

April 5, 2010

Mr. Demian Hardman
Contra Costa County Department of Conservation and Development
651 Pine Street
Martinez, California 94533

Re: Report from P/A Design Resources, Inc., titled "Creekside Memorial Park Preliminary Anticipated Maximum Yearly Water Demand and Water Source Availability" dated June 12, 2009 (revised January 29, 2010)

We have compared the latest version of the report cited above to the earlier version (P/A Design Resources 6/12/2009), and have found that the differences are minor. They reflect the change from two landscaping scenarios for 21 +/- acres of the proposed cemetery (one xeriscaped, one assuming additional water sources) to a single xeriscaped scenario for those 21 +/- acres.

Since our review of their June 12, 2009 report (Newman 8/10/2009) focused on their xeriscaped alternative, our analysis and conclusions remain valid. We have since found two minor typographical errors in our review; although they do not affect our conclusions, we would like to note them: (1) on page 3, we stated "72 AFY would be required for irrigation for the first two (or five) years"; it should be 64 AFY (the 74 AFY also included the non-irrigation requirements), and (2) we noted that 5,074 trees and shrubs were to be planted; it should be 6,074.

Rather than restating our earlier response here, we will describe our additional issues with their proposal:

1. Although no definition of 'xeriscaped' is given in this report, a later report from P/A Design Resources titled 'Creekside Memorial Park - Estimate of Anticipated Project Energy Consumption', February 18, 2010, implies that that the 20.8 acres of xeriscape will be planted with 'no-mow fescue (or xeriscaped wildflower grassland) (which) requires mowing only three times per year' (p. 2). That report also states "Additionally, the conceptual landscape plan for the project calls for the planting of an estimated 300 trees in the approximately 9.4 acres of traditionally landscaped cemetery and the approximately 20.8 acres of xeriscaped cemetery will likely be planted similarly, though not as densely, as the enhanced oak woodland areas, resulting in up to 500 trees being planted in those areas." (p. 4).

Since this report (P/A Design Resources 1/29/2010) did not include these 500 trees, it means that instead of 6,100 +/- trees, shrubs and willows, the total is now about 6,600, an increase of 8%. These 500 trees will need additional water both during their initial establishment period and thereafter from the groundwater supply, which is not included in the applicant's analysis. As a result, the project will need even more water than their already understated usage.

In the calculation of groundwater recharge in ENGEO's 'Initial Groundwater Assessment' (ENGEO 4/6/2007 revised 6/10/2008), the impact of evapo-transpiration was ignored because the assumption was that the only vegetation on the site was sparse vegetation and dry

grasses. However, the approximately 6,600 trees, shrubs and willows would have a very significant impact. We had conservatively (i.e. on the low side) estimated the water needs for the oak woodland and riparian corridor plantings after initial establishment at 61.2 AFY (Newman 8/10/2009). With the number of plantings increasing by 8%, this water requirement could rise to 66.1 AFY or more.

This would bring the total yearly water usage at full build-out to 111 AFY (= 7 AFY non-irrigation operational demands + 38 AFY irrigation for 9.5 acres turf cemetery landscape + 66 AFY groundwater used by 31 acres of oak woodland, 14 acres of riparian corridor and 21 acres of xeriscaped cemetery landscape).

2. Although the applicant has stated that there will be a 150 +/- acre conservation easement (P/A Design Resources 6/16/2009), no mention of it is made in this report, so it is not possible to understand its impact in terms of water use. First of all, exactly which parts of the proposed cemetery are included in the easement?

The applicant should also be required to state exactly how the conservation easement has been defined. For example, the following all need to be identified: (1) the property rights which are being given up, (2) the specific conservation values, such as water quality or migration routes, which are being targeted, and (3) to whom the easement is being given (i.e. to a private organization or public agency), as well as all other pertinent information.

3. In a later report (P/A Design Resources 2/19/2010), the applicant states that "approximately ten on-site wells will be required to provide all the water needs of the project (domestic, landscape, etc.)" (p. 3), but they have not addressed the location of these wells. Since the project's water consultants have stated that the alluvial groundwater aquifer is located at the eastern, low-lying portion of the site (ENGEO 4/6/2007, revised 6/10/2008), it seems likely that this area is where the wells will be located. But this is the same area where most of the large buildings, parking lots, burial sites, and lake will be located.

Since wells (especially those used for drinking water, as these will be) require setbacks from possible sources of contamination such as septic systems (and burial sites), consideration has to be given to where these wells are going to be located relative to the cemetery layout. The typical setback required from a septic system for wells in Contra Costa County is 100 feet. If the assumption is made that the wells are spread out over the entire aquifer area, then the 100 foot setback requirement around each well translates to a circle of $(\pi \times r^2)$ $100 \text{ ft} \times 100 \text{ ft} \times 3.14159 = 31,415$ square feet, or 314,150 sq. ft total for ten wells, equal to 314,150 square feet / 43,560 square feet/acre, or 7.2 acres, which is a significant portion of the 'Lower Garden' area of the proposed cemetery.

However, if the ten wells were to be placed close together, less acreage would be needed to achieve the required setbacks, but the efficiency and rate of extraction from the aquifer would likely be compromised, leading to less water availability for the proposed cemetery.

In addition, whether the aquifer is interconnected or not must be determined in order to determine where to locate the wells. This is important because if the aquifer is not interconnected, the wells must be spread over a wider distance. The water consultants do not agree on this point; ref. ASE 7/15/2007. This is a significant issue which must be addressed.

4. Another issue is the efficiency of water extraction of the well system relative to the amount of water contained in the aquifer. The applicant proposes to draw 45 AFY each year (matching their usage to their estimate of yearly recharge to the aquifer), from an aquifer which they estimate holds 58 AF (ENGEO 6/10/2008).

However, even if these numbers were correct (and we have shown that they are not), it would mean that they were planning to draw 78% of the water contained in the aquifer every year. It does not seem physically possible for wells to actually draw such a high percentage from an aquifer, given that the water is imbedded in a matrix of clay, silt and other materials which retard water flow.

In addition, since we have shown (Newman 7/28/2008) that the aquifer size is only about 13 AF, and that yearly recharge is only about 16.5 AFY, and the yearly proposed usage is 111 AFY, it is clear that there is no way that the site can supply all of the needed water.

5. Another impact of the over-pumping of the 31 acre alluvial plain is possible land subsidence. If 45 AFY were to be drawn from the 31 acre aquifer every year, then the equivalent of an 17" slab of water would be removed from the aquifer every year. Since the aquifer consists of clay, silt, sand and gravel deposits (ENGEO 6/10/2008, page 4), subsidence seems very likely, especially given the quantity of water to be extracted. The implications of this (including the possible changes to the 100 year flood plain) should be addressed by the applicant. (Note that our analysis has shown that site storage is only about 13 AFY, so their wells would go dry - or start pulling water from adjoining properties - sometime during the first summer.)

In conclusion, it is becoming more and more clear with each submission made by the applicant that the proposed cemetery is not an appropriate land use for this property.

Thank you for the chance to submit our comments.

Regards,

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REFERENCES

1. Aqua Systems Engineering (ASE), July 15, 2007, memo to Mr. Sid Corrie, Corrie Development, Comments on the ENGEO Initial Groundwater Assessment (included as attachment to memo to Mr. Ryan Hernandez, Senior Planner, Community Development Department, Contra Costa County, August 14, 2007)
2. ENGEO Incorporated, June 10, 2008, Initial Groundwater Assessment, Creekside Memorial Park, Tassajara Road, Contra Costa County, California, April 6, 2007, revised June 10, 2008
3. Newman, Bill and Holly, July 28, 2008, response to John Oborne, Planner, Community Development Department, Contra Costa County with comments and concerns regarding the report from ENGEO Incorporation titled “Initial Groundwater Assessment, Creekside Memorial Park, Tassajara Road, Contra Costa County, California, Project No. 5710.500.201”, April 6, 2007, revised June 10, 2008
4. Newman, Bill and Holly, September 30, 2008, response to John Oborne, Planner, Community Development Department, Contra Costa County, regarding “Final USFWS Site Visit Meeting Notes, Creekside Memorial Park, from EDAW Inc (Angie Harbin-Ireland), dated 8/22/08”.
5. Newman, Bill and Holly, August 10, 2009, response to John Oborne, Planner, Community Development Department, Contra Costa County, regarding the report from P/A Design Resources, Inc., titled “Creekside Memorial Park Preliminary Anticipated Maximum Yearly Water Demand and Water Source Availability”, dated June 12, 2009
6. P/A Design Resources, Inc., June 12, 2009, Creekside Memorial Park Preliminary Anticipated Maximum Yearly Water Demand and Water Source Availability (supersedes P/A Design Resources, March 30, 2007)
7. P/A Design Resources, Inc., June 16, 2009, Draft Biological Resources Section for CEQA for the 221-acre Creekside Memorial Park, Tassajara Valley, Contra Costa County, stamped ‘Received Jun 16, 2009 P/A Design Resources, Inc’
8. P/A Design Resources, Inc., January 29, 2010, Creekside Memorial Park Preliminary Anticipated Maximum Yearly Water Demand and Water Source Availability (supersedes P/A Design Resources, March 30, 2007 and June 12, 2009)
9. P/A Design Resources, Inc., February 18, 2010, Creekside Memorial Park – Estimate of Anticipated Project Energy Consumption