ATTACHMENT 8 – QUALITY ASSURANCE

The delivery of the project will follow a structured process to ensure quality assurance and quality control (QA/QC) measures are implemented for each task of the project. To be effective, the following structured process will be implemented:

1. **Kick-off (project chartering)** – This first task includes selection of the best members for the team and using team-chartering techniques to provide clarity of project purpose and direction. In this first task, the project leader assembles staff with applicable experience, technical expertise/application, and accessibility. NCWD will work closely in this phase to ensure all team members endorse the project goals and understand deliverables, deadlines, and general QA/QC expectations
2. **Project Planning** – Because the grant application includes a detailed work plan, this planning phase of the project delivery process is already in place. However, to effectively implement the plan, NCWD will meet with the project team members to make sure that they fully understand the project plan (scope of work). In this phase, project team members will gain an understanding of the specific project QA/QC measures by task, including a schedule of all deliverables, reviewers for each specific task, and specific protocol for logging and addressing QA/QC review comments. NCWD will assign a QA/QC manager responsible for fully implementing the QA/QC plan, which includes the following:
    a. **Bid Package Review** – The bid package, including technical well drilling, construction, and development specifications, will be reviewed by a senior geologist with experience implementing similar projects. The reviewer will ensure state and federal regulations are met, and will ensure the project can be implemented in the field as specified.
    b. **Monitoring Well Permit Review** - The project leader will ensure the monitoring well permit application to the Los Angeles Department of Public Health satisfies application requirements and contains appropriate and accurate project details.
    c. **Drilling Contractor Submittal Review** – The senior project geologist will be responsible for ensuring the contractor submittals comply with the intent of the technical specifications. In this task, the contractor's proposed equipment list, drilling fluids program, drilling plan, IDW management plan, well casing and screen, geophysical surveying firm and plan all meet the intent of the technical specifications. A detailed submittal log and any changes or corrections to the contractor's approach will be documented.
    d. **Groundwater Sampling QA/QC** – The quality objectives for field and laboratory analytical data in terms of precision, accuracy representativeness, comparability and completeness are described below. The goal of groundwater sampling is to collect samples that are "representative" of in-situ groundwater conditions and to minimize changes in groundwater chemistry during sample collection and handling. To that end, all samples collected will follow EPA sampling standards and procedures (summarized in "Ground-Water Sampling Guidelines for Superfund and RCRA Project Manager," EPA, 2002).

Quality Objectives for Field and Laboratory Analytical Data

Precision – Precision is a measure of internal method consistency that is demonstrated by the closeness in agreement in measurements of the same property of a sample. Replicate samples will be collected and precision will be calculated as to their relative percent difference. Precision objectives for field parameters to establish water stability and to trigger the sampling event are shown in Table 2. The field equipment used to measure these parameters will be calibrated according to the equipment manufacturer's standards prior to collecting measurements. The calibration will be performed by staff with knowledge and experience performing field calibration of the equipment.

Table 8 - 1. Precision of Water Quality Parameters to Meet Stable Water Objectives	
Parameter	**Precision Criteria**
Temperature	+/- 0.2 °Celsius
pH	+/- 0.2 standard pH units
Specific Conductance	+/- 3% ?S/cm
Oxidation-Reduction Potential (ORP)	+/- 3% mV

Accuracy – Accuracy is the degree of agreement between an observed value and an accepted value. To detect bias relevant to sampling procedures, field and trip blanks will be collected. Concentrations in the blank samples for the parameters of interest should be less than the laboratory-reporting limit.

Quality Assurance (Samples) – To determine whether quality objectives are being achieved through the usage of clean sampling procedures and uniform sampling methodologies, quality assurance replicate and blank samples will be collected. Replicate (sequential filling of two bottles for each analysis from the same source, samples will be collected. A trip blank from **Dl** or reagent Dl source water will be a check on the source water sampling crews use in preparing blanks and/or in decontaminating equipment. If the analytical blanks are negative for the parameters of interest, then groundwater field sampling staff will have demonstrated that its cleaning methods are sufficient to meet project quality objectives, particularly as it relates to decontamination issues.

Clean Sampling Procedures, Equipment Decontamination, and Equipment Blanks – It is critical to quality objectives that field-sampling crews adhere to strict rules of hygiene when working with sampling equipment and utilize rigorous protocols to clean equipment after each sampling event (when applicable). Prevention of potential contaminant carryover between/among wells and provability (demonstration) of that capability is critical to establishing representativeness and comparability of results. Field sampling crews will at all times be wearing clean powder free, latex exam gloves when in physical contact with sampling equipment, supplies or fluids. Gloves will be provided in abundance and liberally used. For instance, gloves used to pre-clean the water level measurement probe, should not be in use during sample collection, and gloves used for sample collection should not be used for equipment decontamination. If working with generators, fuel/oil or other "dirty" items, gloves should be replaced. The rule of thumb would be to change gloves any time the work task changes (which would also include restroom or food breaks). All non-perishable equipment that will be introduced into the well bore must be cleaned with a

1% solution of Liqui-Nox, followed by a deionized (DI) water rinse if not previously cleaned and stored in a clean environment. The cleaning and rinsing can be either in the form of a spray, a bath (submerged in a vessel of cleaner and/or Dl or a pump through method (circulation of Liqui-Nox/DI through pump to contact its interior parts) depending on the size of the piece of equipment and it intended use.

If a submersible pump is utilized to collect samples, pump decontamination (DECON) will closely follow USGS NFM Section A3.3.9.B (for submersible pumps when sampling for inorganic substances). Pump cleaning procedures will be initiated after powering down the system (generator/converter). The pump, power lead and tubing will be retrieved. The power lead will be cleaned like the Solinst electronic tape (described earlier) and the tubing will be discarded. To clean and rinse both the internal and external parts of the pump a series of stations will be set up for cleaning and rinsing and blank sample preparation. Three or four receiving receptacles (wells) large enough to accommodate the submersible pump will include: (1) Liqui-Nox for cleaning; (2) freshwater for intermediate rinse; (3) laboratory deionzed (DI) water for final rinse; and (4) laboratory grade reagent water for blank preparation (if applicable). Short sections (4-6 inches in length) of clean tubing will need to be cut for use at the decontamination station. The short piece of tubing is coupled to the pump's discharge aperture and the pump is lowered into the first well. The generator is restarted and prepared to deliver power to the pump from the converter. Cleaner is circulated through the pump for 2-3 minutes. This process is repeated at the second and third stations. A field blank to test this cleaning procedure will be to place the pump into the well at station 4, fill with reagent grade Dl water and pump through and into sample bottles. Accessory pieces of equipment or supplies that require decontamination before reuse include the manual/electric bailer retrieval reels, manifold, sample and decontamination tubing and the cleaning/rinsing/QA "wells." Decontamination of these items will be accomplished by either spraying/wiping alternating Liqui-Nox and Dl or with two-stage bath (soak/scrub) in Liqui-Nox /DI. Field blank preparation for these items after they have been processed in Liqui-Nox and rinsed with Dl will include a third bath containing reagent grade Dl water.

Chain of Custody and Sample Handling – A chain of custody (COC) document will be submitted with all samples. Each COC completed will document the following information for each sample or group of samples submitted to the certified laboratory for analysis:

- Agency name, monitoring well number
- The sampler's name (printed), signature, and affiliation
- The date and time the samples were relinquished to the courier, to other staff, or to the laboratory
- List of analytical parameters to be measured
- Method of sample preservation
- The sample type code which corresponds to (environmental, replicate, or blank)
- The sample date and time for each corresponding sample
- The total number of sample containers that accompany the particular COC
- Sample delivery mode (by courier or field sampling crew)
- Mailing address of NCWD for billing purposes and for analytical results delivery
- Signature, date, and record the time of sample delivery

Data Review, Validation, and Verification – Data collected will be entered into a spreadsheet (Microsoft Excel® software). Upon data entry completion, the resulting spreadsheet will be double-checked for completeness and to confirm that parameter values are matched with the correct monitoring

well. The project leader will be responsible for data summary, validation, and ensuring the data are reported accurately in the final well installation report.

Final Well Installation Report Review – The final well installation report will be reviewed by the senior project geologist and project stakeholders to ensure the data presented meets the goals of the GWMP.
Performance – The project leader will ensure the QA/QC plan is fully implemented, and will continuously monitor the status of the project schedule and budget to ensure efficient project performance and quality deliverables.

Managing Change – While the team will attempt to avoid unnecessary change, all projects can be susceptible to changes during the execution of the work plan, and the project leader must provide clear, consistent direction and leadership when confronted with any changes. The project leader will coordinate with the project team continuously throughout the project and anticipate change based on what the leader hears and observes from the project team. Monthly status reports and prior notification of potential changes will ensure concurrence on the path forward, should major changes be warranted during the project delivery process.