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COUNTY OF INYO
WATER DEPARTMENT

December 26, 2013

TO: Board of Supervisors
Water Commissioners

FROM: Bob Harrington, Water Director

SUBJECT: Groundwater Conditions in West Bishop

COPY: Kevin Caruchio, CAO
Marge Kemp-Williams, County Counsel

On December 10, 2013, it was reported to me that a number of private domestic wells on or near Highland Drive have become inoperable due to low groundwater levels. This memo is a preliminary look at possible causes of low groundwater levels in this neighborhood. Potential causes of groundwater decline in this area include drawdown of the water table due to groundwater pumping and lack of recharge due to reduced flows in surface water conveyances in the area.

Well W407 is a LADWP production well located north of Sunset Drive and east of Barlow Lane and is within a few thousand feet of Highland Drive (Figure 1). W407 pumps into A-1 Drain and typically runs from April through September (approximately 180 days) to supply irrigation and stock water to LADWP leases and use permit holders in the south Bishop area. W407 was installed in February 1998 and an aquifer test was done in February 1998. W407 replaced W137, which was installed in 1931. The capacity of W407 is about 2.8 cubic feet per second (cfs), and the amount of water pumped annually from W407 has generally been higher than pumpage from V137 (Figure 2). During years of high runoff, less water is pumped due to the availability of surface water to supply uses on the Bishop Cone (e.g., Figure 2; 1983, 1986, 2005, and 2006). After W407 was installed, V137 was converted to a monitoring well.

Due to last winter's low snow pack, flows in Bishop Creek this summer and fall have been low. W407 was operated until mid-December to supply stock water (approximately 250 days) because of low surface water flows in the fall. When we were notified that domestic well owners were having problems with their wells in this neighborhood, we contacted LADWP and

jointly agreed to shut off W407 and started monitoring wells T389 and V137 to observe recovery of the water table so that we could ascertain if W407 was having a negative effect on nearby domestic wells. We also discussed with LADWP the possibility of running W408 (located approximately 1,500 feet east of the east end of Sunrise Dr.) to supply stock water. W407 was turned off on or about December 11, and water levels responded quickly in well V137, rising several feet in a few days; however, well T389 showed negligible recovery. As of December 20, neither W407 nor W408 were operating because warmer temperatures had brought creek flows up enough to supply stock water needs with surface water.

Figure 3 shows the history of water levels in T389. It is evident from Figure 3 that the water table at this site has historically increased about 3 to 6 feet over the summer, followed by a period of decline in the fall and winter. This seasonal pattern is caused by recharge from ditches and irrigation during the summer followed by a declining water table when ditch flows are reduced in the fall and winter (if this seasonal change depth to water were from pumping, it would decline in the summer and recover in the fall and winter – the opposite of what is observed). The average depth to water in T389 increased by a few feet in the late-1990's (Figure 3), possibly due to the increased pumpage from W407 compared to V137 (Figure 2). T389 showed no discernible response to reduced pumping in 2005 and 2006. The most recent measurements (taken by LADWP and the Water Department) shows depth to water over 16 feet, which is about 4 feet deeper than typical late-winter/early-spring low water table observed in prior years (Figure 3). Clearly, something unusual is occurring. Using the results from the 1998 aquifer test, we calculated the amount of additional drawdown that would occur at T389 due to extending the period of operation of W407 from 180 days to 250 days. This rough calculation showed that drawdown at T389 would increase by about one foot. The amount of additional drawdown that would result on Highland Drive would be less because it is further from W407.

The Water Department has no recent pumping records for wells in the area or data from monitoring wells, except for measurements made over the last week by LADWP on T389, V137, and a few other wells. Based on these data and the historical patterns of pumping, surface water management, and water table fluctuations in the area, it is probably that the recent declines in the water table are due to lack of recharge from surface water conveyances.

The Long-Term Water Agreement's provisions concerning private wells are appended.

<u>Conclusions:</u>

1. Groundwater levels are at the lowest levels in the S. Barlow/Highland Dr. area since the early 1970's, as shown by Figure 3.

2. This year, W407 was operated for longer into the fall than is usual, but the resulting additional drawdown is not large enough to be the cause of problems occurring with domestic wells on or near Highland Drive.

3. Water Department and LADWP staff agree that W407 does not appear to be the cause of the lower than normal groundwater levels currently present in this area.

4. Flows in ditches in the Highland Drive/Sierra Vista/Sunset Drive area were cut off in mid-summer, which likely contributed to the recent decline in water table elevation in the area.

Appendix: Water Agreement section III.G – Private Wells

G. PRIVATE WELLS

New wells will be sited and groundwater pumping shall be managed to avoid causing significant adverse effects on water quality or water levels in non-Department-owned wells in the Owens Valley that are attributable to groundwater pumping by the Department. Any such significant adverse effects shall be promptly mitigated by the Department. The determination of significant adverse effects shall be made by the Technical Group as provided in section IV.B below. Although this provision is intended to protect owners of wells who are not parties to this Stipulation and Order from impacts attributable to groundwater pumping by the Department, this provision is not a limitation of the legal rights of such non-parties or the parties, nor does it create a binding administrative remedy that must be pursued and exhausted prior to the exercise of any legal right by such a non-party.

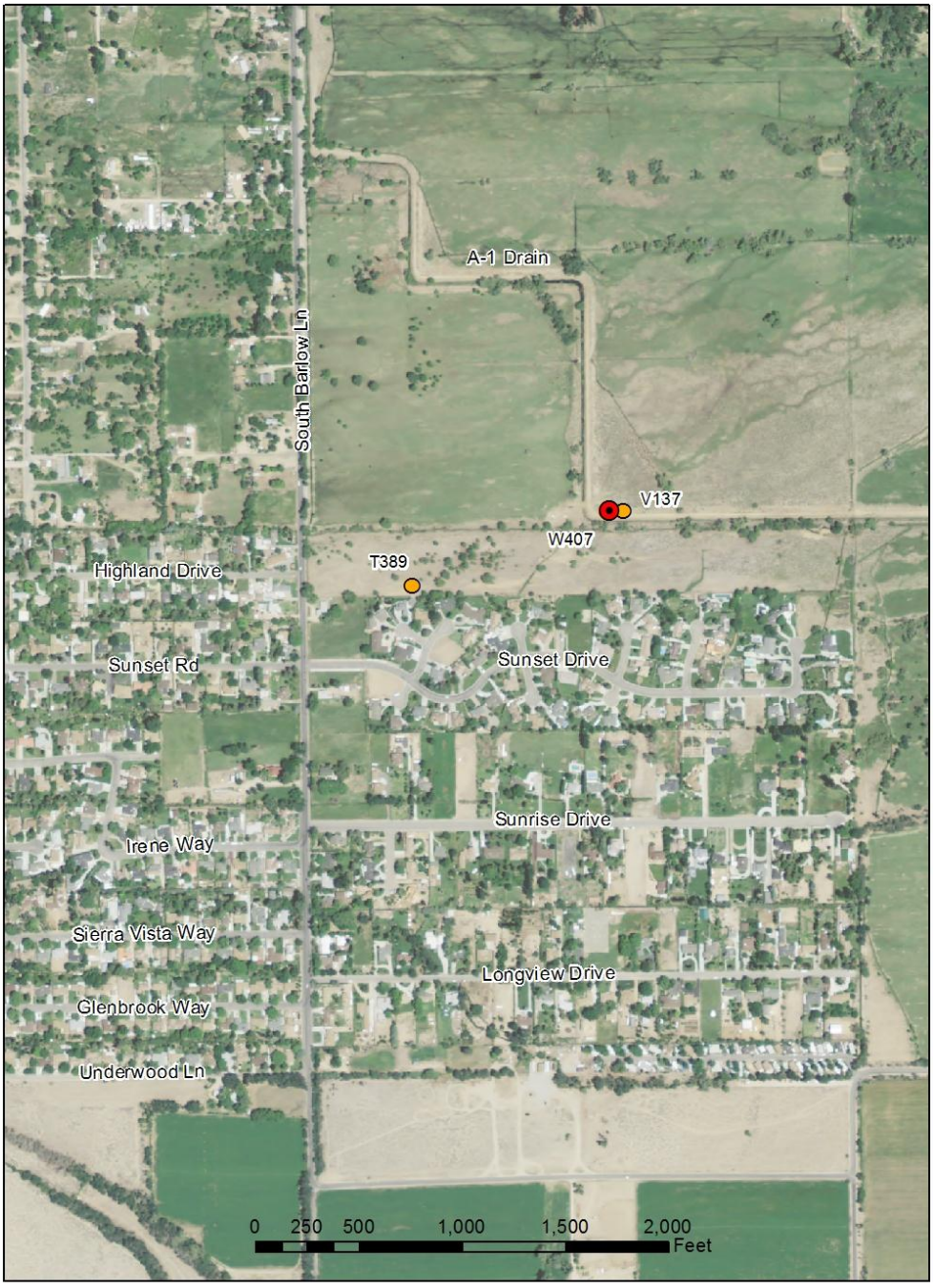

Figure 1. Highland Drive/Well W407 area.

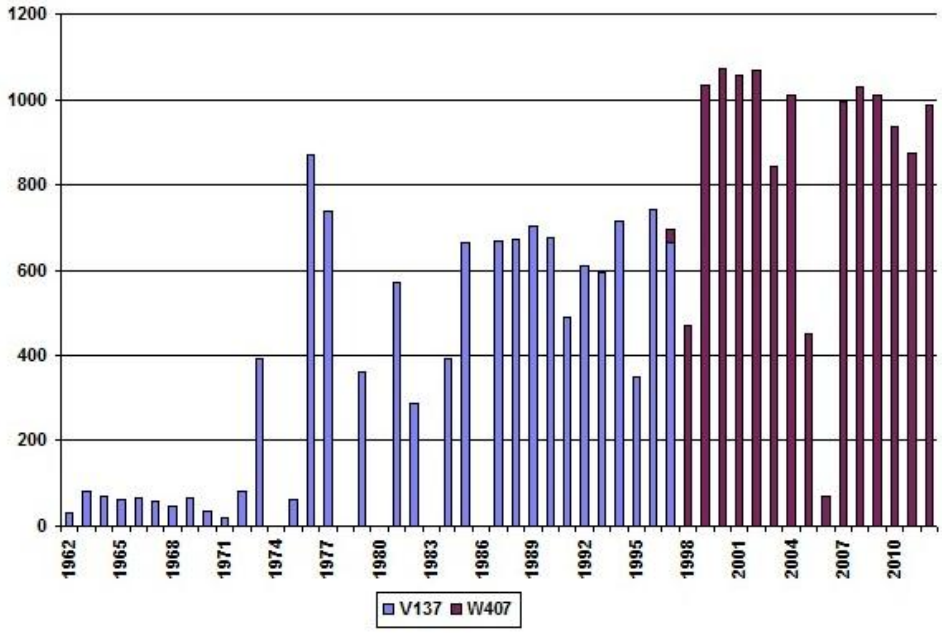

Figure 2. Pumping from Wells V137 and W407. Vertical axis is acre-feet per year.

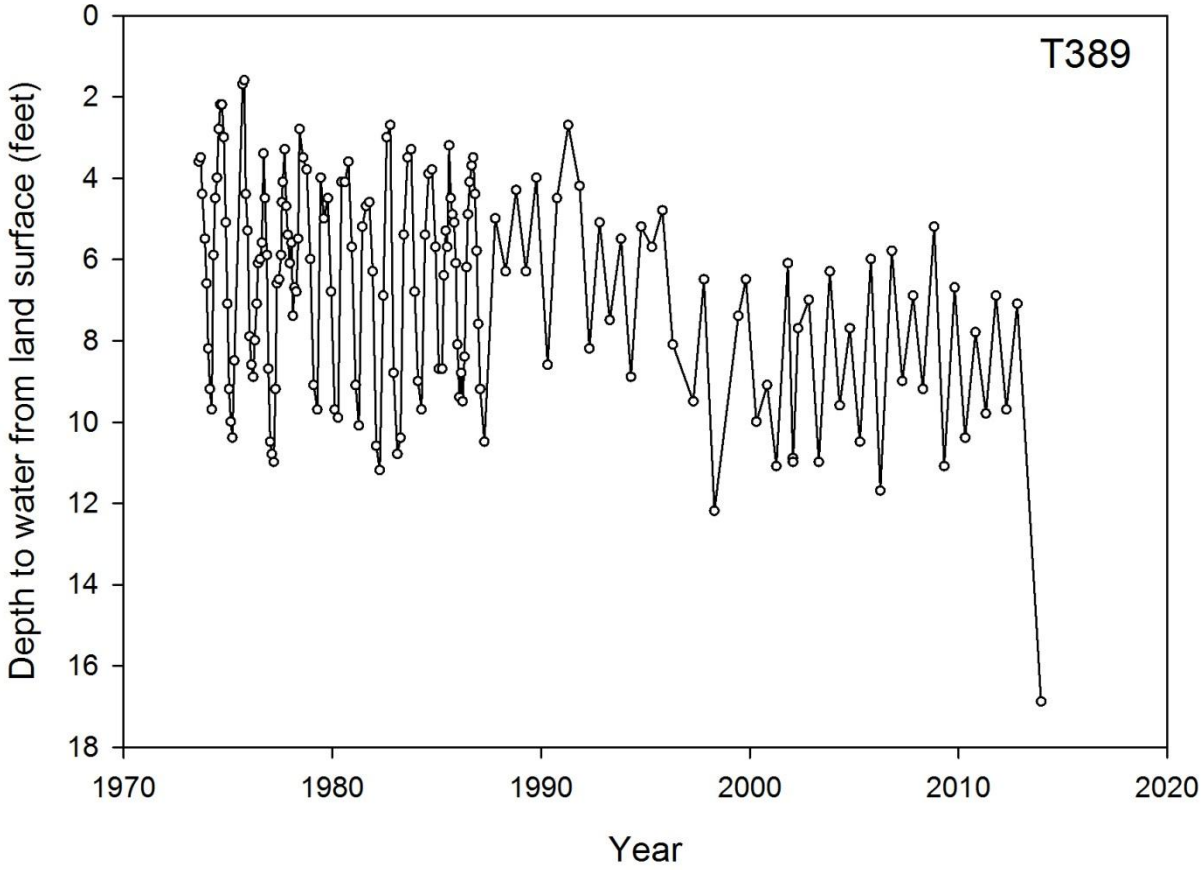

Figure 3. Depth to water in monitoring well T389.