

Attachment A: Scope of Work for Brackish Water Desalination Feasibility Study

Phase 1: Desktop Study

The scope of work for Tasks 1.1, 2 and 3 can be initiated upon notice to proceed. A detailed estimated fee is provided in Appendix D.

Task 1 – Project Management & QA/QC

Task 1.1 - Phase 1 PM Activities

Project management includes project setup, subcontracting, submittal of monthly project status reports, preparation for and leading one (1) Phase 1 kickoff meeting and four (4) project status meetings (calls/webinars), participating in two (2) GSA briefings and internal coordination to keep the project on schedule and within budget. Other project meetings are described in subsequent tasks. Quality assurance/quality control (QA/QC) activities are integrated into KJ's project management system from project inception through final document submission. Each major deliverable will receive a quality control review prior to submission to the client from a senior KJ engineer, and an internal Concept and Criteria Review will be conducted as part of project initiation.

Assumptions

- Five (5) month project duration
- One (1) Phase 1 kickoff meeting (attended by two (2) KJ staff, (2) Geoscience staff (hybrid - in person and teams))
- Four (4) progress status calls (attended by two (2) KJ staff, (2) Geoscience staff (virtual))
- Two (2) GSA briefings attended by one (1) KJ staff, (2) Geoscience staff (virtual))
- Each meeting is anticipated to have a one (1) hour duration

Deliverables

- Agenda, meeting materials and minutes in electronic form
- 5 monthly project status reports and invoices

Task 1.2 - Phase 2 PM Activities

Project management activities for Phase 2 will be similar in nature to Task 1.1. The project duration and number and type of meetings will be further refined upon completion of Phase 1.

Task 2 – Develop Preliminary Project Concept and Cost Update

This task will refine the project concept based on discussion with the District and information from the recent USBR WaterSMART Grant Proposal submitted by the District. A **project summary sheet** will be developed that

includes a project description, overview map of the project location and major facilities and identification of assumptions, benefits, limitations and data gaps.

A **data request** will be generated as part of the initial kickoff meeting, to identify relevant studies, data and other information that can be used to support the analysis. A tracking table will be submitted to the District and maintained by KJ. The District will provide digital files to the project team, as available, within 3 weeks of the data request.

A **preliminary high-level capital cost estimate** will be developed for the project concept, based on siting a regional desalination plant at San Pablo Bay, with subsurface intake. This task will build on unit costs and cost estimates developed for the SWSA, using similar project component as defined in other relevant main water supply alternatives (e.g. \$/MGD of desalination treatment, \$/LF of pipelines, \$/MG of storage etc). It is understood that there is limited unit cost information available from the SWSA. As such, KJ will review the total project costs developed in the SWSA, additional information gathered by the District and develop unit costs that can be applied to this project concept, where applicable. Unit cost assumptions will be further supported based on our team's experience with similar projects. The objective of this preliminary cost estimate is to be able to compare the cost of this new option with the other water supply alternatives. This would allow the District to potentially eliminate, this option early if the project costs and/or unitized cost per AFY are unacceptably high, based on the desktop study, before any further research is done. Soft costs will be estimated based on a percent of facility direct costs, using assumptions similar to the SWSA or as directed by the District. Operations and maintenance costs and life cycle unit costs will not be developed as part of this effort.

Assumptions

- SWSA Table 11, summarizing the potential yield, costs, and timing for each of the main water supply alternatives will be used as the basis for cost comparison.
- A summary of the metrics for desalination-focused options, provided in the SWSA, 13 Sept 2023, Board Workshop #7 (Slide 22: Desalination Options Yield and Cost Summary) will be applied, as appropriate.
- If possible, the District and/or the SWSA consultant (Jacobs) will provide additional unit cost and/or facility cost data from the SWSA study to support the comparison of project concepts.
- All cost will be at a concept-level with major assumptions listed and a range of accuracy provided reflective of AACE Class V Cost estimate (+50% to 30%)

Deliverables

- Project Summary Sheet with Map
- Data Request and Tracking Table
- Preliminary High Level Capital Cost Estimate Table

Task 3 – Desktop Research Using the Existing AEM Survey Data

Under this task, Geoscience and Ramboll will conduct a desktop analysis of the California Statewide Airborne Electromagnetic (AEM) survey that Ramboll conducted for the California Department of Water Resources to identify potential areas for explanatory borehole drilling. KJ will provide coordination and oversight.

Task 3.1 - Data Collection and Review

Initial data review suggests that elevated salinity inland from the bay may be from seawater intrusion from past pumping. Under this task, Geoscience will conduct a detailed review of available data for wells (including well construction data, well logs, groundwater levels, and water quality) in and around the study area close to the San Pablo Bay (approximately from one mile inland of Highway 37 to the coast). The high-resolution dataset will provide an initial understanding of a possible coarse layer within or below the bay mud that would act as a conduit from San Pablo Bay to a new wellfield. The dataset will be provided to Ramboll for their further sensitivity analysis using the AEM data.

Task 3.2 – Sensitivity Analysis and Uncertainty Analysis Using the Existing AEM Database

The existing AEM data will be analyzed under this task to better identify and quantify the uncertainty surrounding subsurface resistivity targets consistent with the expected paleochannels. The analysis will include:

- A desktop study to evaluate the expected AEM signal produced by a paleochannel in the various subsurface scenarios.
- Investigation and application of alternative inversion options to the data to provide more vertical and lateral freedom in the estimated resistivity value. Additionally, this will include applying a priori constraints to known features or layering in the subsurface.
- 1D uncertainty analysis of the AEM data at a selected set of locations to quantify the degree of uncertainty surrounding the resistivity and thickness of potential targets consistent with what would be expected for paleochannels.
- Interpretation of the AEM and auxiliary data and the likelihood that the AEM data would have detected a paleochannel-like feature.

The detailed scope of work for this task is described in Ramboll’s proposal submitted to Geoscience on July 11, 2013 (Appendix B). Ramboll will produce a **Technical Memorandum (TM) - Analysis of AEM Data** presenting the results of the data analysis, preliminary interpretations, and recommendations for future work to improve the identification of potential paleochannels in the area of interest. The memo will contain maps and figures showing the location and types of data analyzed, analysis and interpretation results.

Task 3.3 - Evaluation of Exploratory Borehole Locations

Geoscience will review the Ramboll’s findings from Task 3.2 to evaluate and recommend locations for exploratory boreholes. Two (2) one-hour meetings are assumed with the District to present the findings and discuss next steps. Assuming a viable paleochannel-like feature is detected, the project team will move forward with Task 4.

OFF RAMP: If a viable paleochannel-like feature is not detected or the project concept deemed infeasible, the project team will meet with the District to determine the next steps for additional desktop evaluations or discontinue the effort.

Assumptions

- Two (1) One (1) hour meetings attended by KJ PM, one (1) KJ team member and two (2) Geoscience team members.
- Geoscience will provide technical QA/QC of their internal work products and deliverables provided by Ramboll.
- KJ will provide review of deliverables

Deliverables

- Agenda, meeting materials and minutes in electronic form.
- Dataset provided by Geoscience to Ramboll for their further sensitivity analysis using the AEM data
- Draft and Final TM - Analysis of AEM Data (Ramboll)
- Exploratory boreholes summary table and map

Phase 2: Exploratory Drilling

The scope of work for Tasks 1.2, 4, 5 and 6 will only be initiated if a viable paleochannel-like feature is identified in Phase 1. An outline of the anticipated tasks and subtasks is provided herein. The tasks will be revisited prior to NTP for Phase 2, allowing the KJ team time to validate the approach, develop the appropriate scope and provide a fee estimate based on the desktop findings.

Task 4 – Preparation of Exploratory Drilling Workplan and Permitting Assistance

This task includes preparation of a detailed technical work plan for the contractor to follow during exploratory drilling, sampling, and destruction of three exploratory boreholes. The scope and level of effort for permitting support, meetings and site visits will be refined based on Phase 1 outcomes and the number and placement of exploratory borings recommended. The following subtasks are anticipated.

Task 4.1 – Exploratory Drilling Workplan

Task 4.2 – Permitting Compliance Assistance

Task 4.3 – Exploratory Drilling Meetings

Task 5 – Exploratory Borehole Drilling and Depth Specific Water Quality Testing

For the exploratory investigation, Geoscience can subcontract with a drilling contractor with a C-57 license and proven track record of successfully utilizing the preferred drilling method (e.g. sonic or other) to perform the exploratory work. The scope and level of effort for Task 5 will be developed based on Phase 1 outcomes, the

number and placement of exploratory borings recommended, confirmation of the preferred drilling approach (sonic or other) and District contracting preferences and requirements with respect to the drilling contractor. The following subtasks are anticipated.

Task 5.1 – Construction Management

Task 5.2 – Exploratory Borehole Drilling with Onsite Field Supervision

Task 5.3 – Evaluate Geophysical Logs

Task 5.4 – Depth Specific Water Quality Sampling

Task 5.5 – Mechanical Grading Analysis

Task 5.6 – Draft and Final Technical Memorandum

Task 6 – Additional Services (Not Scoped)

Should the additional services be identified as part of Phase 1, or if the exploratory drilling show favorable results, it is anticipated that the District may wish to continue to develop this regional brackish water desalination project.

Additional tasks that could help to further the project include but are not limited to:

- Continued source water quality investigations
- Finish water quality specification development
- Evaluation of brine disposal options, including data gap identification
- Development of Project partnerships
- Conveyance and distribution system assessment
- Isolated aquifer zone testing
- Further development of Project costs

Task 6 additional services may be identified and scoped as part of Phase 2 or after initial results from field investigations are completed

OFF RAMP: if an insignificant or non-viable paleochannel is encountered during drilling, the project team will meet with the District to determine the next steps for additional field investigations or discontinue the effort.