AMERICAN SAMOA POWER AUTHORITY

SCOPE OF WORK

DESIGN OF UNDERGROUND INJECTION WELLS FOR BRINE DISPOSAL

I. INTRODUCTION

The American Samoa Power Authority (ASPA), through its Water Division, serves as the primary utility responsible for the production, treatment, distribution, and quality monitoring of potable drinking water for residents across American Samoa. To combat chronic saltwater intrusion, elevated chloride levels, and protect vulnerable basal freshwater lenses, ASPA is implementing island-wide water security upgrades. This includes the installation of advanced Reverse Osmosis (RO) desalination units to treat ASPA line water and groundwater and meet strict Safe Drinking Water Act standards at critical locations on Tutuila.

A critical component of this infrastructure upgrade is the environmentally safe management and disposal of the elevated salinity brine byproduct generated during the RO treatment process. To address this, ASPA is working towards the construction of Underground Injection Wells (UIW). These specialized injection wells will provide a long-term, sustainable, and compliant disposal solution, safeguarding the territory's coastal environment and shallow freshwater lenses while supporting the ASPA mission to deliver dependable, high-quality drinking water to the community.

II. PROJECT BACKGROUND

The Project involves the detailed engineering design of the Underground Injection Well (UIW) system for the safe disposal of brine concentrate from existing and upcoming brackish and seawater reverse osmosis units.

The selected Consultant shall perform a complete site-specific geotechnical investigation at the UIW locations identified by ASPA and a hydraulic analysis based on the location of the UIW in reference to the location of the RO units. The project encompasses multiple island-wide RO/UIW sites across American Samoa, specifically designated as follows:

- **Location 1:** Aoa
- **Location 2:** Alao

Based on site findings, the Consultant shall prepare complete, construction-ready engineering drawings, technical specifications, and supporting documents in accordance with professional engineering standards of practice and all applicable Underground Injection Control (UIC) regulations. All drawings, calculations, and reports shall be stamped and signed by U.S. Registered Professional Engineers or equivalent in their respective disciplines, including civil, geotechnical, structural, mechanical, and environmental engineering.

III. PROJECT LOCATION

There are 2 locations that are proposed to have a UIW installed, as shown in Figures 1-2 below.

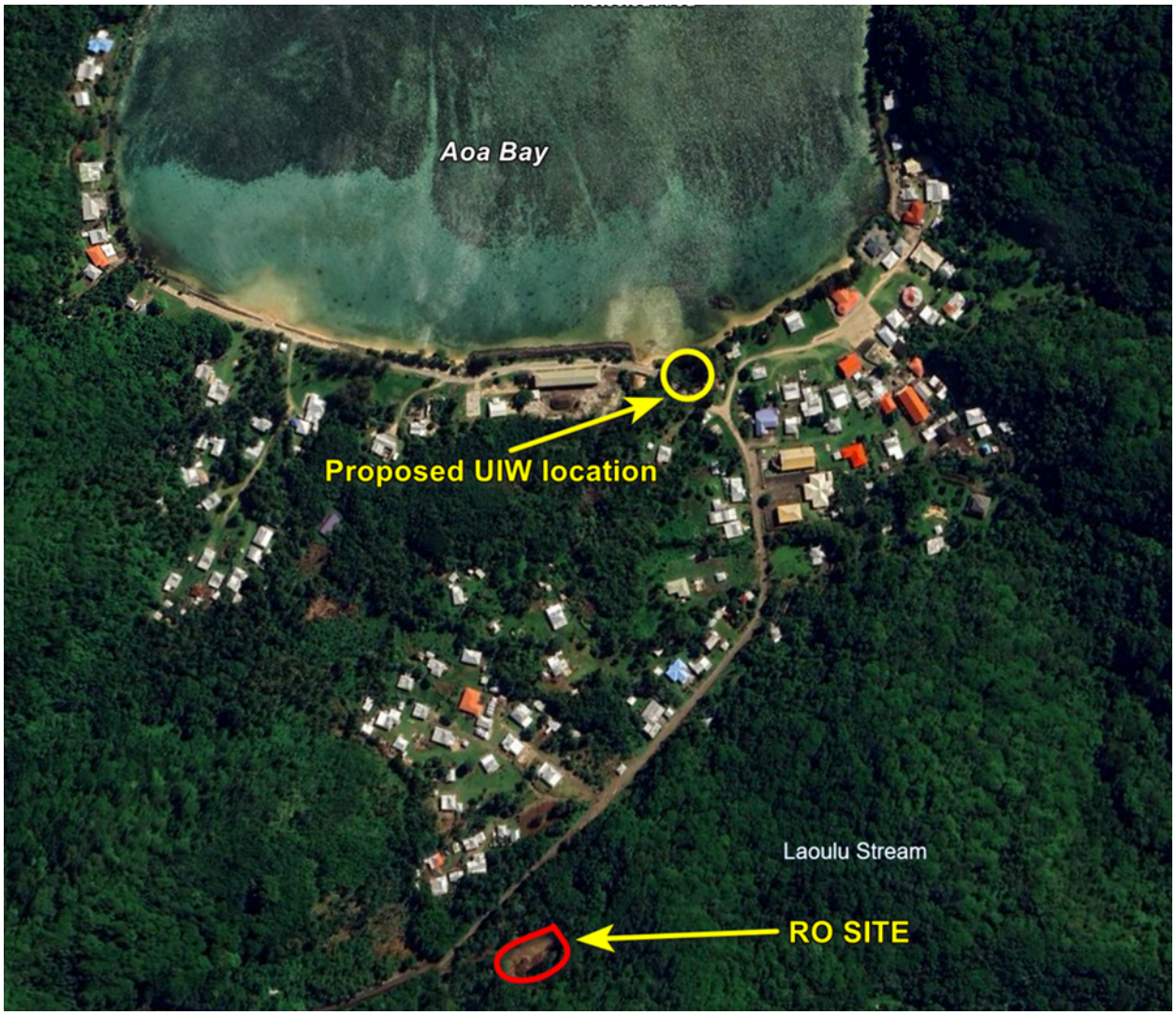

Figure 1 Aoa; northeast quadrant, Tutuila Island

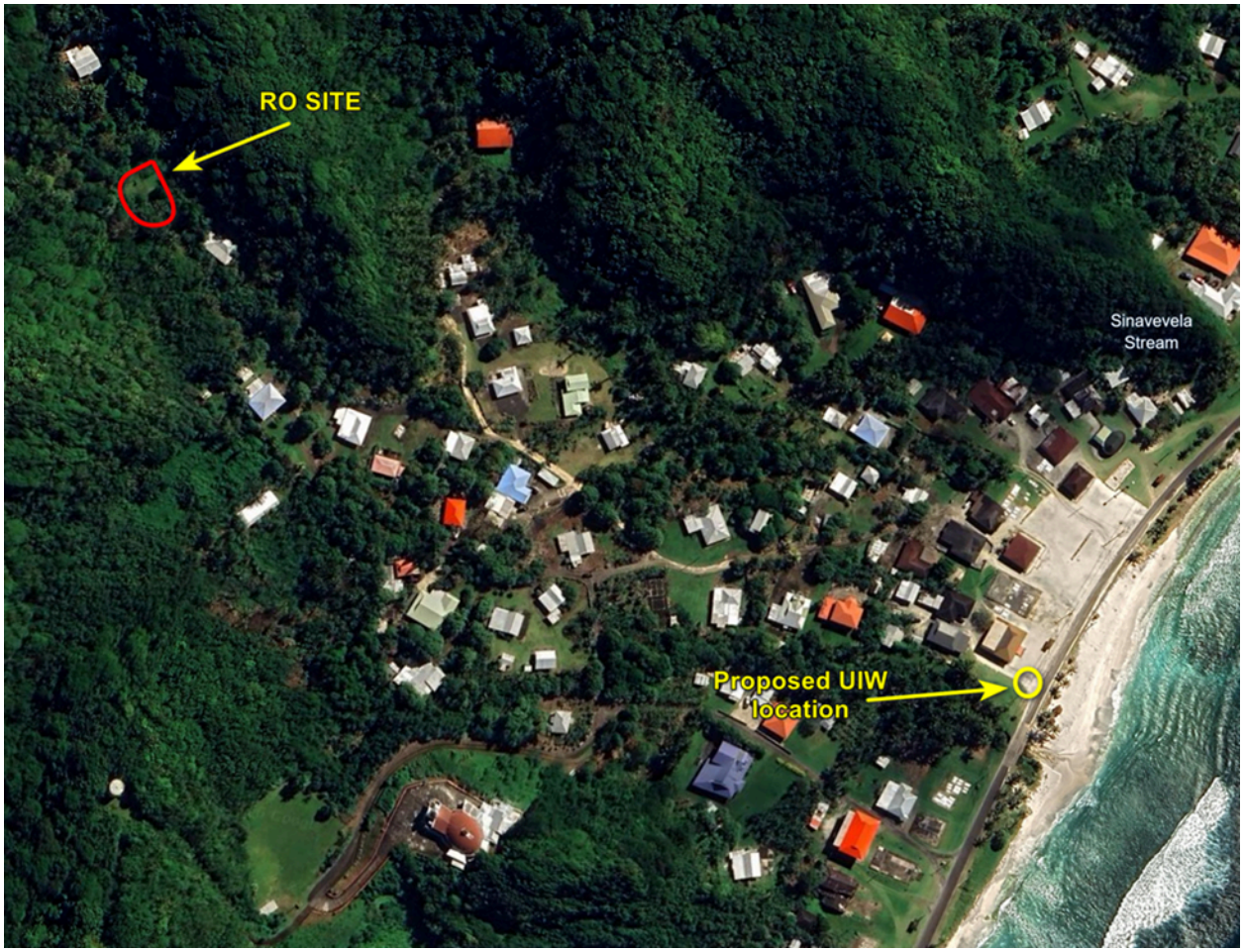

Figure 2 Alao; southeast quadrant, Tutuila Island

IV. PRIMARY OBJECTIVE AND GOAL OF THE PROJECT

The primary objective of this project is to engage a qualified engineering Consultant to develop a complete, construction-ready design package for the Underground Injection Well (UIW) system required for the safe disposal of brine concentrate from existing and upcoming RO units across the designated project locations. ASPA will provide the identified well locations; the selected Consultant shall perform the necessary site-specific geotechnical investigations and, based on those findings, deliver a fully functional, reliable, and regulatory-compliant UIW design package that meets all Underground Injection Control (UIC) requirements and integrates seamlessly with the existing and upcoming RO units.

V. SCOPE OF WORK (SOW)

1. GENERAL

1.1. ASPA has issued this RFP for professional A/E services from a qualified Consultant firm with demonstrated expertise in Underground Injection Control (UIC) wells and brine concentrate disposal systems. The Consultant shall prepare a complete, construction-ready design package for the Underground Injection Well (UIW) system to safely dispose of brine concentrate from existing and upcoming RO units.

1.2. The selected Consultant shall perform a full site-specific geotechnical investigation at the UIW locations identified by ASPA and a hydraulic analysis based on the location of the UIW in reference to the location of the RO units. Based on these findings, the Consultant shall develop comprehensive engineering drawings, technical specifications, calculations, and permit documentation in strict accordance with all applicable UIC regulations, federal and local standards, and industry best practices for brine injection wells.

1.3. The design package shall include well construction details (casing, screens, grouting, seals, injection testing), wellhead design, monitoring requirements, corrosion protection, seismic considerations, and all necessary appurtenances to render the UIW system fully functional and compliant.

1.4. The Consultant shall prepare (1) Conceptual Design Drawings and (2) final Construction Drawings, Specifications, and Engineer's Estimate of Probable Construction Cost.

1.5. All work shall be performed under the direction of a licensed Professional Engineer of Record (EOR). Drawings, calculations, and reports shall be stamped and signed by U.S. Registered Professional Engineers or equivalent in the relevant disciplines (geotechnical, civil, structural, and environmental).

1.6. The Consultant shall coordinate with all required regulatory agencies to support UIC permit acquisition and any other necessary approvals.

1.7. The selected Consultant shall submit design packages for ASPA review and comment at the 30%, 60%, 90%, and 100% completion stages, incorporating all comments for each phase before advancing to the next phase.

1.8. At project start, the Consultant shall submit a detailed project schedule with critical milestones and deliverables. The Consultant shall participate in bi-weekly progress meetings with ASPA.

1.9. ASPA will provide the identified UIW locations, available existing data, and schematic information. The Consultant shall field-verify all critical elements. Land surveying (if required), ROW coordination, and archaeology clearances will be handled by ASPA.

1.10. Submission of a proposal constitutes the Consultant's acknowledgment and acceptance of site conditions, regulatory requirements, and logistical challenges in American Samoa. No additional compensation will be considered for lack of familiarity.

1.11. The overall scope may be modified by written amendment if required by regulatory agencies during review.

1.12.

2. MOBILIZATION AND DEMOBILIZATION

2.1. The work under this item consists of the mobilization and demobilization of the Consultant's engineering and field investigation personnel, specialized equipment, and tools necessary to perform the engineering field services, site assessments, and geotechnical investigations required under this design contract.

2.2. Field mobilization shall include all activities and associated costs for the commercial transportation of the Consultant's personnel, deployment of geotechnical or field testing equipment, initial site setup, and acquisition of necessary professional liability insurance or standard professional project insurances as required by the contract documents.

2.3. Demobilization shall include the safe breakdown, packing, and return transportation of all field equipment, tools, and personnel from the project sites, ensuring all investigation locations are left in a clean, safe, and orderly condition.

2.4. Measurement for payment of Consultant field mobilization, travel, and site-investigation expenses shall be made as a Lump Sum (LS) or on a verified reimbursable expense basis as explicitly detailed in the contract fee schedule. Payment will be released upon submission and approval of appropriate milestone invoices or documented direct costs associated with field deployment.

3. CONCEPTUAL DRAWINGS

3.1. The selected Consultant shall produce Conceptual Design Drawings (CD) of the recommended Underground Injection Well (UIW) system for brine concentrate disposal, based on the well locations identified by ASPA.

3.2. Conceptual Drawings shall be developed using current topographic data, digital elevation modeling, available site information, and the results of the site-specific geotechnical investigation performed by the Consultant.

3.3. The CD preparation will include up to three rounds of review and comment between the Consultant and ASPA prior to finalizing the recommended concept.

3.4. The CD shall clearly present the proposed underground injection well configuration, including well spacing, orientation, depths, wellhead layout, access, and integration with the RO desalination facility's brine discharge piping.

3.5. The CD shall include:

3.5.1. An overall site layout plan on aerial imagery showing the UIW locations,

3.5.2. Conceptual plan and profile sheets for the injection wells, piping, and appurtenances,

3.5.3. Preliminary materials and construction cost estimates, and

3.5.4. Approximate annual operations and maintenance costs.

3.6. Upon ASPA approval of the Conceptual Design, ASPA ROW staff will use the CD to initiate landowner access approvals and right-of-way coordination where the design extends beyond the existing ASPA footprint.

3.7. SPA Archaeology staff shall be kept informed of the proposed injection well locations and brine piping routes. They will use the CD to determine which areas require cultural resource clearance.

3.8. Any re-routing or layout modifications recommended by ASPA ROW or Archaeology shall be incorporated by the Consultant into the final Conceptual Design

4. FIELD INVESTIGATIONS AND REGULATORY PERMITTING SUPPORT

4.1. The Consultant shall execute the site-specific geotechnical and geophysical investigations necessary to characterize the subsurface lithology and hydrogeological properties at each identified UIW location.

4.2. The Consultant shall perform hydraulic testing and injection capacity calculations to determine the target geological formation can safely accept the anticipated brine volumes without compromising surrounding aquifers or freshwater lenses.

4.3. The Consultant shall prepare and assemble all required technical data, environmental assessments, and engineering documentation necessary to support ASPA in obtaining Underground Injection Control (UIC) permits from federal and local regulatory bodies.

4.4. The Consultant shall attend technical meetings with regulatory authorities alongside ASPA staff to address design-related inquiries or engineering clarifications throughout the permit review cycle.

5. CONSTRUCTION DESIGN, PLANS AND SPECIFICATIONS

5.1. **Construction Design and Plans**: Detailed engineering drawings and documents shall be prepared for the complete Underground Injection Well (UIW) system for brine concentrate disposal. Drawings shall follow standard U.S. industry practices for geotechnical, civil, structural, and environmental engineering, shall be stamped by a licensed U.S. Registered Professional Engineer, and shall include, but not be limited to:

- 5.1.1. Site layout, grading, and access plans for the injection well area
- 5.1.2. Detailed well construction drawings (plan, profile, and cross-sections)
- 5.1.3. Well casing, screen, grouting, cementing, seals, and completion details
- 5.1.4. Wellhead design, brine injection piping, and appurtenances
- 5.1.5. Plan and profile sheets for brine conveyance piping and tie-in to the RO facility
- 5.1.6. Structural drawings for well pads, vaults, and protective structures
- 5.1.7. Corrosion protection, seismic design, and monitoring provisions

5.2. **Technical Specifications**: Specifications shall be prepared in the latest CSI MasterFormat and shall cover all equipment, materials, and construction requirements for the UIW system. Special conditions specific to American Samoa (logistics, seismic design, corrosion protection, and brine service) and full Underground Injection Control (UIC) compliance shall be clearly addressed.

5.3. **Construction Bid Form/Schedule**: A detailed unit-price bid schedule shall be prepared suitable for a firm fixed-price construction contract.

5.4. **Engineer's Estimate of Probable Construction Cost**: Detailed cost estimates shall be provided at each design milestone, including capital costs, life-cycle costs, and annual O&M estimates. Estimates shall account for American Samoa's logistical challenges and inflation.

5.5. **Value Engineering**: A Value Engineering Analysis shall be performed to optimize cost-effectiveness while maintaining performance, reliability, and UIC compliance.

5.6. **Design Presentations**: The Consultant shall provide formal presentations at the 30%, 60%, 90%, and 100% design stages. Each presentation shall last approximately one hour.

5.7. **Post-Design Presentation**: One final presentation shall be provided to the ASPA Executive Director and staff upon completion of the 100% design. This shall include a 3–5 page executive summary with schematics.

5.8. **QA/QC Document**: The Consultant shall prepare a clear QA/QC plan for use during the construction phase.

5.9. **Construction Support**: The Consultant shall provide design support during construction, including review of RFIs and material submittals.

6. MINIMUM DELIVERABLES

6.1. The selected Consultant shall provide the following deliverables:

- 6.1.1. Conceptual Design Drawings
- 6.1.2. Detailed Engineering Construction Plans (24" x 36"), stamped by a U.S. Registered Professional Engineer
- 6.1.3. Complete Technical Specifications (CSI format)
- 6.1.4. Engineer's Opinion of Probable Construction Cost
- 6.1.5. Detailed Bid Schedule
- 6.1.6. Geotechnical investigation report, injection capacity calculations, and all supporting engineering calculations
- 6.1.7. Operations and Maintenance Plan
- 6.1.8. Project schedule (Gantt chart)
- 6.1.9. QA/QC Plan for the construction phase
- 6.1.10. 3–5 page design summary with schematics
- 6.1.11. Final presentation materials (PowerPoint)

6.1.12. Three (3) hard copies and complete electronic files (AutoCAD, PDF, Excel, GIS, etc.) of all deliverables

6.2. **Design Submittal Sequence:**

6.2.1. 30% Submittal (Conceptual Design + Preliminary Design)

6.2.2. 60% Submittal

6.2.3. 90% Submittal

6.2.4. 100% Submittal (Final Design, Specifications, and Bid Documents)

7. Each submittal will be followed by ASPA review and comment. All comments shall be addressed by the Consultant to the satisfaction of ASPA. ASPA approval to each design is required prior to the consultant advancing to the next design phase.