EXHIBIT 2-A

MONTEREY PENINSULA
AQUIFER STORAGE AND RECOVERY PROJECT

SAMPLING AND ANALYSIS PLAN

Prepared for:

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GROUNDWATER SAMPLING AND ANALYSIS PLAN

INTRODUCTION

This Groundwater Sampling and Analysis Plan (SAP) has been developed for the Monterey Peninsula Aquifer Storage and Recovery (ASR) Project. The project is cooperatively implemented by the Monterey Peninsula Water Management District (MPWMD or District) and California American Water (CAW), and generally involves the diversion of excess winter/spring flows from the Carmel River system for recharge, storage and subsequent recovery in the Seaside Groundwater Basin (SGB). Treated (potable) drinking water from the CAW distribution system is injected into the Santa Margarita Sandstone aquifer in the SGB via four existing ASR wells located at two ASR facilities in the SGB. The injected water is stored within the aquifer and subsequently recovered into the CAW distribution system during dry periods. The overall objective of the project is to facilitate the conjunctive use of water supplies in the Carmel River system and SGB that will benefit the resources of both systems.

ASR operations generally consist of three components or phases: (1) injection of drinking-quality water into the aquifer through the ASR wells; (2) storage of the injected water within the aquifer; and, (3) recovery of the stored water by pumping at one or more of the ASR wells. Periodic samples of the injected, stored, and recovered waters are to be collected from the ASR wells and associated monitoring wells and analyzed for a variety of water-quality constituents pursuant to requirements of the Central Coast Regional Water Quality Control Board (RWQCB) for the project.

The purpose of this SAP is to identify the locations, sample collection frequency, and parameters to be monitored as part of the project's ongoing water-quality data collection program. The project location and associated wells in the SGB are shown on **Figure 1**.

GROUNDWATER MONITORING

Groundwater Monitoring Wells

ASR Project On-Site Wells. There are two ASR facilities located in the SGB; the Santa Margarita and Seaside Middle School ASR Facilities. Groundwater monitoring wells for collection of on-site water-quality samples include four ASR wells and two associated monitoring wells that have been constructed at the two ASR facilities.

All four existing ASR wells are completed solely within the Santa Margarita Sandstone (Tsm) aquifer. Two of the ASR wells are located at the Santa Margarita (SM) ASR Facility and are designated as ASR-1 and ASR-2 and two are located at the Seaside Middle School (SMS) ASR Facility and are designated as ASR-3 and ASR-4.

In addition to four ASR wells, there are two on-site monitoring wells (one located at each ASR facility) that are also completed solely within the Tsm aquifer. SM MW-1 is located at the SM ASR Facility and SMS Deep MW is located at the SMS ASR Facility. An additional monitoring well is located at the SMS ASR Facility that is completed within the overlying Paso Robles aquifer, designated as SMS Shallow MW. This well is instrumented with a submersible water-level transducer/data logger unit to observe the water-level response of this aquifer to ASR operations (it is not designed or equipped for collection of water-quality samples).

The locations of the ASR wells and on-site monitoring wells are shown on **Figure 2**. A summary of the on-site wells is presented in **Table 1** below:

Table 1. On-Site Wells Summary

Well ID	Distance from ASR Well (feet)				Aquifer Completed
	ASR-1	ASR-2	ASR-3	ASR-4	
ASR-1	--	280	1,380	1,760	Tsm
ASR-2	280	--	1,235	1,600	Tsm
SM MW-1	90	190	1,325	1,700	Tsm
ASR-3	1,380	1,235	--	385	Tsm
ASR-4	1,760	1,600	385	--	Tsm
SMS Deep MW	1,380	1,240	20	385	Tsm
SMS Shallow MW	1,415	1,265	25	350	QTp

Table 1 Notes:

Tsm: Santa Margarita Sandstone aquifer
QTp: Paso Robles aquifer

Off-Site SGB Wells. In addition to the on-site wells at the two ASR facility sites, submersible water-level transducer/data logger units have been installed at seven off-site District monitoring well sites in the SGB to observe the water-level response of the aquifer system to ASR operations. The locations of the off-site monitoring wells are shown on **Figure 1**. The distances from each of the ASR facilities and aquifers monitored by the off-site wells are summarized in **Table 2** below:

Table 2. Off-site Monitoring Wells Summary

Well ID	Distance from ASR Facility (feet)		Aquifer Monitored
	SM	SMS	
Paralta Test	680	740	QTp & Tsm
Ord Grove Test	1,540	2,535	QTp & Tsm
Ord Terrace (Deep)	2,275	2,910	Tsm
FO-7 (Deep)	4,265	3,700	Tsm
FO-7 (Shallow)			QTp
PCA East (Deep)	6,390	6,200	Tsm
PCA East (Shallow)			QTp
FO-9 (Deep)	7,290	6,125	Tsm
FO-8 (Deep)	7,585	6,450	Tsm

Table 2 Notes:

Monitoring well distances are measured to centroid of each ASR site.
Tsm: Santa Margarita Sandstone aquifer
QTp: Paso Robles aquifer

In addition to water-level monitoring at the above off-site monitoring wells, CAW's Paralta municipal production well and PCA East Deep monitoring well have been designated as off-site monitoring wells for periodic water-quality sampling as part of this SAP (refer to **Table 4**).

Groundwater Monitoring Equipment

The equipment required to perform the groundwater monitoring as prescribed in the SAP includes:

- Sampling Pumps
- Pressure Transducers/Data Loggers
- Electric Water Level Sounder
- Field Water Quality Monitoring Devices
- Flow-Thru Cell Device(s)
- Sample Containers
- Coolers and Ice

Each of the on-site wells is equipped with a dedicated pump. The ASR wells are equipped with water-lubricated, vertical line-shaft turbine pumps. SM MW-1, SMS Deep MW, and PCA East Deep are equipped with submersible sampling pumps. Paralta is equipped with a submersible production pump. The flow rates for each monitored wells are measured using

in-line totalizing flow meters. Sampling ports on the well-head piping at each well allow for the collection of grab samples during injection and pumping operations.

Field water-quality monitoring is to be performed using various instruments that allow for the field analysis of a variety of constituents, including but not limited to: chlorine residual, conductivity, dissolved oxygen, pH, temperature, redox/ORP, and Silt Density Index (SDI). The field water-quality monitoring devices are to be routinely calibrated as prescribed in the operating procedures manual for each device.

All of the ASR and monitoring wells are instrumented with dedicated pressure/level transducers and dataloggers. Reference-point elevations have been established by surveying on each of the monitored wells. Static water-levels in each of the wells are to be measured with an electric sounder on a quarterly basis (minimum) and the transducers calibrated accordingly. The transducers are to be programmed with the reference static water-level and the data-collection interval, which will measure and record the water level in each of the wells a minimum of four times per day.

Purging and Sampling

During injection periods, samples of the injectate are to be collected directly at one of the ASR wellheads while active injection is occurring. During storage periods, each of the ASR wells that has been utilized for injection during the season will be periodically purged and sampled. During recovery periods, one or more of the ASR well pumps will be operating and purging is continuous and sustained. Groundwater samples are also to be collected routinely during all three ASR periods (i.e., injection, storage and recovery) from both the on-site monitoring wells (SM MW-1 and SMS Deep MW) and periodically from the far-field off-site monitoring wells (Paralta and PCA-E Deep).

The existing pumps will be used to purge a volume equivalent to a minimum of three (3) casing volumes from the well prior to sampling. Purge water from the ASR wells during backflushing and sampling is to be discharged to the backflush pit at the SM ASR Facility and percolated back into the SGB. Water produced by the ASR well(s) during recovery period operations is to be pumped into the CAW potable water supply system for distribution (in accordance with Department of Drinking Water approvals). Purge water from the monitoring wells will be directed to either the SM backflush pit or to the ground away from the wellheads and percolated back into the SGB.

During purging and prior to sampling, field water-quality parameters of temperature, pH and specific conductance are to be monitored. Stabilization of these water-quality parameters will indicate when collection of a representative sample is obtainable.

Chain-of-Custody, Sample Handling, and Transport

All samples collected will be labeled in a clear and precise way for proper identification in the field and for tracking in the laboratory. All sample shipments for analyses will be accompanied by a chain-of-custody record. Forms will be completed and sent with the samples

for each shipment. The chain-of-custody form will identify the contents of each shipment and maintain the custodial integrity of the samples. Samples will be placed in a cooler for delivery to the laboratory.

Documentation Procedures

Field data will be recorded by field personnel and routinely submitted to the Project Manager for review and QA/QC. Field data will include the completed field sampling-log form and chain-of-custody records. At a minimum, documentation of each monitoring and sampling event will include the following information:

- Sample location and description
- Sampler's name(s)
- Date and time of sample collection
- Type of sampling equipment used
- Field instrument calibration procedures and results
- Field instrument readings
- Field observations and details related to analysis or integrity of samples (e.g., weather conditions, noticeable odors, colors, etc.)
- Sample preservation
- Shipping arrangements
- Name(s) of recipient laboratory
- Any deviations from SAP procedures

Project information will be filed by Water Year. The project file will contain project field data, correspondence, survey reports, laboratory reports, charts, tables, permits, and other project-related information. This information will be utilized in the preparation of the annual Summary of Operations Reports for the project.

LABORATORY PROGRAM

A complete list of constituents and constituent “groups” to be monitored as part of the ASR Project for injected, stored, and recovered waters is presented in **Table 3** below. **Table 4** summarizes the planned sample constituent group frequencies for each source for the injection, storage, and recovery periods.

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Table 3. Analytic Testing Program Constituent Summary

Constituent	PQL	General Parameters	Disinfection Byproducts	Supple-mental	Field[1]
Group ID		**G-1**	**DBP**	**S-1**	**F-1**
Major Cations					
Calcium (Ca)	1 mg/L	✓			
Magnesium (Mg)	1 mg/L	✓			
Sodium (Na)	1 mg/L	✓			
Potassium (K)	0.5 mg/L	✓			
Major Anions					
Total Alkalinity (as $CaCO_3$)	10 mg/L	✓			
Sulfate (SO_4)	1 mg/L	✓			
Chloride	1 mg/L	✓	✓		
Nitrate as (NO3)	1 mg/L	✓			
Nitrite as (Nitrogen)	0.1 mg/L	✓			
General Physical					
pH	0.1 units	✓			✓
Temperature	0.5 ^{0}C				✓
Specific Conductance (EC)	10 uS	✓			✓
ORP (redox potential / Eh)[2]	10 mV				✓
Total Dissolved Solids (TDS)	10 mg/L	✓			
Metals					
Aluminum (Al)	10 ug/L			✓	
Antimony (Sb)	1 ug/L			✓	
Arsenic (As)	1 ug/L			✓	
Barium (Ba)	0.5 mg/L			✓	
Beryllium (Be)	1 ug/L			✓	
Cadmium (Cd)	0.5 ug/L			✓	
Chromium (Cr) (Total)	2 ug/L			✓	
Fluoride (F)	0.1 mg/L			✓	
Iron (Fe) (Total and Dissolved)	50 ug/L	✓			
Lithium (Li)	5 ug/L			✓	
Manganese (Mn) (Total and Dissolved)	10 ug/L	✓			
Molybdenum (Mo)	5 ug/L			✓	
Mercury (Hg) (Total and Dissolved)	0.5 ug/L			✓	
Nickel (Ni)	10 ug/L			✓	
Selenium (Se)	5 ug/L			✓	
Strontium (Sr)	5 ug/L			✓	

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Constituent	PQL	General Parameters	Disinfection Byproducts	Supple-mental	Field[1]
Group ID		**G-1**	**DBP**	**S-1**	**F-1**
Thallium (Tl)	1 ug/L			✓	
Uranium (U)	1 pCi/L			✓	
Vanadium (V)	5 ug/L			✓	
Zinc (Zn)	0.5 ug/L			✓	
Miscellaneous					
Ammonia (as N)	0.05 mg/L	✓			
Boron (B)	0.05 mg/L	✓			
Chlorine residual (free)	0.1 mg/L				✓
Chloramines	50 ug/L		✓		
Cyanide	5 ug/L			✓	
Dissolved Methane	0.5 ug/L			✓	
Dissolved Oxygen (DO)[2]	0.025 mg/L				✓
Gross Alpha	1 pCi/L			✓	
Hydrogen Sulfide (H_2S)	0.05 mg/L				✓
Total Nitrogen (N)	0.2 mg/L	✓			
Perchlorate	2 ug/L			✓	
Total Phosphorous	0.05 mg/L	✓			
Orthophosphate as P	0.05 mg/L	✓			
Radium 226	1 pCi/L			✓	
Silt Density Index (SDI)	0.1 units				✓
Total Kjehldahl N (TKN)	0.2 mg/L	✓			
Organic Analyses					
Total Trihalomethanes (TTHM)	1 ug/L		✓		
Bromodichloromethane	1 ug/L		✓		
Bromoform	1 ug/L		✓		
Chloroform	1 ug/L		✓		
Dibromochloromethane	1 ug/L		✓		
Haloacetic Acids (HAA)	1 ug/L		✓		
Monobromoacetic Acid	1 ug/L		✓		
Monochloroacetic Acid	1 ug/L		✓		
Dibromoacetic Acid	1 ug/L		✓		
Dichloroacetic Acid	1 ug/L		✓		
Trichloroacetic Acid	1 ug/L		✓		
Organic Carbon (Total and Dissolved)	0.1 mg/L	✓			

Table 3 Notes:

1 – Field Parameters (Group F-1) must be taken concurrently with collection of all laboratory samples.

2 – ORP and DO must be analyzed utilizing a flow-thru cell device.

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Table 4. Analytic Testing Program Schedule

INJECTION PERIOD (active injection)			
Analyte Group	**Injectate**	**On-Site MWs**	**Off-Site MWs**
F-1	Bi-Weekly	Bi-Weekly	Semiannually
DBP	Monthly	Monthly	Semiannually
G-1	Quarterly	Quarterly	Semiannually
S-1	Quarterly	Quarterly	Semiannually
STORAGE PERIOD			
Analyte Group	**ASR Wells**	**On-Site MWs**	**Off-Site MWs**
F-1	Monthly	Monthly	Semiannually
DBP	Monthly	Monthly	Semiannually
G-1	Quarterly	Quarterly	Semiannually
S-1	Quarterly	Quarterly	Semiannually
RECOVERY PERIODS			
Analyte Group	**ASR Wells**	**On-Site MWs**	**Off-Site MWs**
F-1	Bi-Weekly[1]	Bi-Weekly	Semiannually[2]
DBP	Monthly	Monthly	Semiannually[2]
G-1	Quarterly	Quarterly	Semiannually[2]
S-1	Quarterly	Quarterly	Semiannually[2]

Table 4 Notes:

1 – During active recovery for any given ASR well.
2 – Near the beginning and end of the SGB production/recovery season (e.g., in June and November).

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PUEBLO water resources

FIGURE 1. PROJECT LOCATION MAP
Monterey Peninsula ASR Project
Sampling and Analysis Plan

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PUEBLO water resources

FIGURE 2. SITE LOCATION MAP
Monterey Peninsula ASR Project
Sampling and Analysis Plan