

ATTACHMENT 8 : QUALITY ASSURANCE

Quality Assurance / Quality Control (QA/QC) Plans will be developed for each of the six projects that form this grant funded program. Details of the likely components of each plan (by project) are as follows:

Project 1 – North SEBP Basin Characterization Study

Project 1 involves installing a new monitoring well within the northern portion of the South East Bay Plain Groundwater Basin. EBMUD anticipates that a consulting geotechnical engineering firm will be hired to supervise the well drilling effort (including the hiring of drillers). As such, the consultant will be asked to submit a workplan prior to the installation of the monitoring well. Said workplan is expected to include the following components:

- Copies of County Well Construction Permits
- Rationale for monitoring well location selection
- Equipment decontamination procedures (as necessary)
- Health and Safety Plan
- Map of existing nearby wells
- Casing diameter
- Borehole diameter
- Depth of surface seal
- Well construction materials
- Diagram of proposed well construction details
- Type of well cap, bottom cap either screw on or secured with stainless steel screws
- Size of perforations and rationale
- Grain size of sand pack and rationale
- Thickness and position of bentonite seal and sand pack
- Depth of well, length and position of perforated interval

The workplan is also anticipated to include well development details, methods to be used for well development and method of determining when well development is completed

Following the field work, the consultant will prepare a Monitoring Well Installation Report that details the following:

- Well Construction:
 - Depth of well drilled
 - Date(s) well was drilled and completed
 - Description of drilling and construction
 - Scaled map of well site illustrating nearby features such as adjacent wells, buildings, storage ponds, waste piles, etc.
- A well construction diagram that contains:
 - Drilling Contractor and driller name
 - Depth of open hole (same as total depth drilled if no caving occurs)
 - Method and materials of grouting excess borehole

- Length of slotted casing installed
- Depth of bottom of casing
- Depth to top of sand pack
- Thickness of sand pack
- Depth to top of bentonite seal
- Thickness of bentonite seal
- Thickness of concrete grout
- Boring diameter
- Casing diameter
- Casing material
- Size of perforations
- Well elevation at top of casing
- Stabilized depth to groundwater
- Date of water level measurement

Field work and reports will be prepared by a California licensed professional engineer or geologist. EBMUD's project manager (also a California licensed professional engineer) will review the workplan and determine if proper field and office QA/QC procedures are proposed to be followed. The Monitoring Well Installation Report will serve as an additional means to document the QA/QC measures taken.

Project 2 – Groundwater Level Monitoring Improvements

Project 2 will consist of installing dedicated water level monitoring instruments in five existing wells located within the City of Hayward municipal boundary. Instrumentation will be capable of logging (recording) data locally (at the well) and of transmitting data to a centralized database for use by groundwater basin managers (via download).

This exercise is also expected to be performed by a consultant engineer on behalf of the City of Hayward. The Consultant will be responsible for the development of plans and specifications for the procurement of monitoring equipment. That same consultant will then install said equipment in City of Hayward wells. A California registered engineer shall supervise the development of the plans and specifications as well as the installation of monitoring equipment. Further, the consultant will install software (on City of Hayward Computers) that translates monitoring data as collected; test the equipment installed and the translation process; and prepare a monitoring Technical Memorandum to document the work effort (and procedures used to QA/QC the probe installation).

There is a warranty period that will come with the probes as purchased, hence if there are problems with the equipment, replacement probes can easily be installed.

Any survey work as necessary for Project 2 will be conducted to establish reference datum for monitoring wells instrumentation.

The field work will be performed by one of EBMUD's 3-man crews, of which the party chief will be a State of California Licensed Land Surveyor. Office work, including the preparation of technical report documenting the survey results, will also be supervised by a California licensed land surveyor.

The technical report will detail well features such as top of casing, horizontal and vertical coordinates, etc. The survey shall be accurate to +/- 0.01 ft. (greater accuracy may be possible, however).

Project 3 and Project 4 – Water Quality Sampling (in EBMUD Service area and in City of Hayward Service Area)

Project 3 involves the collection of water quality samples from key monitoring wells within the portion of the South East Bay Plain Basin that lies within the EBMUD service area. Project 4 involves the collection of water quality samples from key monitoring wells within the portion of the South East Bay Plain Basin that lies within the City of Hayward Service Area.

Samples collected will be sent to EBMUD's in-house water quality laboratory for analysis. A summary laboratory report will be prepared that will be used for input into a basin-wide water quality database.

EBMUD water quality sampling staff will perform the sampling (they have developed QA/QC procedures that are rigidly followed for collection of water quality samples for monitoring wells. Generally, the following is adhered to:

- Adherence to any required well purging method (noting the amount of purge water, plus, as required, purge water storage methods);
- Use of acceptable sample containers, collection methods, and preservation method (as based on parameters sampled for and as directed by EBMUD's in-house water quality testing laboratory);
- Documenting the sample volumes, sample containers used, preservation agents as required, and hold times;
- Identification of analytical laboratory (if, for some reason, EBMUD's in-house laboratory can not be used for a particular test); and
- Chain of custody procedures

Project 5 - Hydrogeological Database and Groundwater Model Improvements

As part of Project 5, an existing ArcHydro hydrogeological database will be augmented with new water quality data, water level data, pumping data, and lithologic data collected under this grant-funded program. Using that improved database, an existing groundwater model as prepared as part of the development of the South East Bay Plain Basin Groundwater Management Plan will be populated with this new, enhanced data.

As a QA/QC procedure, the groundwater model will be run, to identify how closely the model results mimic those observed in the field at the time of sampling.