



May 10, 2010
Job No. 10-1-031

Mr. Todd Johnson
Resource Land Holdings, LLC
619 N. Cascade Avenue, Suite 200
Colorado Springs, CO 80903

**SUBJECT: WATER SUPPLY AND MITIGATION MEASURES
PROPOSED ESTRELLA RIVER VINEYARD AGRICULTURAL CLUSTER**

Dear Mr. Johnson:

In response to your request, this letter follows up on our March 22, 2010 summary review of water-supply aspects related to your proposed Estrella River Vineyard Agricultural Cluster project; it also addresses the recently released **Paso Robles Groundwater Basin Water Balance Review and Update** report by Fugro West, Inc. (March 2010); and it addresses comments and responses by Michael Conger of County Planning Staff in a staff report dated May 13, 2010 (the date of the scheduled Planning Commission hearing on the project) but apparently released at the beginning of last week.

The key points addressed in this letter include the following:

- Despite reported “surplus” yield available in the Paso Robles Groundwater Basin, notably under both historical and projected conditions in the recently-released update report on the basin (Fugro, 2010), it is appropriate to recognize the actual declining groundwater level conditions in the Estrella subarea, and to implement the kinds of mitigation measures that you have proposed to offset the projected water requirements of your project.
- The mitigation measures which you have proposed are feasible (capable of being successfully implemented) to offset the small increases in net groundwater demand for your proposed project, as more fully explained and described in our March 22 letter.
- Groundwater pumping to supply the small amount of water projected to be required by your proposed project can be expected to have a direct effect on groundwater levels of up to about one to two feet in the Jardine neighborhood nearest to the proposed project site. This small drawdown would not be expected to cause any measurable decrease in the yield or capacity of any off-site wells.

As opening remarks on the recent Conger/staff report, it begins by noting that Luhdorff & Scalmanini, Consulting Engineers were retained by you to analyze the March 25, 2010 staff

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report and goes on to pointedly claim that our March 22 letter “categorically attacks many of the fact-based conclusions reached by staff in the previous staff report” (the March 25, 2010 staff report). Both assertions are incorrect. As clearly introduced in our March 22 letter, we were retained to review all water-related aspects of the proposed project, including projected water requirements and groundwater conditions in the Paso Robles Groundwater Basin where the project is located; our introduction also clearly notes that our review primarily focused on potential water requirements and alternative mitigation measures, “including consideration of County staff’s expression of concern and/or conclusion that proposed mitigation measures are infeasible for project-specific mitigation”. Particularly for the latter item, our review included the March 25, 2010 staff report; but our retention was not for the sole purpose of analyzing that staff report. As to the claim in the Conger/staff report that our letter “categorically attacks” many of the so-called “fact-based conclusions reached by staff”, an objective reading of our letter shows that it independently addresses three topics: 1) the inherent conflict between the combination of reported perennial groundwater yield, reported pumping less than perennial yield, and observed groundwater level declines in the Estrella subbasin; 2) projected water requirements on the proposed project site; and 3) the feasibility of three of the mitigation measures which we understand that you have proposed. While we certainly reach some different conclusions than staff has reached, we also make observations that go beyond anything addressed by staff. Our letter has to speak for itself; however, given that it only passingly mentions the March 25 staff report in places, its subject matter and organization do not reflect anything close to a “categorical attack” of many so-called fact-based conclusions reached by staff.

As introduced above, the balance of this letter follows up on our March 22 letter; it also addresses the recent update on the Paso Robles Groundwater Basin, and it addresses a number of the comments and responses in the May 13 Conger/staff report. Much of the following reaches different conclusions than those expressed in the May 13 Conger/staff report; however, none of it is organized or expressed as a “categorical attack”. As in our March 22 letter, we describe our review, analysis, observations and conclusions; as in any proceeding, we trust that there is room in this one for disagreement, and that there is no need for County staff to consider disagreement to be a “categorical attack” on its work or conclusions.

Initial Conclusions

After review of the May 13 Conger/staff report and review of the recently released Fugro groundwater analysis, there is nothing that would substantially change the fundamental conclusion in our March 22 letter. For reference, those conclusions are repeated as follows.

“Based on our review of the available documentation on your proposed project and available reports on the Paso Robles Groundwater Basin, we would conclude that, as analyzed and reported for the County over about the last eight years, the basin has not been pumped to near its perennial yield; the largest reported pumping has been about 10 percent, or about 9,700 acre-feet per year (afy), less than the reported perennial yield of 97,700 afy. That condition would suggest that, by itself, there is a “surplus” yield that is available to meet the small water requirements associated with your proposed project. However, in light of actual declining groundwater level

conditions in the basin near the proposed project, irrespective of reported perennial yield, it appears appropriate to propose the kinds of mitigation measures that you have already proposed to offset the projected water requirements of your project. As already in practice in other vineyards in the area, the first of your proposed mitigation measures is feasible and can offset both the projected water requirements of the proposed agricultural cluster, as well as the potential difference between existing irrigation and that which would be required to irrigate expanded vineyard plantings on the project site. The second and third proposed mitigation measures are also feasible to offset the projected water requirements (gross or net), while focusing the offset on groundwater pumping in the area of the groundwater basin where groundwater depressions are most notable, i.e. beneath and near the City of Paso Robles.”

As we tried to convey in our March 22 letter, the preceding conclusions derived from the following:

- At that time, prior to the availability of the recently-released Fugro groundwater analysis, it was quite straightforward to recognize that the earliest Fugro work for the County (2002) had reported the perennial yield of the Paso Robles Groundwater Basin to be about 94,000 afy. Subsequent Fugro work for the County (2005) increased the perennial yield value to 97,700 afy. For reference in the balance of this letter, that value was not changed in the recent Fugro update (2010).
- At that time, again prior to the availability of the recently-released Fugro groundwater analysis, it was also straightforward to extract estimates of basin-wide pumping from a recent (2009) report prepared by Todd Engineers for the City of Paso Robles and the County. Those values included some limited historical estimates, 74,061 af in 1997 and 82,638 af in 2008, and a most current estimate of 88,154 af in 2006. Todd recognized the latter to be 90 percent of the 97,700 afy perennial yield value reported by Fugro.
- Literally accepting the Fugro definition of perennial yield, one would (and should) expect that pumping within the perennial yield would result in “no ongoing depletion of the groundwater resource”. Since all reported values of pumping, including the largest and most recent (at that time) value in 2006, were well below the reported perennial yield value, there should be (by definition) available groundwater supply for new use, i.e. the difference between pumping and perennial yield.
- If one were to stop there, one could simply conclude that the County had invested in a substantial analysis of the groundwater basin over much of the last decade, developed a perennial yield value, published estimates of ongoing pumping that are all well within (below) the perennial yield value, and continued to “report” that a surplus groundwater supply was available to meet future water requirements in the basin.
- Instead of stopping there, however, we noted that “complicating the preceding simplified comparison of reported pumping versus perennial yield is a combination of what is actually happening in the groundwater basin and the concept of cones of depression”, and went on to recognize and discuss observed and ongoing groundwater level declines in the

basin, ultimately noting that “there is a fundamental disconnect between the combination of reported perennial yield, reported pumping less than perennial yield, and observed groundwater level declines in the Estrella subbasin.” Our ultimate conclusion on that specific topic was that, while the water requirements associated with your project are extremely small when compared to the reported “surplus” between estimated pumping and perennial yield, it is more appropriate to recognize actual groundwater conditions, and thus “appropriate to carefully assess the water requirements of the proposed project, including their “net” effect on groundwater, and to apply one or more mitigation measures that result in an offset of at least any net increase in groundwater use.”

- Cleath (2009) estimated residential water demand for the proposed agricultural cluster to be 1.7 afy per unit without conservation measures, and 0.63 afy per unit with conservation measures. For the 18 proposed units, the latter equates to a total residential water demand of 11.3 afy. Of that total, we estimated that a “net” of about 3.6 afy would be consumptively used, and about 7.7 afy would be returned to the groundwater basin.
- The County estimated residential water requirements to be 1.27 afy per unit, or 22.9 afy for the proposed 18 units. Of that total, we estimated the “net” consumptive use to be 13.4 afy, with the remaining 9.5 afy returned to the groundwater basin.
- Without picking between the Cleath and County estimates, we noted that one or the other, 3.6 afy or 13.4 afy, is the “amount that the proposed project would need to offset in order to mitigate the impact of the proposed agricultural cluster on the groundwater basin.”
- Cleath’s (2009) work on agricultural water requirements at the project site was summarized to note that: 1) existing water demand is about 387 afy; 2) future water demand without conservation measures would be about 449 afy; and 3) future water demand with conservation measures would be about 369 afy.
- We observed that County staff disagreed with Cleath’s (2009) estimates and had used notably higher unit water duties for existing and future cropping. We noted that the County did not cite to any references for its values, and that the values were very high for vineyards and blueberries, and totally inconsistent with actual water use on the site. For example, staff’s estimate of applied water for vineyards is 60 percent higher than actual use, and is 80 percent higher than actual use for blueberries. Our observation of staff’s resultant estimated water requirements remains unchanged in that it appears to be arbitrarily too high, indefensible, and inconsistent with actual practice on the ground.
- Consistent with our observation that it would be appropriate to apply one or more mitigation measures to offset at least any increase in groundwater use, we reviewed three of the four mitigation measures that you had previously proposed and concluded that each was feasible (capable of being successfully implemented). Those measures include reduced agricultural water use, water conservation in Paso Robles, and wheeling of Nacimiento water to Paso Robles. Without repeating the details in our March 22 letter, we summarize here that: 1) reduced agricultural water use can be accomplished, and still

maintain agricultural land use, as well as accommodate the proposed residential water demand, without adversely constraining the ongoing agricultural land use on the property; 2) water conservation in Paso Robles would result in decreased water demand in the City, which would directly translate into decreased pumping in the area where depressed groundwater levels are mapped; and 3) delivery of any supplemental water to the City would translate into an equal decrease in groundwater pumping, again in the area where depressed groundwater levels are mapped.

Our last points with regard to the feasibility of proposed mitigation measures may be where County staff feels “categorically attacked”. While our focus was to describe how each of the proposed measures would be feasible (again, capable of being successfully implemented), our descriptions necessarily ran afoul of County staff’s conclusions that they were all infeasible. Since we didn’t, and still don’t, think that County staff has provided any substantive technical or other support for its conclusions that the proposed mitigation measures are infeasible, we can only close that topic by saying that we disagree with staff, but again add that disagreement was never intended and should not be construed as any form of “attack”.

Updated Fugro Groundwater Analysis

The **Paso Robles Groundwater Basin Water Balance Review and Update** report (Fugro, March 2010) was not available at the time of our March 22 letter, but was apparently completed at about the same time. The May 13 Conger/staff report includes a large number of bullet points that are intended to summarize the findings of that report. Notable in the context of your proposed project are the first and fourth of those bullets:

- “In 2009, water demand was between 91,915 acre-feet (assuming 1.0 acre-feet for rural residences) and 96,781 acre-feet (assuming 1.7 acre-feet for rural residences). This represents between 94 percent and 99 percent of perennial safe yield (97,700 acre-feet per year).”
- “The average annual outflow predicted between 2010 and 2025 is approximately 96,625 acre-feet per year, or 99 percent of the perennial safe yield. Predicted water balances between 2010 and 2025 are estimates and are not intended to be interpreted as absolute numbers.”

Both of the preceding bullet points are either misleading or incorrect. In the first point, Fugro did not report “water demand” to be between 91,915 af and 96,781 af; those numbers were reported estimates of total groundwater outflow. Fugro reported total groundwater pumping to be 89,042 af or 93,908 af (depending on assumed rural residential water use). The latter values are some 3,800 to 8,650 af less than reported perennial yield, and represent 91 to 96 percent of perennial yield. In the second point, Fugro estimated average total outflow to be 96,625 afy for the period 2010 to 2025. However, it is misleading to express that value in the context of perennial yield, which Fugro defined as “the rate at which water can be **pumped** over a long term without decreasing the groundwater in storage” (emphasis added). A correct representation of Fugro’s report on this item would be that Fugro estimated average annual pumping to be

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92,493 af for the period 2010 to 2025; that value is some 5,200 af less than Fugro's reported perennial yield, or slightly less than 95 percent of perennial yield. As with much of the discussion in our March 22 letter, summarized above, straightforward interpretation of the preceding suggests notable existing and projected surpluses of available groundwater supply, within reported perennial yield.

It is quite noteworthy that the Conger/staff summary of Fugro's updated groundwater report omits the observation that Fugro reported groundwater basin storage to have increased by more than 200,000 af (202,834 af to 229,292 af, again depending on assumed rural residential water use) from 1998 to 2009. Fugro also projected that groundwater storage would increase by more than another 400,000 af (406,943 af) between 2010 and 2025. The recent historic increase was noted by Fugro to "support the conclusion that total annual groundwater outflows for each year in the Basin and Subbasin were less than their respective perennial yield values". Again, straightforward interpretation of Fugro's reported changes in groundwater storage suggests quite positive conditions: groundwater storage has been increasing by some 17,000 to 19,000 af over the last 12 years, and is estimated to increase by some 25,000 af over the next 15 years. Noteworthy with regard to the Fugro updated report is that it did not include any qualifiers or limitations which called any kind of special attention to the Estrella subarea, i.e. that somehow its results were not applicable to the Estrella subarea.

Regardless of any debate over the estimated water requirements of your proposed project (and the rest of the project site), the updated groundwater report clearly shows surplus groundwater availability within perennial yield, under both existing and projected conditions, and it includes corresponding historic and projected storage increases in the groundwater basin. Similar to the observations in our March 22 letter, if one were to solely consider Fugro's updated report on the groundwater basin, it shows the basin as a whole to have existing and projected "surplus" available for pumping to meet water demands like those of your project.

From the perspective of your project, the preceding can be considered to be quite positive. Unfortunate from the same perspective, however, is the omission of any actual groundwater observations in the recent updated groundwater basin analysis. There is absolutely no presentation or description of actual historic or current groundwater conditions, no mention of "cones of depression" or "areas of decline", or anything else that might convey any concern about the state of the groundwater basin. Somehow, in spite of the widely reported (and extensively discussed in the County staff reports on your project) prevailing declines in groundwater levels in the basin, Fugro concludes that groundwater storage has **increased** by more than 200,000 af over the last 12 years. Furthermore, Fugro presents a projected water balance for the basin that results in a further increase in groundwater storage, by more than another 400,000 af, over the next 15 years. Notable from the perspective of your proposed project is that Fugro's projected water balance includes between 1,100 and 5,500 af of rural residential/small community pumping above the average values used to generate its reported increases of more than 200,000 af of groundwater storage over the last 12 years. From that, it would appear that Fugro's projected water balance has already accounted for increased pumping by projects like yours; and it still projects substantial improvement in groundwater basin conditions, e.g. storage increase exceeding 400,000 af over the next 15 years.

As we have now expressed several times between our March 22 letter and this letter, one could simply interpret all the historical and now projected perennial yield reporting to show that there is both an existing and a projected "surplus" available in the groundwater basin to serve your project. However, as we have also expressed several times, there is a fundamental disconnect between the combination of reported perennial yield, historical and now projected pumping less than perennial yield, and observed groundwater level declines in the basin. In light of these observed declines, it would still be appropriate to apply one or more of the proposed mitigation measures that you have proposed, and which we still consider feasible, to offset at least any net increase in groundwater use by your project.

May 13, 2010 Conger/Staff Report

Much of what we might respond to the May 13 Conger/staff report is reflected in the preceding discussion. However, since the May 13 Conger/staff report is essentially a "staff response" to our March 22 letter, we would add the following comments and clarifications regarding several of those staff responses.

Staff Response 1 – It is completely unclear how staff can claim that the recently released Fugro report "serves to confirm assertions made in the March 25, 2010 staff report with respect to the questionable sustainability of water in the basin." With no recognition of actual groundwater conditions in its report, Fugro (2010) reports substantial improvement in recent historical basin conditions (more than 200,000 af of increased groundwater storage), which it says "supports the conclusion that estimated total annual groundwater outflows...were less than their respective perennial yield values". Fugro further reports that groundwater storage is projected to increase by more than another 400,000 af over the next 15 years. Those results do not even begin to "confirm... questionable sustainability of water in the basin".

Staff Response 2 – It is again unclear how staff can rely on the Fugro (2010) update to claim that the basin "appears to be approaching overdraft". As discussed above, Fugro's recent report shows recent pumping to be some 3,800 to 8,650 afy below perennial yield, resulting in increased groundwater storage of more than 200,000 af over the last 12 years (an average annual increase of about 17,000 to 19,000 afy). The same Fugro report projects pumping to be about 5,200 afy less than perennial yield, resulting in a projected increase in storage of more than 400,000 af, over the next 15 years (an average annual increase of about 25,000 afy). The reported results reflect anticipated improvement rather than any kind of "approaching overdraft".

Staff Response 6 – As should be obvious from our March 22 letter as well as this one, we recognize that, without mitigation, the proposed project will result in a net increase in water extraction in an area with known groundwater level declines (notwithstanding the results reported by Fugro, 2010). Whether those limitations include staff's claim of limited "long-term sustainability" could certainly be debated in light of all the Fugro work, notably including the findings in its recent updated basin report (March 2010) as discussed above. Also, it is confusing for staff to claim that an "unknown interference impact" is of "known water resource limitations" in a groundwater basin.

To address the potential issue of “unknown” off-site impacts of future pumping to supply the proposed project, a single-layer analytical groundwater flow model was used to estimate the drawdown that would result from pumping to meet projected water demands. Aquifer properties used in the model include a transmissivity based on an aquifer test conducted in Estrella River Vineyard (ERV) Well 3 in 2006 (Cleath-Harris, 2009) and a storativity based on the estimate by Fugro in its 2005 report.

The simulation was based on the proposed residential water demand estimated by Cleath-Harris (2009) and shown in **Table 1**. The total annual water demand is 11.3 afy with the maximum demand occurring during the summer months. The peak monthly demand is estimated to be 1.12 af, 1.23 af, and 1.18 af in June, July, and August, respectively. That translates to continuous pumping rates of 8.4 gallons per minute (gpm), 9.0 gpm, and 8.6 gpm during those months. Since Well 3 has a capacity of about 31 gpm, it would need to run less than 30 percent of the time during the peak months, meaning that interference effects would be intermittent and not continuous. Drawdown near the well would be greatest at the end of each pumping cycle, but a simulated off-site drawdown would be greatest when the pumping rate is averaged over a longer period. Using the latter conservative approach, the maximum off-site drawdown would occur at the end of August, and that drawdown is shown on **Figure 1**. That maximum off-site drawdown would be slightly more than two feet in the Jardine neighborhood west of the site. That small drawdown would not be expected to cause any measurable decrease in the yield or capacity of any off-site wells.

The predicted drawdown is also considered to be conservative because the simulation ignored return flows. If return flows were included, the maximum net groundwater extraction rate would be less than four gpm (based on continuous pumping during the month of July), and the maximum off-site drawdown would be about one foot.

Staff Response 7 – It may be correct that staff has used its methodology to estimate water demand on most projects requiring environmental review for the last several years. However, as discussed in some detail above, staff’s approach is significantly inconsistent with actual irrigation practices, notably for vineyards but also for blueberries in this case.

Staff Response 8 – Staff misrepresents our letter by noting our assertion to have been that “mitigation measures do not require County oversight” (pg 1-4). We understand that the County must craft fully enforceable mitigation measures. Our comment addressed the physical feasibility of your proposed mitigation measures whether with or without County oversight. As originally discussed in our March 22 letter and further discussed above, your proposed mitigation measures are feasible (capable of being successfully implemented) as proposed. The mitigation measures could be successfully implemented and monitored through development of a mitigation and monitoring plan.

Staff Response 10 – It is difficult to understand how staff can fault our assessment of feasibility of mitigation measures for a lack of “factual documentation that reduction in City water demand will offset the project’s effect on the rapidly declining groundwater conditions in the Estrella area”. It is impossible to provide “factual documentation” of a mitigation measure’s effect in

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advance of implementation of any mitigation measure. Our assessment of feasibility in that case derived from the logic that a reduction in City water demand translates into an equal reduction in City pumping; since the most significant mapped declines in groundwater levels in the Estrella area are beneath the City, the resultant benefit from a pumping reduction, albeit small for your project, would be where that reduction occurred, which is also where the basin is currently most affected.

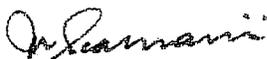
The beneficial effect of pumpage reductions by the City can be inferred from a contour map of equal groundwater elevations for the Paso Robles area which we prepared as part of this response. This map (attached as **Figure 2**) shows groundwater elevations in deep wells in the spring of 2009. The map is based primarily on water levels measured by the County in 13 deep wells in April 2009, but also used data measured by ERV in on-site wells Nos. 1 and 2 on June 1, 2009. Wellhead elevations for the ERV wells were estimated based on a topographic map with a two-foot contour interval prepared by North Coast Engineering.

The overall shape of the groundwater elevation contours is similar to the spring 2006 contour map prepared by Todd, which was attached to our March 22 letter. There is an elongated depression beneath the City of Paso Robles, centered near the southern portion of the airport. Groundwater flows toward this pumping depression from all directions, including the ERV site. There is no specifically identifiable depression beneath the ERV property. Any mitigation measure that results in reductions in the size or depth of the pumping depression beneath the City will benefit groundwater conditions throughout the Estrella subarea, including the ERV site.

We appreciate the opportunity to undertake the review of your proposed project, and proposed mitigation related to the project and to future use of the rest of the property on which the project is located. We trust that this summary of our review will be of use as you move forward in the application process. If we can provide further detail or respond to questions about any of the above, we would be pleased to respond.

Sincerely,

LUHDORFF AND SCALMANINI
CONSULTING ENGINEERS



Joseph C. Scalmanini

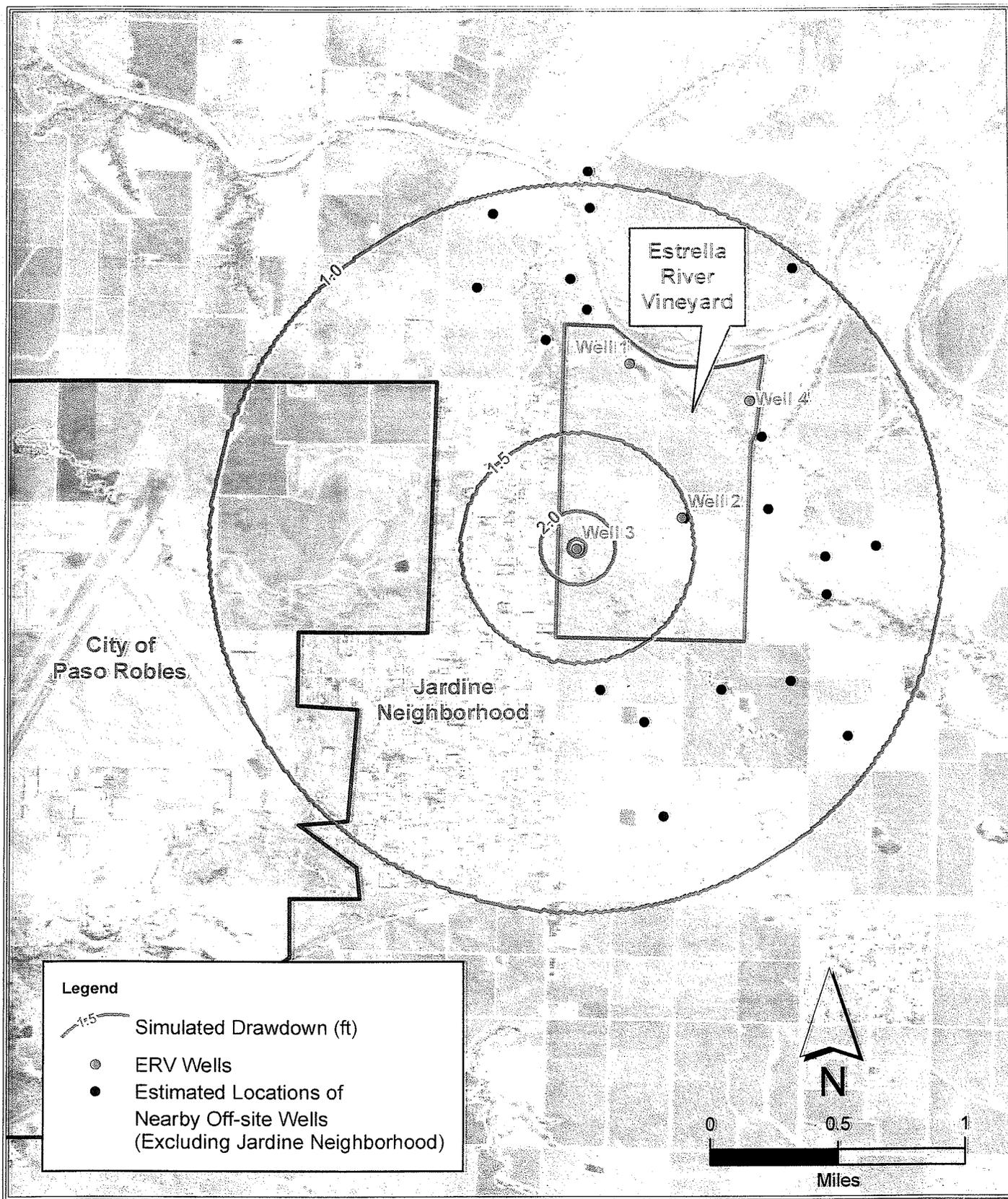


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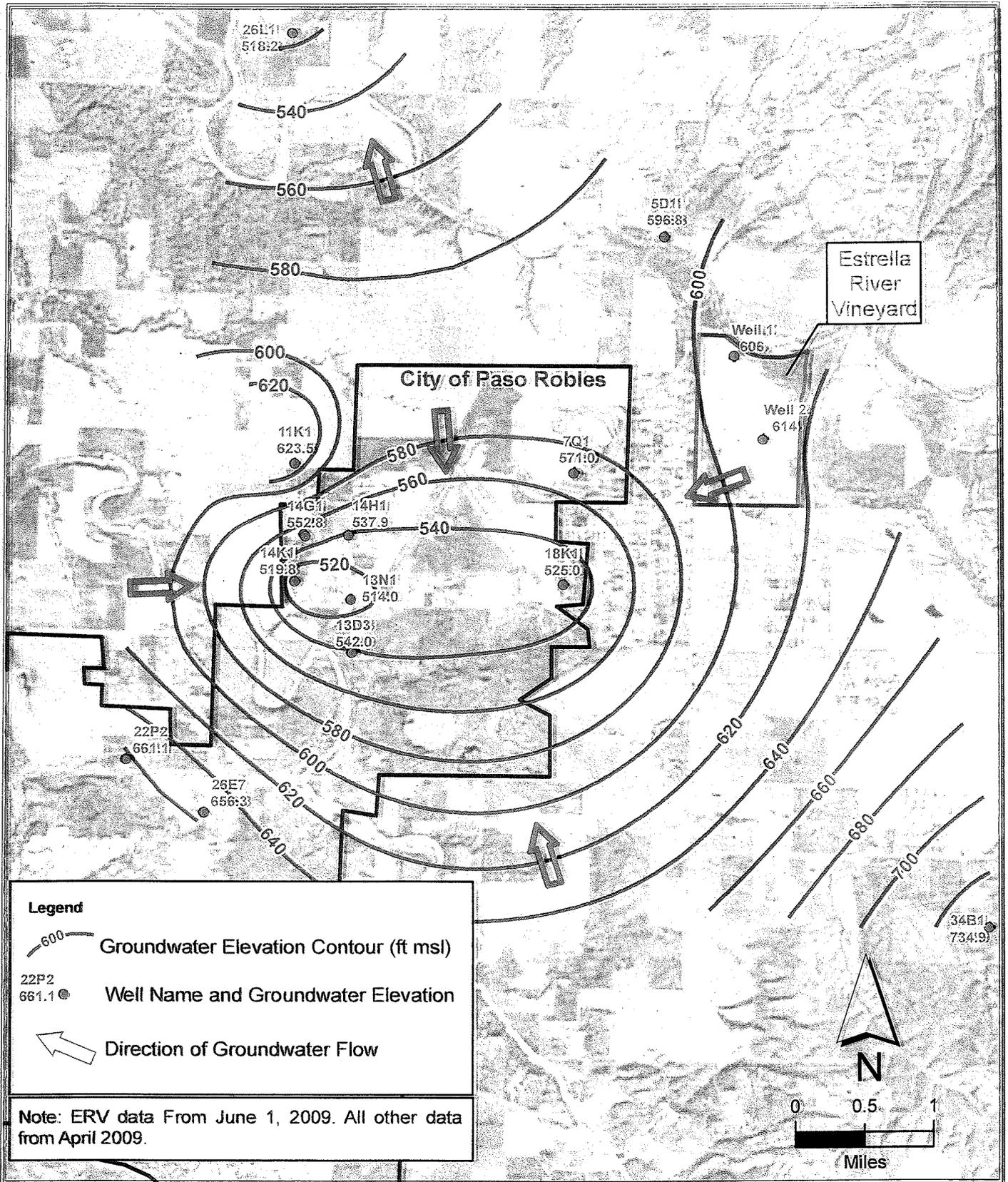
**Table 1
Ag Cluster Water Demand**

Month	Days	Residential Water Demand										
		Outdoor Use			Indoor Use				Total		Average Pumping Rate	
		(af/lot)	(af)	(gal)	(gal/lot)	(gal)	(af)	(gal)	(af)	(gal)	(af)	(gpm)
Jan	31	0.008	0.14	46,922	10,850	195,300	0.60	242,222	0.74	5.4		
Feb	28	0.010	0.18	58,653	9,800	176,400	0.54	235,053	0.72	5.8		
Mar	31	0.015	0.27	87,980	10,850	195,300	0.60	283,280	0.87	6.3		
Apr	30	0.021	0.38	123,172	10,500	189,000	0.58	312,172	0.96	7.2		
May	31	0.026	0.47	152,498	10,850	195,300	0.60	347,798	1.07	7.8		
Jun	30	0.030	0.54	175,959	10,500	189,000	0.58	364,959	1.12	8.4		
Jul	31	0.035	0.63	205,286	10,850	195,300	0.60	400,586	1.23	9.0		
Aug	31	0.032	0.58	187,690	10,850	195,300	0.60	382,990	1.18	8.6		
Sep	30	0.024	0.43	140,767	10,500	189,000	0.58	329,767	1.01	7.6		
Oct	31	0.018	0.32	105,576	10,850	195,300	0.60	300,876	0.92	6.7		
Nov	30	0.010	0.18	58,653	10,500	189,000	0.58	247,653	0.76	5.7		
Dec	31	0.007	0.13	41,057	10,850	195,300	0.60	236,357	0.73	5.3		
Total	365	0.236	4.25	1,384,213	127,750	2,299,500	7.06	3,683,713	11.30			



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Figure 1
Maximum Simulated Drawdown (August) Due to Pumping for ERV Ag Cluster Development



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