CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

REVISED MONITORING AND REPORTING PROGRAM R5-2020-0809-01 FOR WESTLANDS WATER DISTRICT AGRICULTURAL AQUIFER STORAGE AND RECOVERY PROJECT FRESNO AND KINGS COUNTIES

This Revised Monitoring and Reporting Program (MRP) is issued pursuant to California Water Code section 13267 and supersedes MRP R5-2020-0809, which was issued on 1 April 2020 for the Westlands Water District (Westlands) Agricultural Aquifer Storage and Recovery (Ag-ASR) Project. Westlands has submitted a report of waste discharge to implement the Ag-ASR Project through the Westlands Groundwater Sustainability Agency (GSA) in the Westside Subbasin in Fresno County. This MRP describes requirements for monitoring the injection well water, extracted water, and groundwater as part of the Ag-ASR Project. Westlands shall not implement any changes to this MRP unless and until the Central Valley Regional Water Quality Control Board (Central Valley Water Board) adopts, or the Executive Officer issues, a revised MRP.

On 3 July 2019, a Report of Waste Discharge (RWD) was submitted for the project by Westlands. The project proposes implementation of a programmatic Ag-ASR project utilizing up to 28,000 acre-feet per year of Central Valley Project water from the San Luis Canal, flood flows from the Kings and San Joaquin Rivers, and from other sources such as water transfers and exchanges.

The RWD states that treatment would be limited to filtration, periodic chlorination, and other amendments such as magnesium chloride for clay stabilization or acid for well rehabilitation. Agricultural sand media filters with #20 sand will be utilized and will typically operate at less than 12.5gpm/square feet (half of rated capacity). Chlorine will be injected downstream of the filters prior to backwash every three weeks or more, if needed, at approximately 100-300 parts per million (ppm) free chlorine. The RWD states that backwash will occur after chlorine injection ensuring most of the chlorine residual would be recovered during backwashing operations. The RWD indicates that other amendments such as magnesium chloride or acid injection may be used if needed for clay interlayer stabilization or well rehabilitation.

A 2 August 2019 Central Valley Water Board letter states the RWD had sufficient information to draft tentative waste discharge requirements for the Ag-ASR Project and that the 3 July 2019 RWD satisfied Water Code, Section 13260. The letter further indicates that prior to commencing operation of the Ag-ASR project that Westlands must satisfy the applicable timelines in Water Code Section 13264, including satisfying CEQA. A Notice of Determination was filed on 7 October 2019 for a 30 August 2019 Mitigated Negative Declaration for the Project. The Central Valley Water Board staff intends to draft waste discharge requirements as time allows. In the interim, to collect additional data to fully characterize the Ag-ASR Project and ensure the protection of underlying groundwater, this Revised MRP is issued for the Ag-ASR Project. This Revised MRP considers data gathered to date and changes to the MRP requested by Westlands in a letter dated 3 March 2022. Figure B-1 from the 3 March 2022 letter showing well locations is attached.

Due to the drought conditions, water was only injected into the aquifer during early 2020. Water samples collected during 2020 from both the injected and extracted water did not contain giardia or cryptosporidium.

Section 13267, subsection (b)(1) of the California Water Code states:

> *"In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge, waste outside of its region that could affect the quality of waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports."*

Section 13268 of the California Water Code states, in part:

> *"(a)(1) Any person failing or refusing to furnish technical or monitoring program reports as required by subdivision (b) of Section 13267, failing or refusing to furnish a statement of compliance as required by subdivision (b) of Section 13399.2, or falsifying and information provided therein, is guilty of a misdemeanor and may be liable civilly in accordance with subdivision (b).. . .*
>
> *(b)(1) Civil liability may be administratively imposed by a regional board in accordance with Article 2.5 (commencing with section 13323) of Chapter 5 for a violation of subdivision (a) in an amount which shall not exceed one thousand dollars ($1,000) for each day in which the violation occurs."*

If monitoring consistently shows no significant variation in magnitude of a constituent concentration or parameter after at least 24 months of monitoring, the Discharger may request this MRP be revised to reduce monitoring frequency. The proposal must include adequate technical justification for reduction in monitoring frequency.

Pursuant to Section 13267 of the California Water Code, Westlands shall implement this MRP and shall submit the required monitoring reports described herein.

A glossary of terms used in this MRP is included on the last page.

I. GENERAL MONITORING REQUIREMENTS

A. FLOW MONITORING

Hydraulic flow rates shall be measured at the monitoring points specified in this MRP. All flow monitoring systems shall be appropriate for the conveyance system (i.e., open channel

flow or pressure pipeline) and liquid type. The measurements may be based on flow meter readings or pump run time estimates. The method of measurement must be specified. Unless otherwise specified, each flow meter shall be equipped with a flow totalizer to allow reporting of cumulative volume as well as instantaneous flow rate. Flow meters shall be calibrated at the frequency recommended by the manufacturer and records of calibration shall be maintained for review upon request.

B. MONITORING AND SAMPLING LOCATIONS

Samples shall be obtained at the monitoring points specified in this MRP. The Central Valley Water Board Executive Officer shall approve any proposed changes to sampling locations prior to implementation of the change.

Westlands shall monitor the following locations to demonstrate compliance with the requirements of this MRP:

Table 1 - Monitoring Location Designations

Monitoring Location	Monitoring Location Description
IW-001 through IW-XXX	Monitoring of each injection well used for the Ag-ASR Project.
SW-001 through SW-XXX	Monitoring of each surface water source used for the Ag-ASR Project prior to injection into injection well(s).
EW-001 through EW-XXX	Monitoring of each extraction well used for the Ag-ASR Project.
GW-001 through GW-XXX	Groundwater Aquifer Monitoring. Drinking water wells (or other wells) used to monitor the groundwater aquifer(s) to evaluate the Ag-ASR Project's impact on underlying groundwater.

C. SAMPLING AND SAMPLE ANALYSIS

All samples shall be representative of the volume and nature of the water or matrix of material sampled. Except as specified otherwise in this MRP, grab samples will be considered representative of water, wastewater, soil, solids/sludges and groundwater. The time, date, and location of each sample shall be recorded on the sample chain of custody form.

Field test instruments (such as those used to measure pH, temperature, electrical conductivity, dissolved oxygen, wind speed, and precipitation) may be used provided that:

1. The operator is trained in proper use and maintenance of the instruments;
2. The instruments are field calibrated at the frequency recommended by the manufacturer;
3. The instruments are serviced and/or calibrated by the manufacturer at the recommended frequency; and
4. Field calibration reports are submitted as described in the "Reporting" section of this MRP.

Laboratory analytical procedures shall comply with the methods and holding times specified in the following (as applicable to the medium to be analyzed):

- *Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater* (EPA);
- *Test Methods for Evaluating Solid Waste* (EPA);
- *Methods for Chemical Analysis of Water and Wastes* (EPA);
- *Methods for Determination of Inorganic Substances in Environmental Samples* (EPA);
- *Standard Methods for the Examination of Water and Wastewater* (APHA/AWWA/WEF); and
- *Soil, Plant and Water Reference Methods for the Western Region* (WREP 125).

Approved editions shall be those that are approved for use by the United States Environmental Protection Agency (EPA) or the State Water Resources Control Board (State Water Board), Division of Drinking Water's Laboratory Accreditation Program (ELAP). Westlands may propose alternative methods for approval by the Executive Officer. Where technically feasible, laboratory reporting limits shall be lower than the applicable water quality objectives for the constituents to be analyzed.

II. SPECIFIC MONITORING REQUIREMENTS

A. INJECTION WELL MONITORING

All injection wells used, as part of the Ag-ASR Project, to inject surface water into an aquifer shall be monitored as described in Table 2 below. Monitoring of the injection wells shall include, at a minimum, the items specified in Table 2 below.

Table 2 - Injection Well Monitoring

Constituent/Parameter	Units	Sample Type	Frequency
Well Operational Status (see 1 below)	N/A	Recorded	Monthly
Number of days of injection	days	Recorded	Monthly
Daily Average Injection Rate	gpd	Meter	Continuous
Injected Water, cumulative total for year to date	ac-ft/yr	Meter	Continuous

1 Well Operational Status shall be reported for each well associated with the Ag-ASR Project. Injection activity shall be recorded on a monthly basis in a way in which the daily average injection rate can be calculated.

B. SOURCE WATER MONITORING

Injected water shall be monitored during periods when injection is occurring. Monitoring specified in Table 3 below shall be conducted for each source of surface water used during the quarter (i.e., a representative San Luis Canal turnout location and from the Fresno Slough when flood flows are available). Monitoring of the source water, shall include, at a minimum, the items specified in Table 3 below.

Table 3 - Source Water Monitoring

Constituent/Parameter	Units	Sample Type	Frequency
pH	S.U.	Grab	Monthly
Electrical Conductivity	µmhos/cm	Grab	Monthly
Total Dissolved Solids	mg/L	Grab	Monthly
General Minerals	mg/L	Grab	Monthly
Arsenic	µg/L	Grab	Monthly
Total Coliform	MPN/100 mL	Grab	Monthly
Total Trihalomethanes	µg/L	Grab	Monthly
Total Chromium	µg/L	Grab	Quarterly
Uranium	pCi/L	Grab	Quarterly
Vanadium	µg/L	Grab	Quarterly

C. EXTRACTION WELL MONITORING

The following extraction wells shall be monitored, at a minimum, for the items specified in Table 4 below:

1. Extraction wells used for injection of at least 20-acre feet of water in the previous or current calendar year.

2. Extraction wells used for recovery pumping in the current calendar year.

The monitoring of the extraction wells shall occur at the frequency in Table 4 until a minimum of twice the injected volume has been recovered. Monitoring is only required during quarters when injected water is being extracted (i.e., wells do not need to be turned on solely for the purpose of collecting water samples).

Table 4 - Extraction Well Monitoring

Constituent/Parameter	Units	Sample Type	Frequency
Well Activity (see 1 below)	N/A	Recorded	Quarterly
Average Pumping Rate	gpd	Meter	Continuous
Extracted Water/Year (see 2 below)	ac-ft/yr	Meter	Continuous
pH	S.U.	Grab	Quarterly
Electrical Conductivity	µmhos/cm	Grab	Quarterly
Total Dissolved Solids	mg/L	Grab	Quarterly
Total Coliform	MPN/100 mL	Grab	Quarterly
General Minerals	mg/L	Grab	Quarterly
Arsenic	µg/L	Grab	Quarterly(see 3 below)
Total Chromium	µg/L	Grab	Quarterly(see 3 below)
Uranium	pCi/L	Grab	Quarterly(see 3 below)

Constituent/Parameter	Units	Sample Type	Frequency
Vanadium	µg/L	Grab	Quarterly(see 3 below)
Primary Bio-indicators(see note 4 below)	Count / 100 gal	Grab	Quarterly(see 3 below)
Total Trihalomethanes	µg/L	Grab	Quarterly(see 3 below)

1. Well activity shall be reported for all wells associated with the Ag-ASR Project. Injection/extraction activity shall be recorded on a daily basis. The monitoring report shall specify the latitude/longitude of the well and the length and depth of the well screen. The report shall also indicate if the well is screened above or below the Corcoran Clay (or both).
2. Extracted Water/Year represents the total amount of water extracted from a well for the calendar year.
3. For each new extraction well added to the Ag-ASR Project, initial monitoring for arsenic, total chromium, uranium, vanadium, primary bio-indicators, and total trihalomethanes shall be quarterly for the first two quarters of groundwater recovery after the first major (>3 months) period of injection. If an MCL is exceeded, or primary bio-indicators indicate the presence of giardia or cryptosporidium, then quarterly analysis shall continue until there have been two consecutive quarterly results at less than the MCL or into the next recovery cycle, whichever is sooner. Otherwise, if the initial quarterly monitoring does not show exceedances of an MCL and primary bio-indicators do not indicate the presence of giardia or cryptosporidium, future sampling for these constituents (at that specific extraction well) shall be performed once three months after commencement of recovery pumping, but not more frequently than once every year.
4. Primary bio-indicators are to include giardia, cryptosporidium, diatoms, insect/larvae, plant debris, other algae, and rotifers.

D. GROUNDWATER AQUIFER MONITORING (GAM)

Westlands must monitor nearby drinking water wells and/or other wells (as determined by modeling or detected influence from nearby Ag-ASR wells) to demonstrate that all nearby drinking water wells are not placed under the influence of the Ag-ASR Project. Westlands should seek concurrence from the State Water Resources Control Board, Division of Drinking Water (DDW) on what wells need to be included in the GAM network. Currently identified GAM network wells include Wells 17-21N01 and 33E03 as shown on the attached Figure B-1. As additional wells are added to the GAM network, Westlands shall provide updated maps showing all GAM network wells. Those maps shall be attached to this MRP. All drinking water, agricultural, or monitoring wells added to the Groundwater Aquifer Monitoring Network shall be sampled and analyzed, at a minimum, according to the schedule presented in Table 5 below.

Table 5 - Groundwater Aquifer Monitoring Network

Constituent/Parameter	Units	Sample Type	Frequency
pH	S.U.	Grab	Quarterly

Constituent/Parameter	Units	Sample Type	Frequency
Electrical Conductivity	µmhos/cm	Grab	Quarterly
Depth to Groundwater	0.01 feet	Measurement	Quarterly
Groundwater Elevation (see 4 below)	0.01 feet	Calculation	Quarterly
Total Dissolved Solids	mg/L	Grab	Quarterly
Nitrate as N	mg/L	Grab	Quarterly
Arsenic	µg/L	Grab	Quarterly
Boron	µg/L	Grab	Quarterly
Iron	µg/L	Grab	Quarterly
Manganese	µg/L	Grab	Quarterly
Sulfate	mg/L	Grab	Quarterly
Total Coliform	MPN/100 mL	Grab	Quarterly
Giardia and Cryptosporidium	Count / 100 gal	Grab	Annually(see 1, 2, 3 below)
Primary Bio-indicators	Count / 100 gal	Grab	Annually(see 1, 2, 4 below)
Total Trihalomethanes	µg/L	Grab	Annually(see 1 below)

1. If primary bio indicators indicate the presence of giardia or cryptosporidium, then the sampling frequency shall be increased to quarterly and Central Valley Water Board staff shall be notified within 72 hours of receipt of the laboratory results.
2. Monitoring for Giardia and Cryptosporidium is only required when monitoring results indicate that Giardia or Cryptosporidium may be present.
3. Groundwater elevations shall be determined based on depth-to-water measurements using a surveyed elevation reference point on the well casing.
4. Primary bio-indicators are to include giardia, cryptosporidium, diatoms, insect/larvae, plant debris, other algae, and rotifers.

III. REPORTING REQUIREMENTS

All monitoring reports should be converted to a searchable Portable Document Format (PDF) and submitted electronically. Documents that are less than 50MB should be emailed to*: centralvalleyfresno@waterboards.ca.gov*. Documents that are 50 MB or larger should be transferred to a CD, DVD, or flash drive and mailed to the following address:

Central Valley Regional Water Quality Control Board
Region 5 – Fresno Office
1685 “E” St.
Fresno, California 93706

To ensure that your submittal is routed to the appropriate staff person, the following information should be included in the body of the email or transmittal sheet:

Program: Non-15
Facility: Westlands Water District Ag-ASR Program
Order: MRP R5-2020-0809
County: Fresno and Kings
Place ID: 828797

A transmittal letter shall accompany each monitoring report. The letter shall include a discussion of all violations of this MRP during the reporting period and actions taken or planned for correcting each violation. If Westlands has previously submitted a report describing corrective actions taken and/or a time schedule for implementing the corrective actions, reference to the previous correspondence will be satisfactory. The transmittal letter shall contain a statement by Westlands or Westlands' authorized agent certifying under penalty of perjury that the report is true, accurate and complete to the best of the signer's knowledge.

In reporting monitoring data, the Discharger shall arrange the data in tabular form so that the date, sample type (e.g., effluent, groundwater, etc.), and reported analytical result for each sample are readily discernible. The data shall be summarized in such a manner to clearly illustrate compliance with waste discharge requirements and spatial or temporal trends, as applicable. The results of any monitoring done more frequently than required at the locations specified in the Monitoring and Reporting Program shall be reported in the next scheduled monitoring report.

Laboratory analysis reports shall be included in the monitoring reports. All laboratory reports must also be retained for a minimum of three years. For a discharger conducting any of its own analyses, reports must also be signed and certified by the chief of the laboratory.

Monitoring information shall include the method detection limit (MDL) and the Reporting limit (RL) or practical quantitation limit (PQL). If the regulatory limit for a given constituent is less than the RL (or PQL), then any analytical results for that constituent that are below the RL (or PQL) but above the MDL shall be reported and flagged as estimated.

All monitoring reports that involve planning, investigation, evaluation or design, or other work requiring interpretation and proper application of engineering or geologic sciences, shall be prepared by or under the direction of persons registered to practice in California pursuant to California Business and Professions Code sections 6735, 7835, and 7835.1.

A. SEMI-ANNUAL MONITORING REPORTS

Semi-annual Monitoring Reports shall be prepared and submitted to the Central Valley Water Board by the 1st day of the second month following the semi-annual period (i.e., the January-June semi-annual report is due by 1st August and the July-December semi-annual report is due by 1st February). Each Semi-annual Monitoring Report shall include the following:

1. Results of the Injection Well Monitoring as specified in Section II.A.

2. Results of the Source Water Monitoring as specified in Section II.B.

3. Results of the Extraction Well Monitoring as specified in Section II.C.

4. Results of the Groundwater Aquifer Monitoring as specified in Section II.D.

5. Calculation of groundwater elevations, an assessment of ground flow direction and gradient on the date of measurement, comparison of previous flow direction and gradient data, and discussion of seasonal trends if any.

6. Summary data tables (in electronic format) of historical and current water table elevations and analytical results. The table shall summarize the latitude/longitude of each ASR or monitoring well and the length and depth of the well screen. The report shall also indicate if the well is screened above or below the Corcoran Clay (or both).

7. The report shall include an analysis of the data and evaluate the impact the Ag-ASR Project is having on underlying groundwater quality (e.g., compare Extraction Well and Groundwater Aquifer Monitoring to historical concentrations and to respective MCLs)

8. A scaled map showing relevant structures and features associated with the project, the locations of all Ag-ASR and Groundwater Aquifer Monitoring wells, and groundwater elevation contours referenced to mean sea level datum.

B. ANNUAL MONITORING REPORT

In addition to the above, the Discharger shall submit the following additional information as part of the Annual Monitoring Report due on **1st March** of each year.

1. Tabular and graphical summaries of all data collected during the year.

2. Projected Ag-ASR project activity for the next calendar year.

3. A calibration log verifying calibration of all hand-held monitoring instruments and devices used to comply with the prescribed monitoring program.

4. Discussion on annual chemical usage in the Ag-ASR wells (e.g., chemical name, purpose, and quantity used).

Any person aggrieved by this action of the Central Valley Water Board may petition the State Water Resources Control Board to review the action in accordance with California Water Code section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Resources Control Board must receive the petition by 5:00 p.m., 30 days after the date of this MRP, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Resources Control Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the internet (http://www.waterboards.ca.gov/public_notices/petitions/water_quality) or will be provided on request.

The Discharger shall implement the above monitoring program on the first day of the month following its issuance.

Ordered by: *Original Signed by W. Dale Harvey for:*

PATRICK PULUPA, Executive Officer

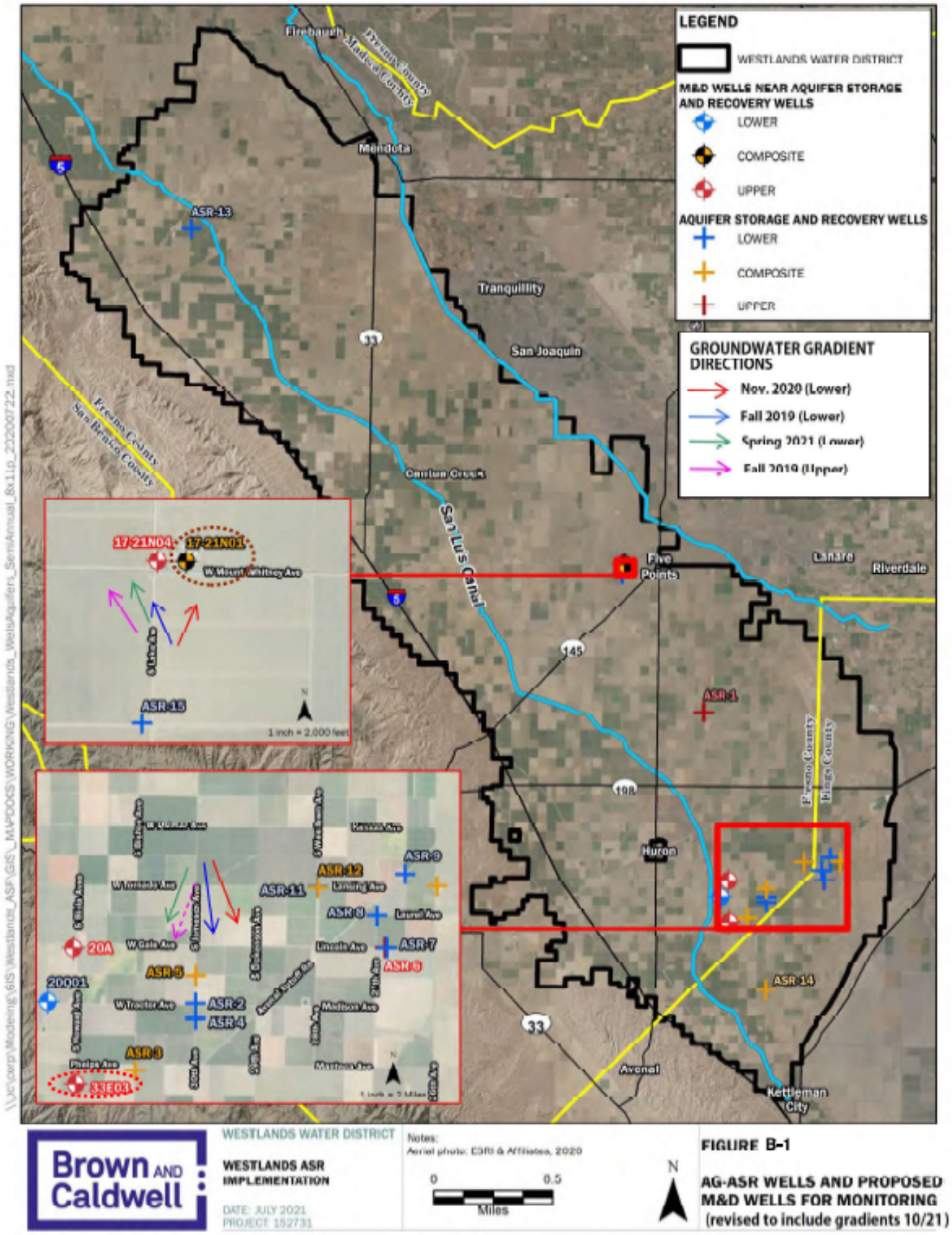
4/28/2023

(Date)

Attachments: **Glossary**
Figure B1

GLOSSARY

BOD_5	Five-day biochemical oxygen demand
CaCO3	Calcium carbonate
DO	Dissolved oxygen
EC	Electrical conductivity at 25° C
FDS	Fixed dissolved solids
TDS	Total dissolved solids
TKN	Total Kjeldahl nitrogen
TSS	Total suspended solids
Continuous	The specified parameter shall be measured by a meter continuously.
24-hr Composite	Samples shall be a flow-proportioned composite consisting of at least eight aliquots over a 24-hour period.
Daily	Every day except weekends or holidays.
Twice Weekly	Twice per week on non-consecutive days.
Weekly	Once per week.
Twice Monthly	Twice per month during non-consecutive weeks.
Monthly	Once per calendar month.
Quarterly	Once per calendar quarter.
Semiannually	Once every six calendar months (i.e., two times per year) during non-consecutive quarters.
Annually	Once per year. Annual samples shall be collected in the third quarter between July and September.
mg/L	Milligrams per liter
mg/kg	Milligrams per kilogram
mL/L	Milliliters [of solids] per liter
µg/L	Micrograms per liter
µmhos/cm	Micromhos per centimeter
gpd	Gallons per day
mgd	Million gallons per day
MPN/100 mL	Most probable number [of organisms] per 100 milliliters
General Minerals	Analysis shall include; alkalinity (as $CaCO_3$), bicarbonate (as$CaCO_3$), boron, calcium, carbonate (as $CaCO_3$), chloride, iron, magnesium, manganese, nitrate as N, phosphate, potassium, sodium, sulfate, and verification that the analysis is complete (i.e., cation/anion balance).
Total Trihalomethanes	Analysis shall include: bromoform, bromodichloromethane, chloroform, and dibromochloromethane.
Primary bio-indicators	Analysis shall include giardia, cryptosporidium, diatoms, insect/larvae, plant debris, other algae, and rotifers.



WESTLANDS WATER DISTRICT

WESTLANDS ASR IMPLEMENTATION

DATE: JULY 2021
PROJECT: 152731

Notes:
Aerial photo: ESRI & Affiliates, 2020

0 0.5 Miles

N

FIGURE B-1

AG-ASR WELLS AND PROPOSED M&D WELLS FOR MONITORING (revised to include gradients 10/21)