GEOSCIENCE

June 10, 2015

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Executive Director
c/o Tom Luster
California Coastal Commission
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Delivered By E-mail

Subject: Monterey Peninsula Water Supply Project – Test Slant Well Long Term Pumping Test and Coastal Development Permit #A-3-MRA-14-0050

Dear Tom:

In compliance with Special Condition 11 of Coastal Development Permits (CDPs) A-3-MRA-14-0050 and 9-14-1735, CalAm has been monitoring daily water and TDS levels in a number of monitoring wells (MW) in the near and far vicinity of the Test Slant Well. At the compliance point for Special Condition 11 under the CDPs (MW-4), groundwater level and TDS monitoring began on 20-Feb-15 in the deepest monitoring well (MW-4D), and on 9-Mar-15 in the shallow (MW-4S) and middle (MW-4M) monitoring wells. The long-term Test Slant Well pumping test began at 15:20 pm on 22-Apr-15 at a discharge rate of approximately 2,000 gpm.

Groundwater Level Trend – MW-4

Near the end of May, it was observed that all MW-4 (S, M, D) water levels fluctuated somewhat but generally exhibited a slight downward trend and when averaged together showed over a 1-ft foot decline. As such, the Hydrogeologic Working Group (HWG) was sent the water level elevation plots of MW-4 on 21-May-15. The plot of water levels in monitoring wells MW-4S, MW-4M, and MW-4D from the time the monitoring wells were completed through 21-May-15 is provided as Attachment 1 to this letter.

Subsequently, a conference call was held with the HWG on 3-Jun-15. After reviewing water levels in MW-4, the general consensus of the HWG was that the observed fluctuations and

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downward trends of water levels in MW-4 were not due to Test Slant Well pumping. This was based on examination of fluctuations and trends in water levels from the start of monitoring through 21-May-15 which included initiation of Test Slant Well pumping. Additional analysis by HWG members has clearly correlated the continuous decline in water levels with irrigation cycles in regional aquifer pumping, and the HWG plans to submit that analysis to the Executive Director of the Coastal Commission along with other related analysis and its conclusion. Attachment 1 to this letter also shows the plot of water levels with non-pumping days (Sundays) delineated for irrigation wells. The plots indicate partial recovery of water levels on weekends when irrigation wells are not pumping.

Temporary Termination of Pumping Test

As the continued regional downward trend was imminent, on June 5, 2015 the pumping from the Test Slant Well was terminated prior to reaching the 1.5 foot water level decline threshold at MW-4 set forth in Special Condition 11. Per Special Condition 11, the pump will remain off unless and until the Executive Director of the Coastal Commission agrees – after submission of further information by the HWG – that the cause of the drop in water level was a source or sources other than the Test Slant Well . In summary with respect to groundwater level trends, the HWG is in agreement with the following:

1) Test Slant Well pumping data indicates impacts only to the shallow (Dune Sand aquifer) and middle (180FTE aquifer) groundwater levels in MW-1 and MW-3.
2) Test Slant Well pumping data indicates no effects on or impacts to deep groundwater levels in the CEMEX North Well, MW-1D and MW-3D, nor any of the MW-4 and MW-5 monitoring wells (deep, middle, shallow).
3) As such, the radius of influence of the Test Slant Well pumping (at an average discharge rate of 2,000 gpm), lies between monitoring well clusters MW-3 and MW-4.
4) A continuous decline in groundwater water levels occurred prior to initiation of the Test Slant Well pumping and is due to regional pumping after one month of continuous pumping. As such, this regional decline is expected to continue as pumping increases into the summer and fall months.

Since Test Slant Well pumping is stopped, CalAm will continue to collect data from monitoring well network and provide to HWG to evaluate groundwater levels in a no Test Slant Well pumping condition to determine if a downward groundwater level trend continues. Once HWG has sufficient data from no pumping to reach a conclusion, the HWG will develop new memoranda with the findings and recommendations.

MW-4 Total Dissolved Solids Levels

Prior to and after the initiation of the long-term test slant well pumping test, the level of total dissolved solids in MW-4 monitoring wells have been monitored daily through use of dedicated downhole transducers with electrical conductivity probes. Attachment 2a shows groundwater levels from the initiation of the pumping on April 22, 2015. Attachment 2b shows the electrical conductivity measured in all three MW-4 monitoring wells. The electrical conductivity in MW-4S has shown a slightly decreasing trend, of approximately 1,000 us/cm or about 640 mg/L[1]. The electrical conductivity in MW-4M has increased approximately 900 us/cm or about 576 mg/L. The electrical conductivity in MW-4D has remained the same.

Review of groundwater level data collected from monitoring wells before initiation of the test (March 20, 2015) and approximately one month after the test commenced shows that groundwater levels in MW-4M are higher at the coast then inland. Attachment 3 shows this relationship. This data validates the reported historical seawater intrusion identified in the 180-FTE by others. These conditions suggest that the slight increase in electrical conductivity in MW-4M is not associated with test slant well pumping and/or seasonal fluctuations. Further increases in TDS are anticipated from regional inland groundwater production and apart from test slant well pumping.

Monitoring Threshold Going Forward

Based on data collected during Test Slant Well pumping, the following monitoring protocol is recommended going forward:

- The HWG shall continue to review the weekly monitoring wells reports that contain the daily water level and electrical conductivity data collected from the Test Slant Well monitoring network.
- The regional water level fluctuation and declining trend due to inland pumping is expected to continue.
- The Test Slant Well is physically located and likely producing primarily from the Dune Sand aquifer with a lesser amount from the 180-FTE aquifer, which is confirmed by the monitoring well data in the shallow and middle monitoring wells at MW-1 and MW-3.

[1] An Electrical Conductivity to TDS ration of 0.64 was used to calculate TDS from electrical conductivity. The TDS:EC ratio was calculated from water quality data collected in the regional borehole study in 2013/2014. The TDS:EC ratio will be refined from water quality data from each monitoring well when sufficient data becomes available

Also, a thick clay layer exists that physically separates these upper aquifers from the 400-ft. Therefore, future water level decline thresholds should not include groundwater levels from the deep monitoring wells (e.g. MW-4D). However, the data from these deep monitoring wells will continue to be collected, monitored and reported in weekly monitoring well reports.

Sincerely,

The Hydrogeologic Working Group (Dennis Williams, Tim Durbin, Martin Feeney, Peter Leffler)

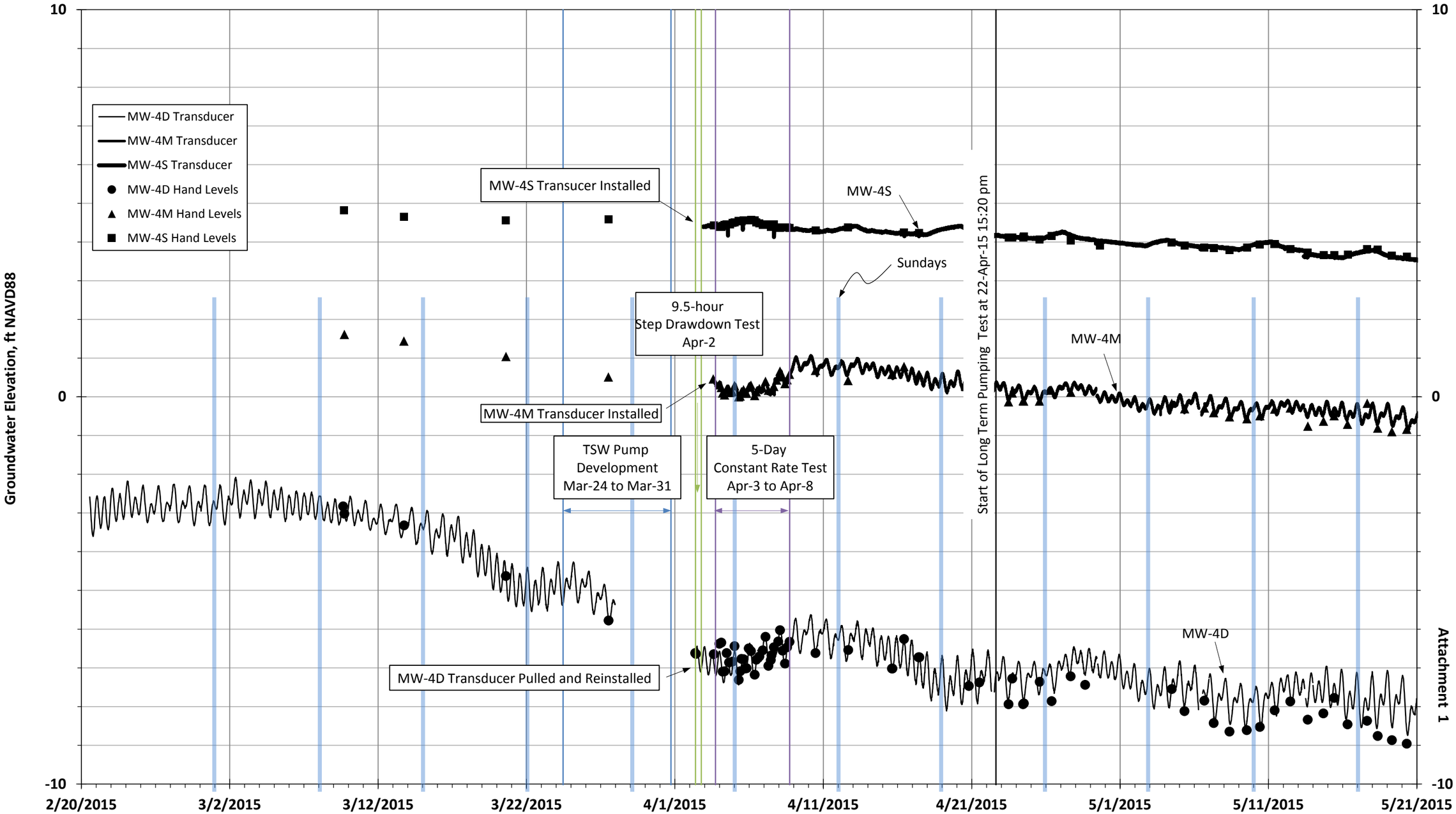
Dennis Williams

Tim Durbin,

Martin Feeney

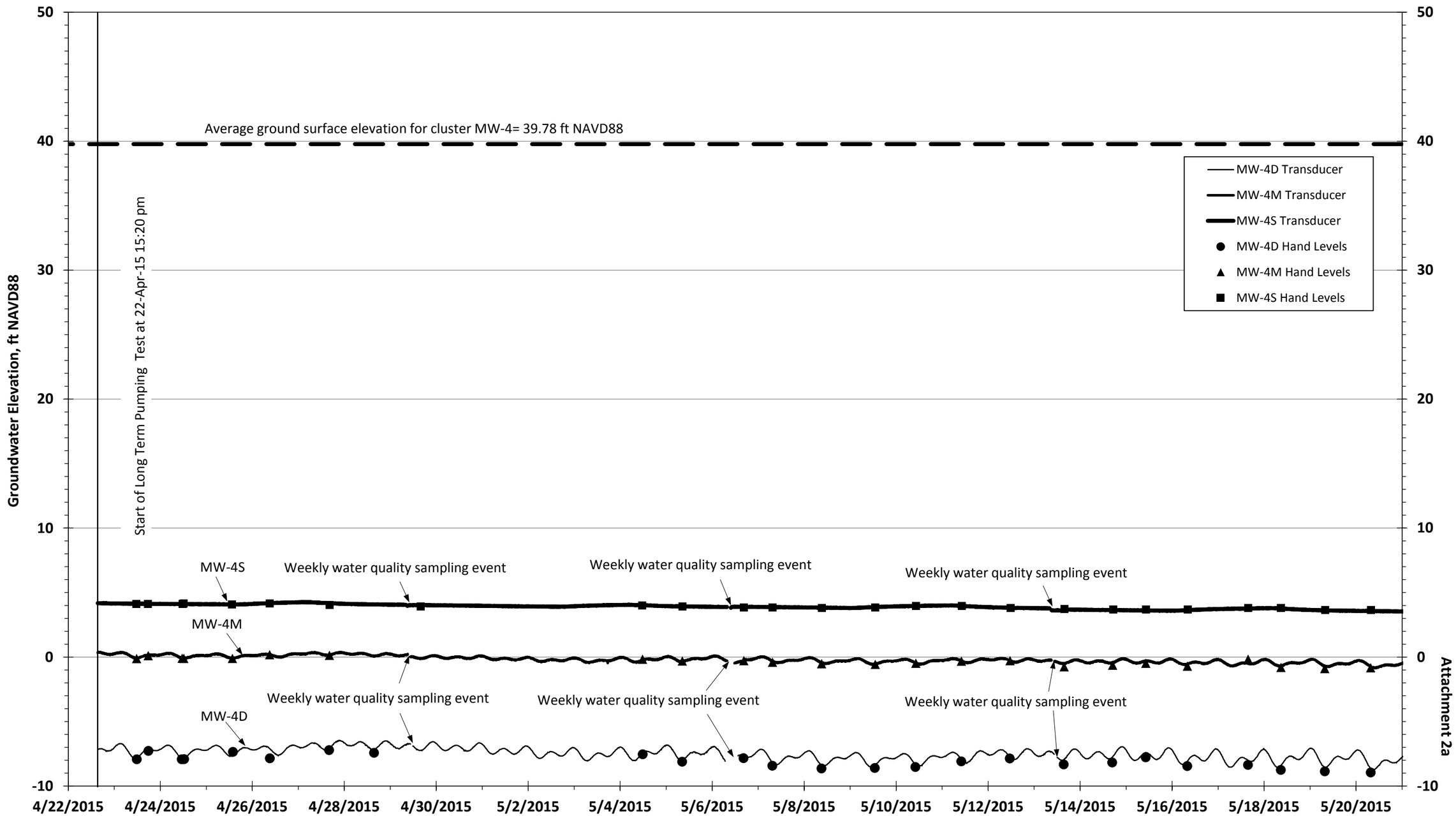
Peter Leffler

Groundwater Elevation in MPWSP MW-4



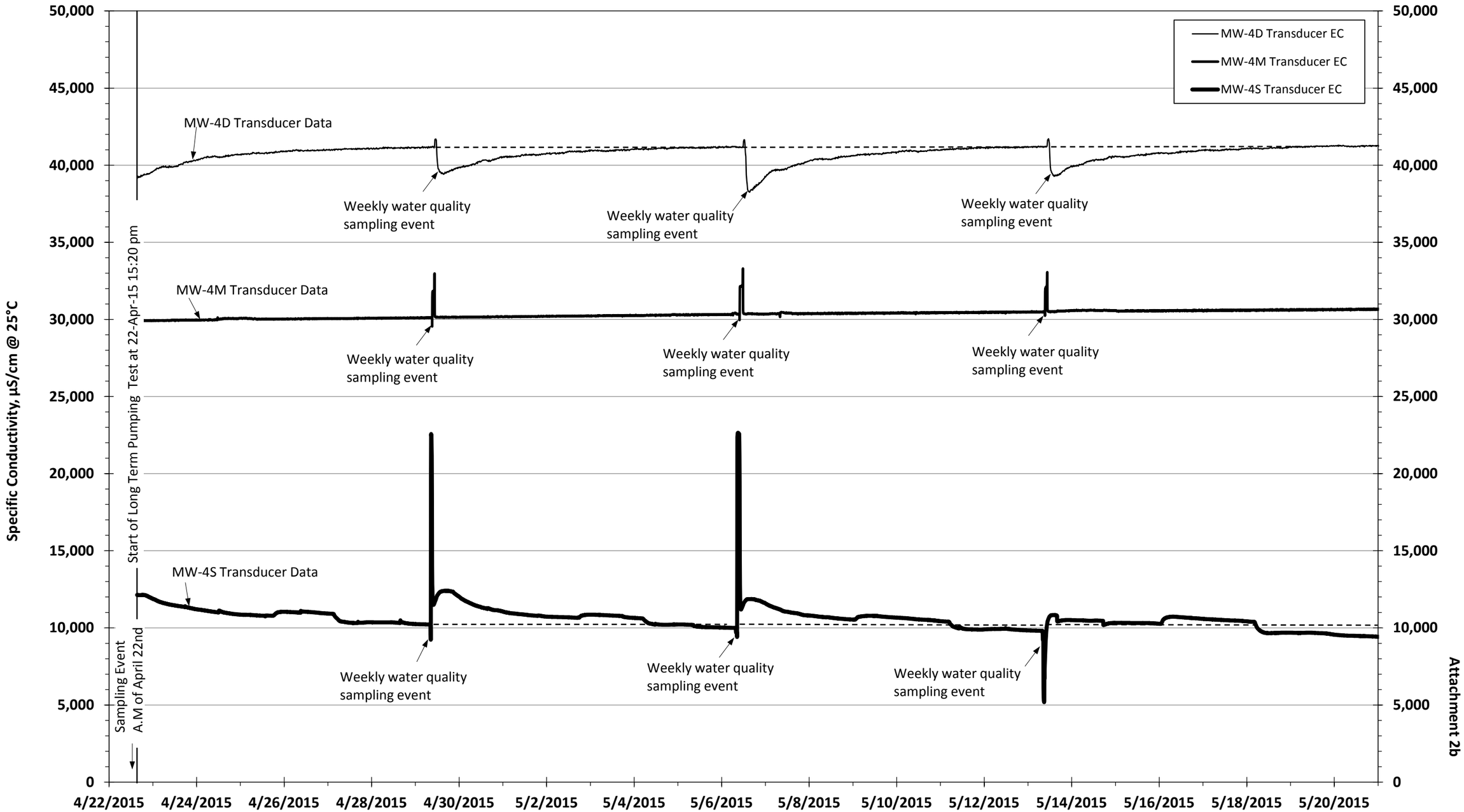
Attachment 1

Groundwater Elevation in MPWSP MW-4

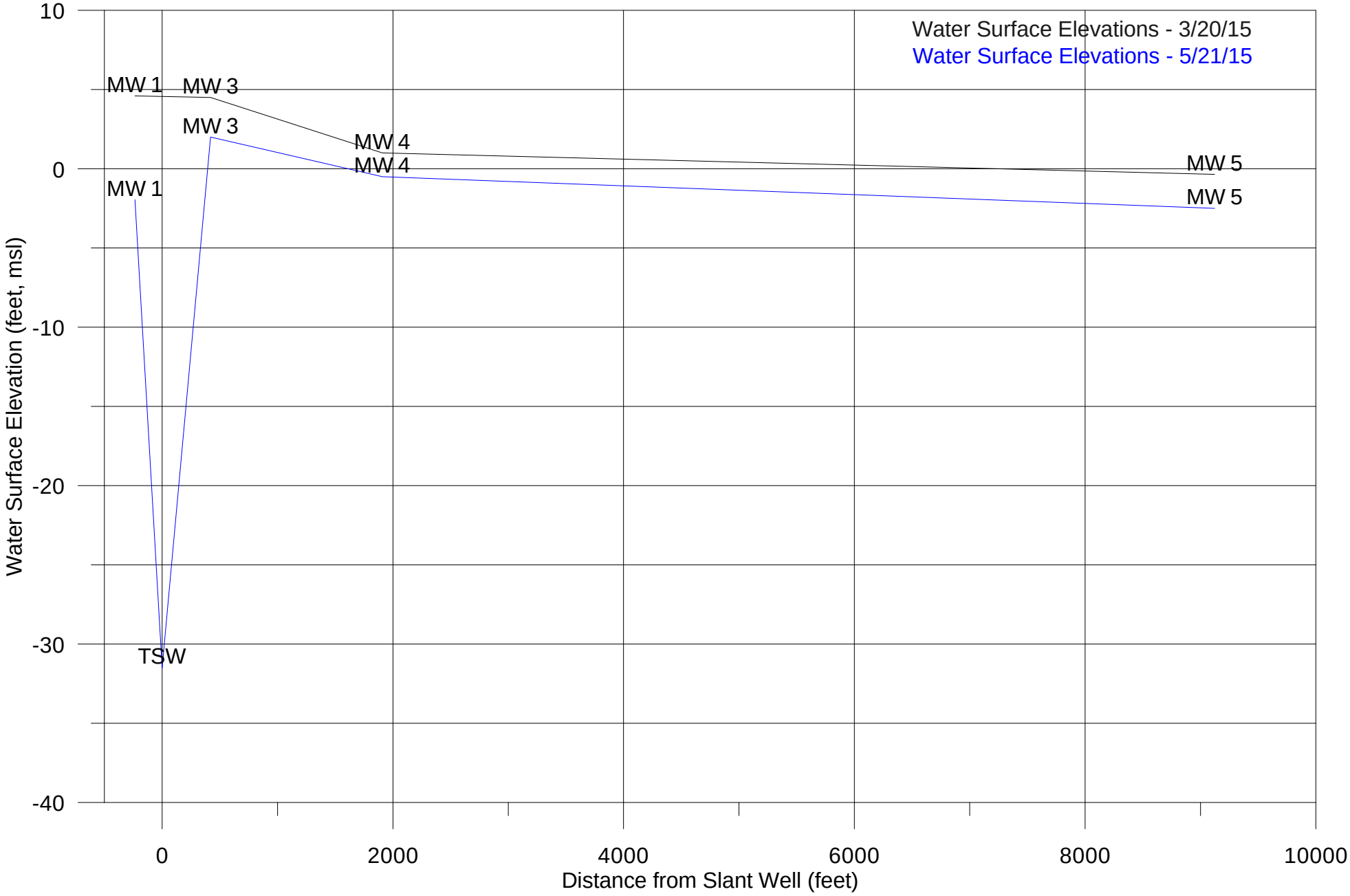


Attachment 2a

Specific Conductivity in MPWSP MW-4



Attachment 2b



Attachment 3