

## **Attachment A. Groundwater Sustainability Plan Regulations - 356.2. Annual Reports**

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## § 356.2. Annual Reports

Each Agency shall submit an annual report to the Department by April 1 of each year following the adoption of the Plan. The annual report shall include the following components for the preceding water year:

- (a) General information, including an executive summary and a location map depicting the basin covered by the report.
- (b) A detailed description and graphical representation of the following conditions of the basin managed in the Plan:
  - (1) Groundwater elevation data from monitoring wells identified in the monitoring network shall be analyzed and displayed as follows:
    - (A) Groundwater elevation contour maps for each principal aquifer in the basin illustrating, at a minimum, the seasonal high and seasonal low groundwater conditions.
    - (B) Hydrographs of groundwater elevations and water year type using historical data to the greatest extent available, including from January 1, 2015, to current reporting year.
  - (2) Groundwater extraction for the preceding water year. Data shall be collected using the best available measurement methods and shall be presented in a table that summarizes groundwater extractions by water use sector, and identifies the method of measurement (direct or estimate) and accuracy of measurements, and a map that illustrates the general location and volume of groundwater extractions.
  - (3) Surface water supply used or available for use, for groundwater recharge or in-lieu use shall be reported based on quantitative data that describes the annual volume and sources for the preceding water year.
  - (4) Total water use shall be collected using the best available measurement methods and shall be reported in a table that summarizes total water use by water use sector, water source type, and identifies the method of measurement (direct or estimate) and accuracy of measurements. Existing water use data from the most recent Urban Water Management Plans or Agricultural Water Management Plans within the basin may be used, as long as the data are reported by water year.
  - (5) Change in groundwater in storage shall include the following:
    - (A) Change in groundwater in storage maps for each principal aquifer in the basin.
    - (B) A graph depicting water year type, groundwater use, the annual change in groundwater in storage, and the cumulative change in groundwater in storage for the basin based on historical data to the greatest extent available, including from January 1, 2015, to the current reporting year.
  - (c) A description of progress towards implementing the Plan, including achieving interim milestones, and implementation of projects or management actions since the previous annual report.

Note: Authority cited: Section 10733.2, Water Code. Reference:

Sections 10727.2, 10728, and 10733.2, Water Code.

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## **Attachment B. Historical Precipitation Records**

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## Monthly Precipitation at the Atascadero Mutual Water Company Station 34

(inches)

Source: Atascadero Mutual Water Company

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	WY Total
1915							0	0	0	0	0.25	3.81	---
1916	15.51	1.72	1.55	0.15	0	0	0	0.08	0.82	1.52	0.36	10	23.89
1917	3.62	8.11	0.95	0.08	0.13	0	0	0	0	0.04	0.52	0.11	24.79
1918	0.4	9.37	5.59	0	0	0	0.01	0.02	0.16	0.52	1.33	2.48	16.22
1919	3.15	3.02	2.39	1.05	0.24	0.03	0	0	0.45	0.75	3.34	1.19	14.66
1920	0.57	4.14	2.97	0.26	0.67	0	0	0	0.16	0.12	0	5.23	14.05
1921	0.54	2.3	4.85	2.27	0	0	0	0	0.7	0.17	0.03	7.32	16.01
1922	5.65	5.61	3.37	0.31	0.91	0	0	0	0	0.33	4.16	6.11	23.37
1923	3.43	0.91	0.09	2.59	0	0.19	0	0	0.17	0.16	0.27	0.28	17.98
1924	1.27	0.56	3.57	0.41	0.23	0	0	0	0	1.64	2.34	1.84	6.75
1925	1.33	2.75	3.57	1.86	2.66	0.00	0.00	0.00	0.00	0.40	0.11	1.90	17.99
1926	3.12	5.26	0.28	3.67	0.00	0.00	0.00	0.00	0.00	0.00	7.23	1.39	14.74
1927	1.91	7.53	1.93	1.21	0.00	0.08	0.00	0.00	0.00	1.66	1.88	2.53	21.28
1928	0.00	2.19	5.04	0.54	0.13	0.00	0.00	0.00	0.00	0.00	3.58	5.48	13.97
1929	1.60	2.79	1.82	0.53	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.26	16.05
1930	4.86	2.66	2.52	0.54	0.97	0.14	0.00	0.00	0.00	0.00	1.58	0.50	11.95
1931	4.98	1.54	0.43	0.38	2.02	0.13	0.00	0.00	0.00	0.00	1.90	9.10	11.56
1932	3.58	4.98	0.59	0.16	0.11	0.00	0.00	0.00	0.03	0.00	0.14	1.13	20.45
1933	7.79	0.09	0.72	0.14	0.65	0.93	0.00	0.00	0.00	0.36	0.00	4.38	11.59
1934	2.44	3.17	0.17	0.00	1.00	0.00	0.00	0.00	0.00	0.99	2.85	1.56	11.52
1935	4.92	0.68	2.66	3.84	0.00	0.00	0.00	0.00	0.08	0.20	1.35	1.85	17.58
1936	2.00	9.68	1.13	1.25	0.00	0.15	0.00	0.00	0.00	1.47	0.00	5.98	17.61
1937	4.12	4.87	4.86	0.05	0.00	0.00	0.00	0.00	0.00	0.10	0.80	5.29	21.35
1938	1.88	8.97	6.63	0.77	0.03	0.00	0.00	0.00	0.53	0.20	0.48	0.93	25.00
1939	2.70	1.38	1.39	0.14	0.00	0.00	0.00	0.00	0.23	1.02	0.90	1.22	7.45
1940	6.72	5.73	1.81	0.30	0.02	0.00	0.00	0.00	0.00	0.40	0.23	7.91	17.72
1941	5.06	11.22	7.78	3.51	0.00	0.00	0.00	0.00	0.00	1.26	0.84	7.57	36.11
1942	3.00	0.59	2.63	4.28	0.00	0.15	0.00	0.00	0.00	0.66	2.20	2.25	20.32
1943	11.85	2.01	6.85	1.20	0.00	0.00	0.00	0.00	0.00	0.46	0.36	3.73	27.02
1944	1.47	7.67	1.54	1.08	0.00	0.00	0.00	0.00	0.00	0.05	2.87	1.30	16.31
1945	1.54	3.84	4.25	0.15	0.00	0.00	0.01	0.03	0.16	0.51	1.30	2.43	14.20
1946	3.08	2.96	2.34	1.04	0.24	0.03	0.00	0.00	0.00	0.30	6.78	2.20	13.93
1947	0.60	1.42	1.38	0.47	0.91	0.00	0.00	0.00	0.04	0.51	0.16	0.95	14.10
1948	0.00	2.07	4.72	3.30	0.60	0.00	0.00	0.00	0.00	0.06	0.00	3.48	12.31
1949	1.70	2.28	4.47	0.31	0.40	0.00	0.00	0.00	0.00	0.00	1.65	3.14	12.70
1950	4.01	3.52	2.39	1.70	0.00	0.00	0.00	0.00	0.00	1.71	3.27	2.28	16.41
1951	1.91	1.87	0.59	1.58	0.28	0.00	0.00	0.00	0.02	0.81	2.96	7.06	13.51
1952	7.16	0.81	6.65	1.57	0.00	0.00	0.00	0.00	0.00	0.00	2.65	5.98	27.02
1953	1.73	0.00	1.38	2.05	0.25	0.00	0.00	0.00	0.00	0.00	2.29	0.08	14.04
1954	5.16	2.85	4.50	0.74	0.08	0.00	0.00	0.00	0.00	0.00	2.44	1.83	15.70
1955	4.10	2.37	0.15	1.89	1.44	0.00	0.00	0.09	0.00	0.00	1.22	7.88	14.31
1956	5.35	0.94	0.08	2.00	1.39	0.00	0.00	0.00	0.01	1.21	0.00	0.43	18.87
1957	4.38	2.68	0.80	2.77	1.99	0.18	0.00	0.00	0.00	0.82	0.16	5.29	14.44
1958	4.76	7.48	6.56	7.21	0.27	0.00	0.00	0.13	1.02	0.18	0.02	0.28	33.70
1959	2.39	4.84	0.01	0.26	0.02	0.00	0.00	0.00	0.63	0.00	0.00	0.38	8.63
1960	2.57	5.51	1.31	1.31	0.05	0.00	0.00	0.00	0.00	0.31	4.17	1.57	11.13
1961	1.66	0.56	1.03	0.30	0.80	0.00	0.00	0.00	0.00	0.00	2.43	2.05	10.40
1962	2.14	11.18	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.74	0.00	1.71	19.90
1963	2.10	5.28	3.68	4.21	0.29	0.06	0.00	0.03	0.16	0.95	3.04	0.05	18.26
1964	2.64	0.14	1.48	1.18	0.51	0.13	0.00	0.00	0.13	0.94	2.95	3.76	10.25

# Monthly Precipitation at the Atascadero Mutual Water Company Station 34

(inches)

Source: Atascadero Mutual Water Company

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	WY Total
2015	0.57	3.04	0.21	0.67	0.02	0.01	1.28	0.00	0.06	0.16	1.41	1.34	11.91
2016	5.40	1.31	4.30	0.24	0.00	0.00	0.00	0.00	0.00	2.36	2.19	2.02	14.16
2017	12.74	7.51	1.32	1.38	0.28	0.00	0.00	0.00	0.14	0.07	0.11	0.11	29.94
2018	2.62	0.29	8.53	0.30	0.00	0.00	0.00	0.00	0.00	0.16	3.58	1.24	12.03
2019	5.82	9.12	3.75	0.07	0.98	0.00	0.00	0.00	0.00	0.00	1.55	4.96	24.72
2020	0.73	0.05	3.92	1.95	0.29	0.00	0.00	0.05	0.00	0.00	0.36	1.10	13.50
2021	6.1	0.04	1.1	0.02	0	0	0.01	0	0	2.01	0.15	8.34	8.73
2022	0.12	0	0.94	0.5	0	0	0	0	0.63				12.69
1916-2022 WY Average:													17.38
1968-2022 WY Average:													17.65

## **Attachment C. Monitoring Network Inventory**

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Table 8-1. Groundwater Levels Sustainable Management Criteria

	Well ID	Well Name	State Well Number	Well Depth (ft)	Ground Surface Elevation (ft)	Reference Point Elevation (ft)	Screen Interval Range (ft btoc)	Spring Water Surface Elevation (ft msl)	Fall Water Surface Elevation (ft msl)	Proposed MT (ft msl)	Proposed MO (ft msl)	Interim Milestones				Comments
												2027	2032	2037	2042	
Alluvial Aquifer (Qa)	001946-PASO-0182	PASO-0182	27S12E09N002M	85	721	721	44-85	676.00	670.50	658	677	663	668	672	677	
	002125-27S/12E-21XX6	27S/12E-21XX6		61	754.18	754.18	31-51	731.28	718.58	725	731	727	728	730	731	Fall measurement collected when pumping ongoing
	002134-27S/12E-29H03	27S/12E-29H03	27S12E29H003M	65		753	35-55	730.51	718.81	709	724	713	717	720	724	Fall measurement collected when pumping ongoing
	002014-28S/12E-04J04	28S/12E-04J04	28S12E04J004M	70	802.37	802.4	30-70	781.17	770.67	729	761	737	745	753	761	
	002023-28S/12E-05AX2	28S/12E-05AX2		60	796.21	796.2	25-55	779.91	773.61	774	778	775	776	777	778	
	001996-28S/12E-04J02	28S/12E-04J02	28S12E04J002M	86	801.99	795.8	21-86	769.93	759.73	742	764	748	753	759	764	
	001995-28S/12E-10R04	28S/12E-10R04	28S12E10R004M	75	825.02	820	46-75	796.50	787.90	770	787	774	779	783	787	
	001993-28S/12E-14K04	28S/12E-14K04	28S12E14K004M	105	838.78	835	50-100	812.00	811.10	785	801	789	793	797	801	
	002033-28S/12E-25B03	28S/12E-25B03	28S12E25B003M	120	866.78	867.8	100-120	-	846.35	832	844	835	838	841	844	Spring measurement not available for 2021
	002053-SL0607989492	SL0607989492	E11W-26B	35	1002.97	1003	10-35	-	-	977	980	978	979	979	980	Data not available for 2021
Paso Robles Formation Aquifer (Qtp)	001710-PASO-0283	PASO-0283	29S13E19H004M	57	1002.5	1005	29-49	997.20	981.88	979	989	982	984	987	989	
	002126-27S/12E-17B02	27S/12E-17B02	27S12E17B002M	400	828.31	828.3	200-360 380-400	667.91	597.81	570	676	597	623	650	676	Fall measurement collected when pumping ongoing
	001707-PASO-0328	PASO-0328	27S12E17E001M	310	842.4	842.4	190-300	678.50	667.90	636	716	656	676	696	716	Fall measurement collected when pumping ongoing
	002132-27S/12E-20A02	27S/12E-20A02	27S12E20A002M	205	779.35	776	105-195	717.10	707.80	698	726	705	712	719	726	
	001926-PASO-0283	PASO-0283	27S12E20R001M	230	771	771	110-230	725.50	708.30	673	710	682	692	701	710	
	002078-27S/12E-22M01	27S/12E-22M01	27S12E22M001M	550	854.15	850.5	pump @ 300'	NA	NA	679	745	696	712	729	745	Data currently not available due to legal dispute
	002083-27S/12E-33G01	27S/12E-33G01	27S12E33G001M	460	901.46	892	200-460	763.10	756.95	678	730	691	704	717	730	
	001708-PASO-0317	PASO-0317	28S12E04J006M	153	800.51	800.5	93-153	767.81	756.11	709	750	719	730	740	750	
	002001-28S/12E-10A03	28S/12E-10A03	28S12E10A003M	500	810.95	808.3	157-500	739.49	711.99	631	712	651	672	692	712	
				603	820	882	300-600	816.10	812.10	707	736	714	722	729	736	
	001927-PASO-0399	PASO-0399	28S12E11K002M													
	002002-28S/13E-31F02	28S/13E-31F02	28S13E31F002M	310	878.54	884.3	55-300	858.80	854.50	786	829	797	808	818	829	
				360	752.46	752.5	110-140 180-250 300-360	730.26	636.46	661	699	671	680	690	699	Fall measurement collected when pumping ongoing
	002082-27S/12E-33F01	27S/12E-33F01	27S12E33F001M	340	882.13	880	140-340	756.20	759.60	689	739	702	714	727	739	
	002016-28S/12E-04J05	28S/12E-04J05	28S12E04J005M	360	803.13	803.1	145-190 210-360	772.43	758.43	697	746	709	722	734	746	

Notes:

msl: mean sea level

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## **Attachment D. Monitoring Well Hydrographs**

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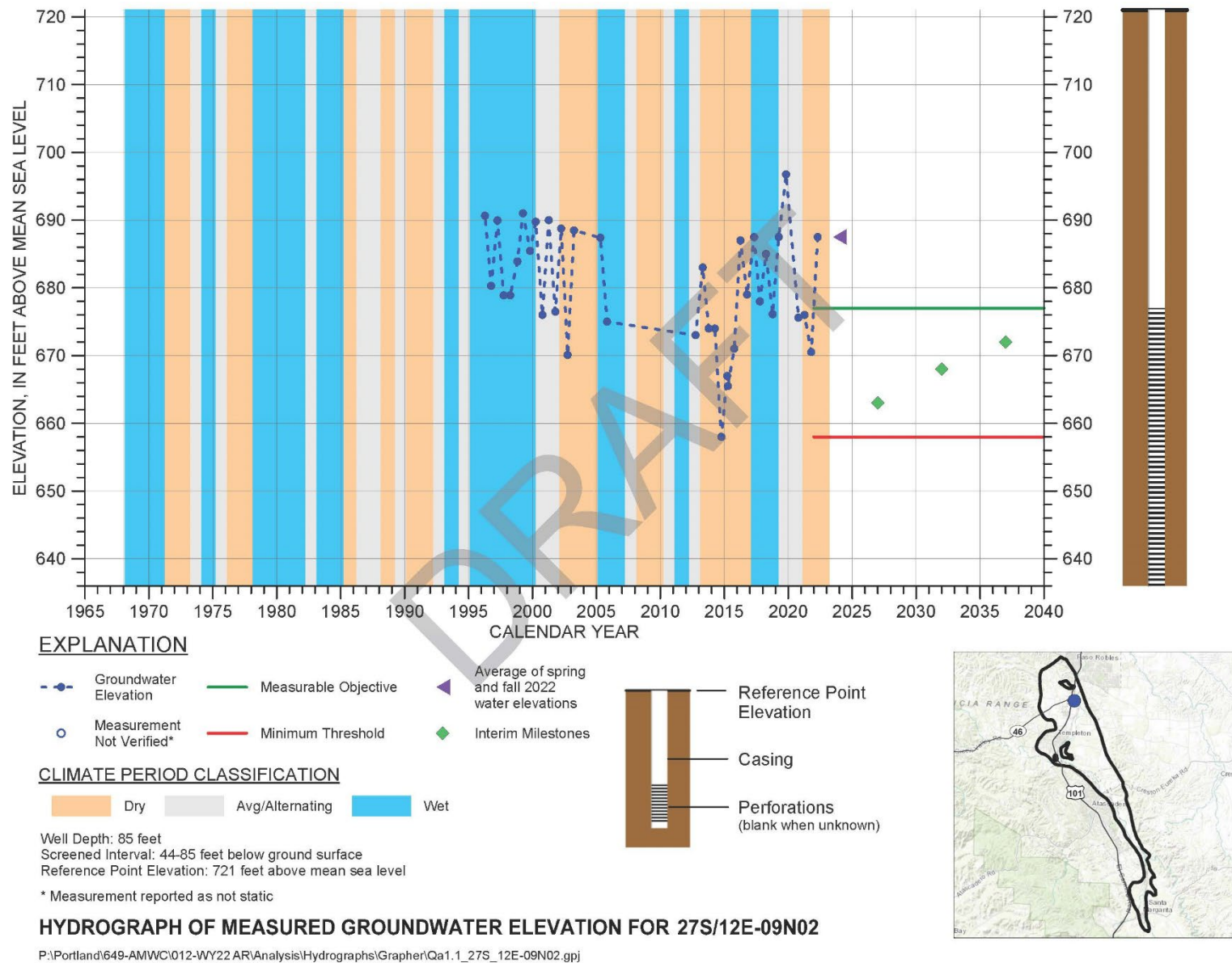
## **Alluvial Aquifer Hydrographs**

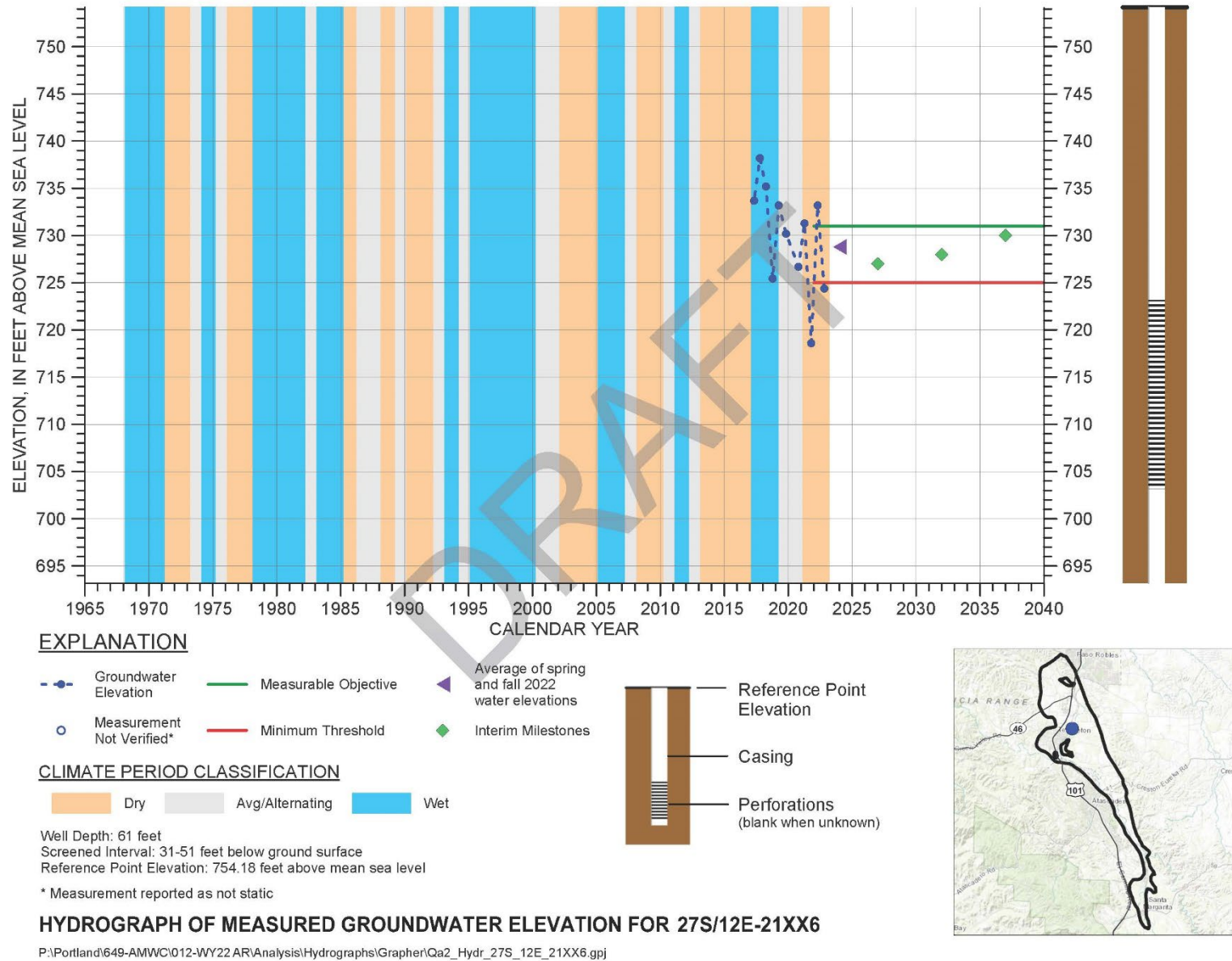
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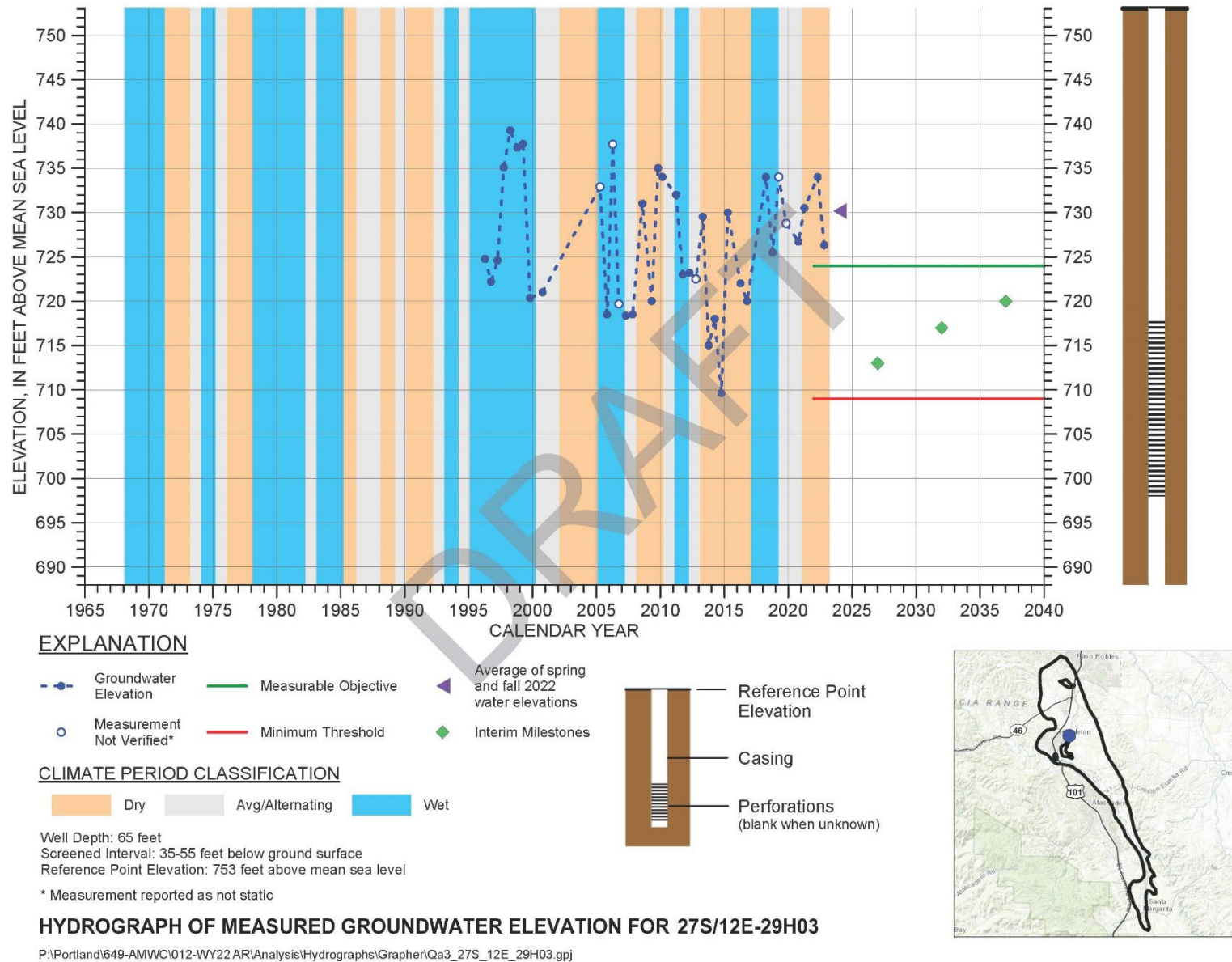
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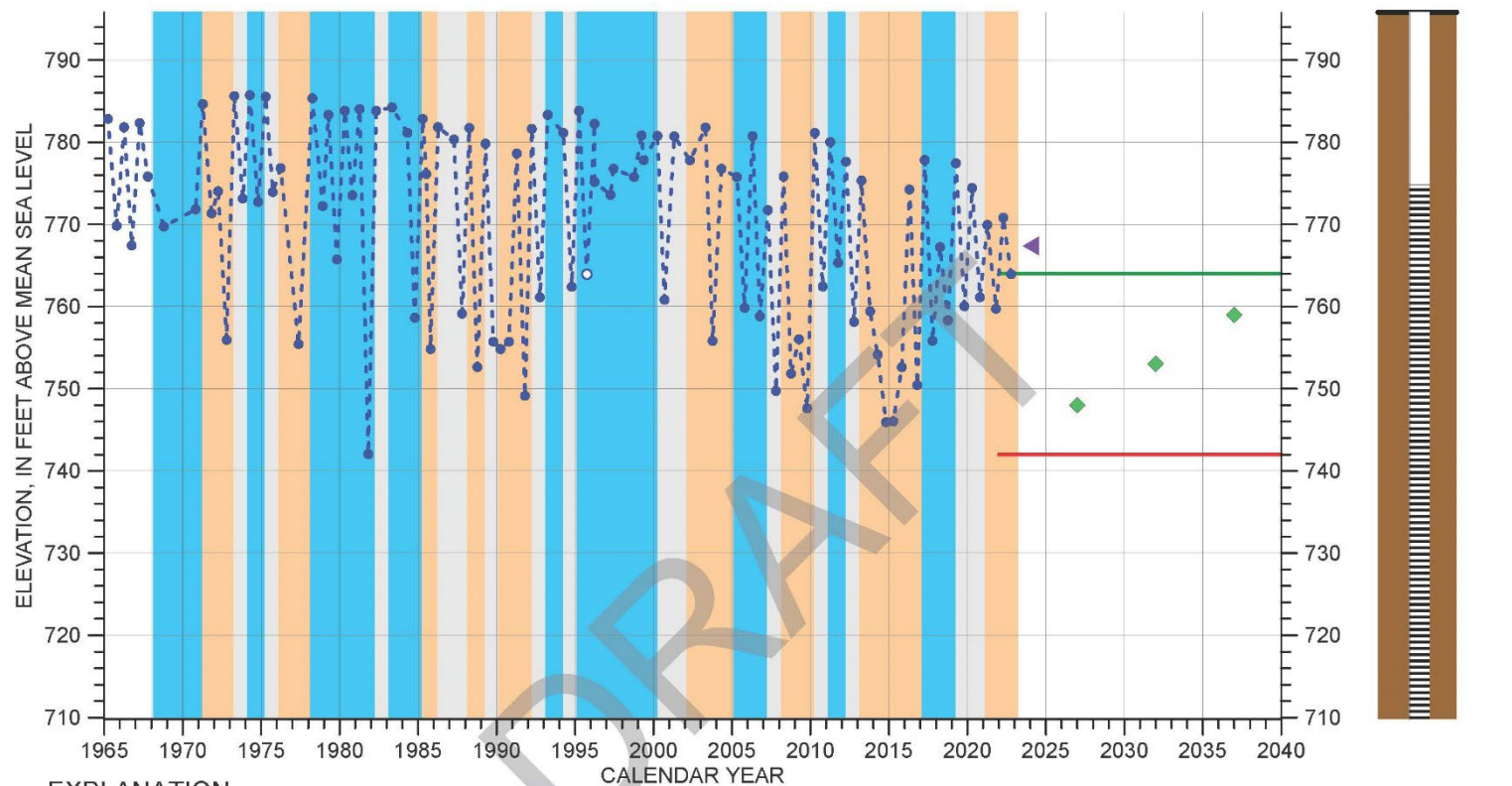












### EXPLANATION

- Groundwater Elevation
- Measurement Not Verified\*
- Measurable Objective
- Minimum Threshold
- Average of spring and fall 2022 water elevations
- Interim Milestones

### CLIMATE PERIOD CLASSIFICATION

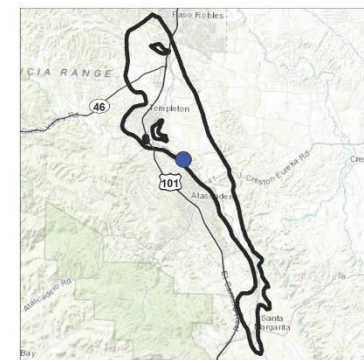
- Dry
- Avg/Alternating
- Wet

Well Depth: 86 feet  
 Screened Interval: 21-86 feet below ground surface  
 Reference Point Elevation: 795.8 feet above mean sea level

\* Measurement reported as not static

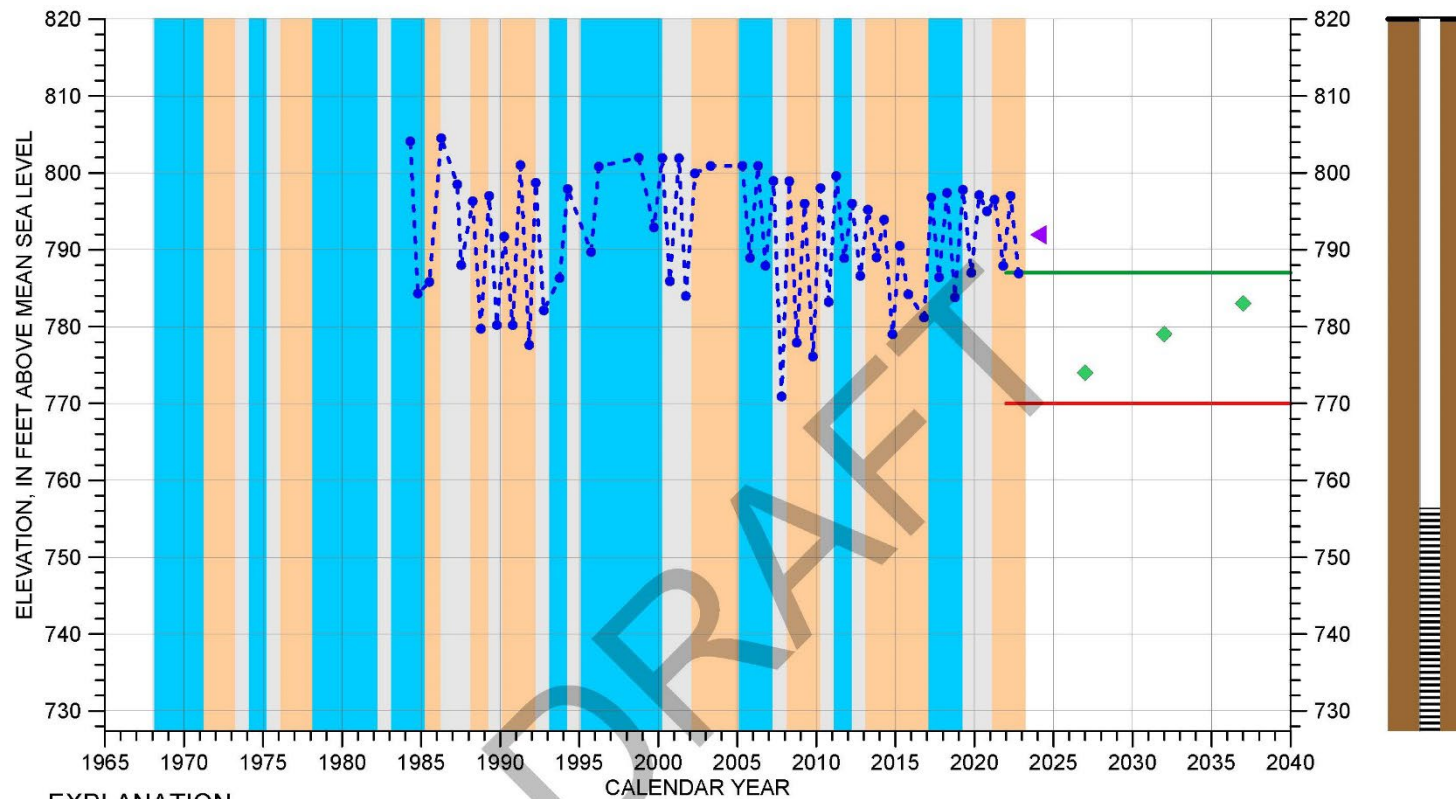
### HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 28S/12E-04J02

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### EXPLANATION

- Groundwater Elevation
- Measurement Not Verified\*
- Measurable Objective
- Minimum Threshold
- ▲ Average of spring and fall 2022 water elevations
- ◆ Interim Milestones

### CLIMATE PERIOD CLASSIFICATION

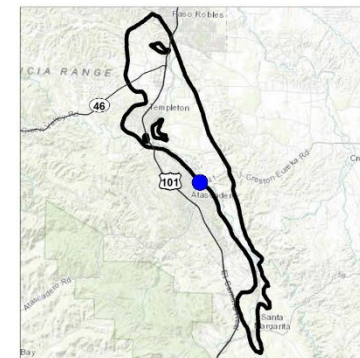
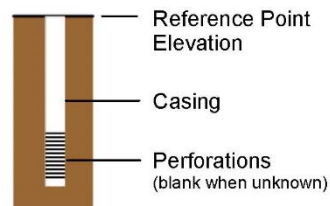
- Dry
- Avg/Alternating
- Wet

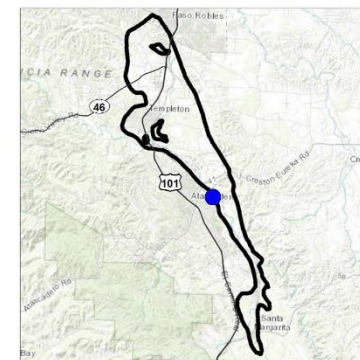
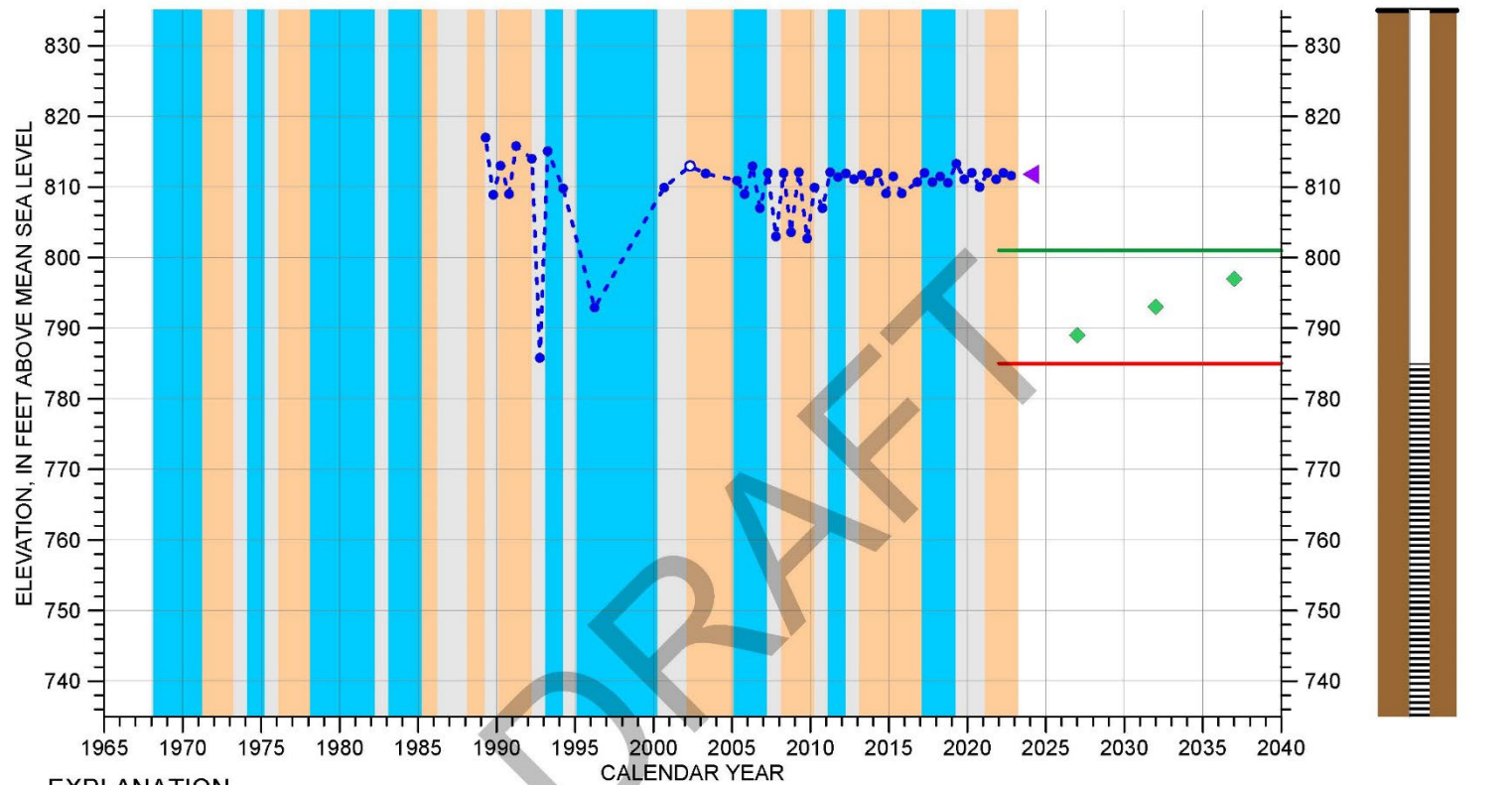
Well Depth: 75 feet  
Screened Interval: 46-75 feet below ground surface  
Reference Point Elevation: 820 feet above mean sea level

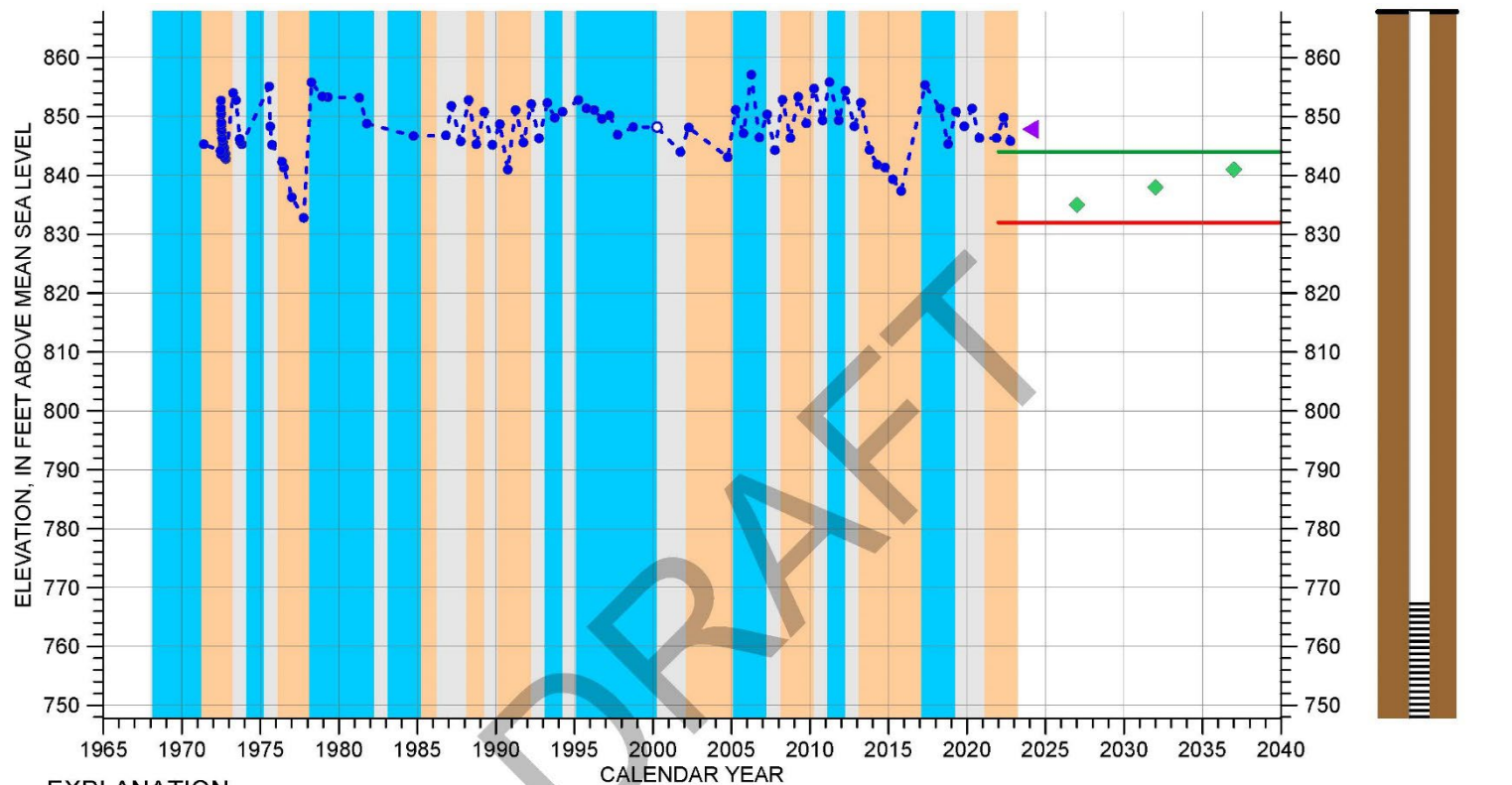
\* Measurement reported as not static

### HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 28S/12E-10R04

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### EXPLANATION

- Groundwater Elevation
- Measurement Not Verified\*
- Measurable Objective
- Minimum Threshold
- Average of spring and fall 2022 water elevations
- Interim Milestones

### CLIMATE PERIOD CLASSIFICATION

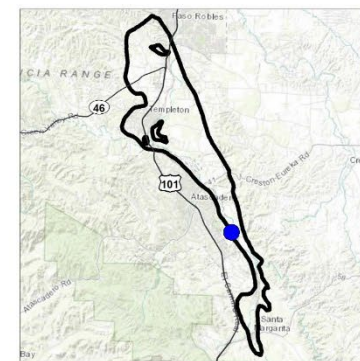
- Dry
- Avg/Alternating
- Wet

Well Depth: 120 feet  
 Screened Interval: 100-120 feet below ground surface  
 Reference Point Elevation: 867.8 feet above mean sea level

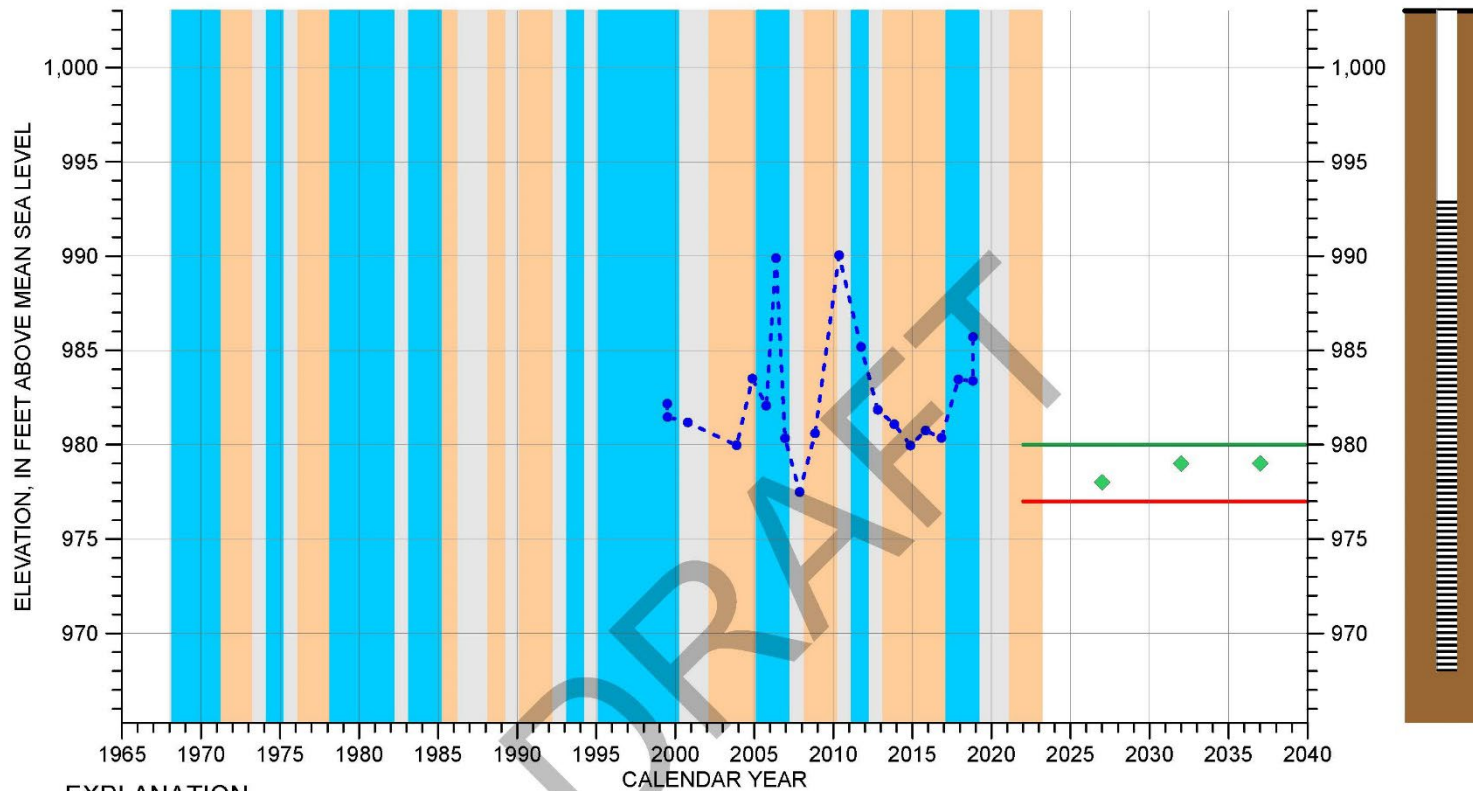
\* Measurement reported as not static

### HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 28S/12E-25B03

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#### EXPLANATION

- Groundwater Elevation
- Measurement Not Verified\*
- Measurable Objective
- Minimum Threshold
- ◆ Interim Milestones

#### CLIMATE PERIOD CLASSIFICATION

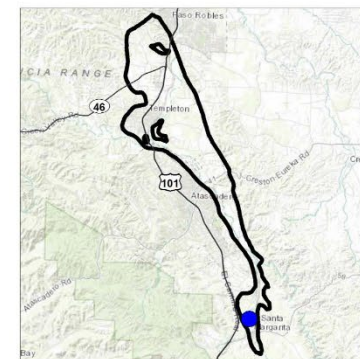
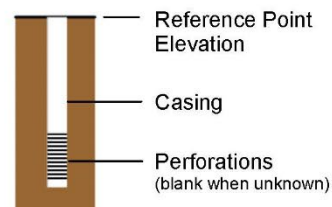
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- Grey Avg/Alternating
- Blue Wet

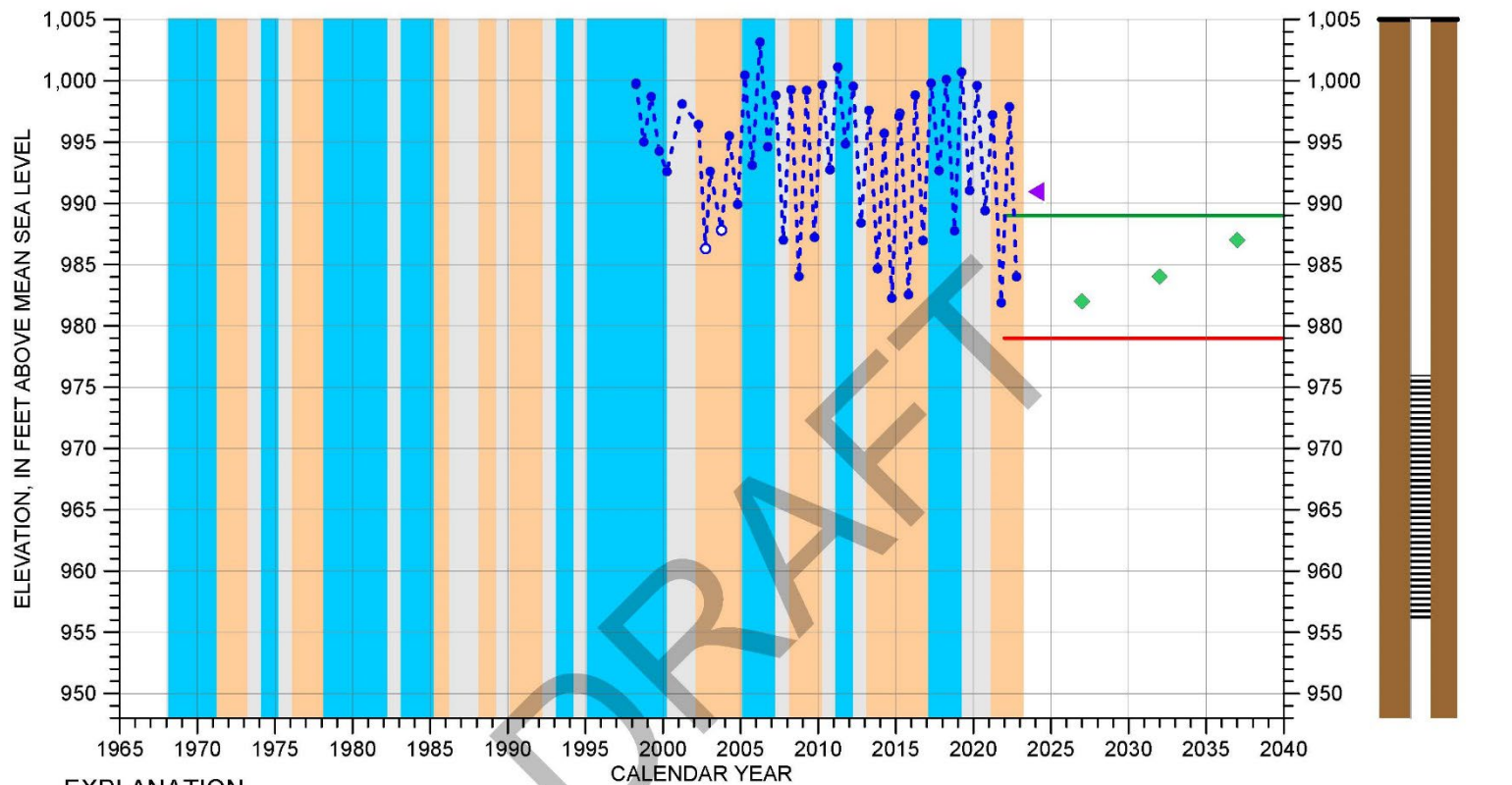
Well Depth: 35 feet  
 Screened Interval: 10-35 feet below ground surface  
 Reference Point Elevation: 1003 feet above mean sea level

\* Measurement reported as not static

#### HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR E11W-26B

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#### EXPLANATION

- Groundwater Elevation
- Measurement Not Verified\*
- Measurable Objective
- Minimum Threshold
- ▲ Average of spring and fall 2022 water elevations
- ◆ Interim Milestones

#### CLIMATE PERIOD CLASSIFICATION

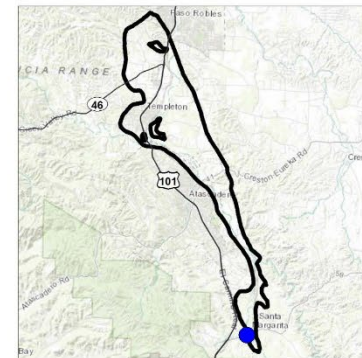
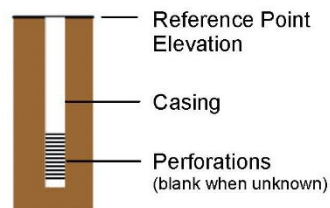
- Dry
- Avg/Alternating
- Wet

Well Depth: 57 feet  
Screened Interval: 29-49 feet below ground surface  
Reference Point Elevation: 1005 feet above mean sea level

\* Measurement reported as not static

#### HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 29S/13E-19H04

P:\Portland\649-AMWC\012-WY22 AR\Analysis\Hydrographs\Grapher\Qa11\_29S\_13E\_19H04.gpj



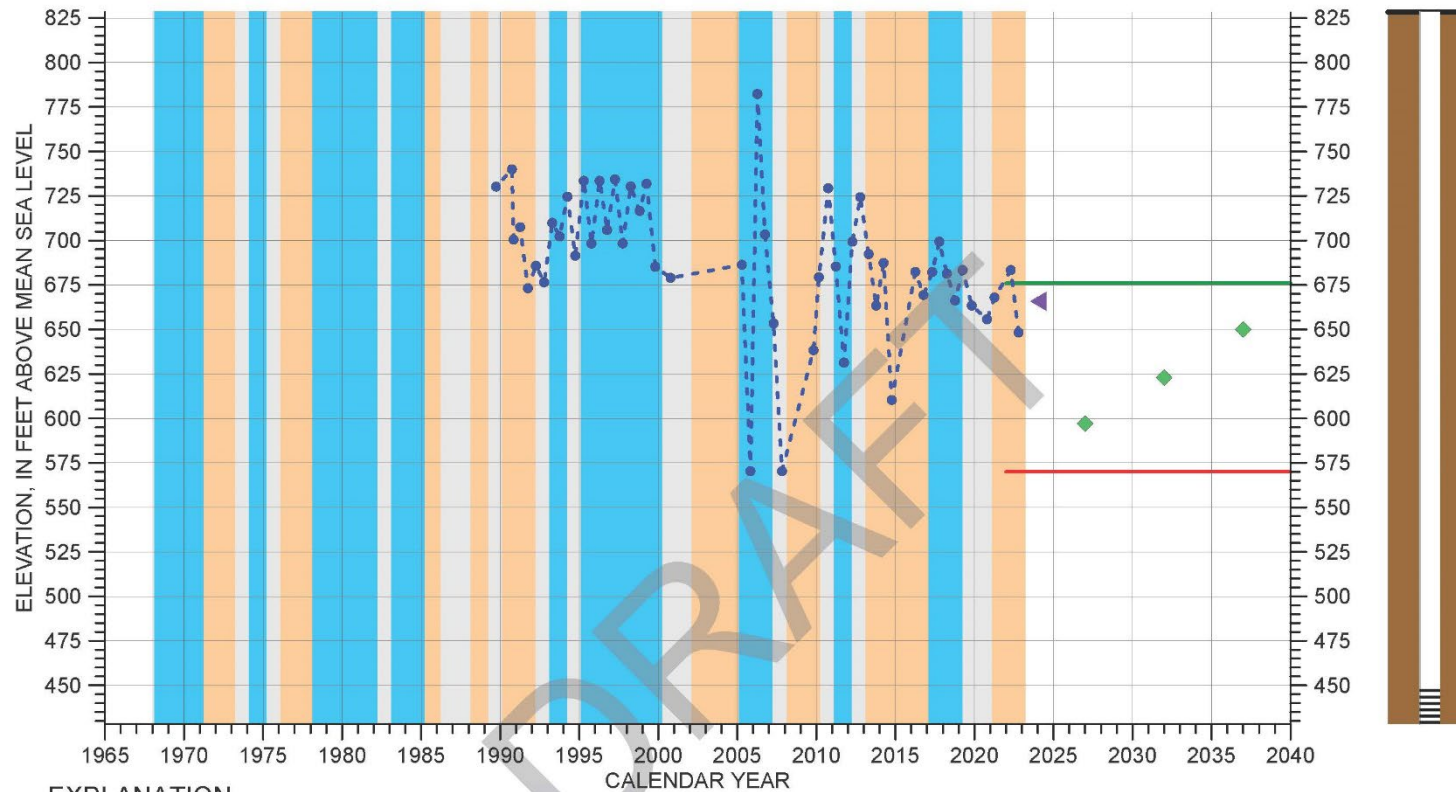


## **Paso Robles Formation Aquifer Hydrographs**

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### EXPLANATION

- Groundwater Elevation
- Measurement Not Verified\*
- Measurable Objective
- Minimum Threshold
- ▲ Average of spring and fall 2022 water elevations
- ◆ Interim Milestones

### CLIMATE PERIOD CLASSIFICATION

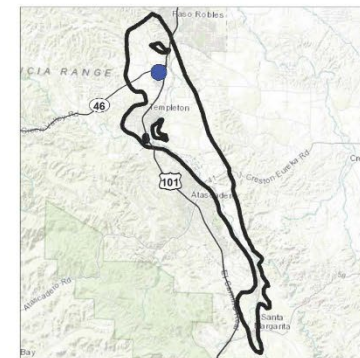
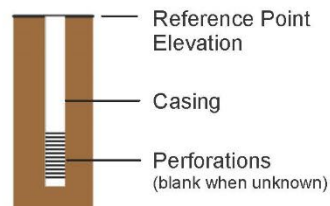
- Dry
- Avg/Alternating
- Wet

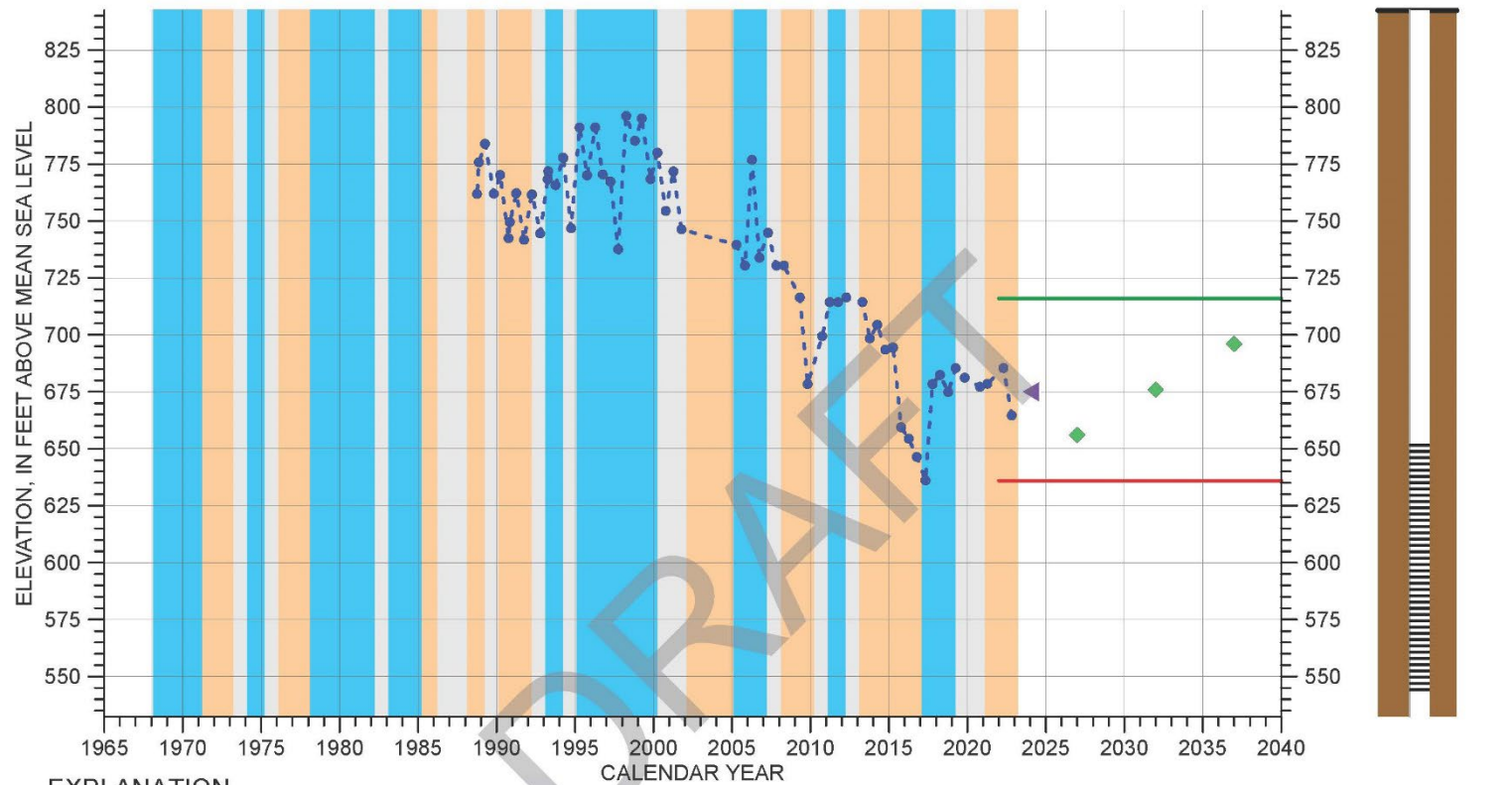
Well Depth: 400 feet  
 Screened Interval: 200-360, 380-400 feet below ground surface  
 Reference Point Elevation: 828.3 feet above mean sea level

\* Measurement reported as not static

### HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 27S/12E-17B02

P:\Portland\649-AMWC\012-WY22 AR\Analysis\Hydrographs\Grapher\QTp1\_27S\_12E\_17B02.gpj





#### EXPLANATION

- Groundwater Elevation
- Measurement Not Verified\*
- Measurable Objective
- Minimum Threshold
- ▲ Average of spring and fall 2022 water elevations
- ◆ Interim Milestones

#### CLIMATE PERIOD CLASSIFICATION

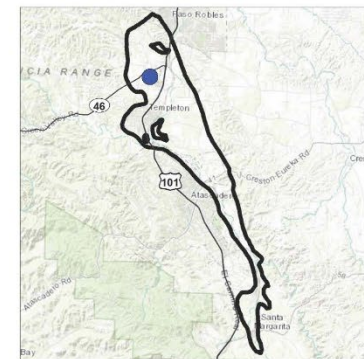
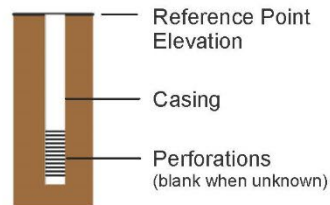
- Orange Dry
- Light Gray Avg/Alternating
- Blue Wet

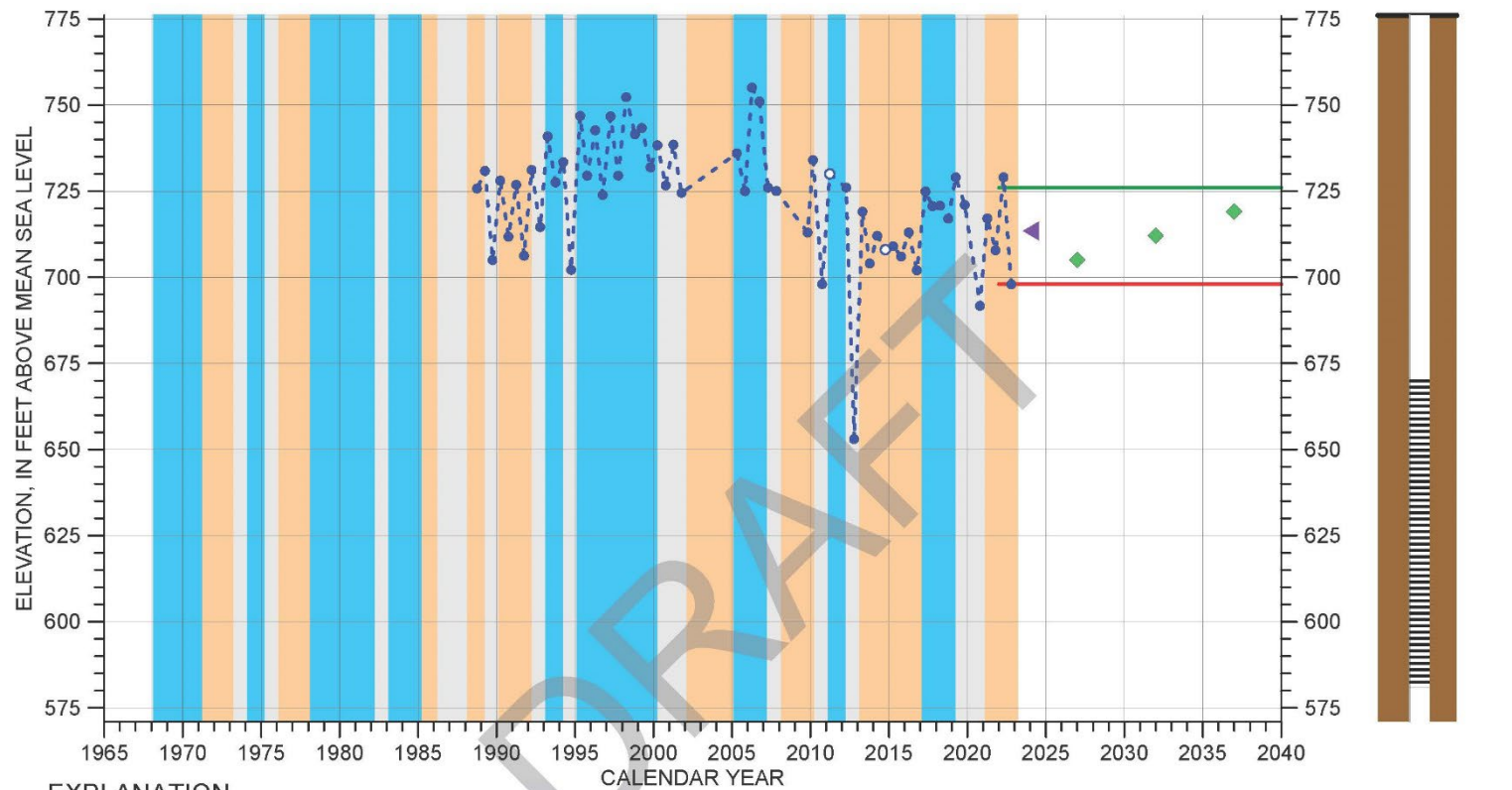
Well Depth: 310 feet  
 Screened Interval: 190-300 feet below ground surface  
 Reference Point Elevation: 842.4 feet above mean sea level

\* Measurement reported as not static

#### HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 27S/12E-17E01

P:\Portland\649-AMWC\012-WY22 AR\Analysis\Hydrographs\Grapher\QTp2\_27S\_12E\_17E01.gpj





#### EXPLANATION

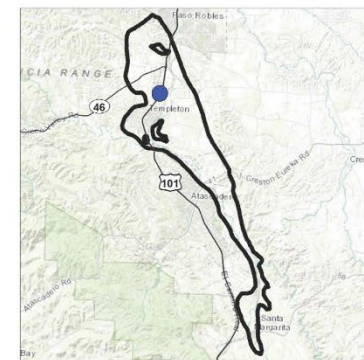
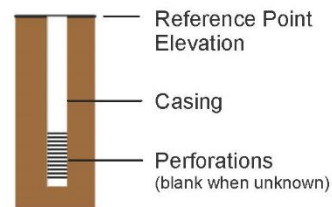
- Groundwater Elevation
- Measurement Not Verified\*
- Measurable Objective
- Minimum Threshold
- ▲ Average of spring and fall 2022 water elevations
- ◆ Interim Milestones

#### CLIMATE PERIOD CLASSIFICATION

- Dry
- Avg/Alternating
- Wet

Well Depth: 205 feet  
Screened Interval: 105-195 feet below ground surface  
Reference Point Elevation: 776 feet above mean sea level

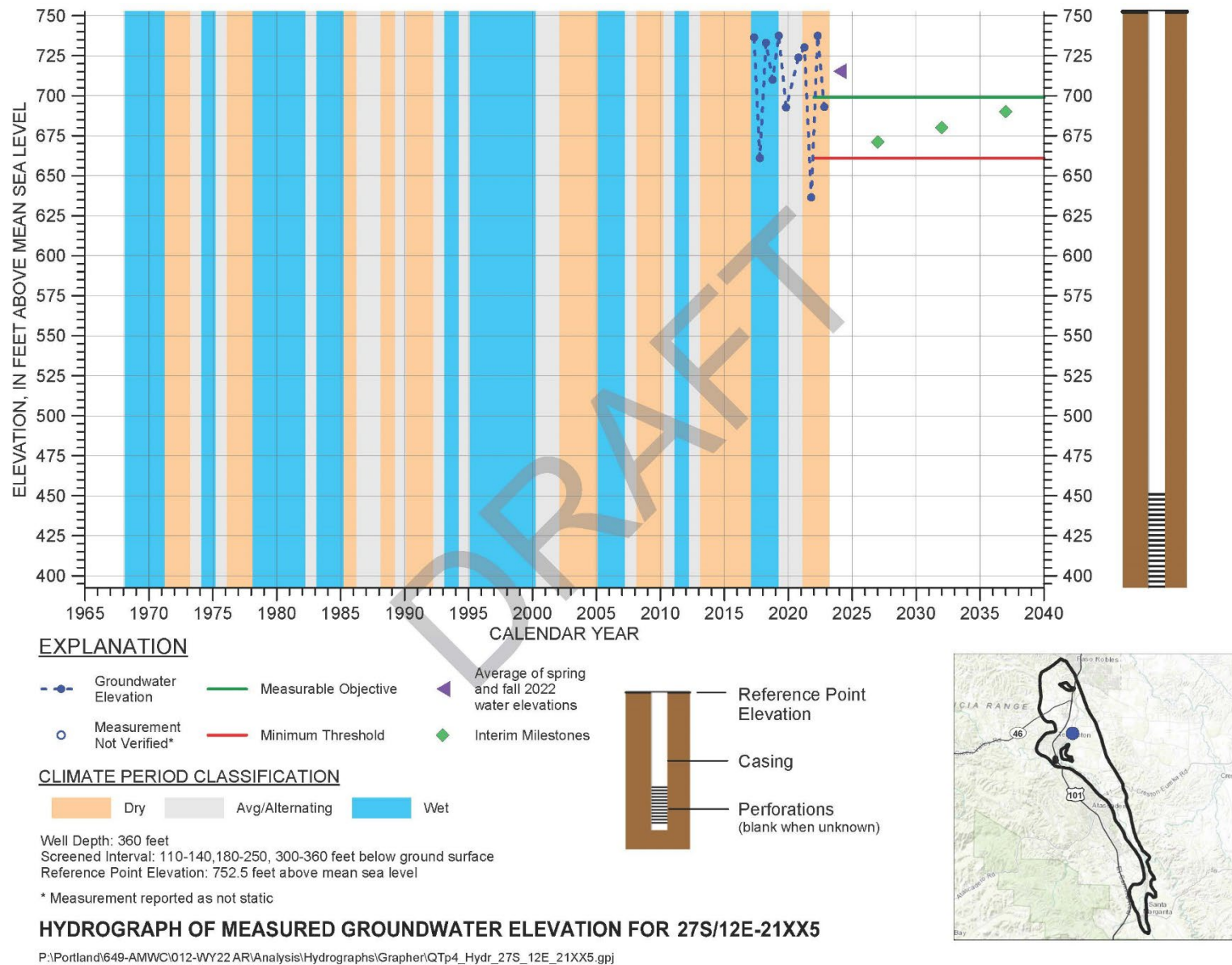
\* Measurement reported as not static



#### HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 27S/12E-20A02

P:\Portland\649-AMWC\012-WY22 AR\Analysis\Hydrographs\Grapher\QTp3\_27S\_12E\_20A02.gpj

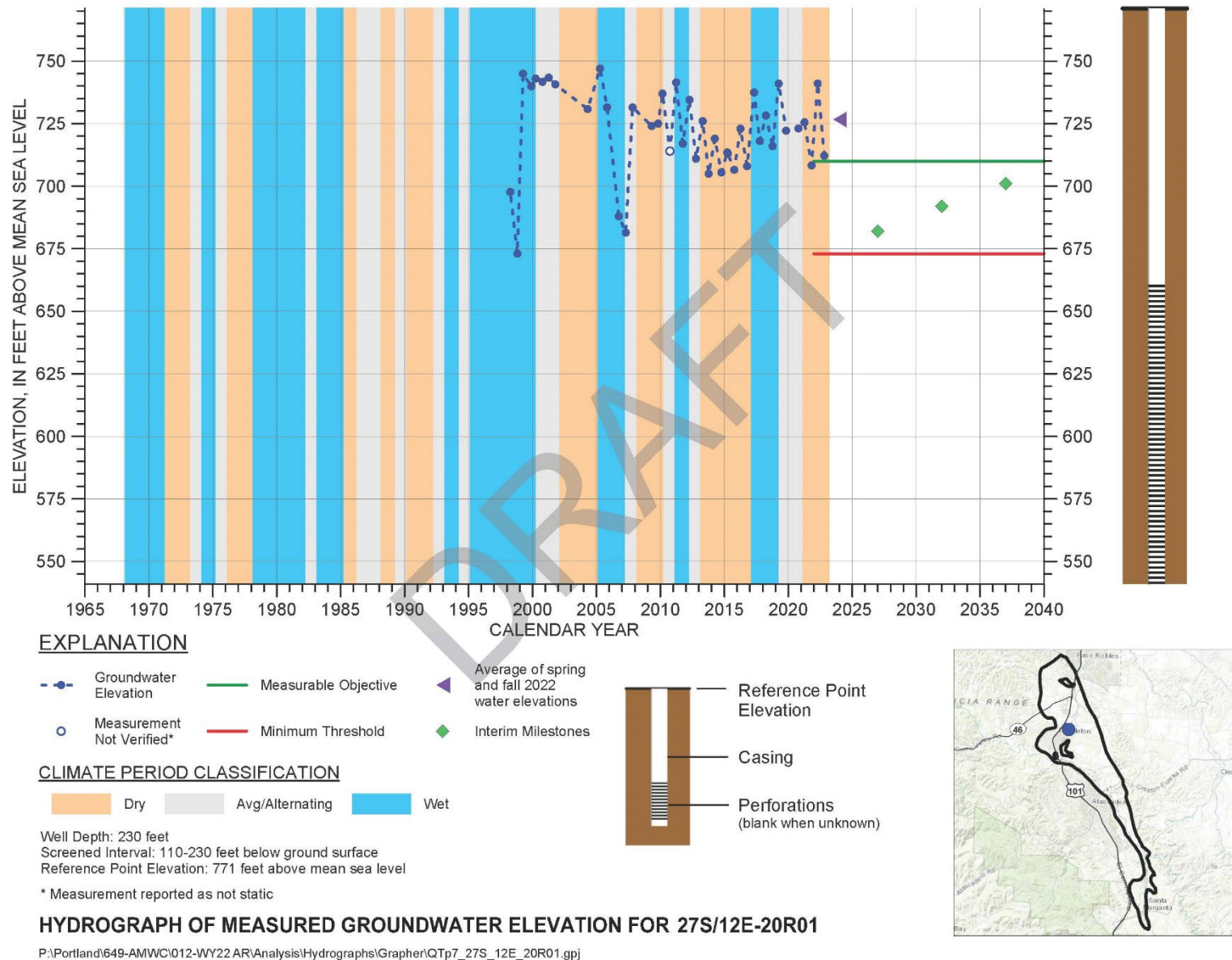




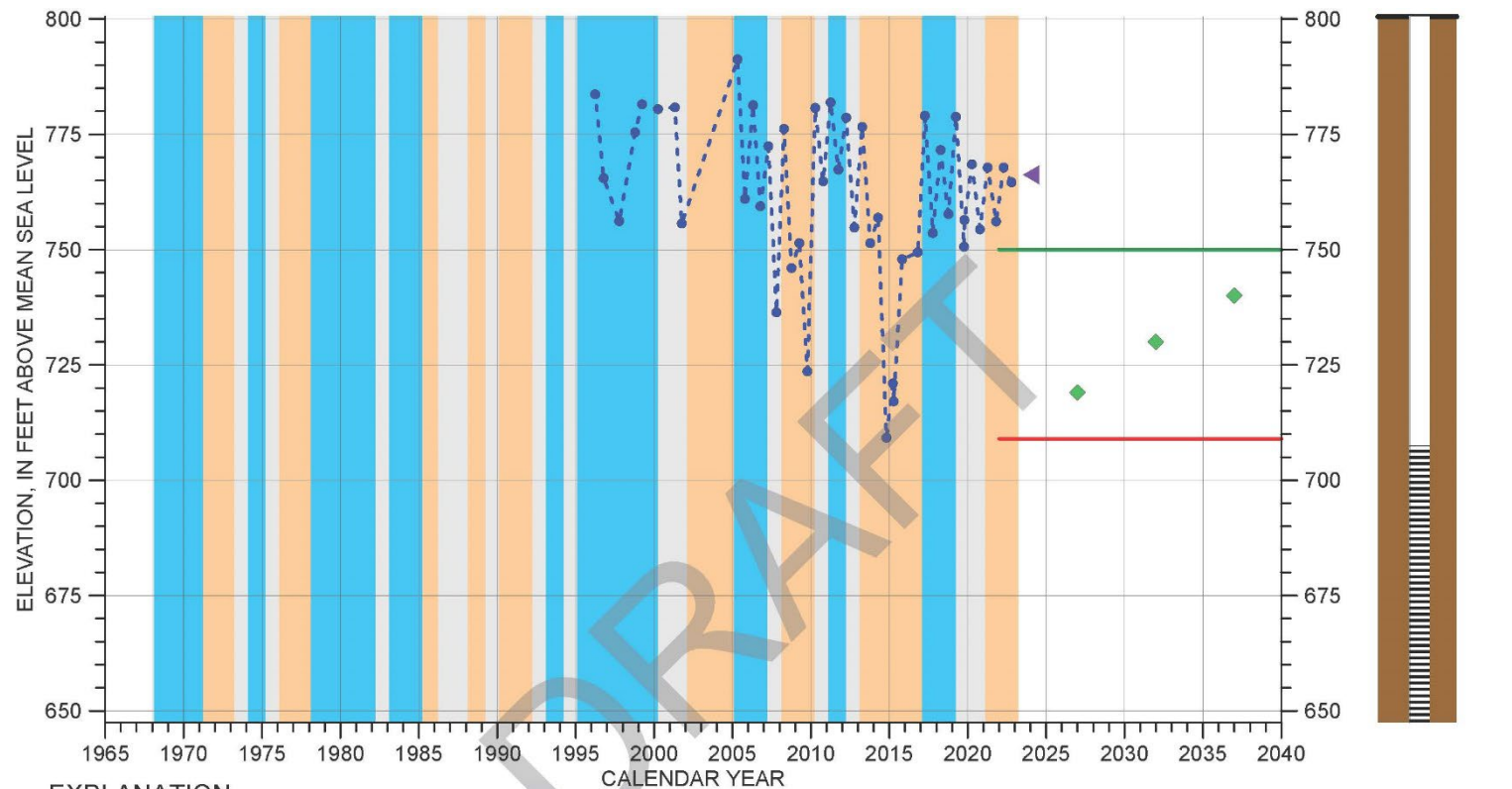












### EXPLANATION

- Groundwater Elevation
- Measurement Not Verified\*
- Measurable Objective
- Minimum Threshold
- Average of spring and fall 2022 water elevations
- Interim Milestones

### CLIMATE PERIOD CLASSIFICATION

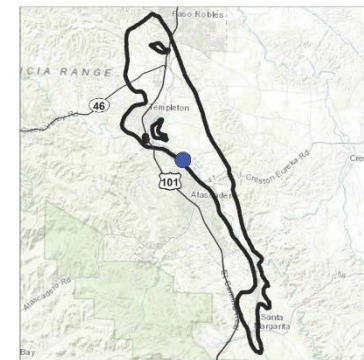
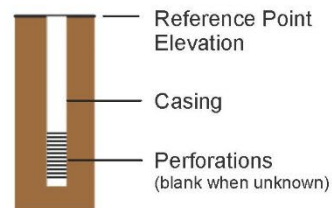
- Dry
- Avg/Alternating
- Wet

Well Depth: 153 feet  
 Screened Interval: 93-153 feet below ground surface  
 Reference Point Elevation: 800.5 feet above mean sea level

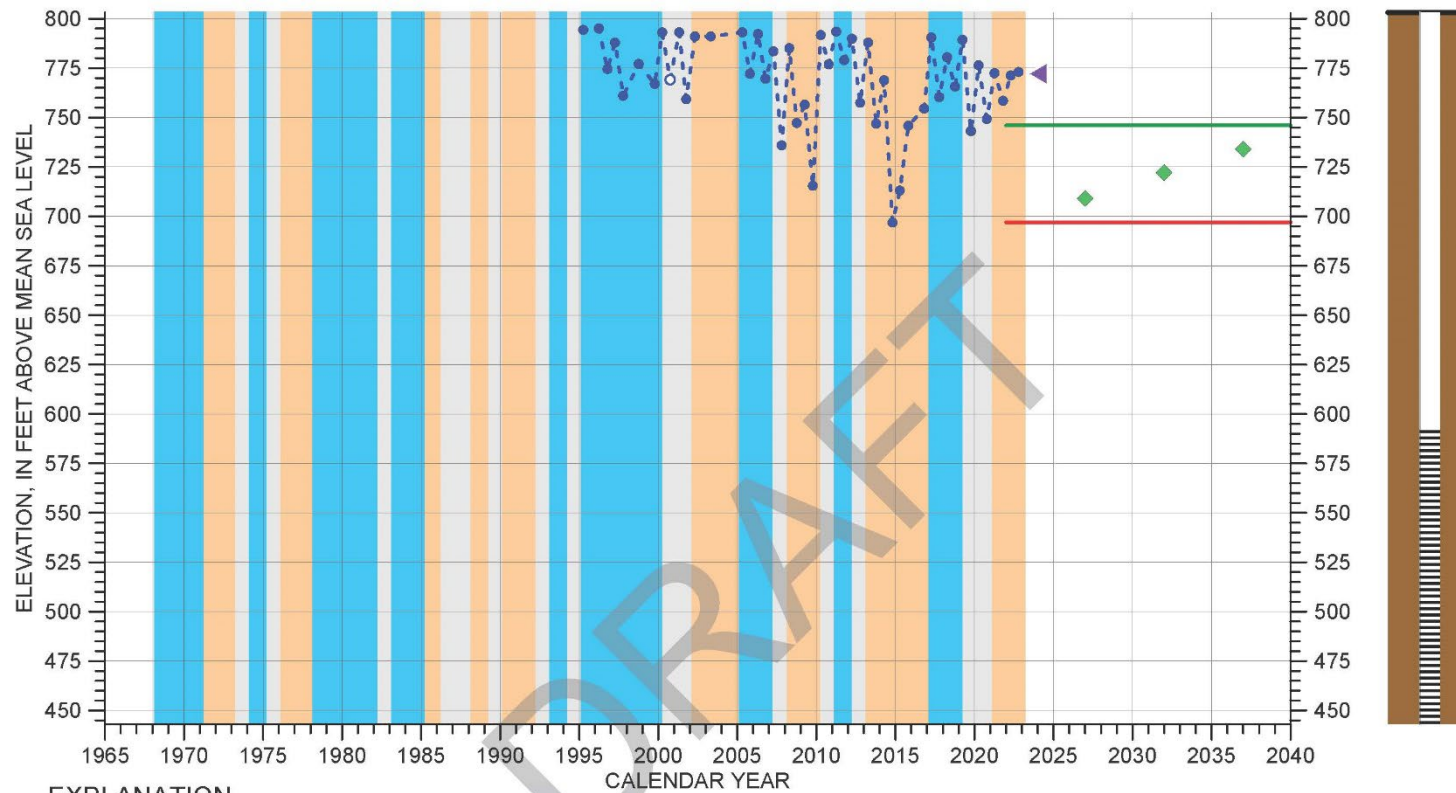
\* Measurement reported as not static

### HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 28S/12E-04J06

P:\Portland\649-AMWC\012-WY22 AR\Analysis\Hydrographs\Grapher\QTp9\_28S\_12E\_04J06.gpj







### EXPLANATION

- Groundwater Elevation
- Measurement Not Verified\*
- Measurable Objective
- Minimum Threshold
- ▲ Average of spring and fall 2022 water elevations
- ◆ Interim Milestones

### CLIMATE PERIOD CLASSIFICATION

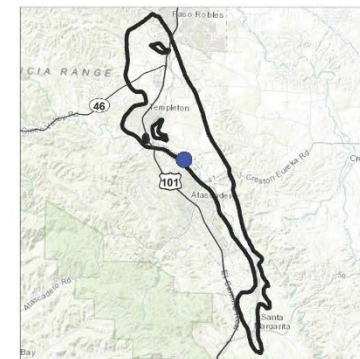
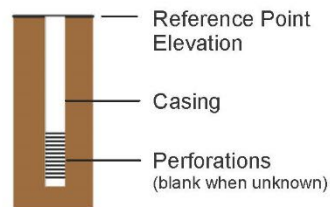
- Orange Dry
- Light Gray Avg/Alternating
- Blue Wet

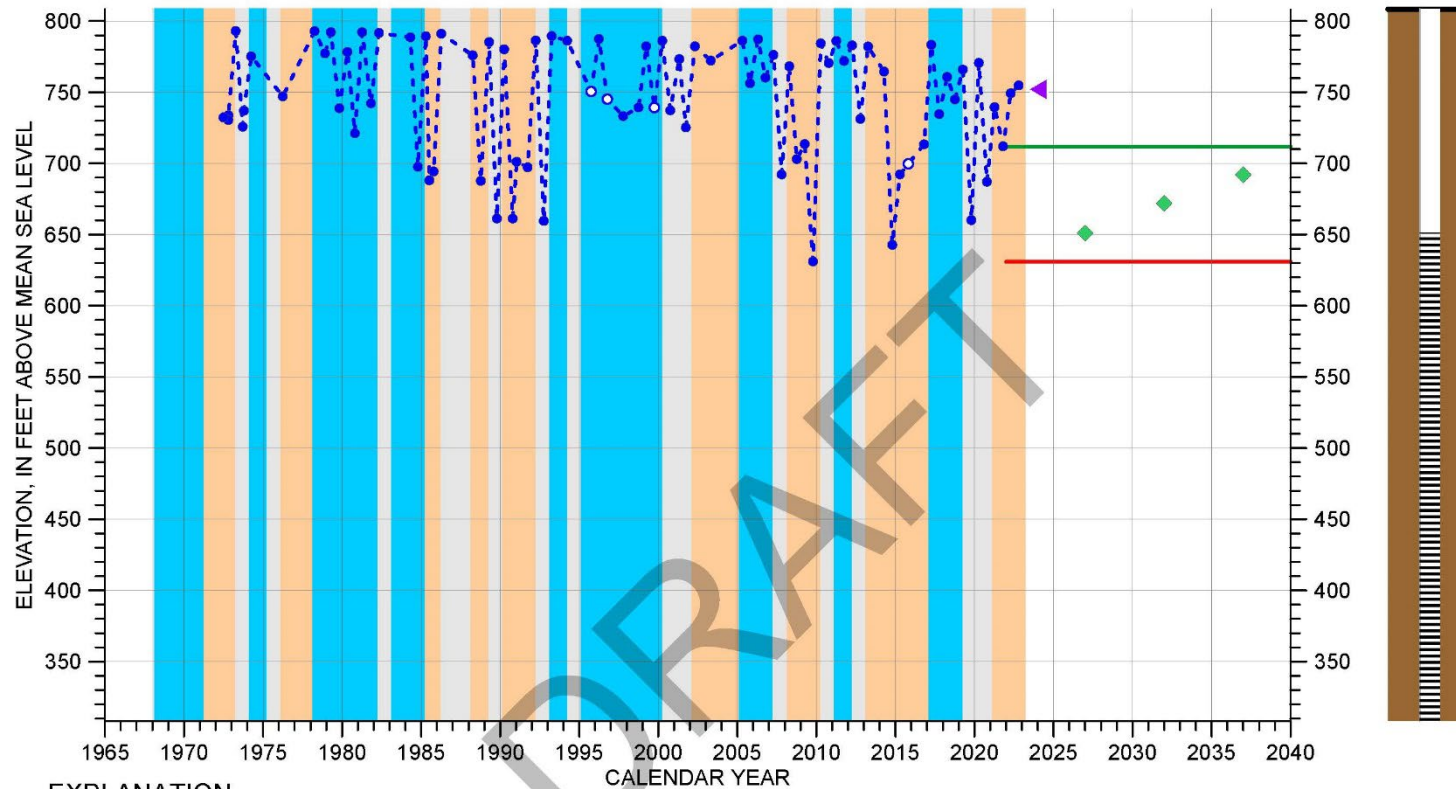
Well Depth: 360 feet  
 Screened Interval: 145-190, 210-360 feet below ground surface  
 Reference Point Elevation: 803.1 feet above mean sea level

\* Measurement reported as not static

### HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 28S/12E-04J05

P:\Portland\649-AMWC\012-WY22 AR\Analysis\Hydrographs\Grapher\QTp10\_Hydr\_28S\_12E\_04J05.gpj





### EXPLANATION

- Groundwater Elevation
- Measurement Not Verified\*
- Measurable Objective
- Minimum Threshold
- ▲ Average of spring and fall 2022 water elevations
- ◆ Interim Milestones

### CLIMATE PERIOD CLASSIFICATION

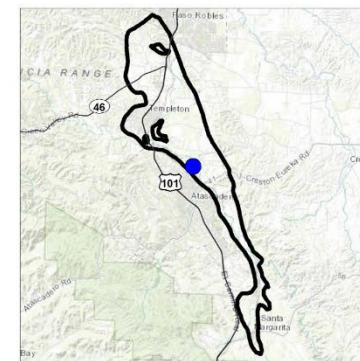
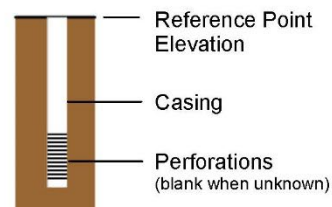
- Dry
- Avg/Alternating
- Wet

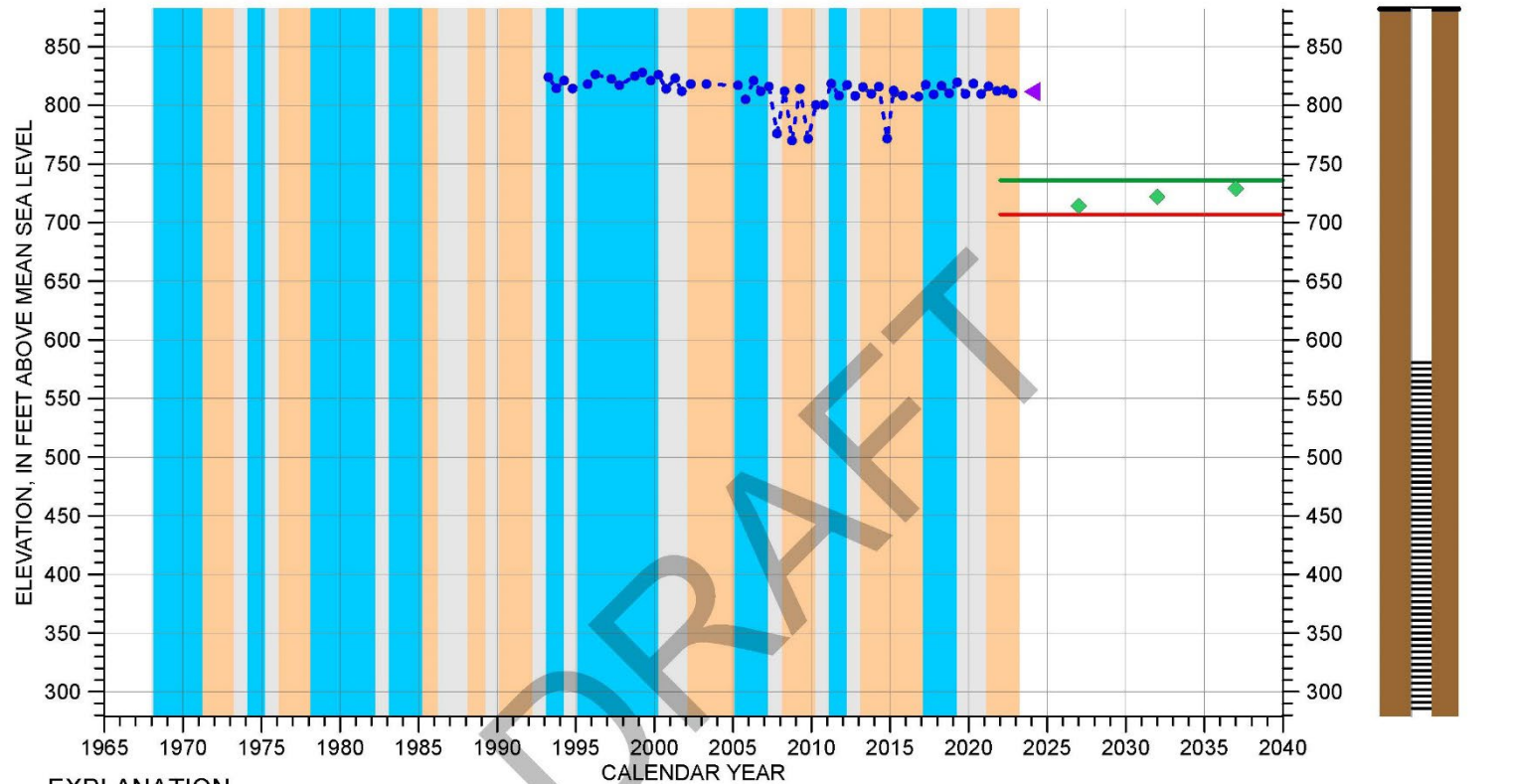
Well Depth: 500 feet  
 Screened Interval: 157-500 feet below ground surface  
 Reference Point Elevation: 808.3 feet above mean sea level

\* Measurement reported as not static

### HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 28S/12E-10A03

P:\Portland\649-AMWC\012-WY22 AR\Analysis\Hydrographs\Grapher\QTp11\_28S\_12E\_10A03.gpj





### EXPLANATION

- Groundwater Elevation
- Measurement Not Verified\*
- Measurable Objective
- Minimum Threshold
- Average of spring and fall 2022 water elevations
- Interim Milestones

### CLIMATE PERIOD CLASSIFICATION

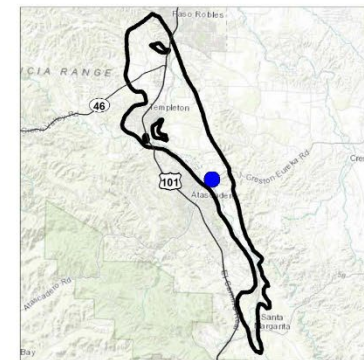
- Dry
- Avg/Alternating
- Wet

Well Depth: 603 feet  
Screened Interval: 300-600 feet below ground surface  
Reference Point Elevation: 882 feet above mean sea level

\* Measurement reported as not static

### HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 28S/12E-11K02

P:\Portland\649-AMWC\012-WY22 AR\Analysis\Hydrographs\Grapher\QTp12\_28S\_12E\_11K02.gpj







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## **Attachment E. Paso Robles Storage Coefficient Derivative**

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APPENDIX **X**

**Paso Robles Formation Aquifer Storage Coefficient  
Derivation and Sensitivity Analysis (GSI, 2020)**

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## Paso Robles Formation Aquifer Storage Coefficient Derivation and Sensitivity Analysis

The annual changes in groundwater in storage calculated for water years 2017, 2018, and 2019 in the Paso Robles Formation Aquifer presented in this first annual report are based on a fixed storage coefficient (S) value derived from groundwater modeling and groundwater elevation data presented in the Groundwater Sustainability Plan (GSP) for water year 2016. The derivation of S for the Paso Robles Formation Aquifer and a sensitivity analysis are presented below. It should be noted that while the GSP groundwater model utilizes a spatially variable S (both laterally and vertically) the S value derived here and used in this first annual report is a single average value representing the Paso Robles Formation Aquifer within the Subbasin.

### 1.1 Derivation of the Storage Coefficient Term

Derivation of S was accomplished through a back calculation using the change in groundwater in storage in the Paso Robles Formation Aquifer determined from the GSP groundwater model for water year 2016 and the total volume change represented by a Paso Robles Formation Aquifer groundwater elevation change map prepared for water year 2016. The change in groundwater in storage for water year 2016 in the Paso Robles Formation Aquifer is -59,459 acre-feet (AF) based on the GSP groundwater model.

The Paso Robles Formation Aquifer groundwater elevation change map for water year 2016 was prepared for this annual report by comparing the fall 2015 groundwater elevation contour map to the fall 2016 groundwater elevation contour map. The fall 2015 groundwater elevations were subtracted from the fall 2016 groundwater elevations resulting in a map depicting the changes in groundwater elevations in the Paso Robles Formation Aquifer that occurred during the 2016 water year (not pictured, but similar to Figures 12, 13, and 14 in this first annual report).

The groundwater elevation change map for water year 2016 represents a total volume change within the Paso Robles Formation Aquifer of -807,490 AF. As described in Section 7.2 of this annual report, this total volume change includes the volume displaced by the aquifer material and the volume of groundwater stored within the void space of the aquifer. The portion of void space in the aquifer that can be utilized for groundwater storage is represented by S. The change in groundwater in storage is equivalent to the product of S and the total volume change, as shown here:

$$\text{Change of Groundwater in Storage} = S \times \text{Total Volume Change}$$

This equation can be re-arranged and solved for S:

$$S = \frac{\text{Change of Groundwater in Storage}}{\text{Total Volume Change}} = \frac{-59,459 \text{ AF}}{-807,490 \text{ AF}} = 0.07$$

Therefore, based on analysis of data for water year 2016, an average S value for the Paso Robles Formation Aquifer in the Paso Robles Subbasin is 0.07.

### 1.2 Sensitivity Analysis

The annual changes in groundwater in storage in the Paso Robles Formation Aquifer calculated for water years 2017, 2018, and 2019 presented in this first annual report are 60,106, 6,398, and 59,682 AF, respectively. These values, calculated using an S value of 0.07, appear reasonable when compared to historical changes in groundwater in storage (see Figure 15 in this first annual report). While the calculated value of S, presented above, is based on sound science and using the best readily available information, it is

necessary to acknowledge that the true value of S in the Paso Robles Formation Aquifer is spatially variable (as indicated in the GSP groundwater model) and ranges in value both above and below the calculated value of 0.07. A sensitivity analysis was performed to demonstrate the range of annual changes in groundwater in storage that result from using a range of S values. Table F1 shows that the annual change in groundwater in storage volumes can range from 27 percent less to 27 percent more than presented in this first annual report based on S values ranging from 0.05 to 0.09. This shows the sensitivity of the S value to determination of annual change in groundwater in storage. However, neither the 27 percent lower nor the 27 percent higher annual change in groundwater in storage volumes seem reasonable when compared to historical changes in groundwater in storage (as shown in Figure 15 in this first annual report). Based on this sensitivity analysis, GSI believes that the calculated value of S (0.07) is reasonable and defensible for the purposes of this first annual report.

**Table F 1. Change in Groundwater in Storage Sensitivity Analysis**

Water Year	Total Volume of Change (AF)	Change in Groundwater in Storage (AF), based on:								
		S = 0.05		S = 0.06		Calculated S [0.07]	S = 0.08		S = 0.09	
		(AF)	% Diff	(AF)	% Diff	(AF)	(AF)	% Diff	(AF)	% Diff
2017	816,274	43,781	-27%	51,943	-14%	60,106	68,269	14%	76,432	27%
2018	86,885	4,660		5,529		6,398	7,267		8,135	
2019	810,508	43,471		51,577		59,682	67,787		75,892	

notes:

AF = acre-feet, S = storage coefficient, % Diff = percent difference from calculated S