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December 19, 2022
Project No: 20-10008

Bryan Bondy, PG, CHG
Executive Director
Upper Ventura River Groundwater Agency
202 West El Roblar Drive
Ojai, California 93023
Via email: bbondy@uvrgroundwater.org

**Subject: Annual Data Deliverable Memorandum for Water Year 2022
Upper Ventura River Groundwater Agency, Ventura County, California**

Dear Mr. Bondy:

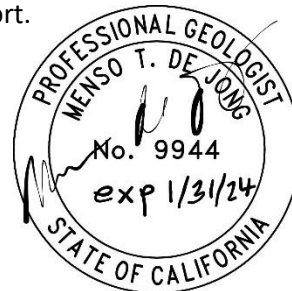
Rincon Consultants, Inc. (Rincon) has prepared the attached Annual Data Deliverable Memorandum for the 2022 Water Year (October 1, 2021, through September 30, 2022) for groundwater elevation monitoring activities performed at nine monitoring wells located within the Upper Ventura River Groundwater Basin in Ventura County California. The memorandum was prepared for Upper Ventura River Groundwater Agency (UVRGA) under the supervision of a licensed California Professional Geologist and in accordance with UVRGA's *Monitoring and Data Collection Protocols and Data Quality Control Review Procedures*.

We are pleased to support UVRGA on this important project and look forward to discussing any questions you may have regarding the data presented in this report.

Sincerely,
Rincon Consultants, Inc.

A handwritten signature in black ink, appearing to read "KB", is written over a faint, larger signature.

Kiernan Birtalik, CPSWQ, QSD/P
Project Manager



Menso de Jong, PhD, PG
Watershed Scientist



Annual Data Deliverable Memorandum Water Year 2022

Groundwater Level Monitoring
Ventura County, California

prepared for
Upper Ventura River Groundwater Agency

prepared by
Rincon Consultants, Inc.

December 15, 2022

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1 Introduction

The Annual Data Deliverable Memorandum for the 2022 Water Year presents data collected between October 1, 2021, and September 30, 2022, from a network of nine groundwater monitoring wells located within the Upper Ventura River Valley Groundwater Basin (Basin) in Ventura County California (Figure 1). This memorandum was prepared for Upper Ventura River Groundwater Agency (UVRGA) under the supervision of a licensed California Professional Geologist. Rincon Consultants, Inc. (Rincon) conducted monitoring activities and data collection, as well as preparation of this memorandum in accordance with the UVRGA's *Monitoring and Data Collection Protocols and Data Quality Control Review Procedures*.

The groundwater monitoring program provides groundwater level and elevation data necessary for the implementation of UVRGA's Groundwater Sustainability Plan (GSP). In early 2017, UVRGA established a monitoring network comprised of six groundwater monitoring wells located throughout the Basin. This monitoring network was expanded in November 2019 by installing two additional pressure transducers in groundwater monitoring wells located at Foster Park (MW 1 and MW 4). Additionally, in 2019, Meiners Oaks Water District (MOWD) and Ventura River Water District (VRWD) agreed to provide groundwater level data from pressure transducers maintained by the districts in their production wells MOWD # 2 (State Well 05N23W33B04S) and VRWD No. 5 (State Well 04N23W15B01S), respectively. As of August 16, 2021, VRWD has made VRWD No. 5 accessible to UVRGA to collect depth-to-water measurements and download pressure transducer data from the district-owned transducer.

The following section presents a groundwater monitoring well location map (Figure 1) and well information table (Table 1), as well as figures presenting groundwater level as depth-to-water (Figure 2a and 2b) and groundwater elevation as feet above mean sea level (ft. amsl) (Figure 3a and 3b). Appendices include field data sheets, raw pressure transducer data, and the processed pressure transducer data.

Figure 1 Groundwater Monitoring Well Locations

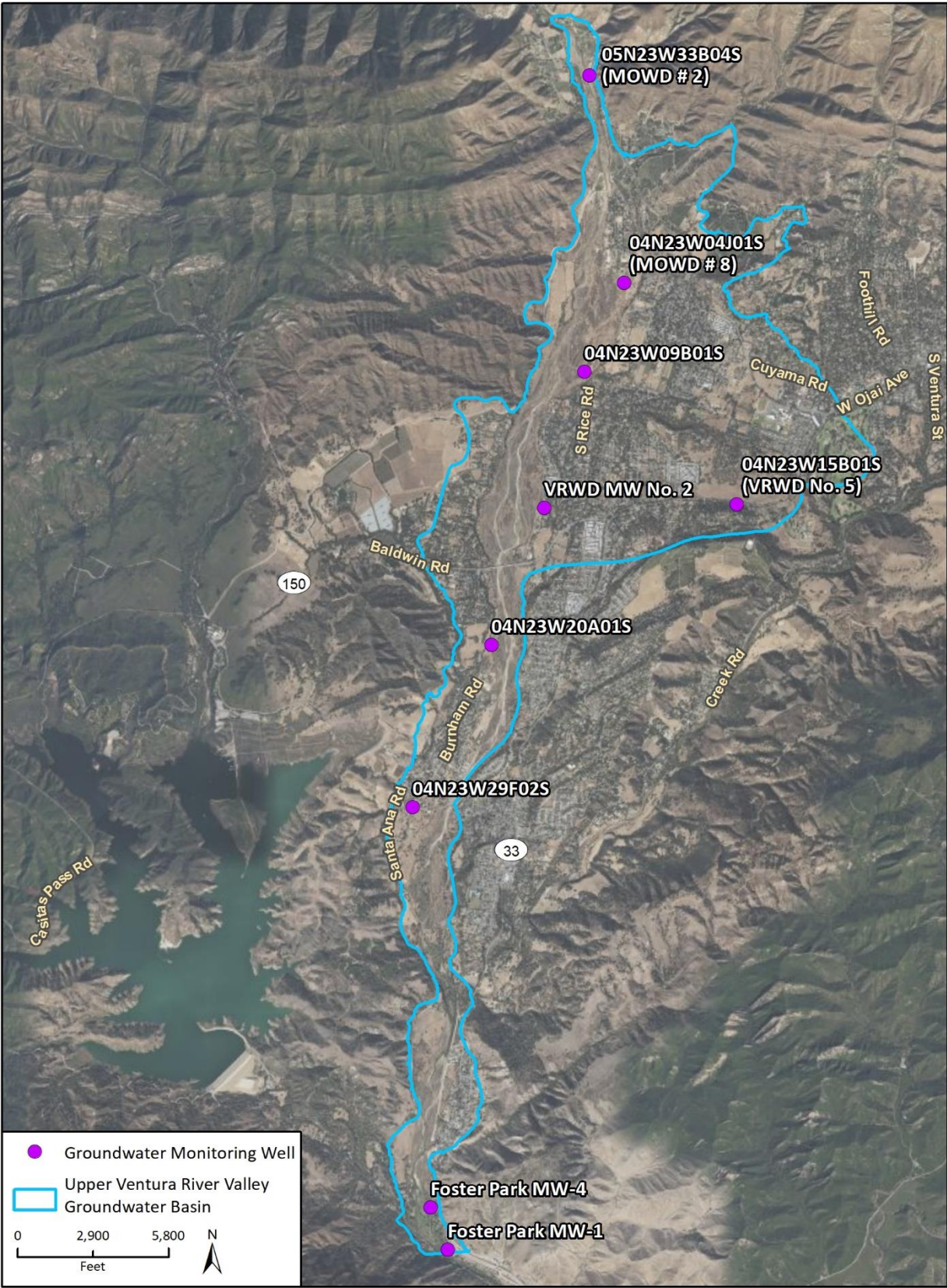


Table 1 Groundwater Monitoring Well Information

State Well Number	Other Name	Owner	Use	Data Source	Reference Point Elevation (ft. amsl)	Coordinates (NAD 83)
05N23W33B04S	MOWD # 2	MOWD	Municipal	MOWD Manual Measurements and MOWD Transducer	816.54	34.4771809, -119.291636
04N23W04J01S	MOWD # 8	MOWD	Municipal	UVRGA Pressure Transducer	713.04	34.4552614, -119.2868565
04N23W09B01S	N/A	Private	Agricultural	Well Owner Pressure Transducer beginning April 2021	662.30	34.445844, -119.291794
N/A	VRWD MW No. 2	VRWD	Monitoring	UVRGA Pressure Transducer	565.11	34.431363, -119.296737
04N23W15B01S	VRWD No. 5	VRWD	Municipal (Inactive)	VRWD Pressure Transducer	686.27	34.4320185, -119.2721482
04N23W20A01S*	N/A	Private	Agricultural	UVRGA Pressure Transducer	488.89	34.4168, -119.303224
04N23W29F02S	N/A	Private	Domestic/ Agricultural	UVRGA Pressure Transducer	396.58	34.399551, -119.312975
N/A	Foster Park MW-1	City of Ventura	Municipal	UVRGA Pressure Transducer	226.01	34.3527778, -119.3077778
N/A	Foster Park MW-4	City of Ventura	Municipal	UVRGA Pressure Transducer	240.84	34.3572222, -119.310

MOWD – Meiners Oaks Water District

UVRGA – Upper Ventura River Groundwater Agency

VRWD – Ventura River Water District

N/A – Not Available

ft. amsl – Feet Above Mean Sea Level

NAD 88 – North American Datum of 1983

* – Transducer removed, and monitoring suspended during the 2021 Water Year monitoring period continuing into the 2022 Water Year (see Section 2.1 Quality Assurance and Control Observations)

2 Monitoring Data Summary

As part of the 2022 Water Year monitoring period, field monitoring activities were conducted on May 23, 2022 and November 18, 2022 by Rincon. During these events, manual depth-to-water measurements were collected, and pressure transducer data were downloaded. On November 5, 2020, the pressure transducer at State Well 04N23W20A01S was removed for servicing and when reinstallation was attempted on February 18, 2021, Rincon observed that the well was reconfigured by a new property owner. The transducer was not reinstalled due to the well reconfiguration. UVRGA is currently developing a new access agreement for this monitoring well.

Field data sheets are provided as Appendix A and raw pressure transducer data is provided as Appendix B. Processed data, including a compilation of raw pressure transducer level data are provided as Appendix C. Appendix C includes a metadata and Quality Assurance and Quality Control (QA/QC) worksheet to summarize the processed data file deliverable, raw data processing activities, and QA/QC considerations.

Pressure transducer data recorded by Solinst Leveloggers were exported to Microsoft Excel to process groundwater level and elevation. Groundwater level was calculated by subtracting raw pressure transducer level data from the effective logger depth for each pressure transducer.¹ Groundwater elevation was calculated by subtracting the groundwater level from the reference point elevation at the top of well casing, which was provided by UVRGA. Groundwater level data provides insight into how groundwater changes in relation to the land surface, whereas elevation data can provide insight into the direction of groundwater flow and gradient. Groundwater levels are presented in Figure 2a and Figure 2b, and groundwater elevations are presented in Figure 3a and 3b. For presentation purposes, these figures present monitoring wells located north and south of Baldwin Road.

¹ This effective logger depth is developed using raw pressure transducer level data (including both water pressure and atmospheric pressure) and manual depth to water measurements.

2.1 Quality Assurance and Control Observations

The following provides a summary of specific QA/QC observations for the 2022 Water Year that were identified during the preparation of this data deliverable. A list of QA/QC comments is provided in the “MetaData and QAQC” tab of Appendix C.

Barometric Compensation

As summarized in the 2022 Semi-annual Data Deliverable (Rincon Consultants, 2022), Rincon understands that the effect of barometric fluctuations on groundwater levels may not be of significance in evaluation of long-term trends in these groundwater monitoring wells. For example, the barometric pressure recorded at State Well 04N23W29F02S and Foster Park MW-4 between October 2021 and September 2022 ranges from 14.3 pounds per square inch (psi) to 14.8 psi, with individual fluctuations of 0.35 psi at each site over the same time period. This is equivalent to a 0.8 ft range of water depth pressure. Considering fluctuations were around approximately one standard atmosphere and water level fluctuations were on the order of five or more feet, data were not compensated for barometric pressure. This was noted in the 2018 report (Kear Groundwater, 2018) and the processed data file included in the 2020 report (Kear Groundwater, 2020) did not present data compensation. For purposes of consistency, Rincon followed previous data processing procedures and has not compensated for barometric fluctuations.

Data Calibration at VRWD MW No. 2 and State Well 04N23W15B01S (VRWD No. 5)

Pressure transducer data at VRWD MW No.2 for the reporting period were calibrated to the manual water level taken by Rincon on October 12, 2021, in order to account for possible transducer drift since the original offset was calculated. Additionally, pressure transducer data at State Well 04N23W15B01S (VRWD No. 5) after the October 2021 download through the remainder of the reporting period was calibrated to the manual water level taken by Rincon on October 12, 2021, in order to account for a change of transducer depth upon redeployment.

Zero Values at State Well 04N23W09B01S and Missing Values at State Well 05N23W33B04S (MOWD #2)

As of April 23, 2021, data from 04N23W09B01S is provided by the well owner via a web portal. During the reporting period some of the data outputs were zero values. These values were considered erroneous and are not included in the report. Additionally, some of the continuous pressure data for State Well 05N23W33B04S (MOWD #2) is missing, including a 21-day period from January 10 through January 31, 2022 and a 35-day period from June 1 through July 5, 2022.

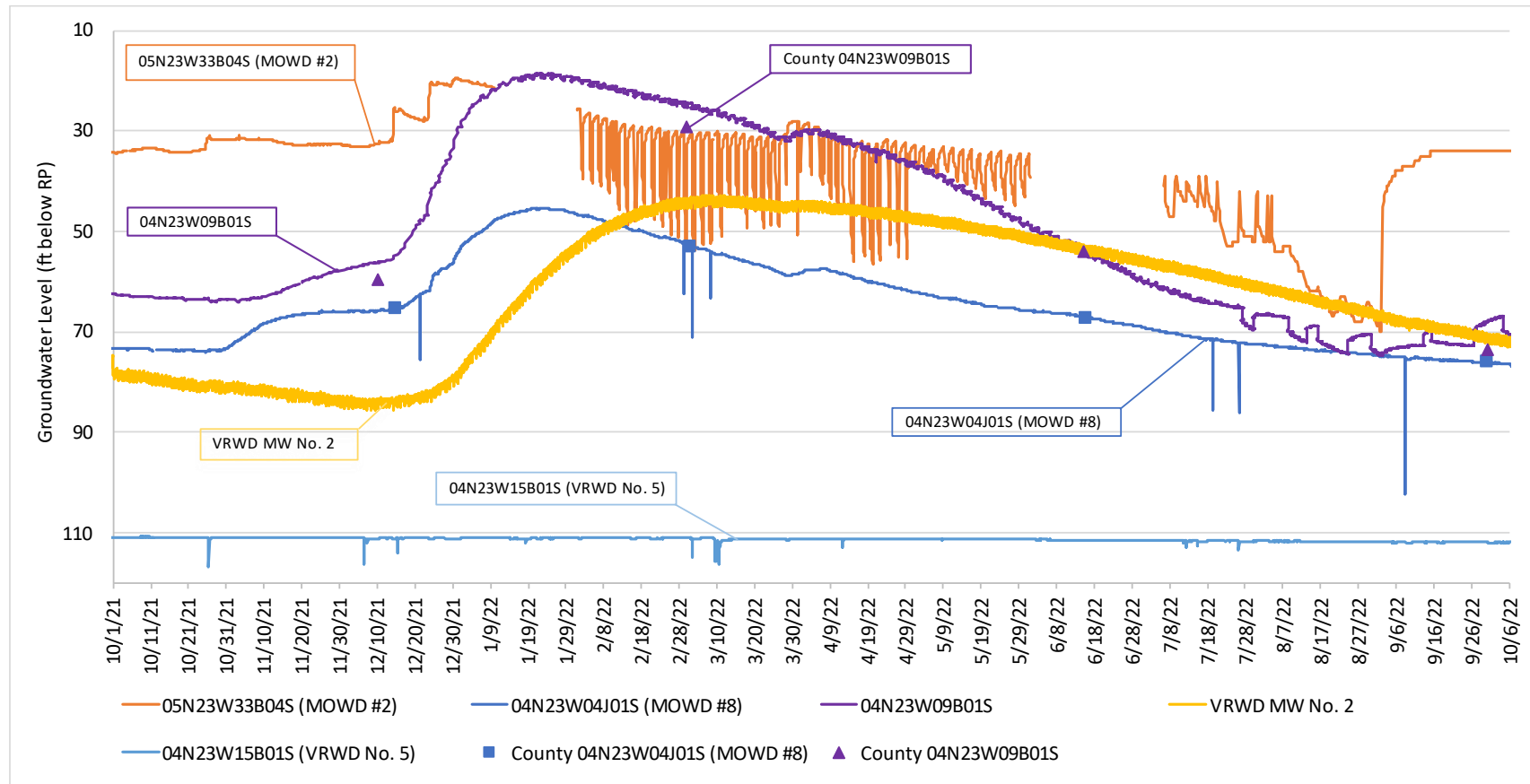
Transducer removed at State Well 04N23W20A01S

Pressure transducer reinstallation is pending and data beyond November 5, 2020, is unavailable. VRWD has been collecting manual measurements at this well in lieu of continuous data, but they were unable to obtain measurements during the reporting period.

County of Ventura Manual Measurements

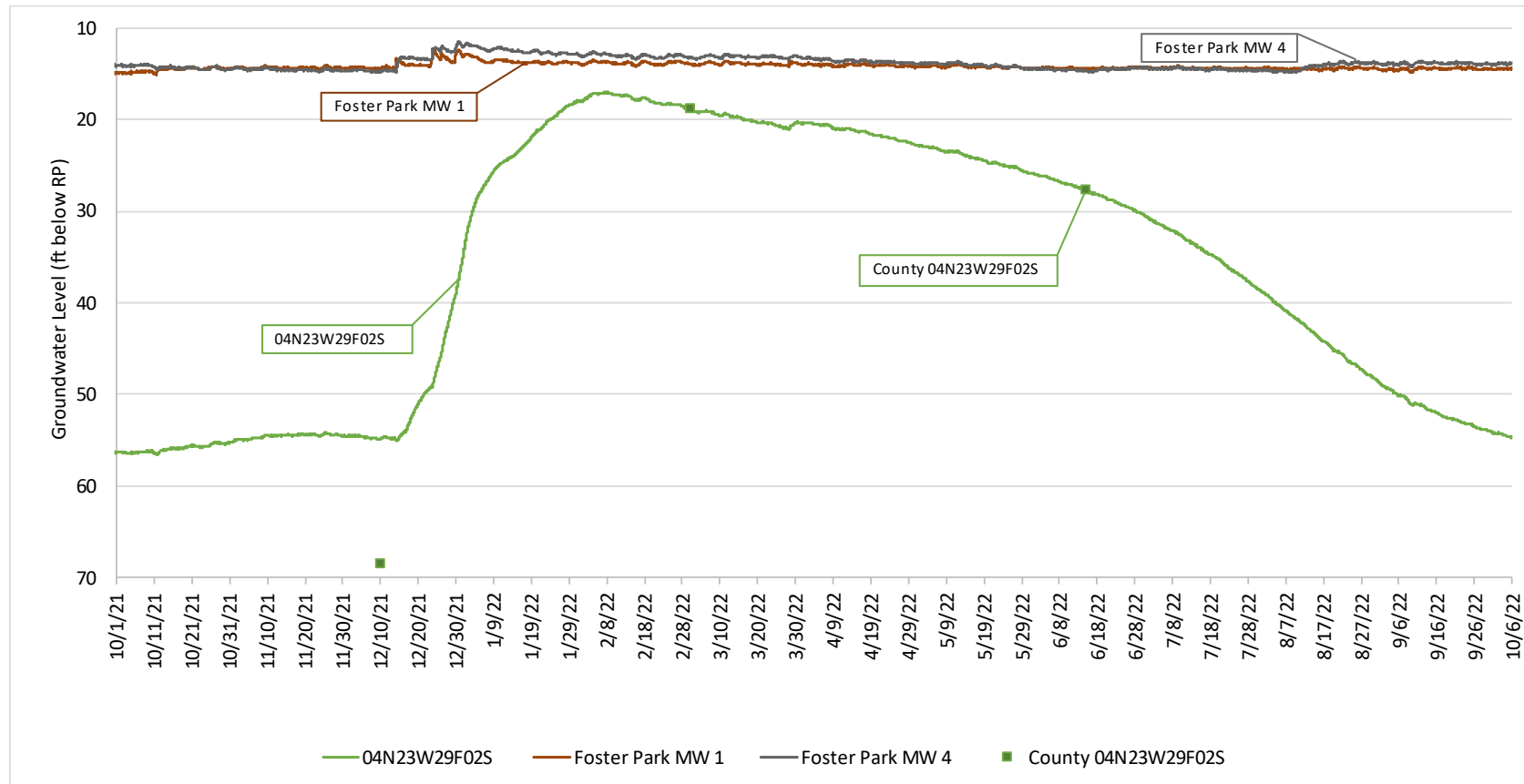
Manual depth to water measurement data collected by the County of Ventura (County) is included in a separate tab in the Processed Pressure Transducer Data file (Appendix C). These data are presented in the figures below to allow comparison between the County's manual measurements and continuous pressure transducer measurements. This comparison provides an additional level of QA/QC insight to reveal both similarities and discrepancies in the dataset.

Figure 2a Groundwater Level Below Reference Points – Wells North of Baldwin Road

**Notes:**

To present depth to water relative to the monitoring well's reference point (RP) at ground surface, the y-axis is presented in reverse order. County of Ventura manual depth to water measurements are presented on this chart for quality assurance purposes.

Figure 2b Groundwater Level Below Reference Points – Wells South of Baldwin Road



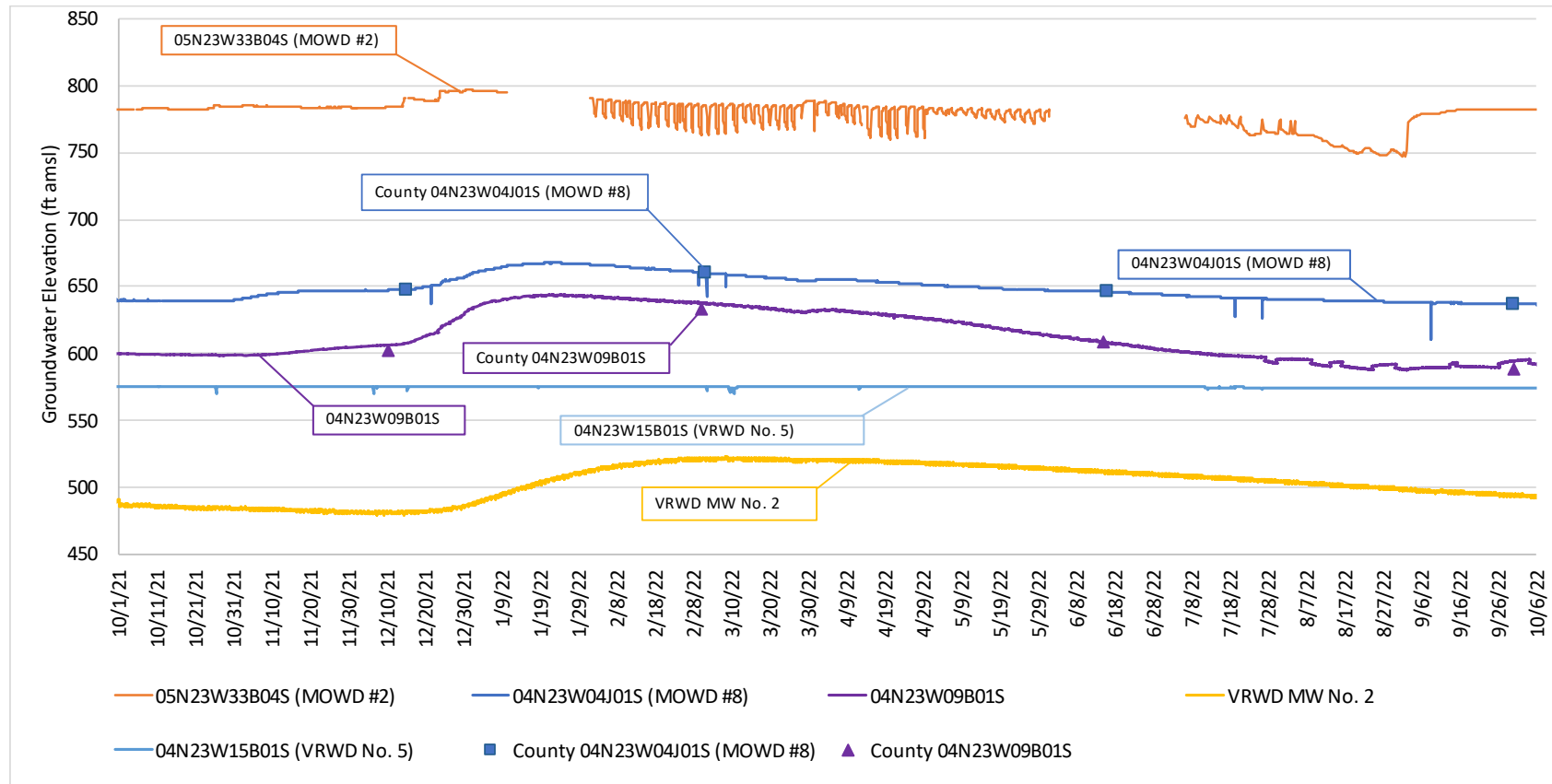
Notes:

To present depth-to-water relative to the monitoring well's reference point (RP) at ground surface, the y-axis is presented in reverse order.

State Well 04N23W20A01S is no longer equipped for water level monitoring due to an ownership change.

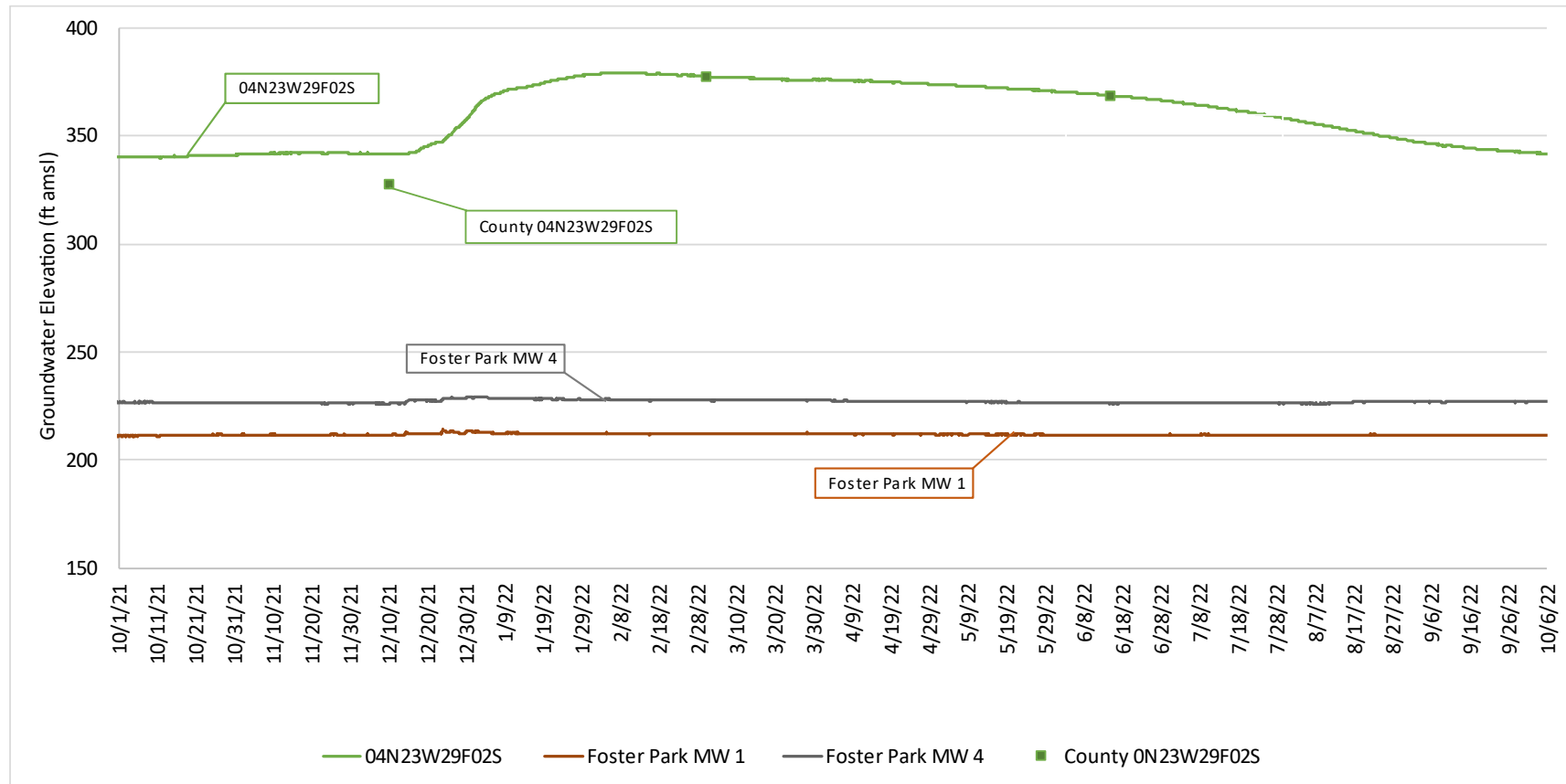
County of Ventura manual depth to water measurements are presented on this chart for quality assurance purposes.

Figure 3a Groundwater Elevation – Wells North of Baldwin Road

**Notes:**

County of Ventura manual elevation measurements are presented on this chart for quality assurance purposes.

Figure 3b Groundwater Elevation – Wells South of Baldwin Road



Notes:

State Well 04N23W20A01S is no longer equipped for water level monitoring due to an ownership change.
County of Ventura manual elevation measurements are presented on this chart for quality assurance purposes.

3 References

Kear Groundwater, 2018, *Report of Groundwater Level and Temperature data, spring 2017 to summer 2018 Upper Ventura River Groundwater Basin Ventura County, California*. September 30, 2018.

Kear Groundwater, 2020, *Report of Groundwater Level and Temperature Data, Spring 2017 to September 2019, Upper Ventura River Groundwater Basin, Ventura County, California*. January 31, 2020.

Rincon Consultants, 2022. *Semi-annual Data Deliverable Memorandum Water Year 2022*. June 30, 2022.

UVRGA Monitoring and Data Collection Protocols, Updated and Adopted November 13, 2018.

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Appendix A: Field Data Sheets

Appendix A – Groundwater Level Field Form



GROUNDWATER LEVEL MEASUREMENT FIELD DATA SHEET

A	B	C	D	E	F	G	H
Well ID	DATE	TIME	RPE (ft amsl)	RPH (ft agl)	DTW (ft)	GWE (ft amsl)	Notes
<i>Researched</i>	<i>Record</i>	<i>Record</i>	<i>Researched</i>	<i>Measured</i>	<i>Measured</i>	<i>D-F</i>	
MOWD #8	5/23/2022	-	713.04	5.65	62.37	650.67	
04N23W09B01S	5/23/2022	-	662.3	-	-	-	Well data provided by owner
VRWD MW No. 2	5/23/2022	9:24	565.11	0.51	51.07	514.04	
04N23W20A01S	5/23/2022	-	-	-	-	-	Transducer removed by new owner.
04N23W29F02S	5/23/2022	-	396.58	2.18	24.78	371.80	Barologger data downloaded.
Foster Park MW-4	5/23/2022	-	240.84	2.2	15.15	225.61	Barologger data downloaded. 14.65' from ground surface
Foster Park MW-1	5/23/2022	-	226.01	0.9	14.53	211.23	13.48' from ground surface.
VRWD #5	5/23/2022	-	686.27	0.25	112.77	573.50	Access provided by VRWD.

Appendix A – Groundwater Level Field Form



GROUNDWATER LEVEL MEASUREMENT FIELD DATA SHEET

A	B	C	D	E	F	G	H
Well ID	DATE	TIME	RPE (ft amsl)	RPH (ft agl)	DTW (ft)	GWE (ft amsl)	Notes
<i>Researched</i>	<i>Record</i>	<i>Record</i>	<i>Researched</i>	<i>Measured</i>	<i>Measured</i>	<i>D-F</i>	
MOWD #8	11/18/2022	13:09	713.04	5.65	71.06	641.98	
04N23W09B01S	11/18/2022	-	662.3	-	-		Well data provided by owner
VRWD MW No. 2	11/18/2022	12:37	565.11	0.51	75.29	489.82	
04N23W20A01S	11/18/2022	-	-	-	-		Transducer removed by new owner.
04N23W29F02S	11/18/2022	15:23	396.58	2.18	56.87	339.71	Barologger data downloaded.
Foster Park MW-4	11/18/2022	15:49	240.84	2.2	14.88	225.96	Barologger data downloaded. Measured DTW from TOC.
Foster Park MW-1	11/18/2022	16:14	226.01	0.9	13.59	212.42	Measured DTW from TOC.
VRWD #5	11/18/2022	14:49	686.27	0.25	113.28	572.99	Access provided by VRWD. Measured DTW from ST.

Appendix B: Raw Pressure Transducer Data

(Provided Electronically)

Appendix C: Processed Pressure Transducer Data

(Provided Electronically)