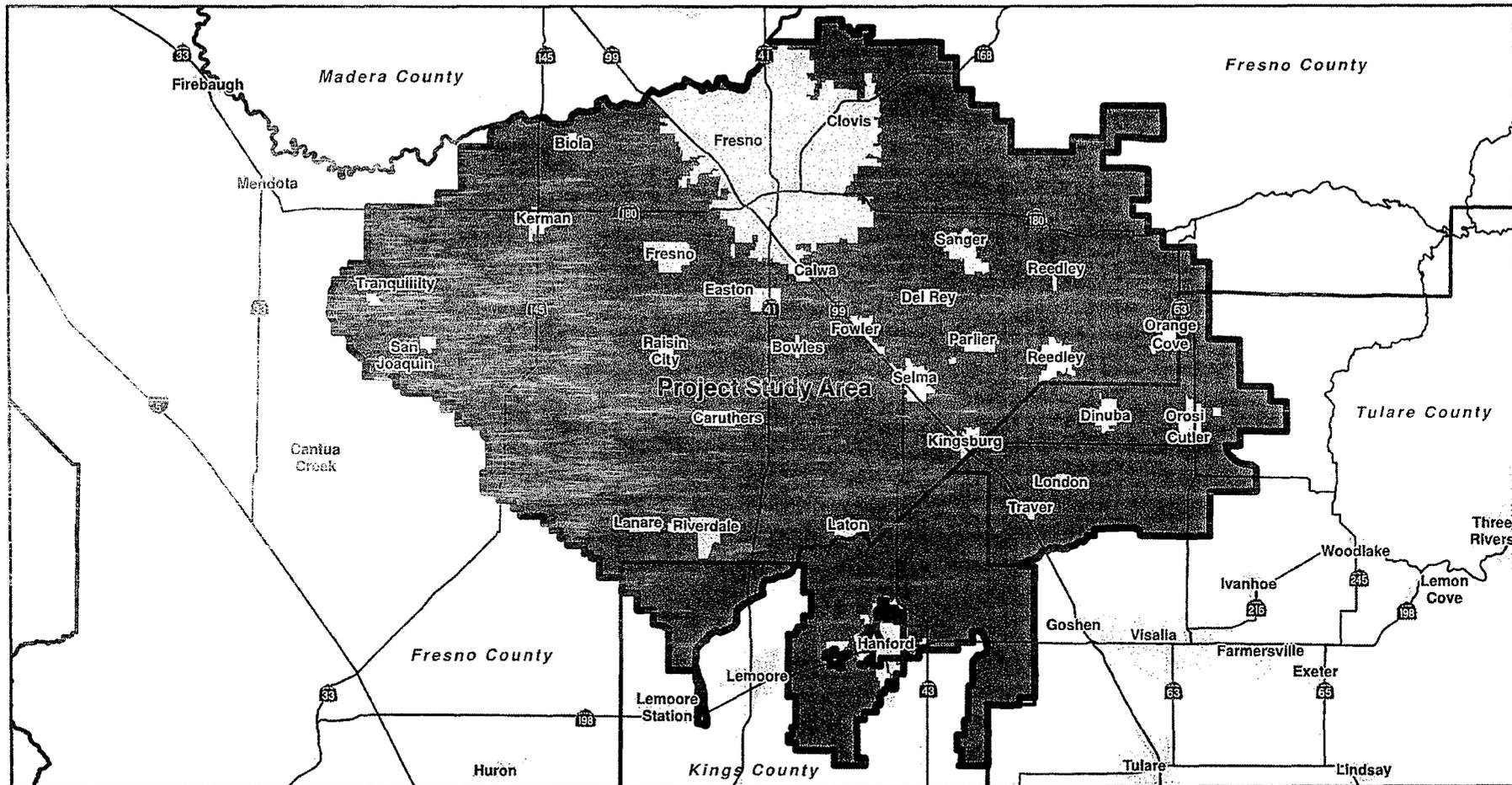
Potential Future Phase Investigations

The following is a list of potential investigations that could be conducted in future phases:

- Site-specific pilot testing of alternative recharge technologies (ASR, injection only, vadose zone injection)

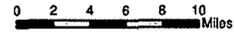
City of Fresno Groundwater Recharge /Banking Project
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- Detailed assessment of potential groundwater banking opportunities including modeling of water resources availability and groundwater basin response
- Development of more detailed facilities layouts and project-level cost estimating
- Development of potential contract term sheets
- Environmental impact assessment of potential projects



Legend

-  County
-  US Census Designated Places (Cities & Towns)
-  Project Study Area



Approximate Scale

City of Fresno
ASR & Groundwater Banking Study

Project Study Area Map

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