

August 10, 2009

Mr. John Osborne
Community Development Department, Contra Costa County
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.

We have reviewed the report cited above in conjunction with the earlier submissions made by the applicant regarding water availability and water requirements for the proposed Creekside Memorial Park Cemetery.

While the applicant's apparent intent to size the project's water usage based on the amount of water available at the site is laudable, the conclusions in the report are meaningless since the project's water requirements are significantly understated and the project's water availability is significantly overstated. When these errors are analyzed, it is clear that even the low-water usage proposal (Landscaping Scenario #1) will use significantly more than the available water every year, making the project unacceptable (details below).

In addition, the applicant is now proposing to xeriscape most of what would be lawn in a traditional cemetery. But no definition is given for what this means except for note 3 on the attachment 'Landscaping Scenario #1': "Water need satisfied by the naturally occurring yearly rainfall." This description could cover anything from gravel and cement, to grasses that turn brown every summer, or even to cactus. Since it appears that the areas to be xeriscaped are those which will have undergone extensive grading (i.e. the top of the ridge and along the southern property line) and which are intended for burials, we believe that the applicant needs to provide additional detail around the xeriscaping proposal. Some of the key issues that need to be addressed are erosion control in these heavily graded areas, managing the invasion of non-native and noxious weeds that occurs after grading, and managing the deep desiccation cracks that occur in local soils not watered during the summer (especially of concern in areas to be used for burials). Lastly, a xeriscaped cemetery would have a totally different look and feel than a traditional lawn cemetery, and the impact of this change needs to be fully explained by the applicant with additional detailed plans, artist's renditions, etc.

Finally, a number of serious inconsistencies and issues remain in this proposal which need to be addressed by the applicant.

In the balance of this write-up, we will provide detail for each of these concerns.

1. Water availability is significantly overstated. As we have shown in our memo to you of July 28, 2008 (reviewing the report from ENGEEO Incorporated, titled "Initial Groundwater Assessment, Creekside Memorial Park, Tassajara Road, Contra Costa County, California", Project No. 5710.500.201, dated April 6, 2007, revised June 10, 2008), the amount of groundwater recharge available at the site is

only 16.5 acre feet per year (AFY), not the 44.9 AFY claimed by ASE/ENGEO. In addition, we showed in that memo that total water site storage is only about 13 AFY, not the 58 AFY claimed by ASE/ENGEO, and the aquifer flow is only 4.5 AFY not the 12 AFY claimed. In other words, not only is the water available on a sustainable basis (i.e. the groundwater recharge) overstated by ASE/ENGEO, there is less water available in the aquifer at the site.

The 45 AFY of annual groundwater recharge proposed by ASE/ENGEO is based on an estimated recharge rate of 15% over the entire 221 acres (16.25 inches of rainfall/year * 221 acres / 12 inches/foot * 15% = 44.9 AFY). In reality, the full recharge rate of 15% will not be achieved on all 221 acres, since 22 acres are impervious (buildings, parking lots, roads etc.), 10 acres are excluded (existing residence and proposed fire station), 149 acres are hilly so the amount of recharge is much less, and even for the remaining 40 flat acres, a recharge rate of 15% is only appropriate for the first roughly 5 inches of rainfall, since after the first 5 inches, the ground is saturated and much of the rainfall becomes runoff (i.e. no recharge). To summarize:

Table 1: Calculation of annual groundwater recharge

Acres	Rainfall (average)	Recharge rate (%)	Calculation of groundwater recharge	AFY
189 acres pervious, made up of:	First 5 inches/yr	15%	$0.15 * 5 \text{ inches/yr} * 189 \text{ acres} / 12 \text{ in/ft}$	11.8 AFY
40 acres flat	Next 11.25 inches/yr	5%	$0.05 * 11.25 \text{ inches/yr} * 40 \text{ acres} / 12 \text{ in/ft}$	1.9 AFY
149 acres hilly	Next 11.25 inches/yr	5% * 50% runoff	$0.05 * 0.5 * 11.25 \text{ inches/yr} * 149 \text{ acres} / 12 \text{ in/ft}$	3.5 AFY
22 acres impervious	16.25 inches/yr	100% runoff	0	0
10 acres excluded	16.25 inches/yr	0	0	0
Total: 221 acres	16.25 inches/yr			16.5 AFY

- Water usage is severely understated, both during the first few years while the plantings become established and also thereafter.

The report states that the trees and shrubs will be irrigated until they become established (two years in this report, five years in their previous report); for both the riparian corridor and the oak woodland, the report states that each tree or shrub will require 20 waterings of two gallons of water per year during the seven dry months, with no watering during the five rainy months. This translates to a single two-gallon watering every six days during the two extreme heat months (= 10 waterings) plus a single two-gallon watering every two weeks during the other five dry months (= 10 waterings). This estimate seems very low, as we are currently working to establish drought-tolerant trees and shrubs on our

property adjacent to the proposed cemetery, and we have found that significantly more water is required.

In addition, this estimate is significantly less than the estimate made in their report of March 30, 2007, which stated (p. 2):

"Once again using the WUCOLS Worksheet for the oak woodland and riparian corridor landscaping, and assuming low density and drought tolerant plantings, more efficient rootball targeted irrigation (i.e. the irrigation system will function at 85% efficiency), similar rainfall assumptions as above (note those rainfall assumptions were that irrigation would not be necessary during December, January or February, and that none of the average 17.5" of annual rainfall would occur outside of these months), and a microclimate with hot summer winds, it is anticipated that the oak woodland and riparian corridor landscaping would require 1.6+/- feet (19") of water per acre per year."

The key takeaway from this is the requirement of 1.6 feet of water per acre per year for the oak woodland and riparian corridor landscaping. If this requirement were to be applied to the current 45 acres of oak woodland and riparian corridor landscaping, it would mean that 72 AFY would be required for irrigation for the first two (or five) years, which is greater by a factor of 100 than the 0.74 AFY in the current report. This is a very significant difference, and the applicant should be required to explain why the current analysis has replaced the WUCOLS worksheet with an arbitrarily small water usage. (Note that if the prior estimate had been used, the water usage would be higher by 71 AFY, making even Landscape Scenario #1 unsustainable.)

In addition, although the riparian corridor and oak woodland areas will not need to be irrigated after the plantings are established, the trees and shrubs will continue to need water, which they will pull out of the aquifer, thus reducing the amount of water available for other uses. Given the 5,074 +/- trees and shrubs to be planted in the riparian corridor and oak woodland, this is a significant oversight.

While it is difficult to estimate the amount of water the established trees and shrubs will pull from the aquifer, a conservative (i.e. understated) estimate would be to use the WUCOLS figure of 1.6 feet of water per acre per year for irrigation, with the 85% irrigation efficiency factor removed or $0.85 * 1.6 = 1.36$ feet per acre per year. For the 45 acres, this translates to 61.2 AFY. This figure is understated, since as the trees and shrubs get larger, they will use more water. But even this understated figure is significantly more than the 16.5 AFY of water available.

The following table compares the total water usage as proposed in the P/A Design Resource report of 3/30/2007 versus their report of 6/12/2009:

Table 2: Comparison of Acres and Water usage given in successive P/A Design Resources reports

Water use (all numbers in AFY)	P/A Design Resources 3/30/2007	P/A Design Resources 6/12/2009
Non-Irrigation Operational Demands (at build-out, full capacity)		
Domestic water	1.25 +/-	1.25 +/-
Emergency fire protection	0.14 +/-	0.14 +/-
Lake Static Water Surface	4.97 +/-	4.97 +/-
Wildland Fire Management	0.66 +/-	0.66 +/-
Subtotal	7	7
Irrigation - initial establishment	1 st 5 yrs	1 st 2 yrs
Non-cemetery landscape		
Riparian Corridor (was 1.6 feet of water per acre per year on 22 acres, now 0.037 feet of water per acre per year on 13.5 acres)	35.2	0.50
Oak Woodland (was 1.6 feet of water per acre per year on 18 acres, now 0.008 feet of water per acre per year on 31.5 acres)	28.8	0.24
Subtotal non-cemetery landscaping (was 40 acres, now 45 acres)	64	0.74
Cemetery Landscape		
Turf (4 feet of water per acre per year: was 27 acres now 9.5 acres)	108	38
Xeriscape (0 feet of water per acre per year: was 0 acres now 21.5 acres per Landscape Scenario #1)	-	0
Subtotal cemetery landscaping (was 27 acres, now 31 acres)	108	38
Subtotal irrigation for initial establishment of plantings (was 67 acres, now 76 acres)	64 + 108 = 172	0.74 + 38 = 39
Total Well Water use during initial 2-5 years (=Non-irrigation operational + non-cemetery landscaping+ cemetery landscaping)	7 + 64 + 108 = 179	7 + 0.74 + 38 = 46
Irrigation - ongoing (after year 2 or 5)		
Non-cemetery landscape (was 40 acres, now 45 acres)	0	0
Cemetery landscape (was 27 acres, now 31 acres)	108	38
Subtotal irrigation (was 67 acres, now 76 acres)	108	38
Additional water usage (drawn directly from the aquifer by the roots of the plants)	61.2 (est)	61.2 (est)
Total Water use after plants established (= Non-irrigation operational (wells) + Irrigation (wells) + direct from aquifer)	7 (wells) + 108 (wells) + 61 (aquifer) = 176	7 (wells) + 39 (wells) + 61 (aquifer) = 107
MEMO: Water availability (corrected)	16.5	16.5

4. Other inconsistencies

A. The acreage given for the oak woodlands and riparian corridor is significantly greater than in the earlier report, and it is unclear why or how the change occurred. In particular, the cemetery landscape area (i.e. the area originally to be turfed) has increased by 4 acres (from 27 to 31 acres), the oak woodland has increased by 13 acres (from 18 to 31 acres) and the riparian corridor has decreased by 8 acres (from 22 to 14 acres), while the grassland has remained constant at 122 acres. This means that the impervious areas (buildings, roads, parking lots etc.) or the excluded areas must have decreased by 9 acres, which seems unlikely, or an error has been made. This is an issue that needs to be addressed by the applicant.

Table 3: Comparison of cemetery land use in successive P/A Design Resources reports

Land use	Previous report (P/A Design Resources 3/30/2007)	Current report (P/A Design Resources 6/12/2009)	Difference (current vs previous)
Cemetery landscape			
Traditional turf	27	9.3 - 9.5	
Xeriscaped	0	20.82 - 21.5	
Subtotal	27	30.22 - 31	+4
Oak woodland	18	31.5 - 31.6	+13
Riparian corridor	22	13.5 - 13.6	-8
Subtotal Oak+Riparian	40	45	+5
Subtotal landscaped	67	75.42 - 76	+9
Grassland	122	122	
Subtotal pervious areas	189	198	+9
Impervious areas (buildings, roads, parking lots etc.) per Master Site Plan rev 9/22/06	22	Not specified; assume still 22	
Excluded (existing residence, future fire station) per Master Site Plan rev 9/22/06	10	Not specified; assume still 10	
TOTAL	221	230 (but should be 221)	+9

B. This report (P/A Design Resources 6/12/09) is inconsistent with the traffic study ("A Traffic Study for the Proposed Creekside Memorial Park Cemetery", prepared by TJKM Transportation Consultants, July 28, 2006). While the P/A Design Resources report states that two chapel services, at full capacity of 138 seats, will occur every day of the year, for a total of 276 visitors per day in the chapels, the traffic study includes only one chapel service per day (ref. Table II, page 15). This change will nearly double the expected traffic load (from 263 trips/day to 401 trips/day). As a result of this change in scope, we

believe that the traffic analysis is no longer accurate and should be redone.

Also, this higher level of traffic (401 trips/day, every day of the year) is incompatible with the agricultural and residential nature of the area. This is a huge number of cars that will be coming and going, 365 days of the year, weekends and holidays included.

- C. A significant amount of landscaping was noted in the original site plan but is ignored in this report. The missing landscaping includes the 'poplar tree alley and informal ornamental low planting' along Camino Tassajara, the 'formal planting with roses' along both sides of the entrance, the 'redwood grove' above the lake, the 'flowering trees' near the entrance, the 'specimen groupings' of deodar cedar, Canary Island Pine, California pepper, Western redbud and flowering cherry, the trees in the parking lots and along the streets (American sweet gum, London plane, flowering pear, Chinese elm), the Dawn Redwood on the lake island and so on. It is impossible to estimate the water use of this additional landscaping without knowing how many of each tree/shrub is to be planted (and several of them have very high water needs). The applicant should be required to completely specify the landscaping plans so that the water requirements can be accurately estimated.

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. This proposal continues to understate the water requirements and overstate the water availability, and with this new report, the figures presented by the applicant change without explanation. For example, the area to be landscaped has increased by nine acres with no explanation, the irrigation required for the first few years has dropped by a factor of 100 with no explanation, the years required for stabilization has dropped from five to two, again without explanation. Also, with the introduction of 'xeriscaped' cemetery landscaping, the proposal has changed significantly, with no explanation or artist's renditions of what this major shift in design entails.

Again we ask that the conditional use permit be denied.

Thank you for the chance to submit our comments.

Regards,

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