



**Water Supply Roadmap
Update – Petaluma River
Brackish Desalination**

OPERATIONS COMMITTEE

MEETING

September 15, 2023



Overview

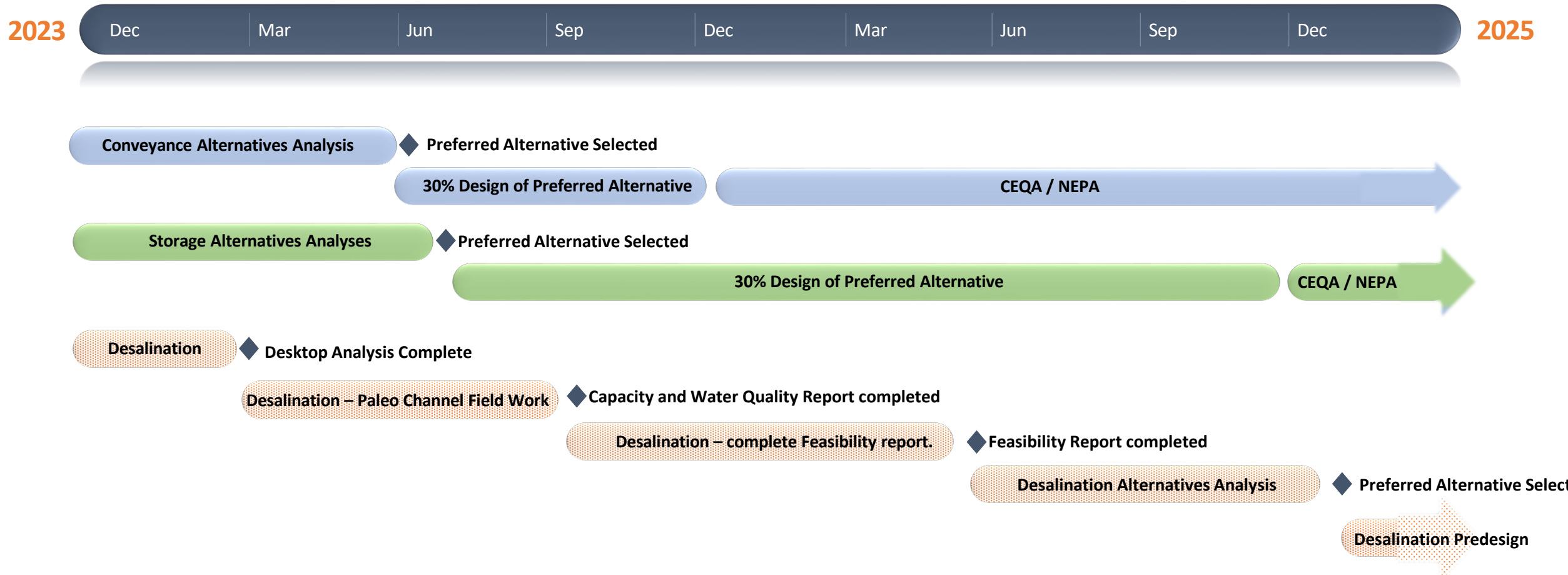
- Roadmap Projects Summary
- Petaluma River Brackish Desalination
- Initial Investigation and Results
- Proposed further investigation
- Schedule
- Next Steps & Recommendation

Water Supply Roadmap: Short term Actions

Status and Schedule

- Soulajule Pump Station Electrification – reviewing options for power, estimate completion end of 2025
- Phoenix to Bon Tempe – Pre-design selecting alignment and determining pumping capacity, estimate completion early 2026
- Stream Flow Automation – Equipment installation in 2023, calibration over 2024 and continued manual monitoring to ensure no adverse affects aquatic species
- Water Efficiency – Refining incentives, updating educational programs and Master Plan
- Water Loss – Deeper dive into water loss technologies, anticipate report and recommendations in early 2024

Water Supply Roadmap: Schedule



Petaluma River Brackish Desalination

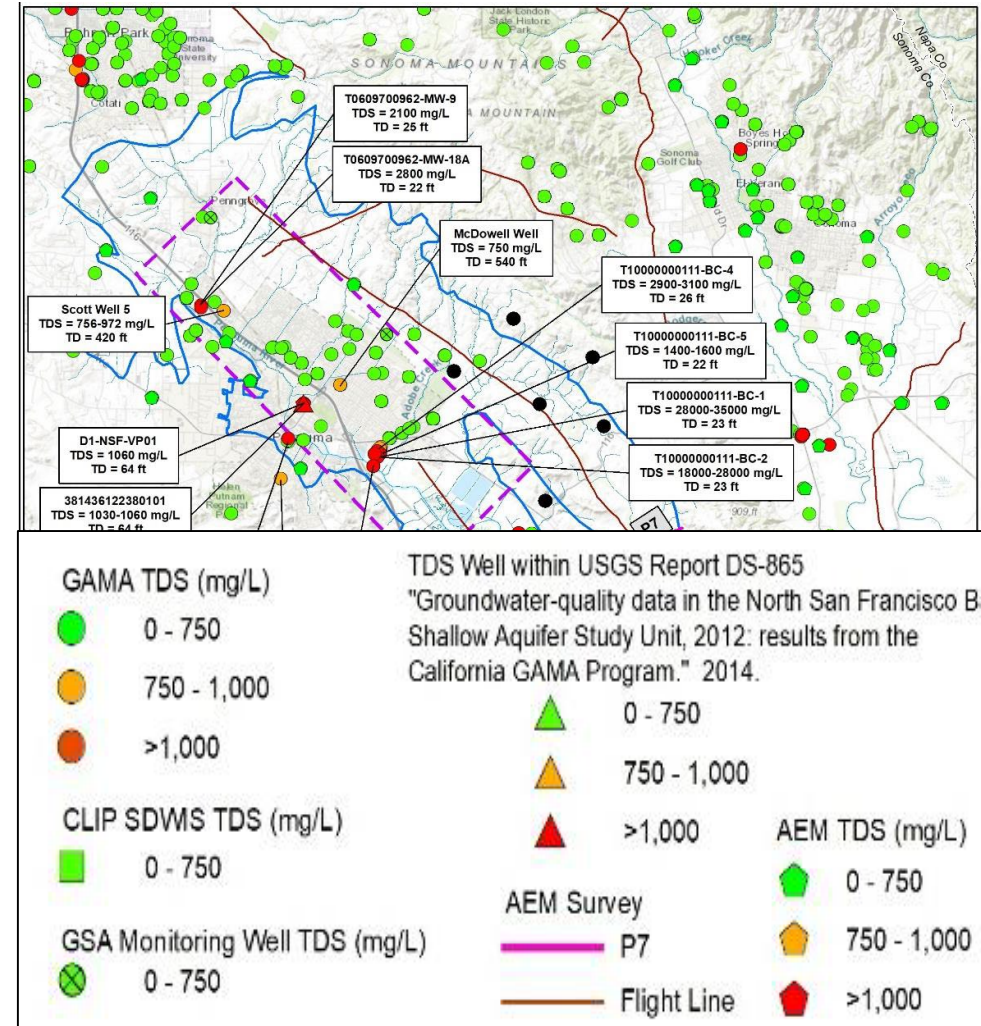
- Identified in Strategic Water Supply Assessment as possible project
- Project concept – withdraw brackish groundwater not suitable for potable or irrigation usage and treat to potable standards
- Partnered with City of Petaluma to investigate potential for water supply

Figure C-19. Proposed location of RO plant, concentrate storage ponds and associated pipelines.



Initial Investigation

- Saline water – up to 1,000 mg/L Total Dissolved Solids
- Brackish Water – 1,000mg/L TDS to ~10,000 mg/L TDS
- Majority of existing wells are not saline water



Petaluma Valley Groundwater Availability

- In the basin there is no water to support the development of a brackish desalination plant or additional pumping of existing groundwater.

Petaluma Valley Groundwater Budget Summary Diagram
Current Mean (WY 2012-2018)

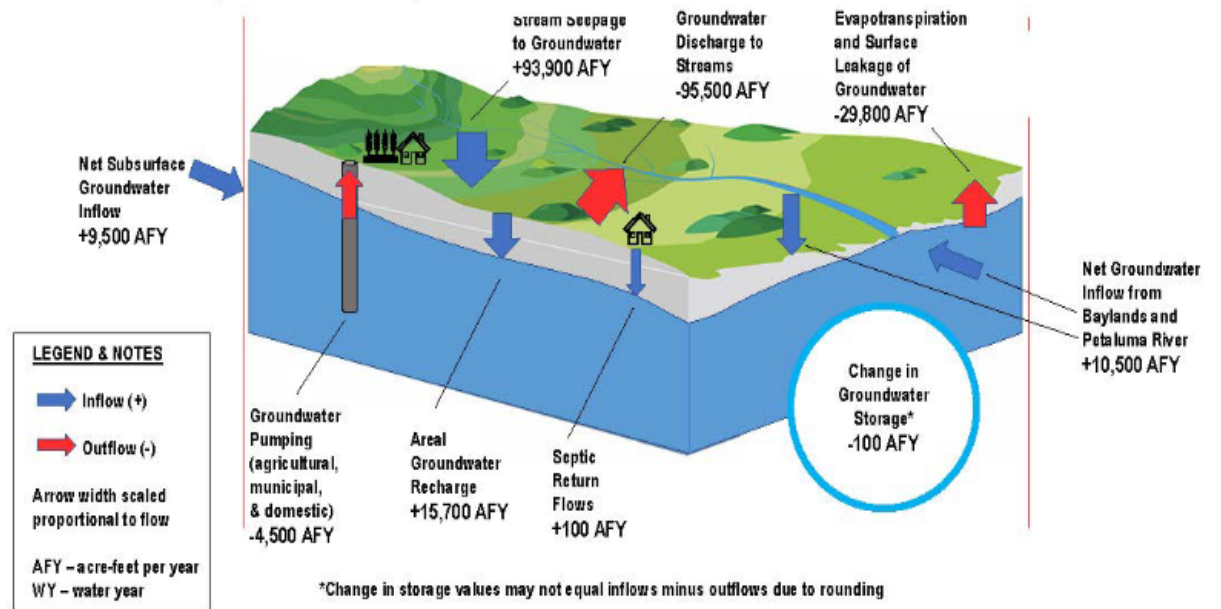
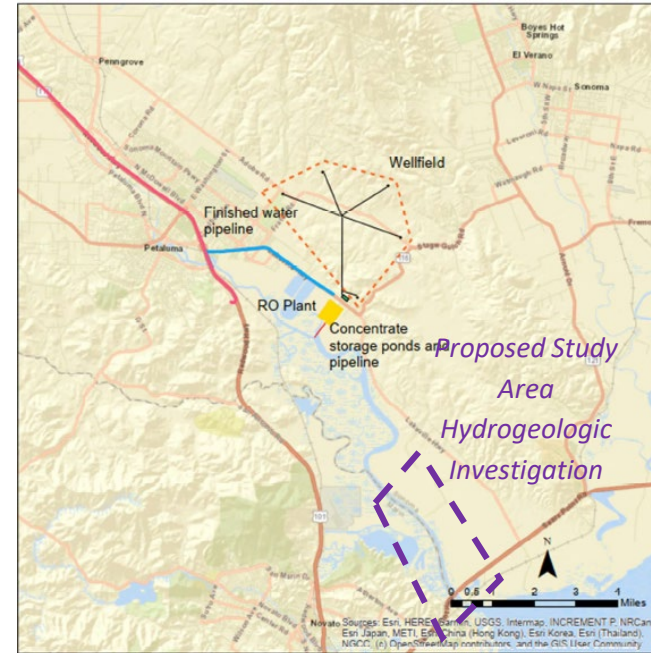


Figure ES-6. Water Budget for Current Period (2012-2018)

Proposed Investigation

- Opportunity to develop a new alternative for desalination
- Determine whether a sub surface hydraulic connection is present at or near San Pablo Bay.
- Review existing lithological data
- Review Airborne Electromagnetic survey data
- IF a hydraulic channel is indicated field work would be required



Project Team

PHASE 1 Desktop Study



Kennedy/Jenks Consultants, Inc. (KJ)

- Primary point of contact to manage the Project
- Responsible for concept-level engineering and cost estimating
- Lead coordination with subconsultants to perform specialized desktop and field investigations



Geoscience Support Services, Inc. (Geoscience)

- Lead for hydrogeologic research
- Responsible for conducting review of well data, evaluation of location for exploratory boreholes and preparation of a exploratory drilling workplan
- Will provide on-site supervision of drilling activities, including construction management during drilling and support regulatory activities



Ramboll Americas Engineering Solutions (Ramboll)

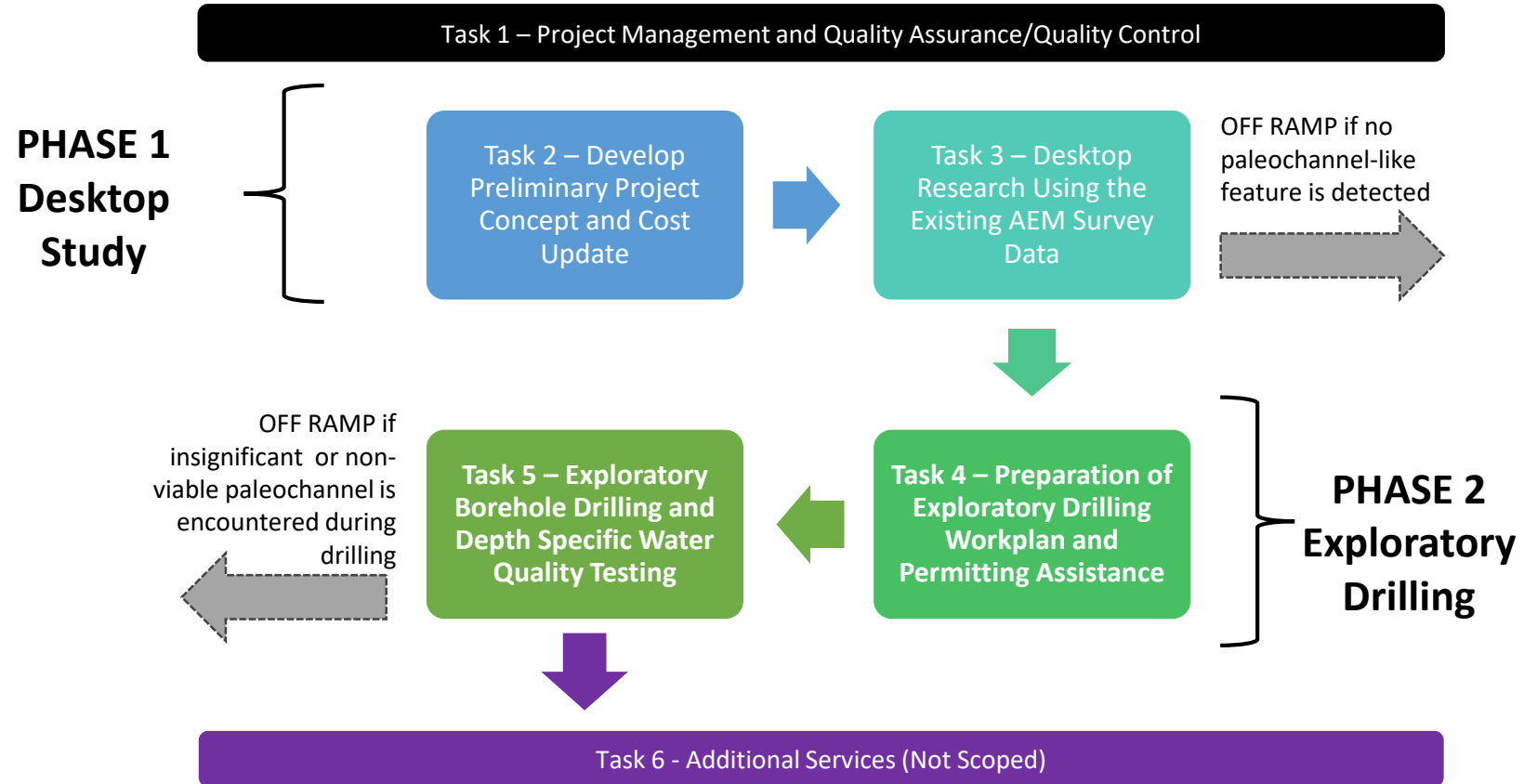
- Conducted recent Statewide airborne electromagnetic (AEM) survey, performed under a contract with the California Department of Water Resources
- Lead desktop study to evaluate AEM data
- Responsible for analysis and interpretation of AEM data focused on the paleo channel-like feature



Drilling Contractor (TBD)

- Upon confirmation of the existence of a paleochannel, a drilling contractor will be selected via an approved District process/contracting vehicle
- Lead exploratory investigation, including sonic drilling and sampling services

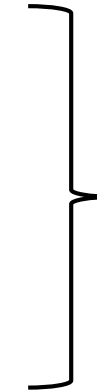
Project Approach



Key Scope of Work and Deliverables

Table 1 – Tasks and Major Deliverables for Phase 1 and Phase 2

| Task | Major Deliverables |
|---|--|
| Phase 1: Desktop Study | |
| Task 1 – Project Management and Quality Assurance/Quality Control (QA/QC) | <ul style="list-style-type: none"> • Agendas, meeting materials and minutes • 6 monthly project status reports and invoices |
| Task 2 – Develop Preliminary Project Concept and Cost Update | <ul style="list-style-type: none"> • Project Summary Sheet with Map • Data Request and Tracking Table • Preliminary High Level Cost Estimate Table |
| Task 3 – Desktop Research Using the Existing AEM Survey Data | <ul style="list-style-type: none"> • Agenda, meeting materials and minutes • Dataset for AEM sensitivity analysis • TM – Analysis of AEM Data • Exploratory Borehole Summary Table and Map |
| Phase 2: Exploratory Drilling¹ | |
| Task 1 – Project Management and Quality Assurance/Quality Control (QA/QC) | <ul style="list-style-type: none"> • Agendas, meeting materials and minutes • Additional monthly project status reports and invoices (TBD) |
| Task 4 – Preparation of Exploratory Drilling Workplan and Permitting Assistance | <ul style="list-style-type: none"> • Exploratory Drilling Workplan (Draft and Final) • Supporting documents for NPDES compliance and a NOI • Agenda, meeting materials and minutes |
| Task 5 – Exploratory Borehole Drilling and Depth Specific Water Quality Testing | <ul style="list-style-type: none"> • TM – Exploratory Borehole Drilling Outcomes |
| Task 6 – Additional Services (not scoped) | To be scoped and authorized as-requested |



**PHASE 1
Desktop
Study**

¹ Anticipated tasks and deliverables for Phase 2 will be reviewed and confirmed at the end of Phase 1 are not scoped nor funded at this time.

Project Schedule

| Tasks, Meetings and Key Deliverables | 2023 | | | | | | 2024 | | | | | | |
|--|--------------------------------|-----|-----|-----|-----|-----|--|-----|---|-----|------|-----|------|
| | Sept | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | July | Aug | Sept |
| | Phase 1 - Desktop Study | | | | | | Phase 2 - Exploratory Drilling ⁽¹⁾ | | | | | | |
| <i>Notice to Proceed</i> | + | | | | | | + | | | | | | |
| Task 1 - Project Management and QA/QC | | | | | | | | | | | | | |
| Meetings and Progress Calls | Kick-off |) |) |) |) |) | Kick-off |) |) |) |) |) |) |
| Status Reports and Invoices | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Task 2 - Develop Preliminary Project Concept and Cost Update | | | | | | | | | | | | | |
| Project summary sheet, data request, cost estimate | | | ◆ | | ✓ | | | | | | | | |
| Task 3 - Desktop Research Using the Existing AEM Survey Data | | | | | | | | | | | | | |
| Task 3.1 - Data Collection and Review | | | | | | | | | | | | | |
| Task 3.2 - Sensitivity Analysis | | | | ◆) | ✓ | | | | | | | | |
| Task 3.3 - Evaluation of Exploratory Boreholes | | | | ◆) | ✓ | | | | | | | | |
| Task 4 - Preparation of Exploratory Drilling Workplan and Permitting Assistance | | | | | | | | | | | | | |
| 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 | | | | | | | | | | | | | |
| Task 5.1 - Construction Management | | | | | | | | | | | | | |
| Task 5.2 - Exploratory Borehole Sonic Drilling | | | | | | | | | | | | | |
| 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 – Future Services (Not Funded) | | | | | | | | | | | | | |
| | | | | | | | | | <i>Confirm Driller Scope/Fee based on number of wells and schedule</i> | | | | |
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| | | | | | | | | | | | | | |
| | | | | | | | | | <i>Initiate Scoping (Simulprobe water quality assessment and other investigations needed)</i> | | | | |

⁽¹⁾ Phase 2 schedule to be refined at/near completion of Phase 1 based on number of wells to be drilled and availability of drilling contractor.

| LEGEND | | | |
|-----------------------|---|---------------------|--|
| Meetings | | Deliverables | |
| Progress Status Calls |) | Interim/Admin Draft | |
| Site Visit | ⊙ | Draft | |
| GSA Briefing |) | Final | |

Fee Estimate

Table 2 – Estimated Budget for Phase 1

| TASK DESCRIPTION | KJ Total Hours | KJ Total Labor | Geoscience ^a | ODCs | Total Labor + Subs + Expenses |
|---|---|-----------------|-------------------------|--------------|-------------------------------|
| Phase 1: Desktop Study | | | | | |
| Task 1 - Project Management and QA/QC (Phase 1) | 113 | \$30,066 | \$5,941 | \$300 | \$36,308 |
| Task 2 - Develop Preliminary Project Concept and Cost Update | 80 | \$19,739 | \$5,025 | \$0 | \$24,764 |
| Task 3 - Desktop Research Using the Existing AEM Survey Data | 0 | \$0 | \$63,571 | \$0 | \$63,571 |
| Subtotal Phase 1 | 193 | \$49,806 | \$74,537 | \$300 | \$124,643 |
| Phase 2: Exploratory Drilling^b | | | | | |
| Task 1 - Project Management and QA/QC (Phase 2) | <i>Scope and Effort to be confirmed after Phase 1</i> | | | | |
| Task 4 - Preparation of Exploratory Drilling Workplan and Permitting Assistance | | | | | |
| Task 5 - Exploratory Borehole Drilling and Depth Specific Water Quality Testing | | | | | |
| Task 6 – Additional Services (Not Scoped) ^c | | | | | |
| Subtotal Phase 2 | TBD | TBD | TBD | TBD | TBD |
| Total Project | TBD | TBD | TBD | TBD | TBD |

^a Fee for Geosciences includes services performed by Ramboll (Phase 1) and may include Drilling Contractor (Phase 2).

^b Fee for Phase 2 is not provided at this time, as the results from the desktop study will inform the number of wells to be drilled and the level of effort.

^c Additional services may be identified and scoped as part of Phase 2 or after initial results from field investigations are completed.

Summary and Recommendation

- Brackish desalination is a key element of the Integrated Roadmap selected by the Board.
- Opportunity to adapt our project to identify a potential hydraulic connection to San Pablo Bay that may facilitate development of an alternative desalination water supply project.
- Kennedy Jenks, Ramboll and Geoscience have the necessary experience and technical ability to deliver this work.
- Staff request that the Committee refer this item to the full board for consideration.