TECHNICAL MEMORANDUM

Evaluation of Wyckoff Groundwater Level Data July 1 through December 31, 2017

PREPARED FOR:	Hun Seak Park/Washington Dept. of Ecology
PREPARED BY:	Nicole Badon/CH2M Cassie Katzen/CH2M Ken Scheffler/CH2M
COPIES	Helen Bottcher/EPA Region 10 Stan Warner/CH2M Keith Allers/CH2M Richard Brooks/Suquamish Tribe Perry Barrett/City of Bainbridge Island
DATE:	January 25, 2018

This memorandum summarizes the Wyckoff groundwater level results for the July 1 through September 30, 2017 (Quarter 3) and October 1 through December 31, 2017 (Quarter 4) monitoring periods and evaluates the data to make a determination on whether upper aquifer hydraulic containment was achieved for each quarterly monitoring period.

Summary/Recommendations

- The upper aquifer recovery wells and groundwater treatment system operated 24 hours per day, 7 days per week, except for temporary shutdowns due to low water levels, external power outages, and weather following the June 5 - September 6, 2017 summer shutdown event.
- Hydraulic containment was maintained at each well pair over the two 92-day monitoring periods, with the lower aquifer to upper aquifer groundwater elevation ratios ranging from 1.08 to 1.28 for Quarter 3 and 1.15 to 1.81 for Quarter 4. A ratio of greater than 1.0 indicates hydraulic containment was maintained. Hydraulic containment determinations for well pairs VG-2U/VG-2L, CW-13/VG-4L, and CW08/P-4L during the Quarter 4 period could not be performed due to field equipment (transducer cable) damage.
- The groundwater elevation data from the transducers in the 10 well pairs will be downloaded again on March 31, 2018 to maintain a quarterly data evaluation schedule consistent with that used in the definition of hydraulic containment.
- Annual transducer calibration is necessary in February 2018 due to installation of new transducer cables following damage during vegetation clearing operations in September 2017. Annual events should continue to confirm accurate water level measurements. The transducers were last calibrated in January 2017.

Water Level Data Collection

The July 1 through September 30, 2017 and October 1 through December 31, 2017 periods represent the next two consecutive 92-day and 92-day quarterly monitoring intervals following the Quarter 2 (April 1 through June 30, 2017) evaluation presented in *Evaluation of Wyckoff Groundwater Level Data*

April 1 through June 30, 2017 (CH2M Memorandum, 2017). The locations of the monitoring wells are shown on Figure 1 and the wells with transducers are listed in Table 1. Model 705 KPSI™ Level and Pressure Transducers are installed in 22 upper aquifer wells and 18 lower aquifer wells and were last calibrated in January 2017. All recorded water level data are available in e-format upon request.

On September 20, 2017 transducer cables for two upper aquifer wells (VG-2U and CW08) and one lower aquifer well (VG-4L) were damaged during vegetation clearing by a U.S. Environmental Protection Agency subcontractor. The transducer cable for lower aquifer well VG-2L was damaged on October 5, 2017. Data for these wells was unavailable for the Quarter 4 monitoring period. Repairs are scheduled to be completed in January 2017.

Table 1 – Wells with Transducers and Upper Aquifer/Lower Aquifer Well Pairings, July 1, 2017 through December 31, 2017

Well Pairs for Vertical Gradient Evaluation			Other Wells with Transducers	
Upper Aquifer		Lower Aquifer Well ID		
Well ID	Compartment		Upper Aquifer Recovery Wells[a]	Lower Aquifer Wells
MW14	1	CW05	E-02b	CW09
MW18	1	02CDMW01	E-04b	P-1L
PO03	1	99CDMW02A	E-06b	P-2L
CW03	2/3	CW02	E-07b	P-3L
VG-2U	2/3	VG-2L	MW-21	P-5L
VG-3U	2/3	VG-3L	RPW-1	P-6L
VG-5U	1	VG-5L	RPW-2	PZ03
PO13	1	VG-1L	RPW-4	SE02
CW13	1	VG-4L	RPW-5	
CW08	1	P-4L	RPW-6	
			PW-8	
			PW-9	

[a] All upper aquifer recovery wells are screened across Compartments 1/2/3 except MW-21, which is screened in Compartment 1.

[b] The E-0x series of wells are located within the Pilot Test sheet pile wall.

Groundwater Treatment Plant Operations

The groundwater treatment plant (GWTP) and all nine of the upper aquifer extraction wells operated 24 hours per day, 7 days per week during the latter part of the Quarter 3 period and for most of the Quarter 4 period as conditions permitted. The annual summer shutdown event occurred from June 5 through September 6, 2017. Several extraction well shutdowns occurred during the latter part of Quarter 3 and during Quarter 4 due to low water levels, external power outages or adverse weather (e.g. wind/freeze) conditions. The dates during which the extraction wells were shut down for periods greater than 24 hours are listed in Table 2. These periods are graphically overlain with the rainfall records and are shown in Figures 4a and 4b. For the Quarter 3 monitoring period (July 1 through September 30, 2017), 0.75-inches of rainfall was recorded. During the Quarter 4 monitoring period (October 1 through December 31, 2017), 17.80-inches of rainfall was recorded.

The total volume of water extracted from the upper aquifer was 6,237,469 gallons during the two 92-day monitoring periods, equating to an average pumping rate of approximately 37 gpm for the 122 days

all or portions of the wellfield were in operation. [Note, when fully operating, and upper aquifer water levels allow, the system can pump about 72 gpm.]

Table 2 – Former Process Area (FPA) Extraction Well Pump Shutdown Periods Greater than 1 Day

Offline Dates	Wells	Reason
June 5 – September 6, 2017	PW-1	Summer shutdown
June 8 – September 6, 2017	PW-6	Summer shutdown
June 12 – September 6, 2017	EW-6	Summer shutdown
June 14 – September 6, 2017	PW-2, PW-4, PW-5, PW-8, PW-9, EW-2	Summer shutdown
September 6 – September 8, 2017	PW-2, PW-4, PW-5, PW-6, PW-8, EW-2, EW-6	Overnight shutdown during plant restart
September 6 – October 19, 2017	PW-1	Low water level
September 6 – November 14, 2017	PW-9	Low water level
October 10 – October 19, 2017	PW-8	Low water level
October 18 – October 19, 2017	PW-2, PW-4, PW-5, PW-8	Power outage
October 25 – October 26, 2017	PW-6	Low discharge pressure
October 26 – November 14, 2017	PW-1, PW-6	Low water level
November 13 – November 14, 2017	PW-2, PW-4, PW-5, PW-8, EW-2, EW-6	Power outage
November 15 – November 27, 2017	PW-9	Low water level
December 8 – December 31, 2017	PW-9	Low water level
December 21 – December 27, 2017	PW-1, PW-2, PW-4, PW-5, PW-6, PW-8, EW-2, EW-6	Freeze protection

Hydraulic Containment Evaluation

Upper aquifer hydraulic containment at the Wyckoff site is evaluated using water level data from 10 upper and lower aquifer well pairs as shown in Table 1 (See Figure 1 for the well locations). Hydrographs for each of the 10 well pairs have been prepared and are presented in Figures 2a through 2j (July 1 through September 30, 2017) and in Figures 3a through 3j (October 1 through December 31, 2017). Seven of the upper aquifer wells are screened in Compartment 1 while three upper aquifer wells are screened in Compartment 2/3.

Hydraulic containment at each well pair is evaluated by first calculating the average groundwater elevations in the upper and lower aquifers using the water elevation data recorded every 15 minutes during the monitoring period. Then the average upper and lower aquifer groundwater elevations at each well pair are compared relative to each other. If the average lower aquifer groundwater elevation is greater than the average upper aquifer groundwater elevation at the well pair, an upward (positive) vertical gradient is indicated. Additionally, if an upward vertical gradient is present, the ratio of the

average lower aquifer water elevation to the average upper aquifer water elevation for that well pair is greater than 1.0 for the duration of the monitoring period, and a hydraulic containment maintained determination is made.

Additional evaluations are conducted through examination of the short-term periods when downward hydraulic gradients occur. Groundwater elevations for each well pair are compared at each 15-minute recording, and the summary statistics: average, maximum, and minimum difference in groundwater elevation for each well pair calculated, along with a duration analysis for negative (downward) gradients. The duration analysis includes the number of downward gradients observed during the monitoring period, their average duration (hours), and the cumulative duration (days and percent) for the monitoring period. A downward vertical gradient is indicated when the difference between the lower and upper aquifer groundwater elevations at each 15-minute recording have a negative value (e.g. average upper aquifer groundwater elevation greater than the lower aquifer groundwater elevation).

The summary statistics and hydraulic containment evaluation data for the well pairs are summarized in Tables 3a and 3b. Table 3a is based on the 92-day monitoring period (Quarter 3) from July 1 through September 30, 2017, and Table 3b is based on the 92-day monitoring period (Quarter 4) from October 1 through December 31, 2017, which corresponds to the quarterly period used for assessing hydraulic containment. The tables present the average groundwater elevations for each well pair, the ratio of the average lower aquifer to upper aquifer groundwater elevation, the average and range of ratios observed, and summary statistics for negative vertical gradient conditions (compared at each 15-minute recording) between the upper and lower aquifers.

Based on the information presented in Table 3a, the following determinations were made:

- The average lower aquifer to upper aquifer groundwater elevation ratios were greater than 1.0 at all 10 well pairs for the 92-day monitoring period, indicating hydraulic containment was maintained at all locations.
- Negative vertical gradients were observed at 8 of the 10 monitoring well pairs. Downward vertical gradient events typically occur during the lowest semidiurnal tide period when the lower aquifer groundwater elevation declines below the upper aquifer groundwater elevation (see Figures 2a through 2j). Groundwater elevations in the upper aquifer Compartment 2/3 and all lower aquifer wells are strongly influenced by daily tidal fluctuations while water levels in the upper aquifer Compartment 1 wells show much less tidal influence.
- A series of short duration downward gradient periods, averaging between 2 and 5 hours each, occurred at 8 of the 10 monitoring well pairs. At seven of these locations (MW14/CW05, MW18/02CDMW01, PO03/99CDMW02A, VG-5U/VG-5L, PO13/VG-1L, CW13/VG-4L and CW08/P-4L), the upper aquifer well is screened in Compartment 1, and at the eighth location (CW03/CW02) the upper aquifer well is screened in Compartment 2/3. The remaining two well pairs (VG-2U/VG-2L and VG-3U/VG-3L) did not have any downward gradients during the current reporting period. The upper aquifer well at these two well pair locations is screened in Compartment 2/3.
- At 1 of the 10 well pairs (VG-5U/VG-5L), the total negative gradient duration for the 92-day period was less than 1.3% (1.2 days). Six of the 10 well pairs (MW14/CW05, MW18/02CDMW01, PO03/99CDMW02A, CW02/CW03, and PO13/VG-1L, and CW13/VG-4L) had durations between 9.4% and 18.8% (7.7 to 17.3 days) while one well pair (CW08/P-4L) had a total duration of 29.4% (24.1 days). CW08/P-4L also had the highest duration during the previous monitoring period.

- Maximum downward flow gradients occurred at three well pairs in late July 2017 when the well field was shut down for the summer and when minus tides up to -3.13 feet mean lower low water (MLLW) occurred. Five well pairs had maximum negative flow gradients on August 20, 2017 when the well field was shut down for the summer and when minus tides up to -1.91 feet MLLW occurred.

Based on the information presented in Table 3b, the following determinations were made:

- The average lower aquifer to upper aquifer groundwater elevation ratios were greater than 1.0 at all 7 well pairs that were functioning for the 92-day monitoring period, indicating hydraulic containment was maintained at all locations.
- Negative vertical gradients were observed at 6 of the 7 functioning monitoring well pairs. Downward vertical gradient events typically occur during the lowest semidiurnal tide period when the lower aquifer groundwater elevation declines below the upper aquifer groundwater elevation (see Figures 3a through 3j). Groundwater elevations in the upper aquifer Compartment 2/3 and all lower aquifer wells are strongly influenced by daily tidal fluctuations while water levels in the upper aquifer Compartment 1 wells show much less tidal influence.
- A series of short duration downward gradient periods, averaging between 3 and 7 hours each, occurred at 6 of the 7 functioning monitoring well pairs. At five of these locations (MW14/CW05, MW18/02CDMW01, PO03/99CDMW02A, VG-5U/VG-5L, and PO13/VG-1L), the upper aquifer well is screened in Compartment 1, and at the sixth location (CW03/CW02) the upper aquifer well is screened in Compartment 2/3. The remaining well pair (VG-3U/VG-3L) did not have any downward gradients during the current reporting period. The upper aquifer well at this well pair location is screened in Compartment 2/3.
- At 4 of the 6 well pairs with negative gradients (MW14/CW05, MW18/02CDMW01, PO03/99CDMW02A, and CW03/CW02), the total negative gradient duration for the 92-day quarter was less than 5.6% (5.1 days). The two remaining well pairs with negative gradients (VG-5U/VG-5L and PO13/VG-1L) had total durations of 18.7% (17.2 days) and 12.2% (11.3 days), respectively.
- Maximum downward flow gradients occurred at one well pair in early December 2017 when minus tides up to -3.22 feet MLLW occurred. Five well pairs had maximum negative flow gradients in late December following a period of increased rainfall (2.91-inches) and a wellfield shutdown for freeze protection.

Summary

During the Quarter 3 and Quarter 4 monitoring periods, hydraulic containment was maintained at each of the well pair locations with functioning transducer cables.

The maximum observed negative gradients, for the July 1 through September 30, 2017 period, occurred for 3 of the 10 well pairs (MW18/CDMW01, VG-5U/VG-5L, and CW13/VG-4L) on July 23 – 24, 2017 when the well field was shut down for the summer and when minus tides up to -3.13 feet MLLW occurred. The remaining five well pairs had maximum negative flow gradients on August 20, 2017 when the well field was shut down for the summer and when minus tides up to -1.91 feet MLLW occurred (Figure 4a). For the October 1 through December 31, 2017, period, the maximum downward flow gradients occurred at one well pair in early December 2017 when minus tides up to -3.22 feet MLLW occurred. Five well pairs had maximum negative flow gradients in late December following a period of increased rainfall (2.91-inches) and a wellfield shutdown for freeze protection (Figure 4b).

Water levels increased about 1 foot during the summer shutdown at most upper aquifers wells, and steadily decreased following the wellfield restart on September 6, 2017. Water levels generally increased between 0.5 to 3 feet during the December 21 through December 27, 2017 shutdown, which also corresponded with a period of high precipitation.

Table 3a
Summary of Groundwater Elevation Data by Well Pair
July 1, 2017 through September 30, 2017

				Summary Statistics Short Term Comparison - Water Level Difference between the Upper and Lower Aquifer wells (ft)			Duration Analysis – Downward (neg.) Gradient			
Well Pair	Upper Aquifer Average Groundwater Elevation (ft. MLLW)	Lower Aquifer Average Groundwater Elevation (ft. MLLW)	Ratio (Avg Lower Aq WL / Avg Upper Aq WL)[a]	Average	Max	Min	Number of Neg Grad Events	Average Duration of Neg Grad (hours)	Total Duration of Neg Grad (days)	Percent Duration of 92-day Monitoring Period[c]
MW14/CW05	8.29	10.21	1.23	1.93	4.76	-1.60	73	4	11.7	12.8%
MW18/02CDMW01	7.64	9.74	1.27	2.09	8.30	-1.59	73	4	13.6	14.8%
PO03/99CDMW02A	8.54	10.33	1.21	1.79	5.18	-1.78	78	4	13.5	14.6%
CW03/CW02	8.21	9.50	1.16	1.30	4.26	-1.44	73	5	14.1	15.4%
VG-2U/VG-2L[b]	8.56	9.26	1.08	0.77	1.93	0.25	none			
VG-3U/VG-3L	8.27	10.57	1.28	2.30	5.02	0.40	none			
VG-5U/VG-5L	9.39	11.52	1.23	2.13	4.06	-0.33	15	2	1.2	1.3%
PO13/VG-1L	8.16	9.81	1.20	11.52	4.80	-2.29	95	4	17.3	18.8%
CW13/VG-4L[b]	9.81	11.70	1.19	1.81	3.92	-1.13	60	3	7.7	9.4%
CW08/P-4L[b]	8.88	9.65	1.09	0.85	4.12	-3.10	107	5	24.1	29.4%

Notes:

[a] Ratio > 1 = Hydraulic Containment was Achieved

[b] VG-2U/VG-2L, CW13/VG-4L, and CW08/P-4L is calculated at 82 days because of damage on September 20, 2017.

[c] Percent Duration of Monitoring Period = total duration of negative gradient in days divided by the number of calendar days in the monitoring period

Table 3b
Summary of Groundwater Elevation Data by Well Pair
October 1, 2017 through December 31, 2017

				Summary Statistics Short Term Comparison - Water Level Difference between the Upper and Lower Aquifer wells (ft)			Duration Analysis – Downward (neg.) Gradient			
Well Pair	Upper Aquifer Average Groundwater Elevation (ft. MLLW)	Lower Aquifer Average Groundwater Elevation (ft. MLLW)	Ratio (Avg Lower Aq WL / Avg Upper Aq WL)[a]*	Average	Max	Min	Number of Neg Grad Events	Average Duration of Neg Grad (hours)	Total Duration of Neg Grad (days)	Percent Duration of 92-day Monitoring Period[c]
MW14/CW05	6.94	9.88	1.42	2.94	6.48	-1.83	29	4	5.1	5.6%
MW18/02CDMW01	5.21	9.45	1.81	4.23	8.43	-0.44	4	3	0.6	0.6%
PO03/99CDMW02A	6.96	10.00	1.44	3.04	6.41	-1.56	29	4	4.5	4.8%
CW03/CW02	6.87	9.20	1.34	2.33	4.81	-1.05	25	4	3.9	4.2%
VG-2U/VG-2L[b]	Not Determined	6.91	Not Calculated	Not Calculated			VG-2U damaged			
VG-3U/VG-3L	6.56	10.35	1.58	3.79	5.73	0.75	none			
VG-5U/VG-5L	9.97	11.42	1.15	1.45	4.96	-2.98	61	7	17.2	18.7%
PO13/VG-1L	7.31	9.53	1.30	11.42	6.17	-3.03	67	4	11.3	12.2%
CW13/VG-4L[b]	11.29	NA	NA	Not Calculated			VG-4L damaged			
CW08/P-4L[b]	Not Determined	9.35	Not Calculated	Not Calculated			CW08 damaged			

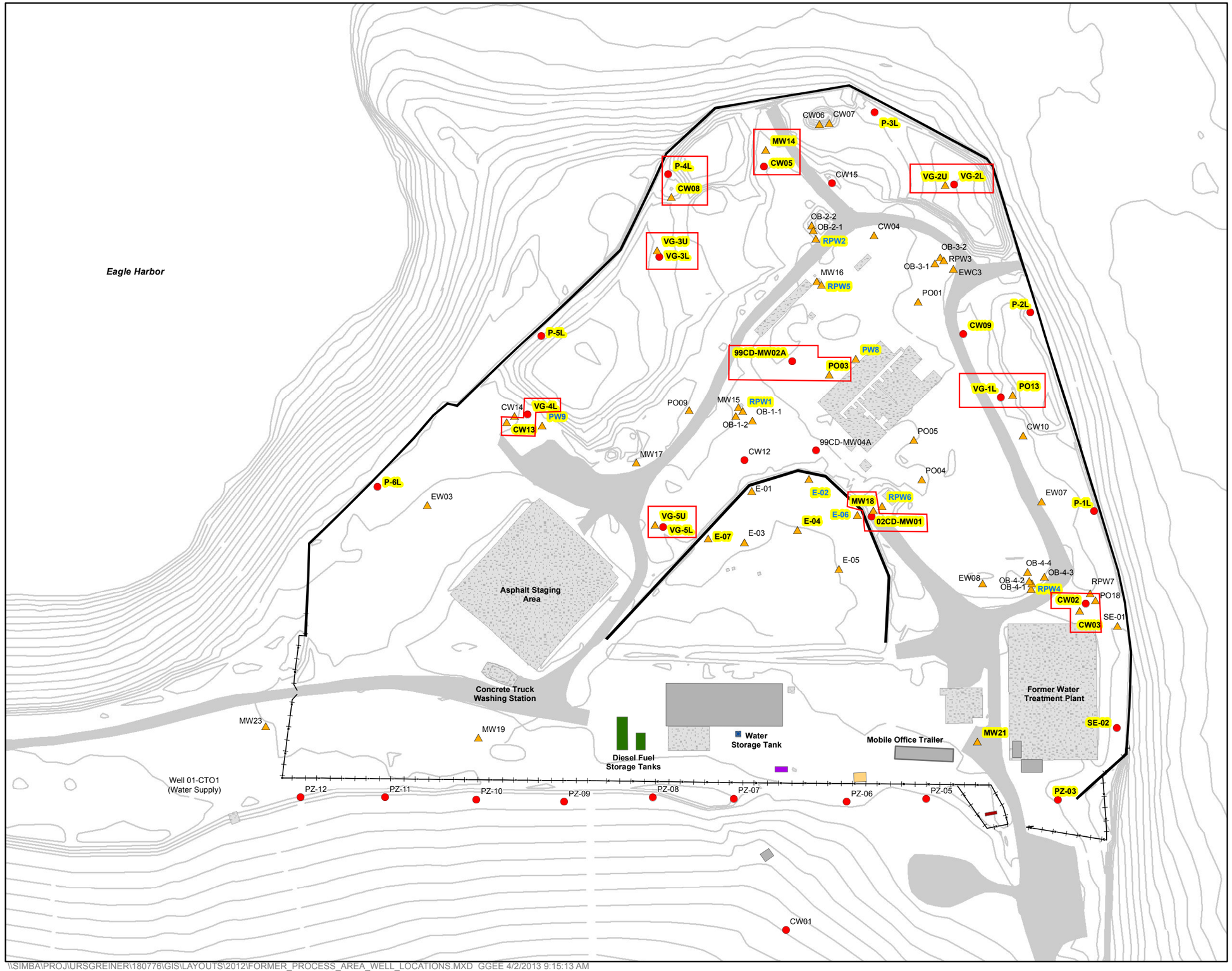
Notes:

[a] Ratio > 1 = Hydraulic Containment was Achieved

[b] VG-2U/VG-2L, CW13/VG-4L, and CW08/P-4L is calculated at 82 days because of damage on September 20, 2017.

[c] Percent Duration of Monitoring Period = total duration of negative gradient in days divided by the number of calendar days in the monitoring period

Figures



LEGEND

- Lower Aquifer Well
- Upper Aquifer Well
- Fence
- Wall
- Roads
- Buildings
- Concrete Slab

Well labels:

highlighted - well is monitored with transducer
blue text - production well
red boxed wells - well pair monitored for hydraulic containment

N

0 50 100 Feet

FIGURE 1

Former Process Area Well Locations

WYCKOFF/EAGLE HARBOR SUPERFUND SITE

\\SIMBA\PROJ\URSGREINER\180776\GIS\LAYOUTS\2012\FORMER_PROCESS_AREA_WELL_LOCATIONS.MXD GGEE 4/2/2013 9:15:13 AM

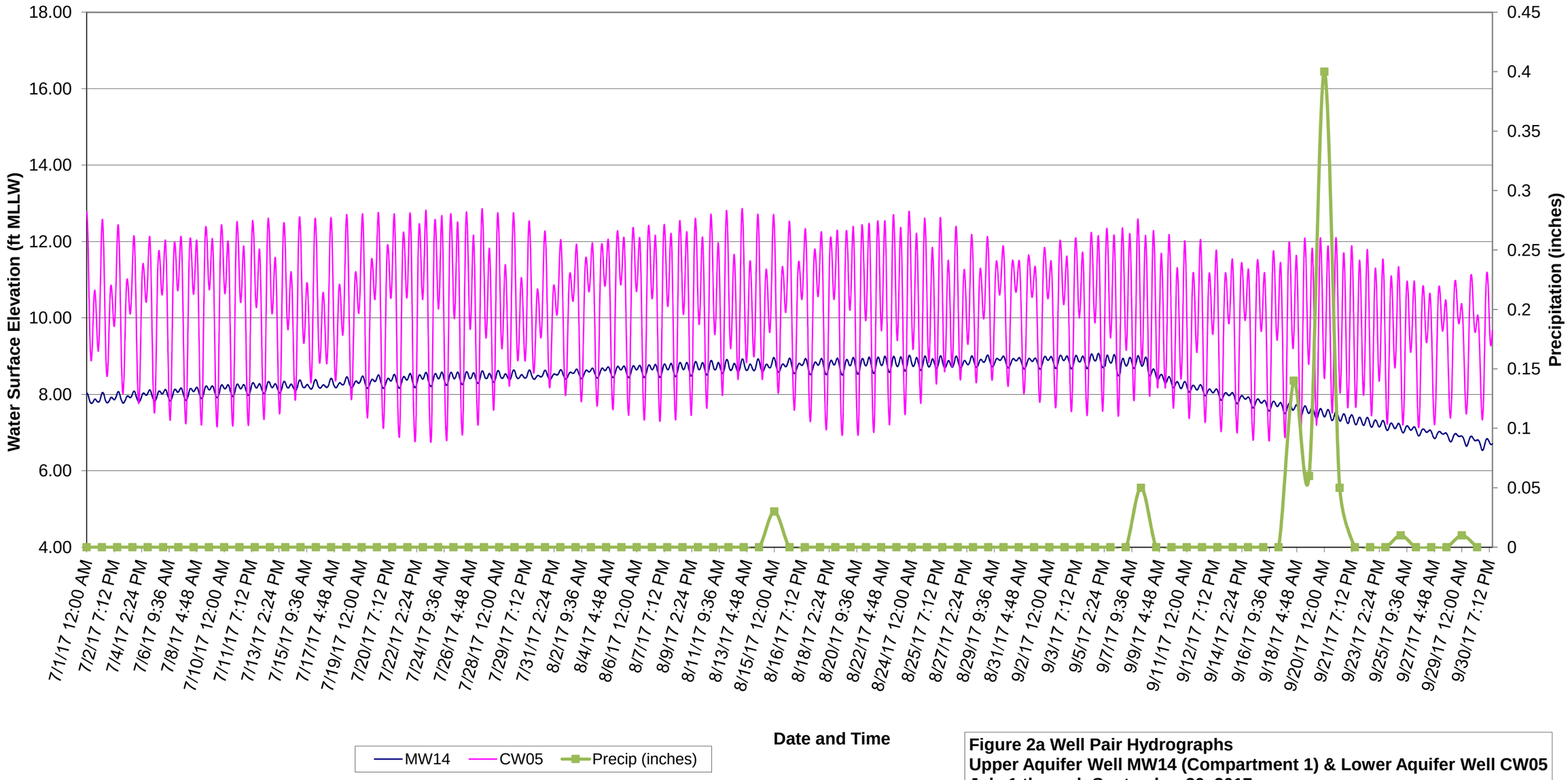


Figure 2a Well Pair Hydrographs
Upper Aquifer Well MW14 (Compartment 1) & Lower Aquifer Well CW05
July 1 through September 30, 2017

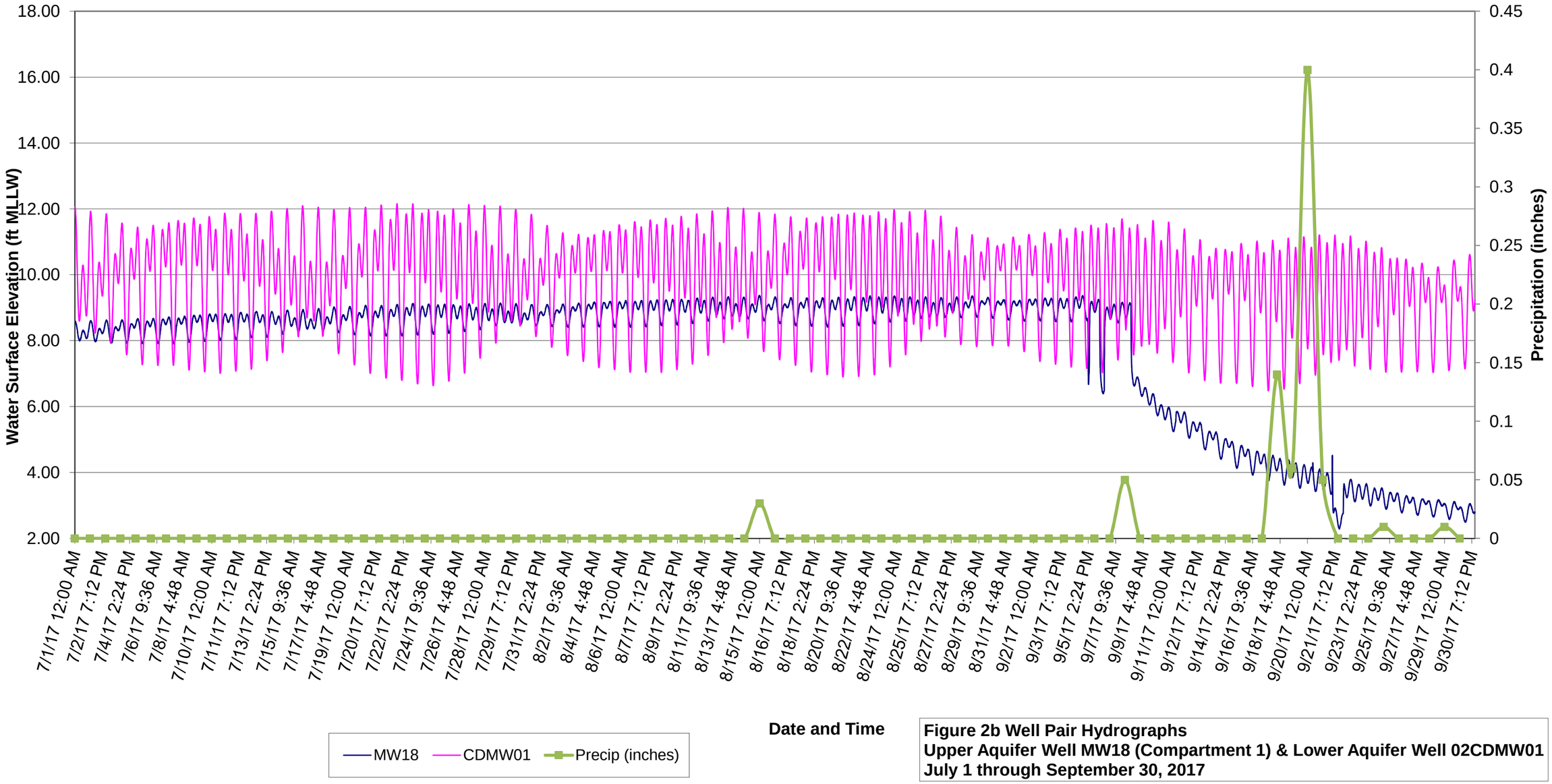


Figure 2b Well Pair Hydrographs
Upper Aquifer Well MW18 (Compartment 1) & Lower Aquifer Well 02CDMW01
July 1 through September 30, 2017

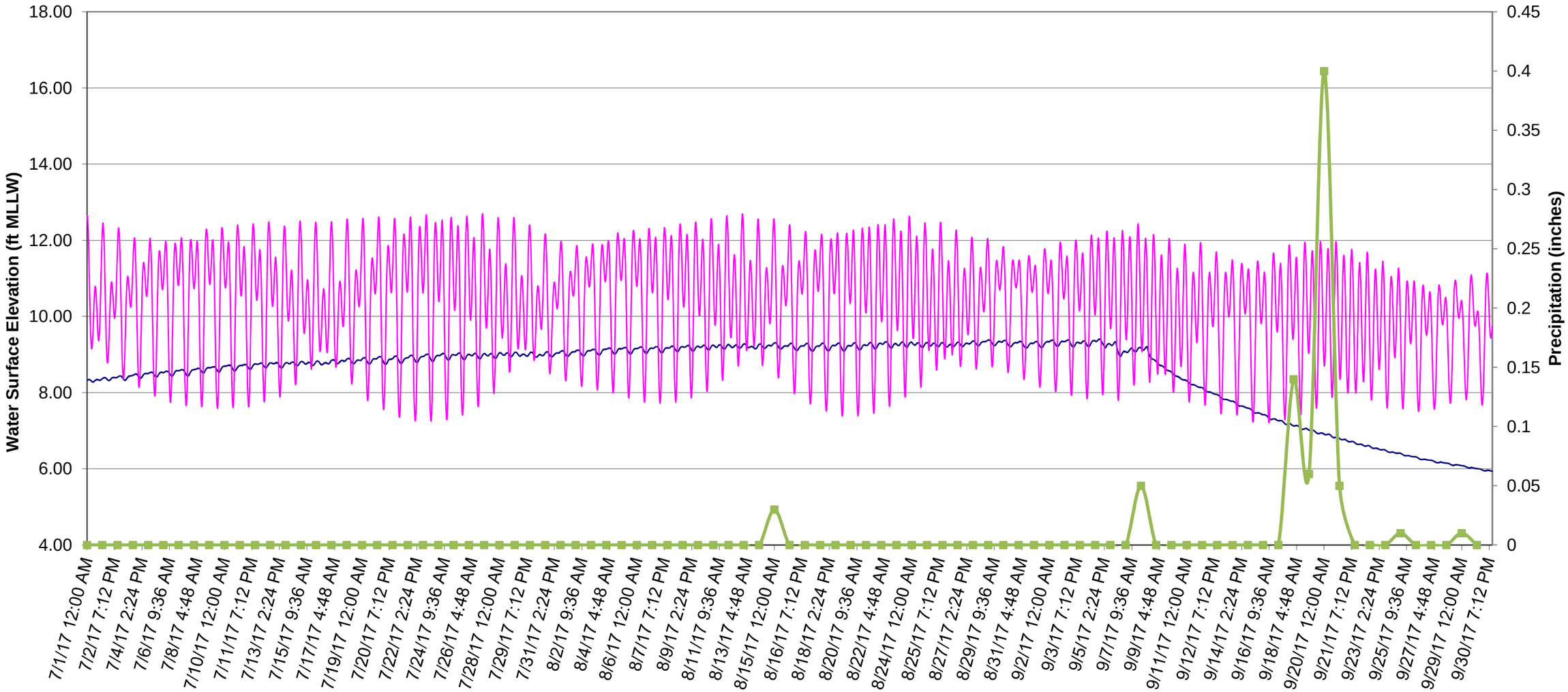


Figure 2c Well Pair Hydrographs
Upper Aquifer Well PO03 (Compartment 1) & Lower Aquifer Well 99CDMW02A
July 1 through September 30, 2017

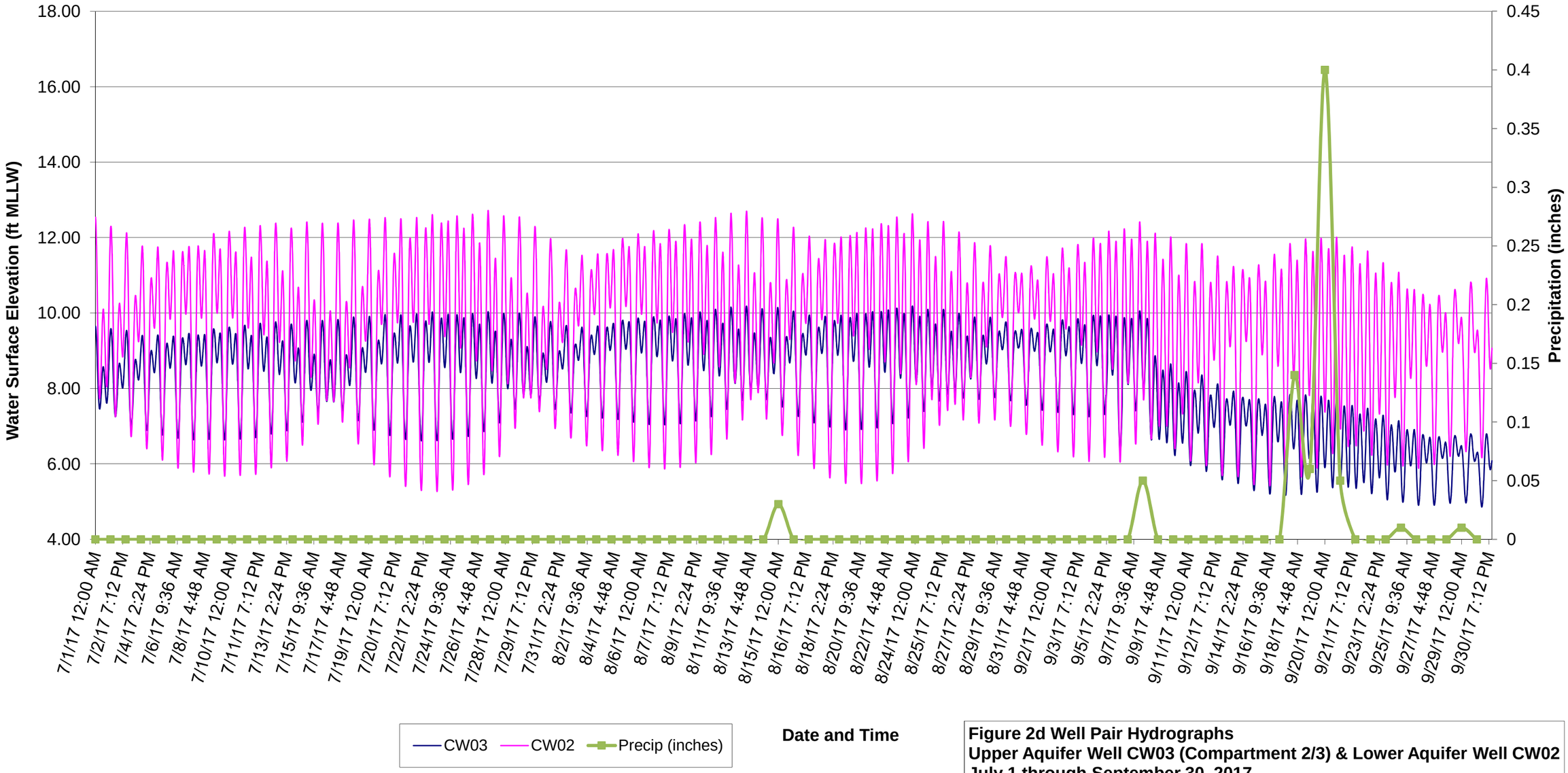


Figure 2d Well Pair Hydrographs
Upper Aquifer Well CW03 (Compartment 2/3) & Lower Aquifer Well CW02
July 1 through September 30, 2017

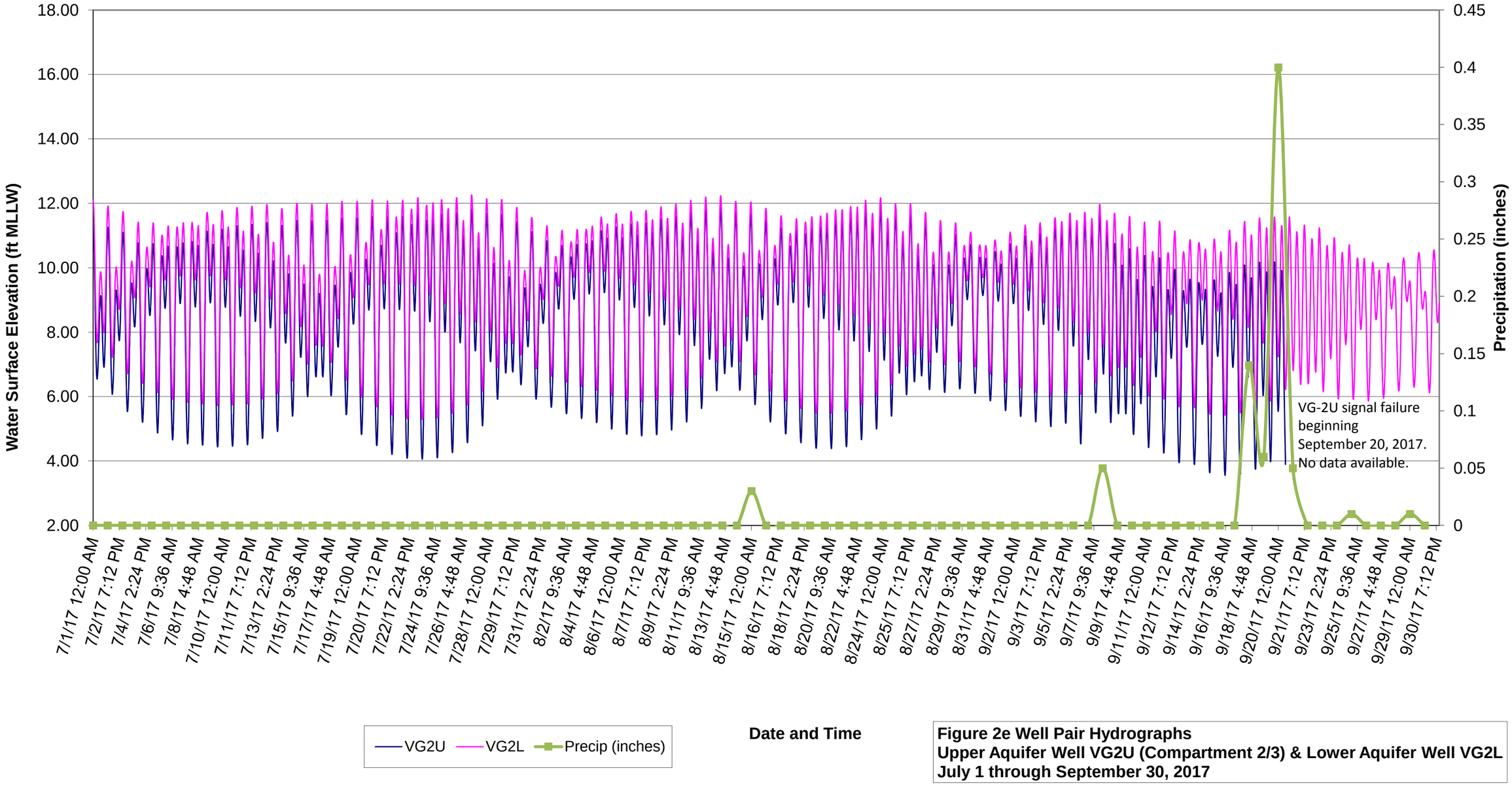


Figure 2e Well Pair Hydrographs
Upper Aquifer Well VG2U (Compartment 2/3) & Lower Aquifer Well VG2L
July 1 through September 30, 2017

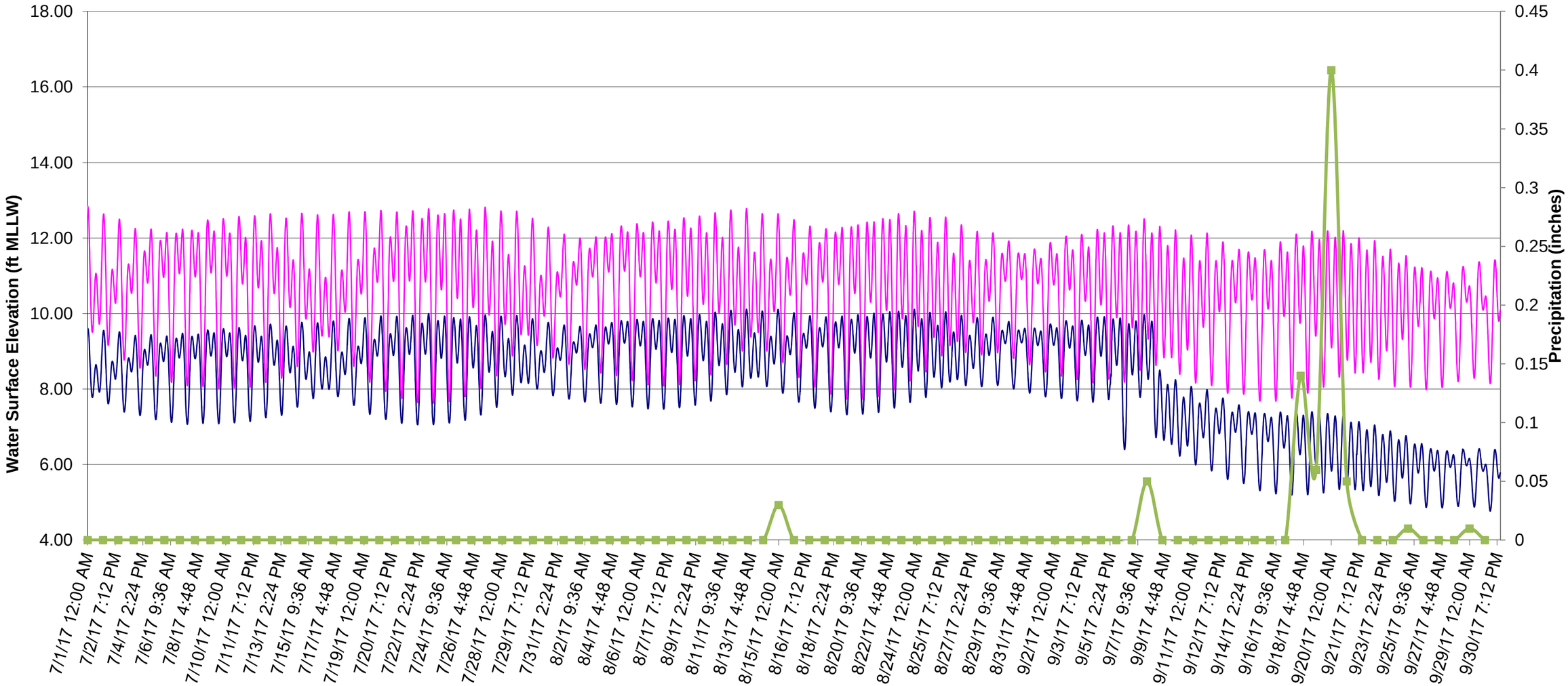


Figure 2f Well Pair Hydrographs
Upper Aquifer Well VG3U (Compartment 2/3) & Lower Aquifer Well VG3L
July 1 through September 30, 2017

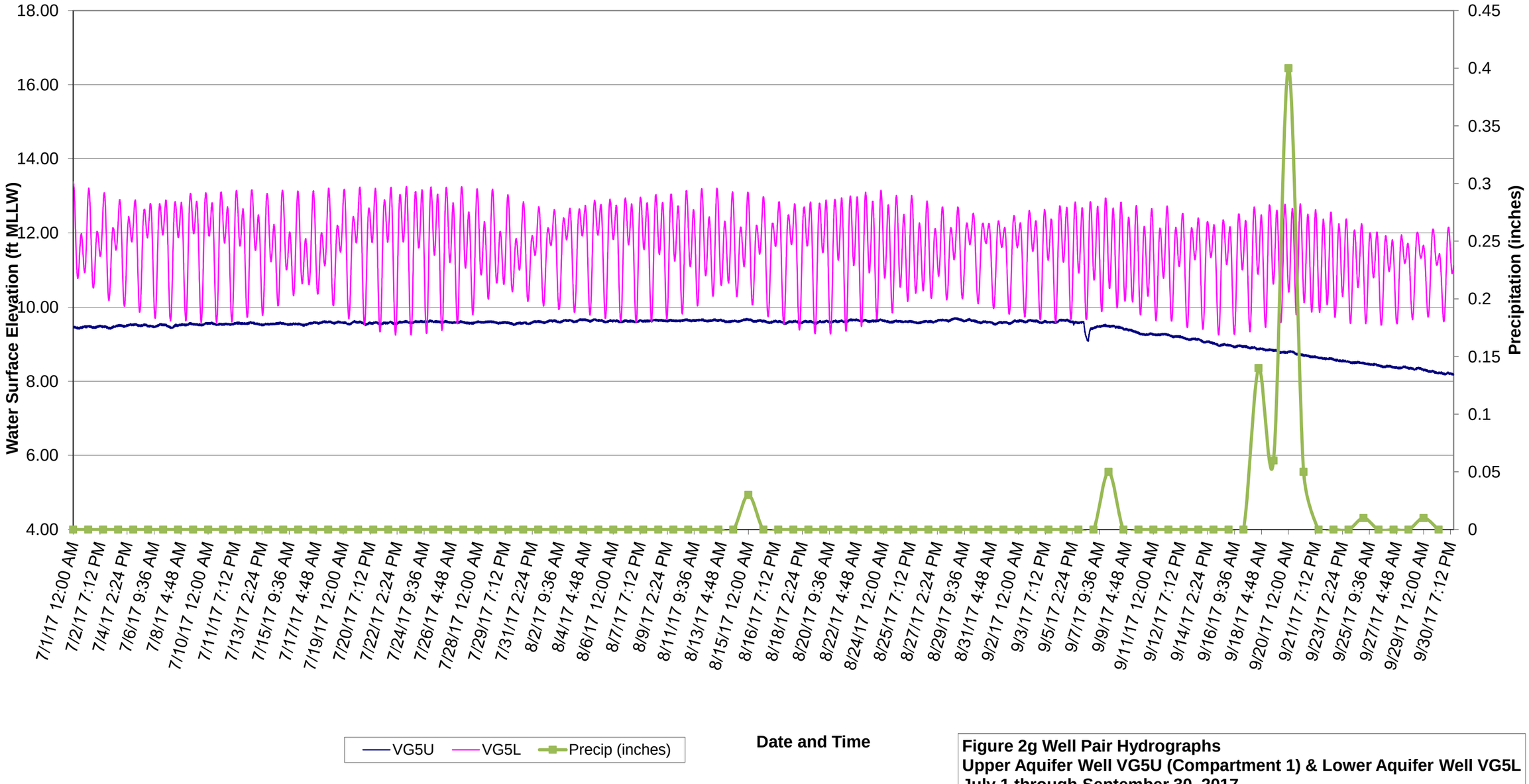


Figure 2g Well Pair Hydrographs
Upper Aquifer Well VG5U (Compartment 1) & Lower Aquifer Well VG5L
July 1 through September 30, 2017

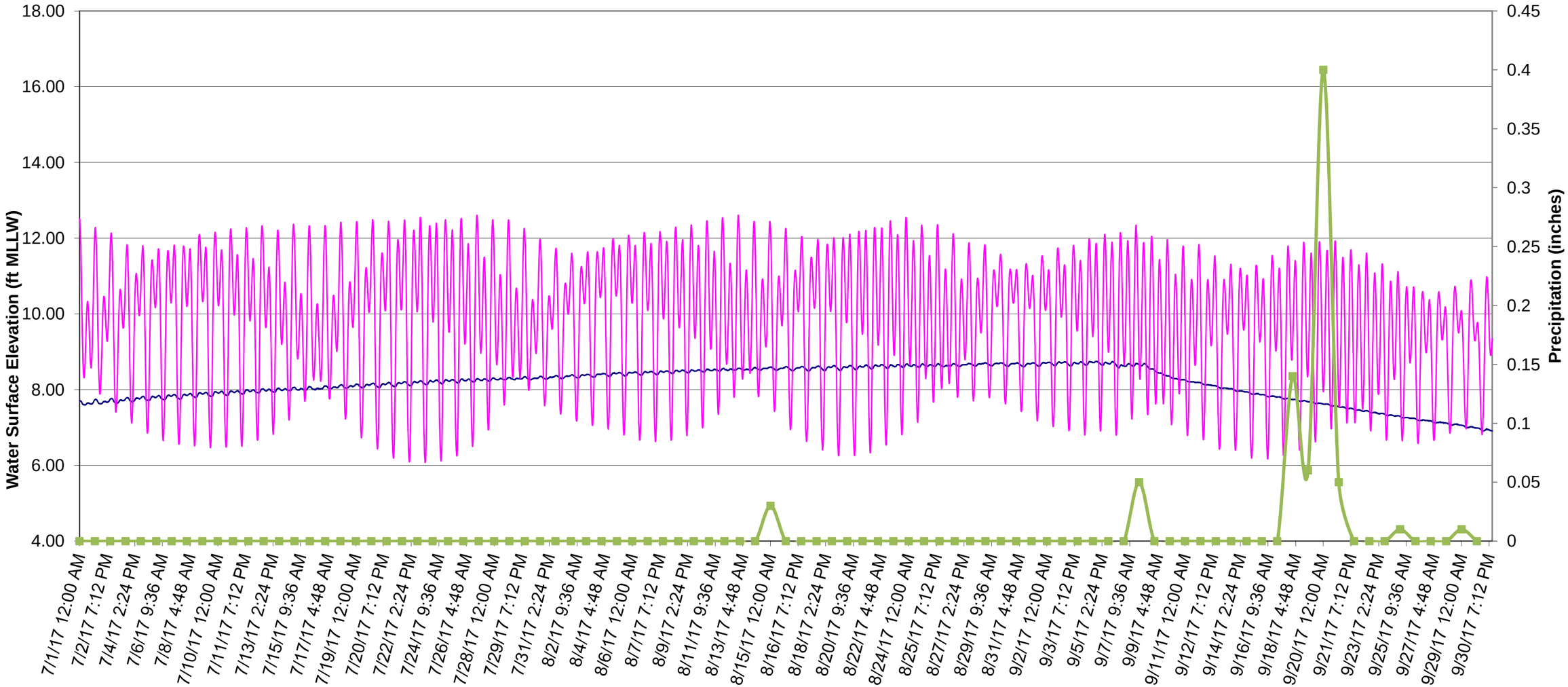


Figure 2h Well Pair Hydrographs
Upper Aquifer Well PO13 (Compartment 1) & Lower Aquifer Well VG1L
July 1 through September 30, 2017

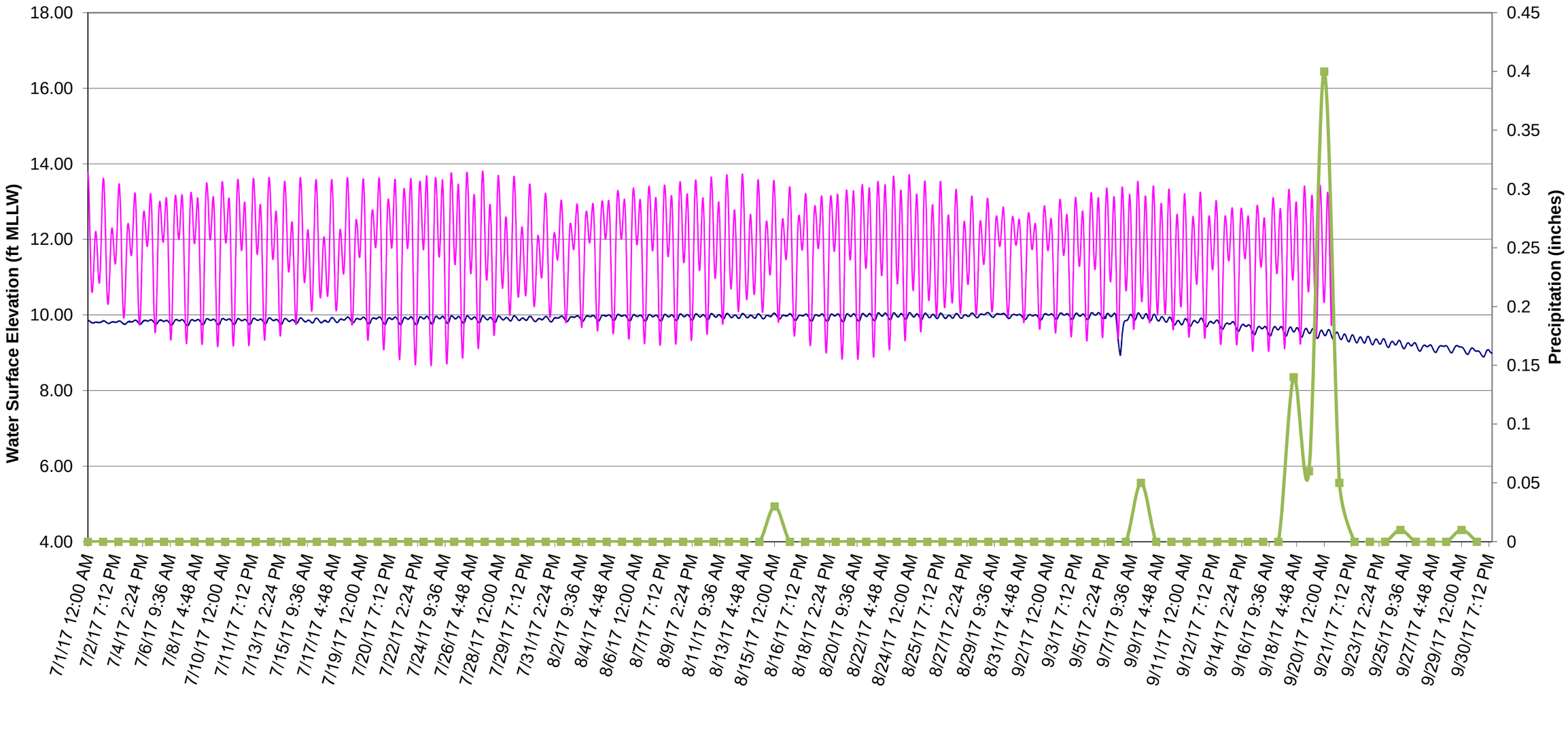


Figure 2i Well Pair Hydrographs
Upper Aquifer Well CW13 (Compartment 1) & Lower Aquifer Well VG4L
July 1 through September 30, 2017

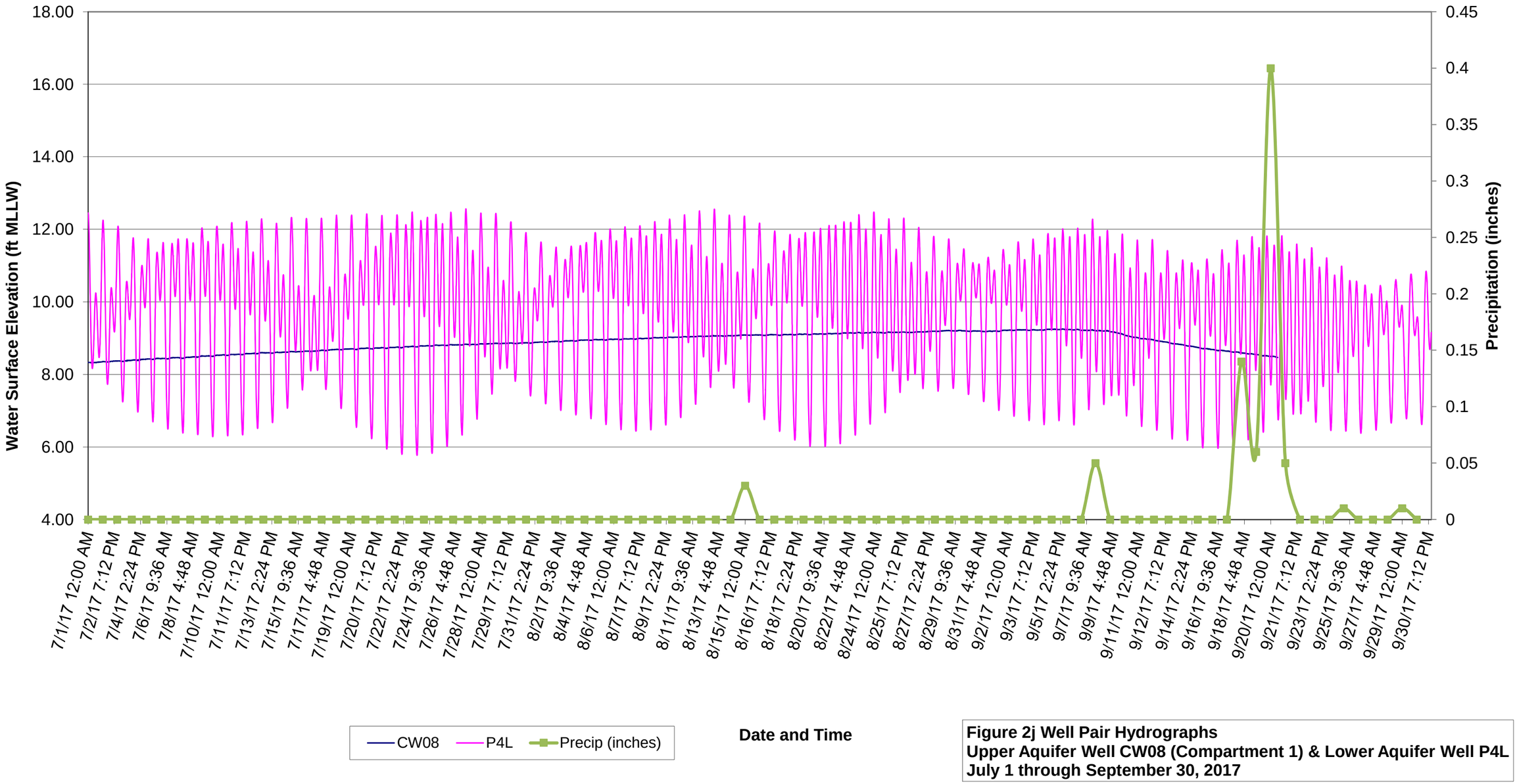


Figure 2j Well Pair Hydrographs
Upper Aquifer Well CW08 (Compartment 1) & Lower Aquifer Well P4L
July 1 through September 30, 2017

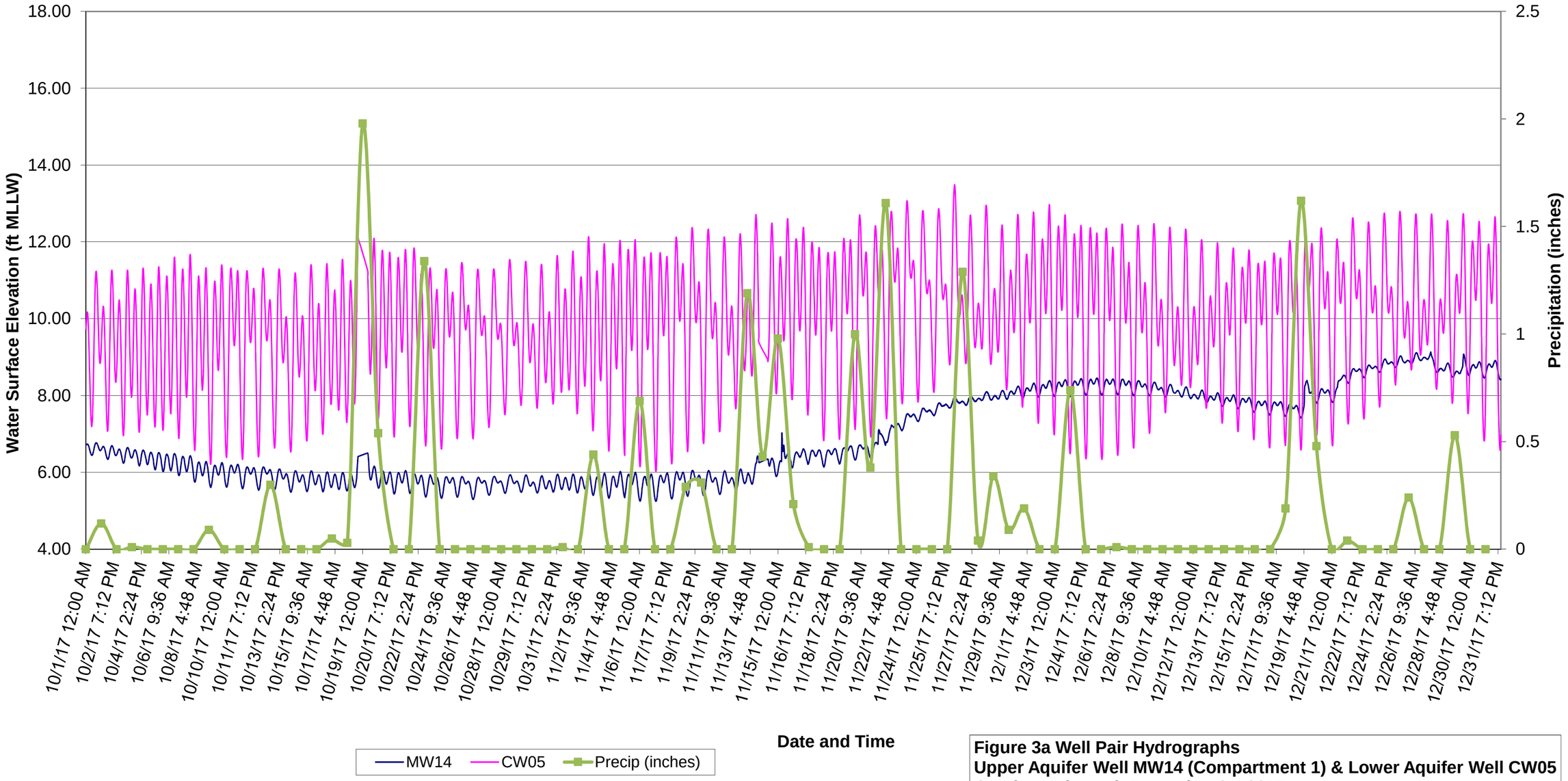


Figure 3a Well Pair Hydrographs
Upper Aquifer Well MW14 (Compartment 1) & Lower Aquifer Well CW05
October 1 through December 31, 2017

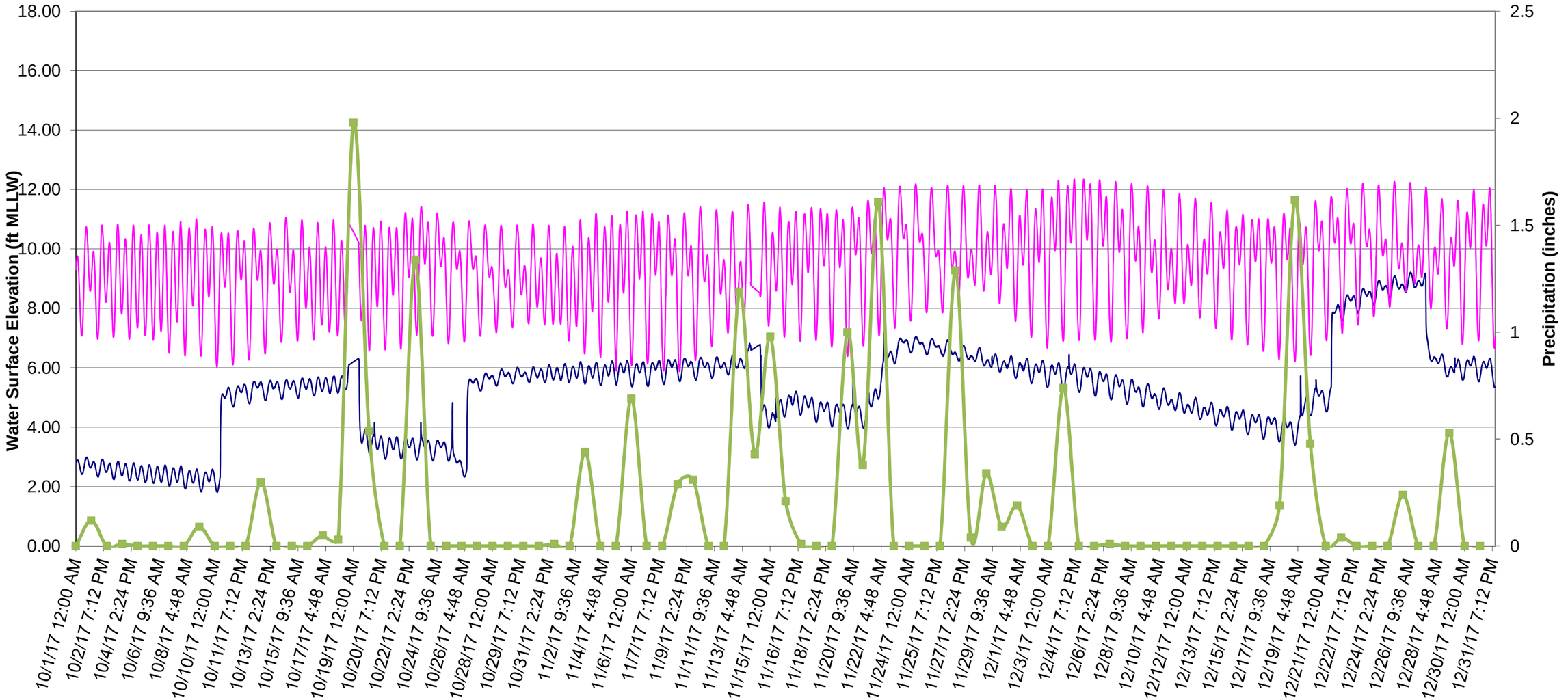


Figure 3b Well Pair Hydrographs
Upper Aquifer Well MW18 (Compartment 1) & Lower Aquifer Well 02CDMW01
October 1 through December 31, 2017

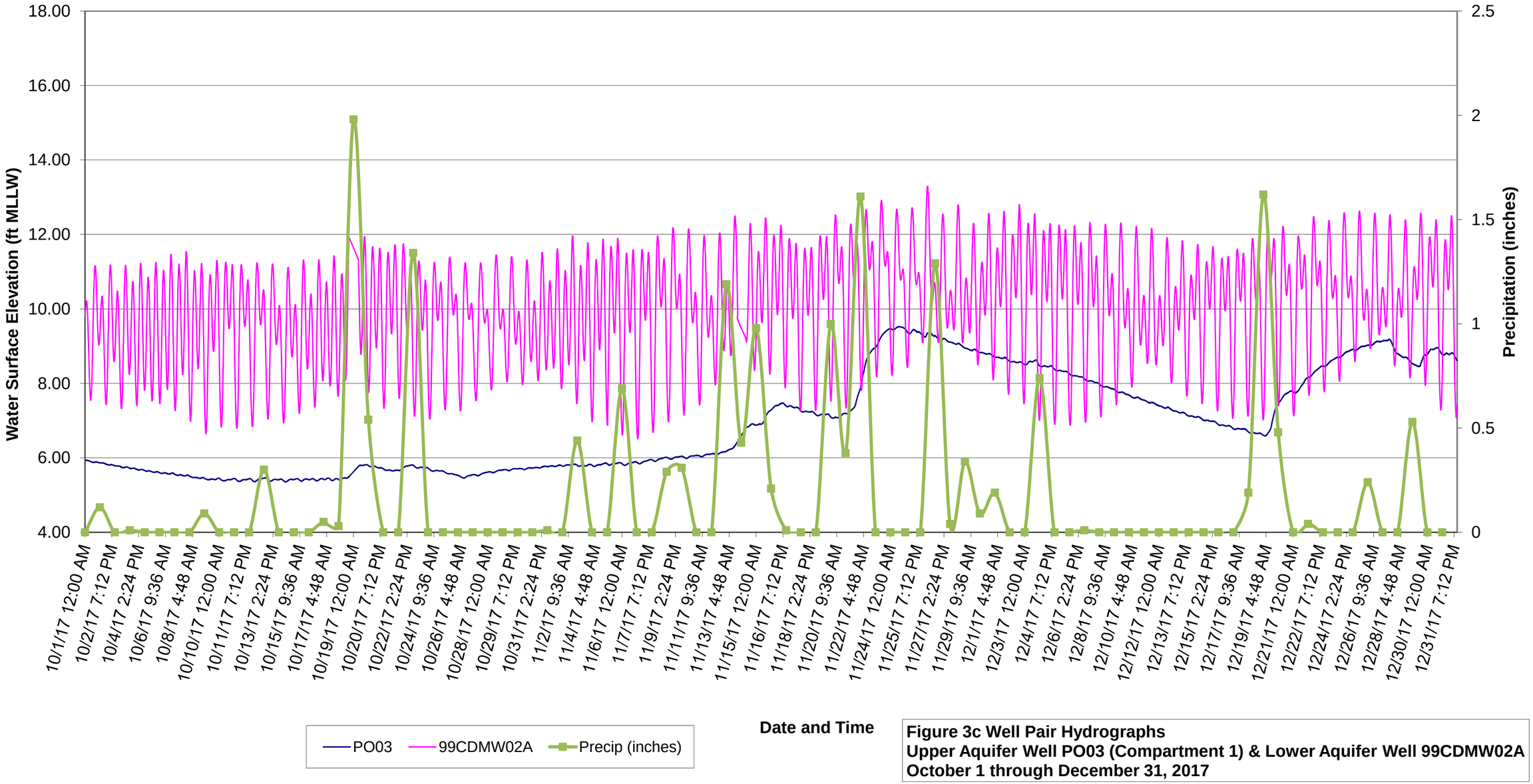


Figure 3c Well Pair Hydrographs
Upper Aquifer Well PO03 (Compartment 1) & Lower Aquifer Well 99CDMW02A
October 1 through December 31, 2017

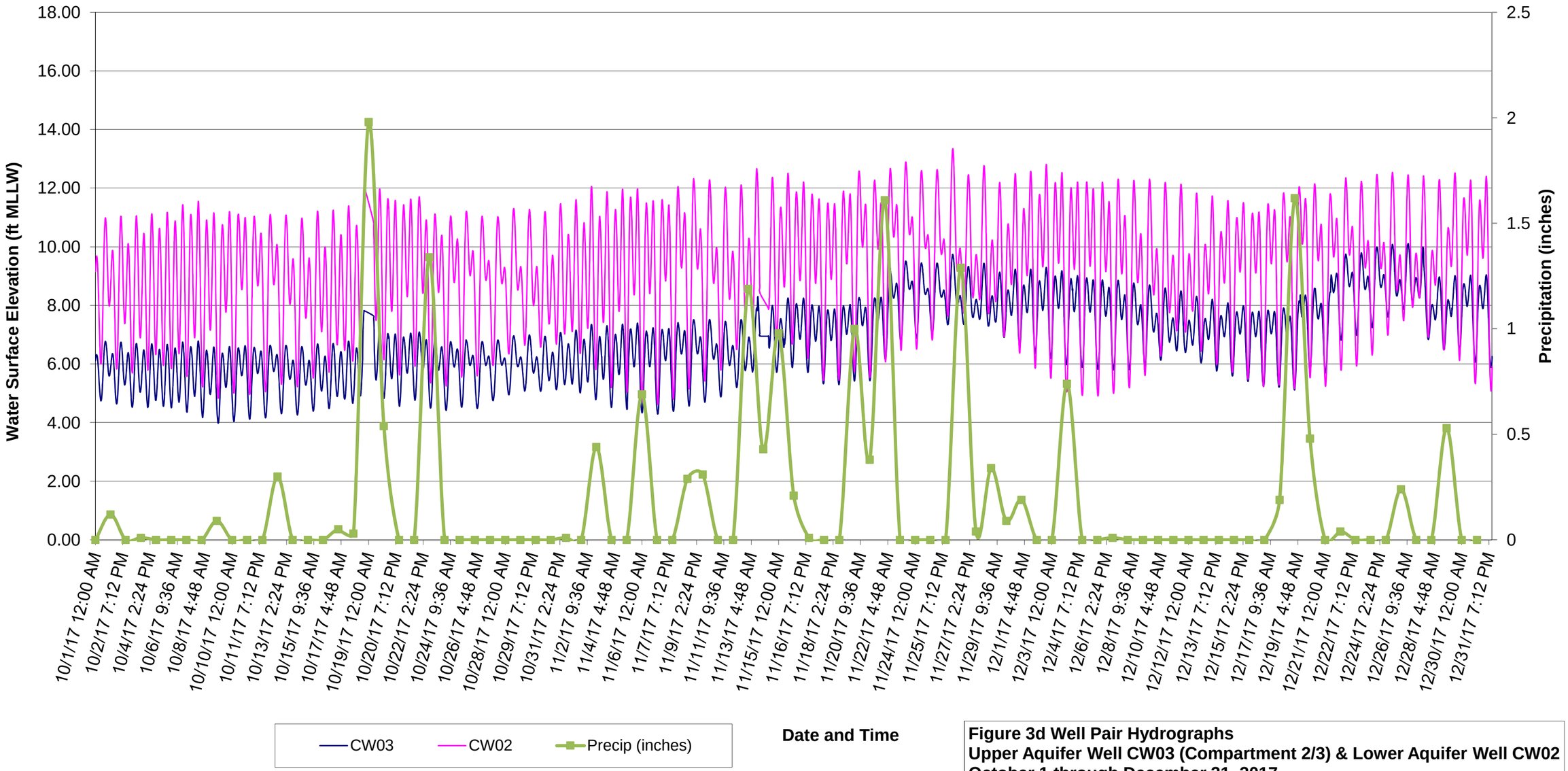


Figure 3d Well Pair Hydrographs
Upper Aquifer Well CW03 (Compartment 2/3) & Lower Aquifer Well CW02
October 1 through December 31, 2017

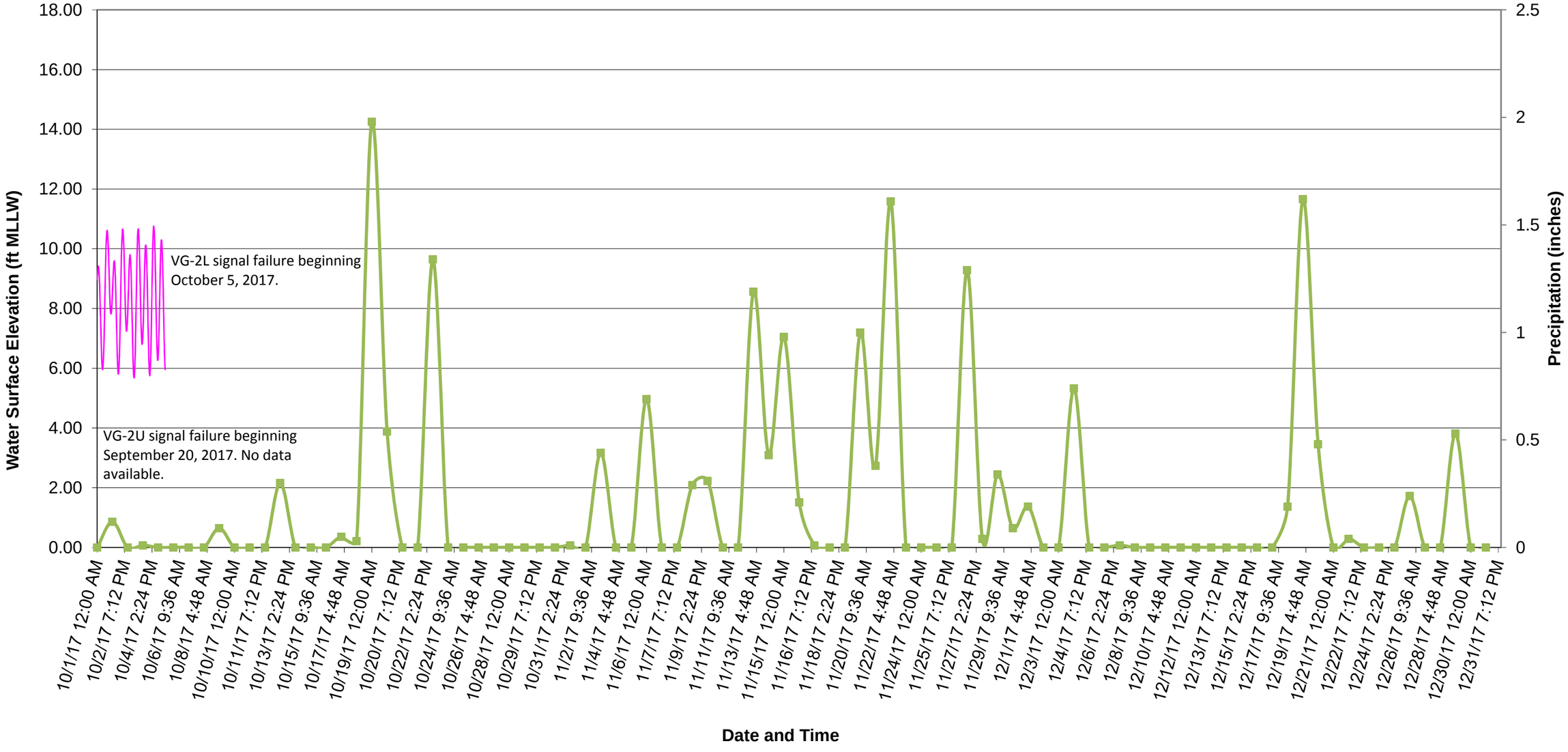


Figure 3e Well Pair Hydrographs
Upper Aquifer Well VG2U (Compartment 2/3) & Lower Aquifer Well VG2L
October 1 through December 31, 2017

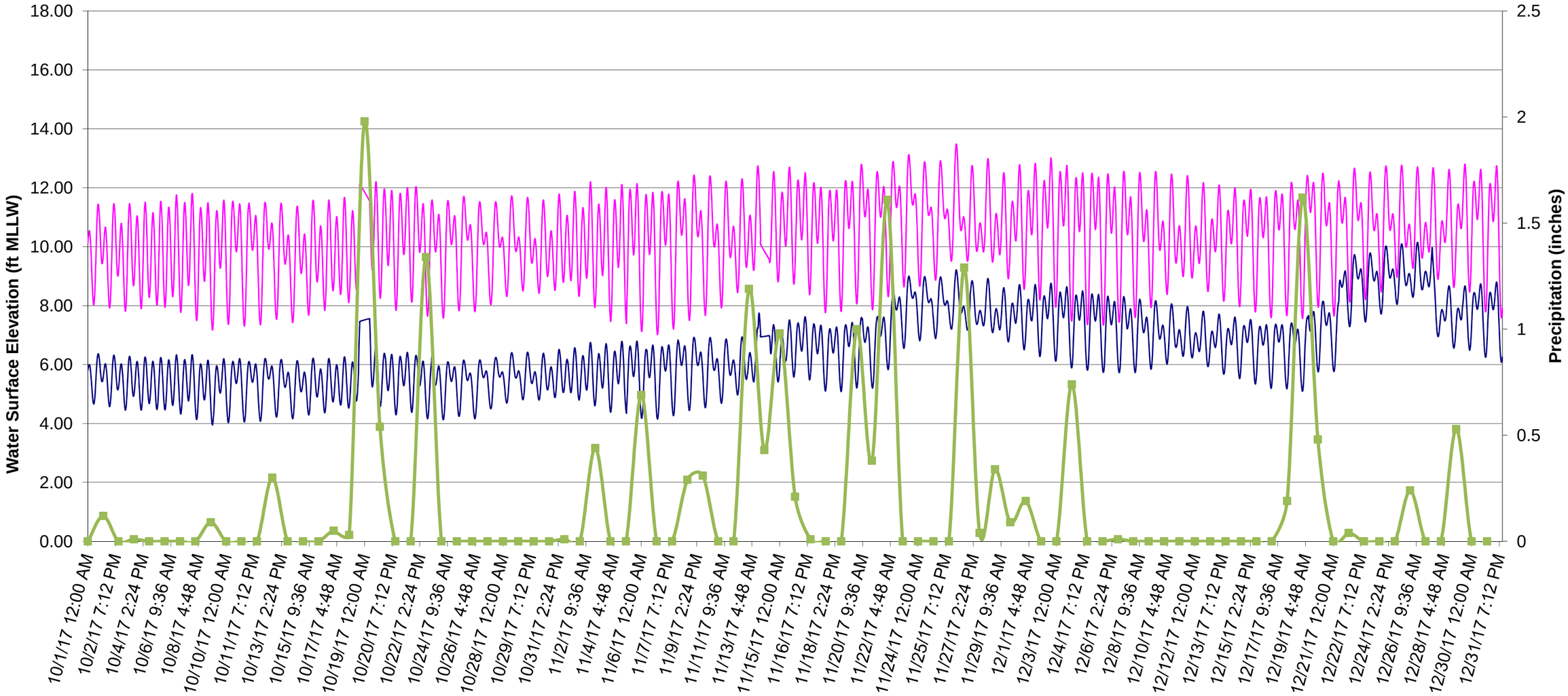


Figure 3f Well Pair Hydrographs
Upper Aquifer Well VG3U (Compartment 2/3) & Lower Aquifer Well VG3L
October 1 through December 31, 2017

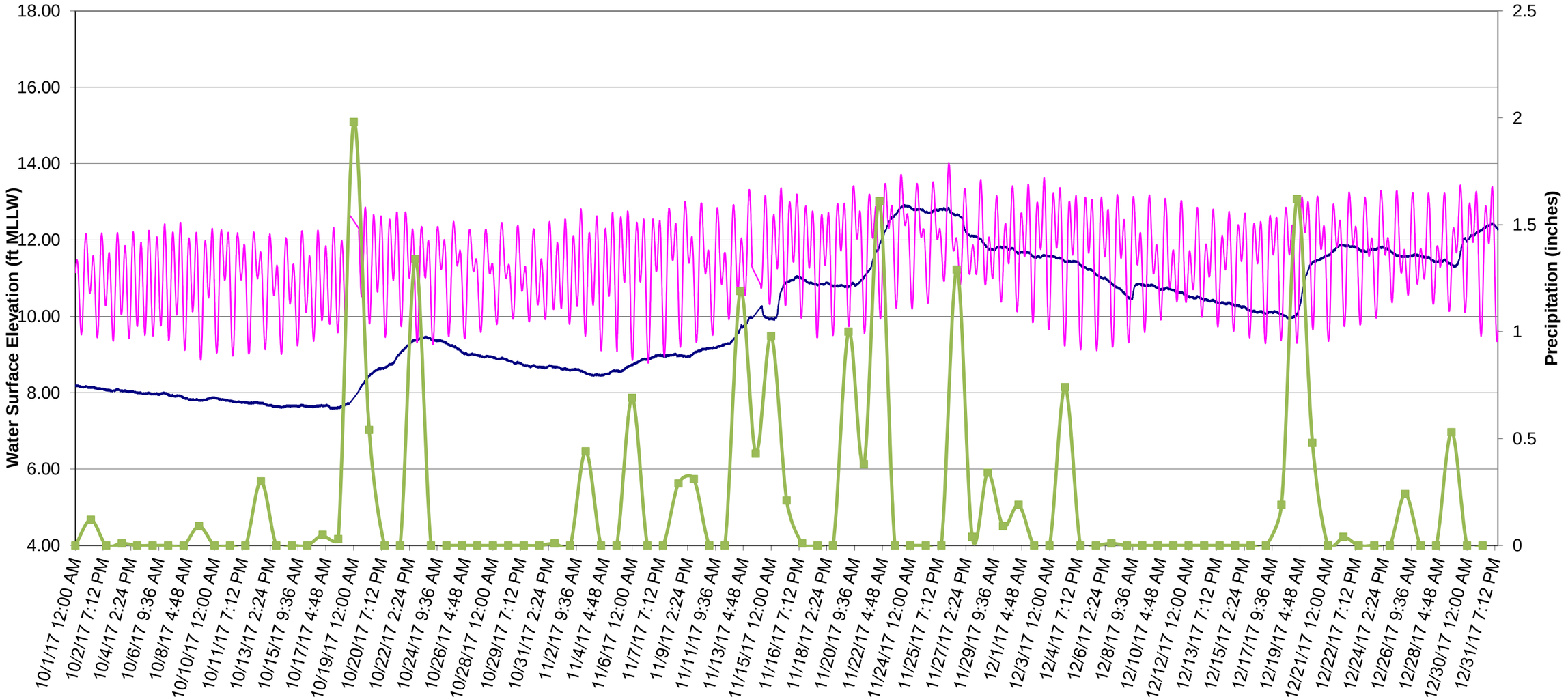


Figure 3g Well Pair Hydrographs
Upper Aquifer Well VG5U (Compartment 1) & Lower Aquifer Well VG5L
October 1 through December 31, 2017

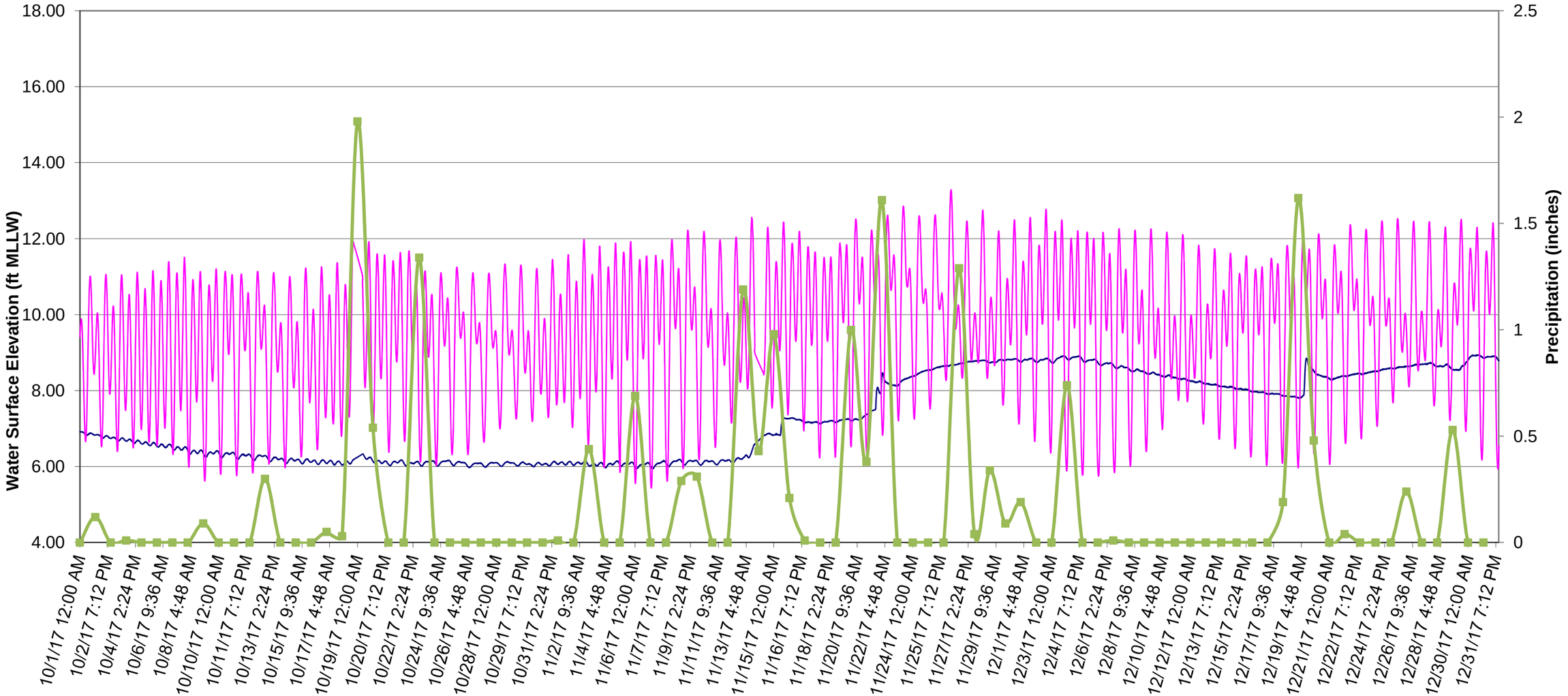


Figure 3h Well Pair Hydrographs
Upper Aquifer Well PO13 (Compartment 1) & Lower Aquifer Well VG1L
October 1 through December 31, 2017

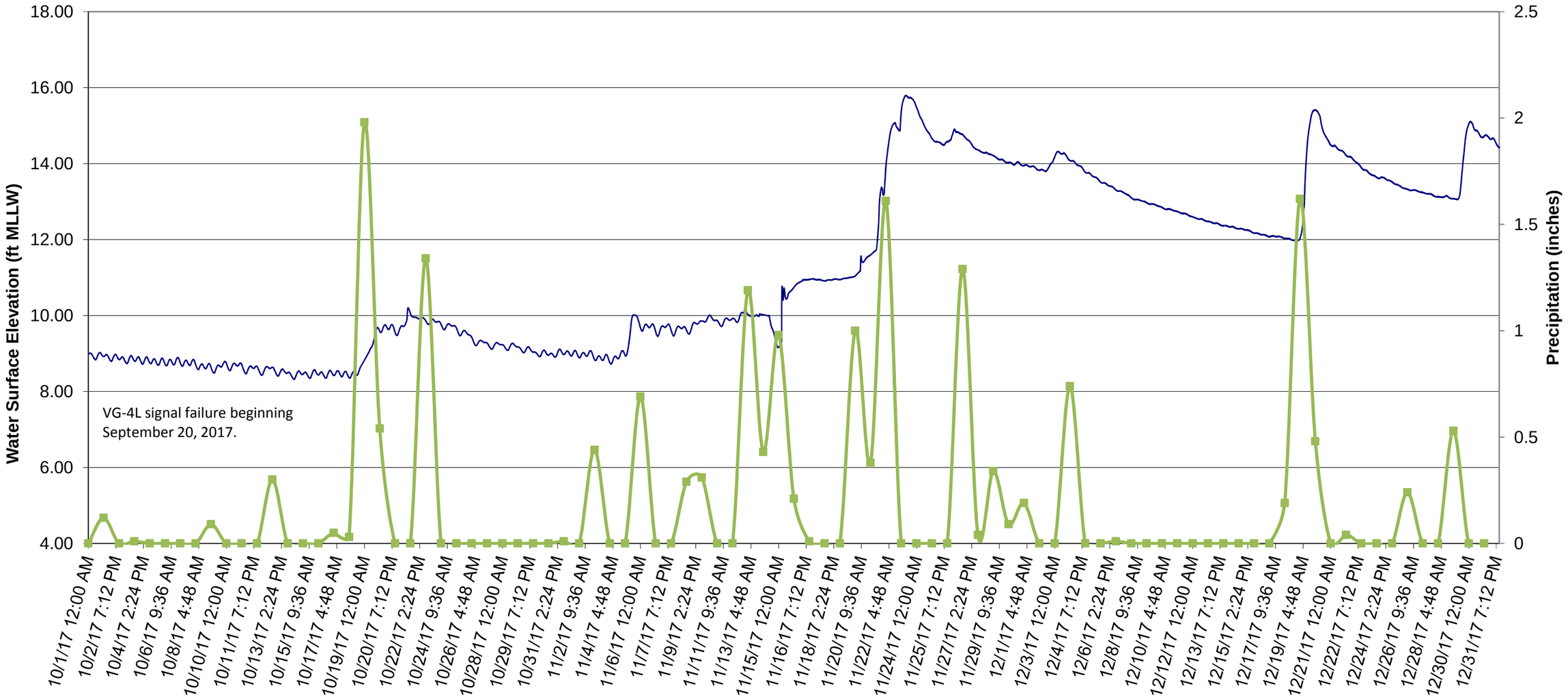


Figure 3i Well Pair Hydrographs
Upper Aquifer Well CW13 (Compartment 1) & Lower Aquifer Well VG4L
October 1 through December 31, 2017

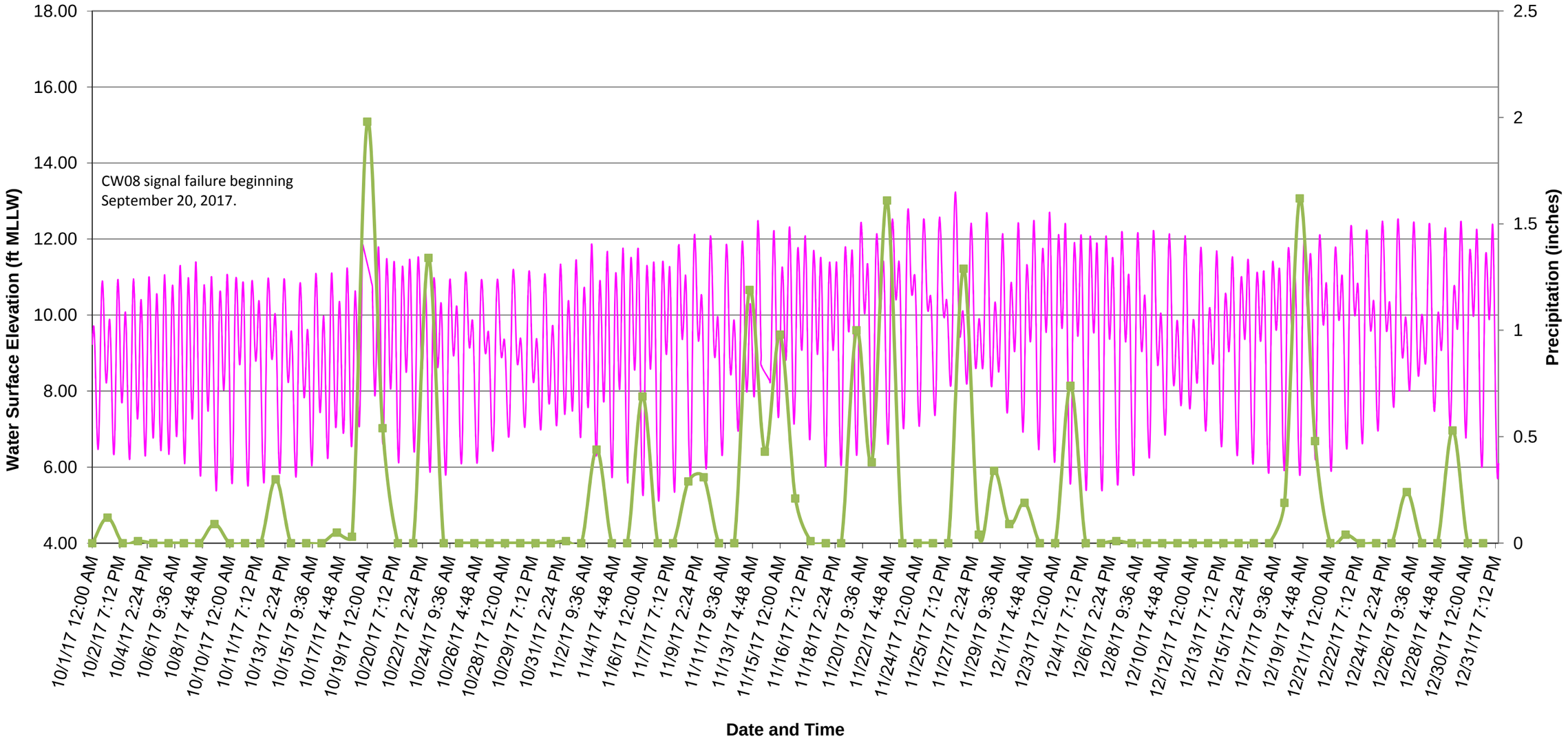


Figure 3j Well Pair Hydrographs
Upper Aquifer Well CW08 (Compartment 1) & Lower Aquifer Well P4L
October 1 through December 31, 2017

Maximum Downward Flow Gradients

MW14/CW05	8/20/2017
MW18/02CDMW01	7/24/2017
PO03/99CDMW02	8/20/2017
CW03/CW02	8/20/2017
VG2U/VG2L	None
VG3U/VG3L	None
VG5U/VG5L	7/23/2017, 7/24/2017
PO13/VG1L	8/20/2017
CW13/VG4L	7/23/2017
CW08/P4L	8/20/2017

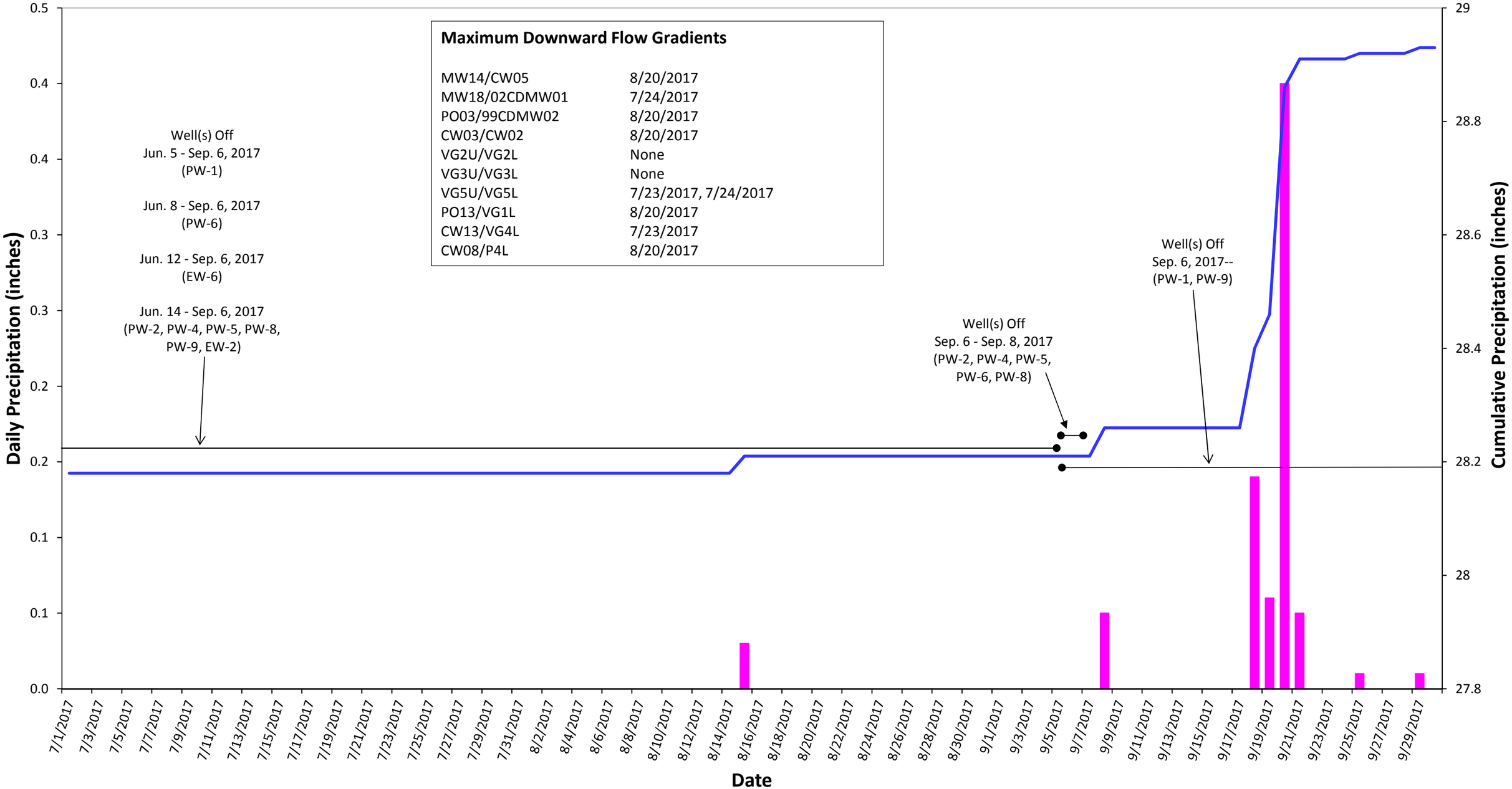


Figure 4a Wyckoff Site Precipitation, Well Field Shutdown, and Max Downward Flow Potential Summary July 1 through September 30, 2017

Maximum Downward Flow Gradients

MW14/CW05	12/31/2017
MW18/02CDMW01	12/22/2017
PO03/99CDMW02	12/31/2017
CW03/CW02	12/23/2017
VG2U/VG2L	Not Calculated
VG3U/VG3L	None
VG5U/VG5L	12/31/2017
PO13/VG1L	12/5/2017
CW13/VG4L	Not Calculated
CW08/P4L	Not Calculated

Well(s) Off
Sep. 6 - Oct. 19, 2017
(PW-1)

Sep. 6 - Nov. 14, 2017
(PW-9)

Oct. 10 - Oct. 19, 2017
(PW-8)

Well(s) Off
Oct. 18 - Oct. 19, 2017
(PW-2, PW-4, PW-5, PW-8)

Well(s) Off
Oct. 25 - Oct. 26, 2017
(PW-6)

Well(s) Off
Oct. 26 - Nov. 14, 2017
(PW-1, PW-6)

Well(s) Off
Nov. 13 - Nov. 14, 2017
(PW-2, PW-4, PW-5, PW-8,
EW-2, EW-6)

Well(s) Off
Nov. 15 - Nov. 27, 2017
(PW-9)

Well(s) Off
Dec. 8 - Dec. 31, 2017
(PW-9)

Well(s) Off
Dec. 21 - Dec. 27, 2017
(PW-1, PW-2, PW-4, PW-5,
PW-6, PW-8, EW-2, EW-6)

Daily Precipitation (inches)

Cumulative Precipitation (inches)

Date

Daily Precipitation

Cumulative Precipitation

Figure 4b Wyckoff Site Precipitation, Well Field Shutdown, and Max Downward Flow Potential Summary
October 1 through December 31, 2017