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PLANNING/BUILDING
DEPT

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James T. Toomey
161 Jovita Place
Nipomo, CA 93444

August 16, 2013

Mr. Brain Pedrotti, Project Manager
County Planning & Building Dept.
County Government Center, Rm 300
San Luis Obispo, CA 93408-2040

Re: Laetitia Agricultural Cluster Development Revised Recirculated Draft Environmental Impact Report

Dear Mr. Pedrotti:

Enclosed (Enclosure #1) with this letter is a copy of my previous letter of November 1, 2008 submitted in response to the RDEIR. This slightly modified letter is being resubmitted in accordance with my understanding of the instructions accompanying the RRDEIR.

I concur with the Water Resources Advisory Committee comments regarding the RRDEIR. Said comments are incorporated herein by reference to avoid the necessity of responding to repeat comments in the FEIR. In addition I offer the following questions, comments and suggestions regarding the proposed Laetitia Project.

Mitigation measure AQ/mm-5 (Enclosure #2) is intended to prevent airborne dust from leaving the project site by applying water for dust control, spraying dirt stockpile areas daily, and irrigating graded areas until vegetation is established. Given that the proposed project estimates 819,000 cubic yards of earthwork over a wide area, what is the amount and source of this water? Where in the RRDEIR is this use built into the water demand numbers?

Appendix H of the RRDEIR purports to justify the .44 AFY/Unit water duty factor by incorporating assumptions utilized in the Department of Water Resources (DWR) Model Water Efficiency Ordinance and the 2011 California Green Buildings Standard Code (CGBSC). Although the mathematics supporting the GeoSync assumptions "pencil out", the real question is are the underlying assumptions correct? The CGBSC cited homes are described as 3 bedroom with 4 occupants without reference as to size of home or lot. Laetitia is proposing 3000 to 5000 square foot homes on 1 acre lots. The low end of the GeoSync estimate of 46,849 gallons per year for four occupants provided by CGBSC equates to 32 gallons per capita per day (gpcd). The 1998 County Master Water Plan Update estimates the average indoor water use for rural residential properties at 350 gallons per day per residence. DWR and EPA estimates for indoor usage are 55 gpcd and 45 gpcd respectively. It should be noted the DWR number of 55 gpcd is but a provisional standard only to set a target. However, no one is actually required to demonstrate this indoor residential requirement has actually been met. It is but a goal.

Regardless of the engineered standards employed in the various water savings devices it should be kept in mind that it is one thing to implement water savings devices; it is another to change human behavior to use them in the way they were intended. Certain household functions require a water quantity based on personal comfort level and habit. These standards are relatively new and little if any data exists to demonstrate they can actually be attained. A useful comparison is enclosure #3 from the USGS reporting per capita water use for San Luis Obispo County of 147 gpcd. Although the 147 gpcd includes exterior use as well it is nonetheless a meaningful comparison even assuming 50% exterior use. According to the Municipal Service Review (MSR) of July 2010 for the Nipomo Community Services District the average water usage per connection for the year 2009 was .65 AFY or 145 gpcd using the same 4 occupant assumption. This .65 AFY number includes many multi-family and high density developments which tend to underestimate what an average single family detached residence uses. For example the same MSR for the Golden State Water Company, consisting primarily of detached SFR's, shows a 9 year average water consumption of 0.94 AFY (210 gpcd) per connection. Understating water requirements and using unrealistic assumptions makes meaningful CEQA analysis difficult. Even GeoSync cautions that in order to meet these goals the Laetitia project should incorporate a water management plan with a well-defined process to monitor and enforce the plan.

Why is no allowance provided for distribution system loss (leakage)? The California Home Building Association, the same organization whose assumptions are being utilized to support the frugal water duty factor, cites an allowance of 6% for leaks for the average home (page 6) in their publication entitled Water Use in the California Residential Home (Enclosure #4). Page V-B14 of the Price Canyon General Plan Update and Spanish Springs Specific Plan EIR depicts a loss allowance of 2 percent. (Enclosure #5).

Conditions of approval, if granted, must include timely, verifiable and enforceable conditions that limit water use specified by the RRDEIR. Utilizing remote read-only water meters featuring leak detection should be employed throughout the proposed project. Another suggestion to enforce the .44 AFY per unit water duty factor would be to maintain a twelve month moving average of usage per residence. Those exceeding the .44 amount should be required to pay a significant fine to the HOA or MWC to help defray future maintenance and capital expenditures.

Please provide the clear and unambiguous meaning of the terms "equilibrium interval" and "operational static" used in the third paragraph of page V.P.-31.

Please help reconcile the statement found on V.P.-39 "Based on available data, groundwater production needed for the proposed project is feasible, but will result in long term average declines in groundwater associated with each proposed domestic well."; with the following statement found on V.P. 42 "As noted above, implementation of the project would not result in a reduction in available groundwater associated with other on-and-offsite wells." On their face these statements seem diametrically opposed to one another.

The following comments are in response to the June 7, 2012 letter submitted to the WRAC via Mr. John Janneck by Cleath Harris Consultants (CHC) with the subject "Comments on Section V, Chapter 8 (Water Resources) of Laetitia RDEIR." Under General Comments #4 CHC asserts that close to 30 years of data from Guage #175.1 registered 22.53 inches of average precipitation from 1965 to 1998. A closer look at the actual data (Enclosure #5) shows a gap in the data from 1968-1969 to 1977-1978 and two sets of data for the very high rainfall year 1977-1978 thereby skewing the average higher. Apparently Cleath looked only at the summary data which is very misleading. The 2002 DWR Report on the Nipomo Mesa (Table 14 Precipitation Stations) also used the Mehlschau #38 guage and the Penny #175.1 guage. These two gauges show a long-term average to 1995 of 16.29 inches for #38 and 19 for 175.1. GeoSyntec's extrapolation of approximately 17 inches average precipitation may be a little low but is certainly more accurate than CCH's alleged 22.53 inches.

A factor influencing the quantity of water for this proposed project and the alternatives analysis is its density. Following is a listing of existing approved Agricultural Clusters listing the total area of each cluster and the number of homes compared to Laetitia (Enclosure #6)

Subdivision	Units	Site Area	Location
Varian Ranch	48	3250 acres (68 ac/unit)	Edna Valley
Edna Ranch	51	1651 acres (32 ac/unit)	Edna Valley
Talley Farms	84	5000 acres (60 ac/unit)	Arroyo Grande Valley
Santa Margarita Ranch	111	3778 acres (34 ac/unit)	Rural Santa Margarita
Laetitia Proposal	102	1900 acres (19 ac/unit)	South County

It is obvious Laetitia has optimized or exceeded the convoluted algorithm governing density of homes in the Ag Cluster Ordinance applicable to this proposal. A significantly reduced proposal as outlined in the Alternatives Analysis Section of the RRDEIR might be justified.

How will measures regarding pumping limitations noted in the last paragraph of page V.P.-41 be implemented to ensure compliance both initially and on an on-going basis?

During the course of this long running proposed project 3 peer reviews have been conducted of the work product of the Hydrogeologist hired and paid by the developer. Each of these peer reviews disagreed with many of CHC's conclusions. For some reason 2 of these peer reviews by Paul Sorenson of Fugro West are not included in the RRDEIR appendices but are only cited as references. The duty of the decision makers is to consider **all** of the data and sort out what actually represents the "Truth". Therefore the missing peer reviews are enclosed. (Enclosures #7 and #8).

Have the provisions of Title 17 and 22 of the California Code of Regulations pertaining to New & Existing Source Capacity been met? Specifically, has Article 2, Permit Requirements, Section 64552 and Section 64554 (e), (g), and (h) regarding New and Existing Source Capacity been met? If so, should not the report be included in the FEIR? If not, these requirements should be among the conditions of approval, if granted, and subject to public scrutiny.

Page V.P.-24 states a policy in the Central Coast RWQCB that "Groundwater recharge with high quality water shall be encouraged." Why are there no retention basins to retain runoff to replenish the aquifer?

Vineyard water demand of 0.34 AFY as outlined in the GeoSync letter to Shawna Scott dated 18 April 2012 appears extremely low. The use of WPA 2 data for estimating water use for WPA 7 is totally inappropriate as manifested in their significantly different evapotranspiration rates, which are 38.1 and 52.1 respectively (Enclosure #9). There is a small error in Table V.P.-6 Estimated Project Water Demand (Page V.P.-36) regarding vineyards and orchards (existing), i.e. 0.34 * 624.9 = 212.5, not 208. This changes the existing water use to 226.7 AFY and total water use (existing plus proposed demand) to 282.2 AFY. The values reflected on Table V.P.-1 also need to be changed accordingly.

In my opinion the appropriate water duty factor would be the middle value for WPA 7 of 1 AFY less .25 AFY for frost protection or .75 AFY. This would change total water use to 587.1 AFY. If one assumed a very conservative .75 less .25 for frost protection or .50 AFY the total water use would be 398.6 AFY. As can be seen small changes in the water duty factor can have significant changes in the total water needed. To use a niggardly water duty factor form another WPA with dissimilar growing conditions is absurd!

What is the source for the following statement "Typically, approximately 32 percent of agricultural water use results in groundwater recharge....."

The last sentence of page 8 of the above referenced letter states "....curtailment of pumping from Well 11 during the months off August through November (Table 4 and Figure 19, GeoSync 2011) will **help** to mitigate potential impacts to Los Berros Creek of groundwater pumping for the proposed residential development." One can infer it will not totally mitigate thus supporting the fact this dewatering of the creek should remain a Class I impact.

CEQA requires an accurate description of the existing environment (baseline) in order to assess environmental impacts of this proposed project and determine appropriate mitigation measures. Unless the lead agency knows how much water exists in the area one cannot possibly know what level of withdrawal would trigger significant impacts. An attempt has been made to establish current and proposed baseline water needs within the boundaries of this proposed project. However, no baseline exists for the surrounding area. An environmental document should look at both direct and indirect impacts. As noted in the RRDEIR no data was provided for nearby neighboring wells such as the Tremper and Fitzgerald wells. Was this data requested? Was it considered in the cumulative water availability impacts? The RRDEIR must take into consideration the approximately 40 acres of new citrus plantings going in on a portion of the former Fitzgerald Ranch recently purchased by BeeSweet Citrus. There are also many legally approved mostly rural residential vacant lots in the Rancho Nipomo (20), RimRock (3), Fitzgerald (10) and Wittstrom (4) properties all of which are solely dependent on groundwater. Most of these lots are entitled to build secondary units as well. Has the RRDEIR considered the effect this proposed project will have on these properties? The Dude Ranch is listed as a proposed future development project and should be considered in the cumulative impacts. The evidence and documentation suggests that there is insufficient water supply to support cumulative demand.

I also question the conversion of some existing producing vineyard to residential parcels. What is being proposed is to replace these building sites, located on relatively good and level soil, with new non-producing plantings on less desirable soils on hillsides. This proposal, while reducing home construction costs, is not in concert with the stated intent of protecting agriculture by tightly clustering homes in areas not affecting production agriculture.

In summary I continue to have grave doubts about the adequacy and sustainability of water for this project sole sourced from unreliable and unpredictable hard rock aquifers. The long-term sustainability of this water resource is uncertain at best. For example there have been 8 wells drilled on our family's property near this proposed development. Of these 8 wells only 3 are currently producing. The other 5 are dry. As noted in the NCSD Sphere of Influence Municipal Service Review by SLOLAFCO dated May 2004, "The simulation done as part of this report shows that the existing distribution of agricultural pumping in Los Berros Creek demonstrates that there would be a major impact on water availability with a recurrence of the dry cycle of the 20's and early 30's. This potential impact could be the result of increased agricultural pumping from the fractured tuff reservoir in upper Los Berros Creek, and probably to some extent the increased pumping from this reservoir in the upper Nipomo Valley." Are we entering such a dry cycle? As seen from the opinions of the hydrogeologists concerning this project, their views vary widely and reinforce the difficult and somewhat subjective nature of their multidisciplinary work. The prediction of the future behavior of an aquifer system is an imprecise undertaking. If we error shouldn't it be on the side of caution?

I respectively request these comments, questions, and concerns be considered in the development of minimization and mitigation measures and conditions of approval (if applicable) for this proposed project.

James T. Toomey

James T. Toomey

Enclosures

ENCLOSURE # 1

James T. Toomey

161 Jovita Place

Nipomo, CA 93444

Mr. Brian Pedrotti, Project Manager

County Planning & Building Department

976 Osos Street, Room 300

San Luis Obispo, CA 93408-2040

June 4, 2012

Re: Laetitia Revised Draft Environmental Impact Report

Dear Mr. Pedrotti:

I continue to have doubts about the adequacy and sustainability of the water supply of the proposed Laetitia Project. In my letter responding to the initial DEIR I documented how my well, which had been pumped for 12 hours producing 60 gpm, had declined in productivity to where it could barely meet the needs of a single residence consisting of two adults. Subsequent to that initial letter the well went dry and I had to drill a new well. Enclosed are copies of the well driller's report and invoice to verify. I have also enclosed a copy of an e-mail regarding water problems at the Speedling Nursery.

Attempting to understand the proposed project's water needs has been a moving target with numerous iterations. The only consistency in the many water studies conducted by the applicant's hydrogeologist has been the overestimation of the water supply while repeatedly revising estimates of project water demand downward. Water needed by the project per the applicant has gone from a high of 142.9 AFY to the current 46.3 AFY. Most interesting is the fact that while proposed water demand has shrunk by over sixty percent, the number of proposed residences remains constant at 102.

The work done by GeoSync on analyzing the pump test data appears to be very thorough. However, it should be noted that this analysis was based on review of the testing data provided by the applicant's hydrogeologist. As can be seen from the enclosed letter from GeoSync to Shawna Scott of SWCA dated 13 September 2010, it appears the testing plan and data were not submitted from CHC to GeoSync on a timely basis. What was supposed to be an independent testing program conducted by a neutral 3rd party became one dependent on the data submitted by CHC without oversight by GeoSync.

The assumption of a water duty factor for each residence of .44 AFY appears to be ultra conservative when compared to other comparable developments such as Varian Ranch, Santa Margarita Ranch and the Woodlands, whose duty factors range from 1.44 to 1.5 AFY. The proposed water duty factor is more suitable to small lot urban developments than to 1 acre rural properties. A relatively small but realistic increase in the Laetitia water duty factor from .44 to .60 AFY plus the ranch headquarters plus a conservative distribution system loss allowance (leaks) of 1.5% (102 x .60 = 61.20 + 1 + .93 = 63.13) exceeds the estimated sustainable safe yield of 62.4 AFY. The Dude ranch would consume an additional 13 AFY. Considering rainfall was 138% of normal during the testing period in conjunction with the size of the project, the range of water demand estimates, the limited water supply and the very small, if any, margin between demand and supply, I urge you to error on the side of caution. It appears obvious there is not sufficient water to meet project demands. Even if one accepts these unrealistically low demand estimates, adequate measures to implement and enforce the proposed water conservation methods are lacking.

Reduced flow to Los Berros Creek was correctly identified as a Class I impact in the initial DEIR. The RDEIR proposal is to mitigate this impact by the use of wells 14 & 15 in lieu of wells 12 & 13. Allegedly wells number 14 and 15 are further from the creek and replenished by a different drainage. This is but a "shell game" by the developer to appease this Class I impact "on paper only". There is no prohibition put in place to preclude use of wells numbered 8, 11, 12 & 13 all of which are close to the creek and likely draw from the riparian underflow. What purpose does it serve to deny use of wells 12 & 13 for the proposed project then turn around and use them for irrigation which still results in the further de-watering of Los Berros Creek and the resultant Class I impact? Prohibitions against the use of these wells must be implemented as a condition of approval. If the county maintains they cannot prohibit their use under existing authority, then project approval must be denied. Approval is a discretionary decision retained by the Reviewing Authorities.

Underflow is regulated as surface water by the State Water Resources Control Board. There is a need to better understand the status of the water that is being used and/or proposed to be used. A diversion of underflow requires a water right (appropriative or riparian) for that water. The EIR needs to address this issue in depth.

The applicant's hydrogeologist continues to use groundwater in storage as a component of "safe yield" in violation of CEQA guidelines regarding depletion of groundwater. As acknowledged in the RDEIR significant dewatering of Los Berros Creek has taken place since the 1970's and there has been a general decline in groundwater elevation as well. What was once a perennial stream is now dry much of the year. As Gordon Thrupp of GeoSync states in his analysis "...sustainable yield must allow for sufficient natural recharge of groundwater to preserve streams, springs, wetlands and riparian corridor ecosystems (e.g. Sophocleous, 1997, 2000)." Obviously we are already mining the aquifer. Allowing the extraction of an additional 58 AFY (26% increase) will result in irreparable harm to the creek and its' ecosystem.

The agricultural cluster subdivision ordinance requires the Review Authority to make the following finding prior to approval of an agricultural cluster subdivision. *The water resources and all necessary* *services are adequate to serve the proposed development including residential uses, as well as existing and proposed agricultural operations on the proposed site.* The Review Authority must essentially find there is a sufficient, long- term sustainable water source. As local residents will attest, and I can substantiate, the amount of water in storage in hard rock aquifers is very limited. Wells drilled in hard rock often produce abundantly initially then decline over time and occasionally run completely dry.

The California Supreme Court has stated "the ultimate question under CEQA is not whether an EIR establishes the likely source of water, but whether the EIR has examined the reasonable foreseeable impacts of supplying water to this project." This proposed development, if approved, results in our current and future water supply being mortgaged for the present gain of the developer.

Sincerely

James T. Toomey

Enclosures

YAHOO! MAIL Classic

FW: well data

Monday, February 2, 2009 10:15 AM

From: "Jay Hardy" <hardyj@hardydiagnostics.com>
To: "Tim Toomey" <yemoot2002@yahoo.com>

Here you go, Tim.
Jay

From: Johnny R [mailto:johnny.r@earthlink.net]
Sent: Monday, February 02, 2009 9:30 AM
To: Jay Hardy
Subject: RE: well data

Jay,

Here is our current well situation.

Speedling originally drilled 6 wells. 3 of which have never produced any water. The forth well is a seasonal well, which, on normal rainfall years, produces for about 3-4 months. This year and last it has been dry. Our fifth well produces some water but is located near Toomey's well and if we use it heavily, Toomey's well will run dry, so we are forced to use it sparingly. Our sixth well is our only consistent well. Our pump is set at 320 ft. Last year the water level came close to "breaking suction" as it was measured at 285 ft. Historically our water level fluctuates around 180 ft-220ft. The last few years are level has dropped 30-40 ft and has maintained around 250-265 ft. During the driest parts of the year (late summer/ fall), our water level drops even further.

Hope this helps,

Johnny Rosecrans
Nursery Manager
Speedling, Inc.

> ----- Original Message -----
> **From:** Jay Hardy
> **To:** Johnny Rosecrans
> **Sent:** 1/31/2009 5:40:41 PM
> **Subject:** well data
>
> **Johnny,**
> **I was wondering if you have reached a decision about helping the Nipomo Hills Alliance in stopping the Laetitia development. We still need more data on the problem wells. Your assistance would sure be appreciated!**
> **Jay**
>
> ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
> Jay Hardy, CLS, SM (ASCP)

TRIPLICATE
Owner's Copy

Page 1 of 1

Owner's Well No. 1

Date Work Began 7-20-09, Ended 8-5-09

Local Permit Agency SAN LUIS OBISPO COUNTY PUBLIC HEALTH

Permit No. 2009-102 Permit Date 7-8-09

STATE OF CALIFORNIA

WELL COMPLETION REPORT

Refer to Instruction Pamphlet

No. 1097987

DWR USE ONLY — DO NOT FILL IN

STATE WELL NO./STATION NO.

LATITUDE | LONGITUDE

APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION (✓) ✓ VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)

DRILLING METHOD ROTARY FLUID BENTONITE

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	60	LIGHT BROWN CLAY
60	110	BROWN CLAY
110	210	GREY SHALE
210	385	BLUE SANDSTONE
385	400	GREY SOFT SHALE

TOTAL DEPTH OF BORING 400 (Feet)

TOTAL DEPTH OF COMPLETED WELL 390 (Feet)

WELL OWNER

Name JAMES TOOMEY

Mailing Address 161 JOVITA PLACE

NIPOMO CA 9344[illegible]

CITY STATE ZIP

WELL LOCATION

Address 161 JOVITA PLACE

City NIPOMO

County SAN LUIS OBISPO

APN Book 090 Page 041 Parcel 078

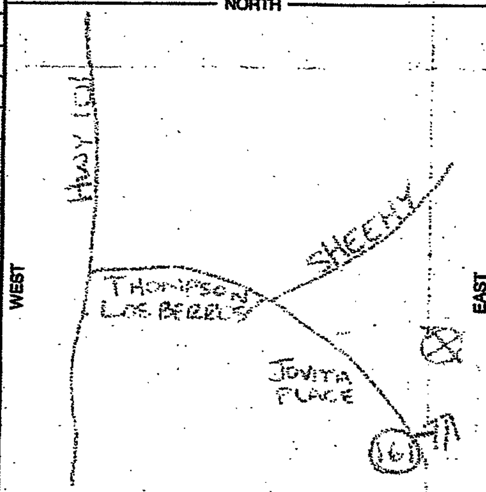
Township — Range — Section —

Lat 35° 04' 758" N Long 120° 30' 17[illegible]

DEG. MIN. SEC.

LOCATION SKETCH

NORTH



WEST / EAST / SOUTH

Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)

✓ NEW WELL

MODIFICATION/REPAIR

___ Deepen

___ Other (Specify)

___ DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")

USES (✓)

WATER SUPPLY

✓ Domestic ___ Public

___ Irrigation ___ Industrial

MONITORING

TEST WELL

CATHODIC PROTECTION

HEAT EXCHANGE

DIRECT PUSH

INJECTION

VAPOR EXTRACTION

SPARGING

REMEDIATION

OTHER (SPECIFY)

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER — (Ft.) BELOW SURFACE

DEPTH OF STATIC WATER LEVEL 315 (Ft.) & DATE MEASURED 8-5-09

ESTIMATED YIELD * 10 (GPM) & TEST TYPE AIRLIFT

TEST LENGTH — (Hrs.) TOTAL DRAWDOWN — (Ft.)

** May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE: BLANK	SCREEN	CON-DUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	190		✓				PVC	5"	SDR21/200	—
190	390			✓			PVC	5"	SDR21/200	0.032

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	CE-MENT (✓)	BEN-TONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	50	✓			
50	390			✓	Monterey

ATTACHMENTS (✓)

___ Geologic Log

___ Well Construction Diagram

___ Geophysical Log(s)

___ Soil/Water Chemical Analyses

___ Other

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief

NAME CHAD MAZZI MAZZI WELL DRILLING
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

4948 S. EL POMAR TEMPLETON CA 9345[illegible]
ADDRESS CITY STATE ZIP

Signed ___ C-57 LICENSED WATER WELL CONTRACTOR

8-7-09 DATE SIGNED

881710 C-57 LICENSE NUMBER

MAZZI WELL DRILLING
4948 South El Pomar
Templeton, CA 93465
(805)226-8985
286-8776

INVOICE

Bill Date:	8/5/2009
Invoice #:	1081

Bill To: Tim Toomey
161 Jovita Place
Nipomo, CA 93444
(805)489-1043

Date:	Description:	Amount:
6/24/2009	Down Payment Check #3696	(-$2,000.00)
7/28/2009	Partial Payment	(-$1,000.00)
7/29/2009	Drilled 390' Cased 5" Well @ $28.00/ft	$10,920.00
8/5/2009	County Permit #2009-102 & 50' Sanitary Seal	$1,600.00

Balance Due: **$9,520.00**

Total balance is due upon job completion.

Geosyntec consultants

475 14th Streeet, Suite 400
Oakland, California 94612
PH 510.836.3034
FAX 510.836.3036
www.geosyntec.com

13 September 2010

Shawna Scott
Planning Program Manager
SWCA Environmental Consultants
1422 Monterey Street C200
San Luis Obispo, CA 93401

Subject: Request for Additional Testing During Dry Season for Sustainable Yield Assessment
Proposed Laetitia Agricultural Cluster Subdivision
San Luis Obispo County

where is document

Dear Shawna,

Geosyntec has conducted an initial review of the Laetitia Well Testing and Sustainable Yield Assessment dated July 2010 prepared by Cleath Harris Geologists (CHG) for the Laetitia Agricultural Cluster proposed development in San Luis Obispo County.

Background

The County requested a third party provide review of existing information, conduct independent testing, and evaluate if the existing wells can provide a sustainable water supply to meet the needs of the proposed development project[1].

As described in our August 2009 proposal, we assumed that the methodology of the pumping tests should satisfy California Environmental Quality Act (CEQA) and California Water Code regulations and guidelines. The California Water Code outlines two methods for evaluation of well capacity in fractured bedrock[2]. Method 1 requires a report that includes well testing, evaluation of hydrogeology, historical use, and monitoring data from other local wells. Method 2 requires either a 72 hour or 10 day test without the more comprehensive report. Method 2

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[1] Original scope requested by the County is described in an email dated 21 August 2009 email from SWCA to Geosyntec.

[2] http://www.cdph.ca.gov/certlic/drinkingwater/Pages/Lawbook.aspx
Section 64554 (g) (h) and (i) are the basis for the guidance. These regulations were part of the California Water Works Standards which became effective in March 2008.

specifies that if the water level recovery requirements[3] are met, a production rate equal to 25% of the pumping rate during the 72-hour test will be granted or 50% of the pumping rate will be granted by for a 10-day test.

At the meeting in the County's offices on 7 January 2010, the applicant's consultants (CHG) proposed a testing program specifically designed for the project and setting, which would be consistent with Method 1 of the California Water Code Methods for Well Capacity Determination in fractured rocks. The County agreed that instead of the third party consultant (Geosyntec) conducting the testing, it was acceptable for CHG to conduct the testing with oversight by Geosyntec. My understanding was that CHG would provide us with a workplan presenting their proposed testing methodology and that Geosyntec would review the testing plan and provide comments. We also understood that CHG would provide us with the monitoring data for review during the testing period. This would have facilitated third-party review, approval of the testing methodology, oversight of the testing program, including when to terminate the testing program. However, we did not receive a testing workplan or any data during the testing. The first information we have received since the site meeting and site visit on 7 January 2010 is the July 2010 report documenting the testing.

Not Independent

Summary of Testing Conducted to Date

Intermittent pumping alternated between two pairs of wells: Wells 10 & 11, which are completed in tuffaceous rocks of the Obispo Formation, and Wells 14 & 15, which are completed in the siliceous shales of the Monterey Formation. During the first phase of pumping from mid October to mid January, which is termed the dry season, the wells were pumped for 2 to 5 days and then shut off for 4 to 15 days. During the second phase of pumping from mid January to mid May, which is termed the wet season, the wells were pumped for 3 to 8 days and then shut off for 2 to 9 days. The total volume of groundwater pumped over seven months was 69.3 acre feet (AF), which is substantially more than the allocated project demand of 46.3 acre feet per year (AF/Y).

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[3] The tested well must demonstrate that, within a length of time not exceeding the duration of the pumping time of the pump test (72 hours or 10 days), the water level has recovered to within two feet of the static water level measured at the beginning of the well capacity test or to a minimum of ninety-five percent of the total drawdown measured during the test, whichever is more stringent.

ENCLOSURE #2

prior to commencement of construction activities. The Dust Control Plan shall:

a. Use APCD approved BMPs and dust mitigation measures;
b. Provide provisions for monitoring dust and construction debris during construction;
c. Designate a person or persons to monitor the dust control program and to order increased watering or other measures as necessary to prevent transport of dust off-site. Duties should include holiday and weekend periods when work may not be in progress;
d. Provide the name and telephone number of such persons to the APCD prior to construction commencement.
e. Identify compliant handling procedures.
f. Fill out a daily dust observation log.

AQ/mm-4

Prior to approval of subdivision improvement plans or issuance of grading permits, and subsequent individual lot construction permits, the applicant shall:

a. Obtain a compliance review with the APCD prior to the initiation of any construction activities;
b. Provide a list of all heavy-duty construction equipment operating at the site to the APCD. The list shall include the make, model, engine size, and year of each piece of equipment. This compliance review will identify all equipment and operations requiring permits and will assist in the identification of suitable equipment for the catalyzed diesel particulate filter;
c. Apply for an Authority to Construct from the APCD.

AQ/mm-5

Prior to approval of subdivision improvement plans or issuance of grading permits, and subsequent individual lot construction permits, the following mitigation measures shall be shown on all project plans, included in the Dust Control Plan, and implemented during the appropriate grading and construction phases.

a. Reduce the amount of the disturbed area where possible.
b. Water trucks or sprinkler systems shall be used in sufficient quantities to prevent airborne dust from leaving the site. Increased watering frequency shall be required whenever wind speeds exceed 15 mph. Reclaimed (non-potable) water shall be used whenever possible.
c. All dirt stockpile areas shall be sprayed daily as needed.
d. Exposed ground areas that are planned to be reworked at dates greater than one month after initial grading shall be sown with a fast-germinating native grass seed and watered until vegetation is established.

Enclosure #3

Table 90: Per capita urban water use by county from the USGS (gallons per day)

County	GPCD		County	GPCD
Alameda	53		Orange	72
Alpine	78		Placer	138
Amador	128		Plumas	181
Butte	211		Riverside	192
Calaveras	278		Sacramento	101
Colusa	187		San Benito	160
Contra Costa	139		San Bernardino	141
Del Norte	100		San Diego	87
El Dorado	216		San Francisco	47
Fresno	228		San Joaquin	175
Glenn	299		San Luis Obispo	147
Humboldt	114		San Mateo	102
Imperial	156		Santa Barbara	112
Inyo	474		Santa Clara	80
Kern	173		Santa Cruz	126
Kings	168		Shasta	240
Lake	120		Sierra	635
Lassen	310		Siskiyou	216
Los Angeles	113		Solano	95
Madera	205		Sonoma	135
Marin	82		Stanislaus	251
Mariposa	350		Sutter	224
Mendocino	214		Tehama	431
Merced	221		Trinity	192
Modoc	295		Tulare	221
Mono	268		Tuolumne	321
Monterey	103		Ventura	113
Napa	92		Yolo	193
Nevada	306		Yuba	191

The USGS also provides estimates of water use by county for the United States (Figure 5) (USGS 2005). Per-capita urban water use was obtained by dividing the quantity Domestic, total use (withdrawals + deliveries) by the total population of the county. Domestic use is the sum of self-supplied withdrawals (for example, from a well, spring, or river) and deliveries from public supply.

The values from DWR and USGS are not directly comparable, as they are compiled for different geographic boundaries, but the general patterns appear the same, and values are similar. The

Enclosure #4

Water Use in the Home

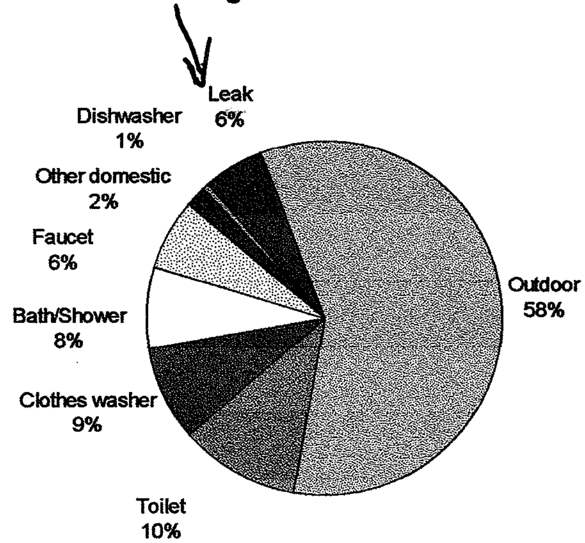

Figure 2: Average US Residential Water Use[2]

In the United States, residential water use is typically dominated by landscape water use and California is no exception. Figure 2 above shows the relative importance of various water uses throughout the home. There is a wide amount of variability in the above percentages. How much water an individual home will use is largely dependent on four factors: the number of residents; the types of fixtures (toilets, showerheads, faucets); the size of the home lot, and the type of landscaping (turf and pools using the most water.)

Indoor Water Use

The 2008 California Green Building Standards Code (CGBSC)[3] sets new standards for the flow rate of fixtures in new construction. The standards come into effect in 2011 and will call for a 20% reduction in indoor water use. The code also includes guidance on how to calculate the "baseline" indoor water use for a current new single family home. Table 1 lists the fixture flow rates and usage amounts assumed in the code for present day construction. The current fixture flow rates were set by the Federal Energy Policy Act of 1992, which became effective in 1994. Before that time, flow rates for these fixtures were much higher. In California, the 1980 plumbing code set showerhead flow rates at 2.5 gallons per minute (gpm) and toilet flow rates at 3.6 gallons per flush (gpf.) Before 1980, those values were typically 3.5 gpm and 5.0 gpf respectively. Table 2 shows the historical flow rates of showers, faucets, and toilets, as well as the flow rates which will become effective in 2011. Low flow faucets and showerheads should not add to the cost of the home. Currently, there is an approximately $50 premium on low-flow toilets, but that price has dropped dramatically over the past two years.

[2] http://www.aquacraft.com/Publications/resident.htm

[3] http://www.documents.dgs.ca.gov/bsc/2009/part11_2008_calgreen_code.pdf

ENCLOSURE #5

Table V-B.5 Project Water Demand Estimates

Land Use	Quantity	Use Factor[1]		Projected Water Demand Total Demand (AFY)	AFY/ unit	Unit
Residential						
Single-Family	422 units	2.5[2]	persons/unit	118.2	0.280[3]	unit
Multi-Family	51 units	2.05[2]	persons/unit	11.1	0.218[3]	unit
Senior Housing	360 units	1	persons/unit	36.3	0.101[3]	unit
Subtotal				**165.6**		
Commercial						
Hotel including restaurant and visitor /wine center	150 rooms	–	–	29.1	0.194[4]	room
Subtotal				**29.1**		
Recreation and Open Space						
Golf Course	1 course	30	acres	57.0	1.900[5]	acre
Golf Course Retail	1 shop	50	parking spaces	0.1	0.002[3]	parking space
(employees)	–	15	employees	0.2	0.011[3]	employee
Park (Play Field)	1 park	1[6]	acres	3.1	3.064[7]	acre
Park (Community Garden)	1 garden	6	acres	3.0	0.500[8]	acre
Subtotal				**63.3**		
Other						
Losses	–	2%	–	5.2	–	–
Subtotal				**5.2**		
Total[9]				**263.2**		
Agriculture						
Orchards/vineyards	–	104.6	acres	52.3	0.500[8]	acre
Subtotal				**52.3**		
Grand Total				**315.5**		

Notes

1. Use factors are assumed based on information contained in the Specific Plan, the City's General Plan (where noted), and other reasonable assumptions based on nature and goals of the proposed development.
2. Source: City of Pismo Beach General Plan, including amendments through 2008. A housing density of 2.5 and 2.05 people/unit/day were assumed for single- and multi-family residences, respectively.
3. Source: Tchobanoglous, G. & Burton, F.L. (1991). Water Resources and Environmental Engineering). San Francisco: McGraw Hill, Inc.
4. Source: City of Pismo Beach (2004). Water Master Plan.
5. Source: Environmental Institute for Golf. (2009). Golf Course Environmental Profile, Volume II. Water Use and Conservation Practices on U.S. Golf Courses.
6. Of the 17 acres of the proposed park, 1 acre of irrigable turf grass requiring municipal supply was assumed. A community garden will cover an additional 6 acres. The remaining park footprint will be planted with native, drought-tolerant landscape, or otherwise left in its natural condition. The entire park will be served with a combination of recycled water, supplemented with private, non-potable groundwater wells.
7. Based on park irrigation data contained in the City of Pismo Beach's Water Reuse Study (2007).
8. Source: City of Pismo Beach (2011).

ENCLOSURE 5b

Geosyntec reduced the estimated yield for Well 11 from 38 acre-feet per year to 28.1 acre-feet per year by first distributing the sustainable yield evenly throughout the year, then eliminating pumping during four months (as a stream flow impacts mitigation measure) and finally by increasing production "slightly" (10 percent) during the remaining eight months. No rationale is given for why Well 11 would not be able to pump the estimated sustainable yield of 38 acre-feet, from December through July of each year. The well is capable of pumping in excess of 100 gallons per minute (gpm), a rate which would produce 38 acre feet in less than three months.

GENERAL COMMENTS

#4) Rainfall

Based on a contour map of equal mean precipitation for the period of record from 1870 to 1995, the expected mean annual rainfall for the project site is approximately 17 inches. Beginning in January 2010, rainfall was recorded at three rain gauges installed at the project site. Based on a correlation of the on-site data with a private guage in east Arroyo Grande Valley, the rainfall was extended back to July 2009. Based on a comparison of current and historic data, the total rainfall in the project area between July 2009 and March 2011 was 138 percent of average. ***(page V-35)*** V.P.-3

The referenced isohyetal map (from DWR, 2002) does not include rain stations (such as Station 175.1) that would reflect the effects of orographic lift on precipitation in upper Los Berros Canyon. Station 175.1, active from 1965 to 1998, registered 22.53 inches average precipitation approximately 1/4 mile east of Laetitia and at a similar elevation. Station 38, which was the closest gage used for the DWR contour map and which was also used by Geosyntec for site characterization, is two miles south of Laetitia and at a lower elevation in the Nipomo Valley.

The location and elevation of Station 175.1, along with close to 30 years of records, makes this upper Los Barros Canyon station the best available choice to represent on-site precipitation in the vicinity of the project wells. Based on a comparison of on-site data with historical monthly averages at Station 175.1, total rainfall in the project area between July 2009 and March 2011 was 116 percent of average, with rainfall during Phase 1 and Phase 2 (used for the sustainable yield baseline period) approximately 105 percent of average.

#5) Hydrogeology description

The project site is underlain by Early Miocene age rocks of the Obispo and Monterey Formations, Pliocene-Pleistocene are rocks of the Paso Robles Formation, and localized shallow unconsolidated alluvial deposits along Los Berros Creek, Adobe Creek, and other drainages. The location of onsite wells and underlying geology is shown in Figures V.B.-3 and

Enclosure #5a

San Luis Obispo County Public Works

Volunteer Precipitation Gauge Station

MONTHLY PRECIPITATION REPORT

Station Name and no. Penny Ranch # 175.1

*** All units are in inches ***

Water Year	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	Total
1997-1998	0.00	0.00	0.00	0.00	5.73	4.08	6.24	16.03	4.29	4.18	4.85	0.07	45.47
1996-1997	0.00	0.00	0.00	3.35	5.38	8.90	10.42	0.00	0.00	0.00	0.00	0.00	28.05
1995-1996	0.00	0.00	0.00	0.00	0.59	0.36	4.71	10.02	1.89	1.45	0.94	0.00	19.96
1994-1995	0.00	0.00	0.45	1.10	2.14	0.85	14.35	2.66	11.60	0.31	1.10	1.00	35.56
1993-1994	0.48	0.00	0.00	0.20	2.10	2.05	2.80	4.52	1.57	1.25	1.23	0.00	16.20
1992-1993	1.15	0.00	0.00	0.00	0.30	5.10	8.73	7.93	4.72	0.00	0.00	0.00	27.93
1991-1992	0.00	0.00	0.00	0.00	0.00	0.00	2.97	9.40	3.62	0.00	0.00	0.00	15.99
1990-1991	0.00	0.00	1.02	0.00	0.40	0.85	1.24	2.27	14.63	0.31	0.00	0.26	20.98
1989-1990	0.00	0.00	1.11	1.25	0.60	0.01	3.36	2.87	0.55	0.27	1.25	0.00	11.27
1988-1989	0.00	0.00	0.00	0.00	2.67	7.58	1.04	1.59	2.60	0.44	0.05	0.00	15.97
1987-1988	0.00	0.00	0.00	2.86	1.27	3.77	2.48	2.62	0.84	4.07	0.16	0.00	18.07
1986-1987	0.15	0.00	0.20	0.00	0.30	2.15	2.45	0.00	0.00	0.00	0.00	0.00	5.25
1985-1986	0.01	0.00	0.00	0.50	2.35	1.30	2.35	7.50	7.25	0.90	0.00	0.00	22.16
1984-1985	0.00	0.00	0.00	1.55	3.50	2.55	1.30	2.45	2.30	0.05	0.00	0.00	13.70
1983-1984	0.00	0.50	0.43	2.50	5.27	3.03	0.15	0.40	1.10	0.65	0.00	0.00	14.03
1982-1983	0.00	0.00	1.17	0.85	5.20	3.40	6.55	9.09	8.50	2.80	0.10	0.00	37.66
1981-1982	0.00	0.00	0.00	1.25	3.93	2.25	4.60	1.85	6.10	2.45	0.05	0.15	22.63
1979-1980	0.00	0.00	0.25	1.65	1.15	2.30	8.25	7.25	0.00	0.50	0.00	0.00	21.35
1977-1978 (2)	0.00	0.00	1.53	0.00	2.25	1.20	11.00	10.17	8.05	5.25	0.00	0.00	39.45
1977-1978	0.00	0.00	1.53	0.00	2.25	1.20	10.10	10.17	8.05	4.25	0.00	0.00	37.55
1968-1969	0.00	0.00	0.00	3.05	1.97	2.37	4.30	12.35	1.10	3.10	0.00	0.00	28.24
1967-1968	0.00	0.00	0.00	0.00	2.65	2.20	0.95	0.00	0.00	0.00	0.00	0.00	5.80
1966-1967	0.00	0.00	0.73	0.00	4.12	8.46	6.72	0.75	3.01	7.36	0.00	0.00	31.15
1965-1966	0.00	0.00	0.00	0.00	1.19	4.20	1.98	1.68	0.00	0.20	0.00	0.00	9.25

→ 5b OVER

ENCLOSURE # 6

- **Minor agricultural cluster:**
  - Number of residences: Number of residences is based on the number of parcels qualifying under a conventional subdivision, plus up to a 25 percent density bonus (or at least one parcel).
  - Location: Minor agricultural cluster subdivisions may occur on any land designated Agriculture or Rural Lands, except in Exclusion Areas.
  - Clustered area: Residential development must be clustered on 10 percent of the site, leaving 90 percent of the site open for agricultural uses.

The County's first agricultural cluster subdivision, Varian Ranch, was recorded in 1987. Since that time, the County has processed and approved several agricultural cluster subdivisions, resulting in the creation of 367 residential cluster parcels. Another two agricultural cluster projects (Laetitia and Estrella River Vineyard) have been accepted for processing under the current ordinance and are currently under environmental review. If approved, as currently proposed, these projects would add 102 and 18 new cluster parcels, respectively. Table 2.4-1 summarizes the approved cluster projects. Figure 2.4-1 shows the locations of the approved cluster projects as well as the pending Laetitia and Estrella-Vineyard projects.

Table 2.4-1: Approved Agricultural Cluster Subdivisions

Subdivision	Type	Units	Site Area[1]	Location	Approval	Built-out?
Varian Ranch *Tract 1254*	Major	48	3,250 ac (68 ac / unit)	Edna Valley	12/16/86	Yes
Edna Ranch *Tract 2138*	Major	51	1,651 ac (32 ac / unit)	Edna Valley	10/18/94	Yes
Talley Farms *Tract 2408*	Major	84	5,000 ac (60 ac / unit)	Arroyo Grande Valley	01/12/06	Partially
Huer Huero Ranch *Tract 2526*	Major	55	834 ac (15 ac / unit)	Rural Paso Robles	08/14/04	No
Santa Margarita Ranch *Tract 2586*	Major	111	3,778 ac (34 ac / unit)	Rural Santa Margarita	12/23/08	No
Jespersen Ranch *Tract 2811*	Minor	6	120 ac (20 ac / unit)	Rural San Luis Obispo	12/31/07	No
Morabito *CO 04-0582*	Minor	3	56 ac (19 ac / unit)	Rural San Luis Obispo	8/07/06	No
OCW II *CO 06-0087*	Minor	3	118 ac (39 ac / unit)	Nipomo Valley	11/07/06	No
Linthicum *CO 07-0143*	Minor	3	144 ac (48 ac / unit)	Edna Valley	01/08/08	No
Gardner *CO10-0025*	Minor	3	124 ac (41.33 ac /unit)	Edna Valley	04/04/11	No

Source: County of San Luis Obispo Department of Planning and Building Permit Tracking Records

[1] Site areas are approximated.

① ENCLOSURE #7

FUGRO WEST, INC.

660 Clarion Court, Suite A
San Luis Obispo, California 93401
Tel: (805) 542-0797
Fax: (805) 542-9311

April 23, 2009
Project No. 3014.033

County of San Luis Obispo
Department of Planning & Building
County Government Center, Room 200
San Luis Obispo, California 93408

Attention: Mr. Brian Pedrotti

Subject: Hydrogeologic Peer Review
Water Resources Section of the Draft Environmental Impact Report
Laetitia Agricultural Cluster Subdivision, Tentative Tract Map and Conditional Use Permit, SCH No. 2005041094

Dear Mr. Pedrotti:

In accordance with our proposal dated January 12, 2009, and County of San Luis Obispo (County) Purchase Order No. 25005028 dated March 18, 2009, we have completed a peer review of hydrogeologic information provided to us by the County and the firm of SWCA related to the proposed project. The purpose of this study is to provide a peer review of the technical reports and analyses of the water supply reports prepared by Cleath and Associates (Cleath) in support of the proposed Laetitia Agricultural Cluster Subdivision. The results of the Cleath reports are generally described in the project Draft Environmental Impact Report (DEIR) prepared by SWCA.

The focus of the hydrogeologic peer review was on data and conclusions contained in reports prepared by Cleath. These reports, and other relevant information that we were provided for the purposes of the peer review, are listed as follows (the numbers assigned to these references will be referred to throughout the following peer review analysis):

1. Water Supply Assessment for Laetitia Vineyard and Winery, Arroyo Grande, California. Cleath & Associates, January 27, 2004.
2. Water Resources Studies for Laetitia Vineyard Property, Arroyo Grande, San Luis Obispo County. Cleath & Associates, October 6, 2005.
3. Revised Water Demand and Source Capacity for Laetitia Agricultural Cluster, San Luis Obispo County. Cleath & Associates, October 6, 2005.
4. Additional Water Resource Development, Laetitia Vineyard and Winery, Arroyo Grande, California. Cleath & Associates, October 6, 2005.
5. Response to County Comments on Water Resources, Laetitia Agricultural Cluster EIR, Arroyo Grande, San Luis Obispo County. Cleath & Associates, March 28, 2008.

6. Draft Environmental Impact Report, Laetitia Agricultural Cluster Subdivision, Morro Group/SWAC. September 2008.
7. Mitigation of Stream Flow Impacts, Laetitia Agricultural Cluster, Arroyo Grande, San Luis Obispo County, Cleath & Associates. November 4, 2008.
8. Laetitia Mitigated Plan, Description of Proposed Mitigations in Response to September 2008 DEIR & Acceptability of Mitigation Measures, RRM Design Group. November 6, 2008.
9. Pertinent water resource comment letters received on the DEIR. Compiled and provided to Fugro by SWCA. Transmittal letter dated December 29, 2008.
10. Water Resources Advisory Committee, Agenda Item 5, Laetitia Ranch Development DEIR. Mr. Sylas Cranor, March 4, 2009.

Proposed Project Description

The proposed project, as described in the DEIR prepared by SWCA, consists of the subdivision of 21 parcels of approximately 1,910 acres into 106 lots, including 102 residential lots of one acre each in size, four open-space lots of some 1,787 acres, and approximately 25 acres of internal residential roads. Approximately 113 acres of existing vineyards would be removed and approximately 140 acres of vineyards replanted. The open space lots would include a HOA facility, recreation center, and a community center. As described in the Draft Environmental Impact Report (DEIR) prepared by SWCA, (September 2009) the project would be developed in three phases. Infrastructure to support the development would include construction of a wastewater treatment plant, wastewater storage ponds, a wastewater irrigation system, various potable and non-potable water lines, water storage, the drilling of two new water wells, and other amenities. The water resources sections of the DEIR were derived from reports prepared by Cleath as referenced above. The DEIR cites a project water demand for the proposed project at build-out of 168.6 acre-feet per year (AFY), including a 10 percent water reserve, and also a reasonable "worst-case" analysis approach during a 3-year drought of 175.3 AFY. Water supply to meet this estimated demand(s) is proposed to be obtained from four wells, two of which produce from fractured shale of the Monterey Formation, and two producing from resistant volcanic tuff units of the Obispo Formation. The sustainable, long-term supply from these four wells, based on 41-hour to 72-hour discharge pump tests performed by Cleath at the time of construction and an analysis of aquifer storage and annual yield, was estimated at 197 AFY.

The project's water demand estimate and methodology associated with the annual yield of the aquifer (and wells) sustainable supply contained in the DEIR received a number of comments, prompting this hydrogeologic peer review. In particular, there were global concerns about the impact assessment issues, standards of analysis, thresholds of significance, proposed mitigations, and Cleath's conclusions relative to sustainability of supply and offsite impacts. The CEQA guidelines relative to thresholds of significance states that project specific impacts would occur 1) if the project substantially depletes groundwater supplies or interferes substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the groundwater table and, 2) if the project does not have sufficient supplies available to serve the proposed project from existing resources.

General Remarks Regarding Groundwater Demand Analysis

Relative to project water demand, Cleath provides several estimates. Water demand estimates and sources of water supply for the existing Laetitia winery and related improvements are described in Reference #1 dating from January 2004. The capacity of the various water supply wells were described, as well as the general water system, storage reservoirs, and the typical irrigation practices of the existing vineyards. Applied irrigation water volumes for various vineyard blocks are presented. The report does not describe the proposed agricultural cluster project and accordingly there are no water demand estimates for the project.

Reference #3 dating from October 2005 presents a water demand analysis for the Laetitia Agricultural Cluster. The residential, equestrian center, Ranch Headquarters HOA, and landscape buffer area project elements are briefly described. Water demand for the proposed project is estimated at an average of 119.6 AFY at project build-out. A residential water demand of 1.12 AFY per lot (102 lots proposed) was estimated by Cleath, based on a comparison of similarly sized estate lots in Santa Barbara and SLO County. No discussion of return water flow reductions to offset the average annual estimated project demand is presented.

The next project demand estimates are contained in Reference #5 prepared by Cleath dating from March 2008. This letter appears to be a (ADEIR) response letter to a number of County of SLO comments on the Laetitia Agricultural Cluster EIR directed to the Morro Group, who were preparing the project EIR. Relative to residential indoor and outdoor water use, Cleath cites a revised water demand estimate of 1.26 AFY. A discussion is also provided of offsets to project water demands related to the return of produced water to groundwater. A table is provided that assumes 90 percent of indoor use and 20 percent of outdoor use, totaling 56.3 AFY, is returned to the aquifer through return flow. The total project demand is estimated by Cleath to be 86.7 AFY. The technical analysis and basis for how the return flow estimate is determined is not provided, nor is the manner in which the "return flow" would benefit either the project's groundwater supply or the Santa Maria basin (i.e., the downstream users).

The water demand figures in the September 2008 DEIR (Reference #6) reflect three estimates, including:

- A "Proposed Project Estimated Demand" of 132.6 AFY based on water duty factors provided in Cleath's October 2005 report (Reference #3);
- A "CWMP Estimated Demand" of 168.6 AFY based on water duty factors from the 1998 County of San Luis Obispo Water Master Plan, and;
- A "Woodlands Estimated Demand" of 175.3 AFY based on "reasonable worst-case" water duty factors from the Woodlands Specific Plan EIR (1998).

Subsequent to the publication of the DEIR, Cleath revised the project water demand estimates in a November 4, 2008 letter (Reference #7) that addresses the mitigation of stream flow impacts. The Cleath November 2008 report describes an estimated project total water demand of 73.7 AFY (reduced from 143 AFY). A revised spreadsheet of the return flow estimates are provided, again with no supporting technical basis, which estimates the project's consumptive water use at 33 AFY, based on return flows of 40.7 AFY.

A summary of the various water demand estimates is provided in Table 1 – Summary of Water Demand Estimates.

Table 1. Summary of Water Demand Estimates

Date	Reference	Total Water Demand (AFY)	Return Flow (AFY)	Net Consumptive Water Demand (AFY)
October 2005	#3	119.6	–	–
March 2008	#5	142.9	56.3	86.7
September 2008	#6	Proposed Project – 132.6 Co. Water Master Plan – 168.6 Woodlands "Worst-Case" – 175.3		
November 2008	#7	73.7	40.7	33

General Remarks Regarding Groundwater Supply Analysis

The proposed water supply for the development is discussed in the October 6, 2005 report prepared by Cleath (Reference #4). In that report information is provided on the geologic setting of the project area, the design and capacity of the four water supply wells proposed to be used, the estimated volume of groundwater in storage in the bedrock aquifers from which the wells produce, and a discussion of aquifer recharge and yield.

A summary of project water well information including design, producing aquifer, and pumping test data as presented in the October 6, 2005 report is provided in Table 2 - Summary of Project Well Data. A discussion of the pumping test data for each well is also provided.

Table 2. Summary of Project Well Data

Well Name	Producing Aquifer	Well Depth (feet)	Perforated Interval (feet below ground surface)	Estimated Annual Yield (AFY)	Pump Test Yield (gpm)	Anticipated Pumping Level (ft below ground)	Stable Pumping Level Achieved during Pumping Test?	Observed Recovery	Boundary Condition Encountered during Pumping Test
2004-1 (13)	Monterey Shale/Chert	560	220-340 370-560	63	200	210	No	Incomplete	Yes at 600 minutes
2004-2 (12)	Monterey Shale/Chert	510	190-320 370-510	58	100	180	No	Incomplete	Yes at 1,200 minutes
2004-3 (10)	Obispo Tuff	330	150-240 280-330	34	ND	140	No	Incomplete	Yes
2005-1 (11)	Obispo Tuff	305	115-305	42	190	135	No	Incomplete	Yes at 1,000 minutes

Well 2004-1. The constant-rate pumping test for Laetitia Well 2004-1 was conducted at an average pumping rate of 200 gallons per minute (gpm) for a duration of 2,680 minutes. The data provided in Appendix C of the Cleath report (Reference #4) shows a calculated transmissivity (T) value of 24,000 gallons per day per foot of aquifer (gpd/ft). However, the actual T value should be 2,400 gpd/ft; a typographical error was apparently made by adding an extra zero to the calculation results. The resulting hydraulic conductivity (K) value based upon 310 feet of screened zone is 1.0 feet/day. As indicated on the pumping test plot, a discharge boundary condition was encountered approximately 600 to 700 minutes into the pumping test. The discharge boundary condition suggests the well is pumping from an aquifer of limited areal extent.

The recovery test was of insufficient duration (420 minutes) to draw definitive conclusions; however, a projection of the rate of recovery using available data suggests the well would be far short of complete recovery at a recovery time equivalent to the pumping time. Projection of the slope of the late-time recovery data suggests the water level in the well would be about 30 feet below the static water level of 121 feet at a recovery time (2,680 minutes) equivalent to the pumping time. This amount of recovery equates to about 70 percent of the total drawdown. The insufficient recovery demonstrated by this well test indicates over-pumping or mining of the aquifer and is typical of a well encountering a discharge boundary condition during pumping and/or too high of a pumping rate, and typically would lead to a significant down-grade in its sustainable long-term pumping rate.

Well 2004-2. The static water level prior to start of the step-drawdown test on December 26, 2004 was 45.5 feet. It is noted that the range of step-drawdown pumping rates (100 to 225 gpm) severely overstressed the aquifer and resulted in a final pumping water level of 320 feet. Water level recovery from the step-drawdown test was far from complete by the onset of the constant-rate pumping test on December 27, 2004, when a standing water level of 102 feet was measured (from an original standing level of 45.5 feet). It should be noted that any interpretation of the constant-rate pumping test data, such as described below, is compromised by the fact that constant-rate pumping was superimposed on ongoing recovery from the step-drawdown test.

The constant-rate pumping test for Laetitia Well 2004-2 was conducted at an average pumping rate of 100 gpm for a duration of 4,230 minutes (almost three days). The results in Appendix C of the Cleath report (Reference #4) show a calculated T value of 1,200 gpd/ft, which is equivalent to a K value of 0.6 feet/day based upon the 270 feet of screened zone. The pumping rate throughout the test was erratic, which makes interpretation of the data difficult. As was the case with Well 2004-1, interpretation of the data indicates the presence of a discharge boundary condition (at about 3,000 minutes of pumping) that is indicative of an aquifer of limited areal extent.

The constant-rate test recovery data are of insufficient duration (230 minutes) to draw definitive conclusions. In addition, the constant-rate test recovery is superimposed on the ongoing step-test drawdown recovery. Projection of the slope of the late-time recovery data suggests the water level in the well would be about 40 feet below the static water level of 45.5 feet at a recovery time equivalent to the pumping time (4,230 minutes). This amount of recovery amounts to less than 70 percent of the total drawdown from the step and constant rate pumping tests. The insufficient recovery demonstrated by this well test is typical of a well encountering a discharge boundary condition during pumping, and typically would lead to a significant down-grade in its sustainable long-term pumping rate.

Well 2004-3. The pumping test for Laetitia Well 2004-3 was conducted for about three days (4,350 minutes) and was not a constant rate test. The pumping rate apparently had to be reduced several times from an initial rate of 530 gpm to 200 gpm due to severe declines in the pumping water level, yet the time-drawdown data slope remained fairly constant. Thus, it is not possible to neither calculate T and K values for this test nor evaluate boundary conditions. The anticipated well yield would be far less than the lowest pumping rate used in this test (200 gpm) due to the continuing steep decline in water levels at the lowest pumping rate utilized for the test.

Recovery data of greater duration (12,830 minutes) were collected for this test, but again aquifer parameter interpretation is difficult due to the nature of the drawdown portion of the test. It is important to note that the recovery of water levels after a recovery time equal to the pumping time (4,350 minutes) is still 35 feet short of the static water level, which equates to only 33 percent of the total drawdown. This severe lack of sufficient recovery from the pumping test again indicates that a relatively low long-term pumping rate should be assigned to this well.

Well 2005-1. The constant-rate pumping test at Laetitia Well 2005-1 was conducted at an average pumping rate of 190 gpm for 4,320 minutes (3 days). It is noted that the pumping rate varied from 200 to 240 gpm in the initial 30 minutes of pumping, then gradually declined to a final pumping rate of 185 gpm for the final hour of pumping. The time-drawdown data show multiple and increasingly steeper rates of water level decline over time, indicating the presence of discharge boundary conditions and also possibly resulting from the decline of the water level into the screen interval. Calculation of aquifer parameters is uncertain due to the lack of a stable time-drawdown slope; however, the calculated T value of 4,800 gpd/ft would correspond to a K value of 3.4 feet/day if assumed to be valid.

Recovery data were collected for an insufficient duration (1,260 minutes), but indicate that recovery would be about 70 percent of total drawdown after an equivalent recovery time (4,320 minutes). This lack of complete recovery again is often associated with a well that was pumped at too high of a pumping rate and/or encountered discharge boundary conditions during pumping.

Aquifer Storage and Recharge. Relative to water level data, aquifer storage, and recharge Cleath concludes that water levels would be lowered at each of the wells and that recharge would be induced from Los Berros Creek to the wells if the project were developed using the proposed water supply wells. During periods of no surface flow in the creeks (Los Berros and Adobe Creek) there would be depletion of groundwater in storage in the alluvial aquifers.

Groundwater in storage within the bedrock aquifers was grossly estimated by Cleath by using the static water level data for each well in late 2004, the well depth, the inferred reservoir (aquifer) length, and an assumed specific yield (essentially the porosity of the fractured bedrock). The aquifer storage volume was appropriately reduced to the saturated volume available using the static water level as measured in late 2004 to the top of the perforations. The resultant volume estimates for groundwater in storage for each well as calculated by Cleath are provided in Table 3 - Estimated Aquifer Storage Volumes

Table 3. Estimated Aquifer Storage Volumes

Well Name	Total Estimated Storage (AF)	Available Storage Volume (AF)
2004-1	510	110
2004-2	460	140
2004-3	235	70
2005-1	260	55

It should be understood that the estimated available volumes of groundwater to each well as suggested above are very approximate and assume the aquifers(s) release groundwater in storage to each well uniformly. The pumping test data, however, show pronounced aquifer boundary conditions within the cone of influence of each well, given the inclined, linear nature and degree of fracturing of the aquifers. This is supported by the inability of the wells to either sustain a constant rate of discharge during the pumping tests and/or a need to reduce the rate of discharge during the pump tests to keep the pumping water level from dropping below the top of perforated well screen interval. Moreover, relative to the anticipated annual yield from each well (refer to Table 2) as advanced by Cleath, the storage volumes are quite low and provide a limited factor of safety of anticipated demand versus supply from each well given the uncertainty in the storage volume estimates.

Recharge to the bedrock aquifers from which the wells produce is inferred by Cleath (Reference #4) to derive from Los Berros Creek, Adobe Creek, and percolation of precipitation. While various stream flow records dating from the early 1980s are discussed, the conclusion is advanced that stream flow recharge to the aquifers must be occurring since the number of days of stream flow (in Los Berros Creek) has declined in recent years. Annual recharge to each well by stream flow recharge is estimated by the number of days of current stream flow, the geometry of the aquifer under the creek that can receive recharge and a hydraulic conductivity value obtained from the pumping tests. Cleath (Reference #4) provides a summary table of expected recharge to each well during a 2-year drought, to which a nominal value of recharge by precipitation is added. The estimated amount of annual recharge during a 2-year drought, as calculated by Cleath, is shown in Table 4 – Calculated Recharge to Aquifers.

Table 4. Calculated Recharge to Aquifers

Well Name	Total Annual Recharge (AFY)
2004-1	26
2004-2	11
2004-3	11
2005-1	24

Relative to the anticipated demands from each well (Table 2) and the estimated available storage (Table 3), the project water supply from the four wells is considered limited not only in actual amounts but the uncertainty associated with the estimates.

Aquifer Yield. The definition of aquifer yield as presented in the DEIR is the volume of water that can be pumped from each aquifer during drought conditions without depleting groundwater in storage in the aquifer. However, Cleath (Reference #4) suggests that a certain volume of the groundwater in storage (Table 3, above), coupled with the annual recharge estimates (Table 4, above), can be combined to estimate the annual yield of each well. The estimates of aquifer and well yield, as calculated by Cleath, are shown in Table 5 – Estimated Aquifer Yield.

Table 5. Estimated Aquifer Yield

Well Name	Available Storage (AF)	Total Annual Recharge (AFY)	Estimated Annual Yield (AFY)
2004-1	110	26	63
2004-2	140	11	58
2004-3	70	11	34
2005-1	55	24	42
		Total Aquifer Yield	197

Peer Review Comments

Water Demand. Relative to the estimates of project water demand there have been several iterations, the most recent occurring in a letter prepared by Cleath in November 2008 (Reference #7) suggesting the project water demand to be 73 AFY, with a net consumptive demand of 33 AFY. This estimate however was provided after the circulation of the DEIR, and the suggested methods to reduce demand are not included in the project description. For purposes of comparison to water supply, we believe the water duty factors presented in the DEIR (Table V.B-3) are appropriate. A worst-case total project water demand estimate on the order of 168.6 AFY to 175.3 AFY is considered reasonable. However, given the size of the project and the range of water demand estimates, the limited available water supply, and the very small margin between demand and supply, we recommend that a detailed water demand analysis be conducted. In addition, if credit for return flows to the aquifer is proposed that would result in a net consumptive demand estimate, the nexus between the return volume and benefit to the aquifer should be demonstrated.

Well Yield. Relative to a review of the pumping test data we believe in all cases the pumping rates of the wells during the tests were too high. The inability to maintain constant pumping rates and the general decline of pumping rates throughout the tests makes the resulting interpretation of the time-drawdown data questionable. Discharge boundary conditions were encountered in all of the pumping tests, which have significant implications relative to assigning long-term well yields and to a credible interpretation of aquifer extent and yield. In most cases, the recovery data collection period was insufficient but nonetheless demonstrated aquifer storage depletion over a relatively short period of time related to the pumping stress. The amount of recovery data collected at three of the four wells was insufficient. The duration of recovery measurements should be at least equal to the length of the pumping period.

Based on the limitations associated with the pumping test data, we suggest a pumping test program be developed in which the tests be performed at lower pumping rates (50 gpm maximum) for longer durations (10 to 20 days) to determine the long-term viability of each well. The pumping rates must be held constant and not allowed to decrease over time; hence the need for a sufficiently low enough pumping rate at the start of the test. Recovery data should be collected for a length of time equal to the pumping period. Long-term well yields should be assigned only after careful consideration of longer-term pumping and recovery tests, with careful consideration of discharge boundary conditions and recovery data.

Aquifer Storage and Yield. Depending on the outcome of the suggested retesting of the wells we are concerned that insufficient data exist to reasonably estimate aquifer storage volumes and perform a credible water balance and estimate annual recharge amounts. Since limited to no history of water level data exist for the aquifers proposed to be used, the estimates of creek recharge can be considered gross estimates. The creek recharge amounts suggested by Cleath are in part based on the assigned hydraulic conductivity values of the fractured bedrock aquifers. As indicated in this review, the pump test data may overstate these values considerably, and hence the estimated recharge amounts.

It should be noted also that the annual recharge estimates provided by Cleath are misleading in that they imply a component of available aquifer storage as recharge during a critical drought. The volume of groundwater in storage is very small given the limited extent of the bedrock aquifers and that amount cannot be used as a component of sustainable supply. It is simply a reservoir of available water to buffer periods of deficient recharge. Based on the data presented in the Cleath reports and the DEIR, it is our opinion that the annual recharge estimates to the wells provided by Cleath (derived essentially all from creek recharge) are significantly less than the long term project demand estimate.

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If you have any questions, please do not hesitate to call us.

Sincerely,

Fugro West, Inc.

Paul A. Sorensen, C.Hg 154
Principal Hydrogeologist

David A. Gardner, C.Hg 122
Principal Hydrogeologist
Senior Vice President

Copies Submitted: (1-Pdf) Addressee

ENCLOSURE #8

FUGRO WEST, INC.

660 Clarion Court, Suite A
San Luis Obispo, California 93401
Tel: (805) 542-0797
Fax: (805) 542-9311

June 9, 2009
Project No. 3014.033

County of San Luis Obispo
Department of Planning & Building
County Government Center, Room 200
San Luis Obispo, California 93408

Attention: Mr. Brian Pedrotti

Subject: Supplemental Hydrogeologic Review
Water Resources Section of the Draft Environmental Impact Report
Laetitia Agricultural Cluster Subdivision, Tentative Tract Map and Conditional Use Permit, SCH No. 2005041094

Dear Mr. Pedrotti:

This supplemental hydrogeologic review comments on information contained in a letter prepared by Cleath & Associates dated November 4, 2008 entitled *"Mitigation of Stream Flow Impacts, Laetitia Agricultural Cluster, Arroyo Grande, San Luis Obispo County"*. The Cleath letter, issued after preparation of and circulation of the project Draft Environmental Impact Report (DEIR), was previously reviewed by Fugro and discussed in our review letter dated April 23, 2009 relative to various revised estimates of the project's water demand (*cf.* Table 1 of the Fugro letter dated April 23, 2009). Our earlier review did not, however, specifically comment on the proposed changes in the source of the project water supply (*i.e.*, replacement of Well Nos. 12 and 13 with use of Well Nos. 14 and 15) to mitigate stream flow impacts. At the time, we had understood that the scope of our review was to focus on reports prepared by Cleath that formed the basis of the approved project description (PD) and that were contained in the water supply analysis prepared by SWCA and contained in the circulated DEIR. This letter supplements our earlier review and specifically comments on the revised project water demand and the proposed use of Well Nos. 14 and 15 as discussed in the letter prepared by Cleath dated November 4, 2008.

The Cleath letter essentially speaks to three issues: 1) revised project water demand, 2) depletion of groundwater in storage related to the proposed use of Well Nos. 12 and 13, and 3) the proposed use of Well Nos. 14 and 15. Each of these issues is discussed more fully below.

Revised Project Water Demand.

As briefly discussed in our letter of April 23, 2009, (page 4), the Cleath letter of November 4, 2008 revised the project water demand from 143 acre-feet per year (AFY) to 73.7 AFY. The basis for the downward revision is contained in the DEIR as a mitigation measure that would limit exterior landscape irrigation on each of the proposed 102 lots to a maximum of 1,500 square feet, of which no more that 20 percent of this amount could be turf (*i.e.* 300 square feet). Based on this, Cleath assigns an exterior water use for each lot at 0.33 AFY, for a combined exterior water demand (102 units) of 33.8 AFY. A spreadsheet is attached to the Cleath report that uses a monthly turf and low-water use plant landscape coefficient derived from Department of Water Resources (DWR) and University of California Cooperative Extension (UCCE) data. The general approach is considered reasonable by Fugro.

Interior water use is assigned at 340 gallons per day or 0.381 AFY. The source for the interior water duty factor is not referenced. For the proposed 102 units the interior water demand is thus estimated at 38.9 AFY. The Ranch Headquarters/HOA water demand is assumed to be 1 AFY for a combined total water demand of 73.7 AFY. With these water use restrictions, the project water demand is thus reduced by about 50 percent from the demand estimate originally stated in the DEIR. A discussion of water demand offsets related to return flow (either related to wastewater discharges or excess applied landscape irrigation water) are not discussed in the letter, but are listed in the water demand spreadsheet. How such offsets may or may not be applied or are related to project mitigation is unclear.

The scope of our hydrogeologic peer review included consideration of project water demand insofar as it related to issues of sustainable water supply to meet the estimated demand. Our scope did not include a re-evaluation or re-calculation of the project water demand, but rather a review of the validity of the approach. As a basis of such analysis, we assume that the revised project water demand estimate of 73.7 AFY provided by Cleath is generally valid. The final demand estimate proffered by Cleath seems somewhat low to us, but we acknowledge that the approach is reasonable.

If County staff agree with the final demand estimates, and if mechanisms are in place as part of the project approval process to both restrict and enforce the quite limited water use suggested by Cleath, then we are comfortable with the final demand estimates. If not, we suggest that a civil engineer qualified in estimating residential water demands (both interior and exterior) for projects similar to the proposed Laetitia Agricultural Cluster be retained to provide a rigorous water demand analysis that considers local standards, conservation measures, project phasing, seasonal peaking factors, project construction water demands, etc. such as might be available in local Urban Water Management Plans and Potable Water Supply Master Plans.

Stream Flow and Relation to Project Wells.

The second topic of the Cleath letter relates to the pumping of the Monterey formation bedrock aquifer Well Nos. 12 and 13 that are inferred to receive significant recharge from Los Berros Creek. In effect, during certain seasonal conditions (i.e., drought periods) Cleath, based on various stream flow measurements made in both Los Berros and Adobe Creeks, believes that pools observed in the Los Berros Creek upstream of Adobe Creek would dry up and/or streamflow would be significantly reduced due to pumping of Well Nos. 12 and 13. This potential impact was identified in the DEIR as a significant, unmitigable impact. Accordingly, the Cleath report proposes to mitigate this impact by replacing project Well Nos. 12 and 13 with Well Nos. 14 and 15. The latter two wells were constructed in 2006 at distances about 2500

Well is closer to creek than 12 & 13

and 3500 feet northwest of Los Berros Creek, and are interpreted by Cleath to receive recharge from a separate, adjacent watershed that is not hydraulically connected to Los Berros Creek.

We agree that recharge to the Monterey formation Well Nos. 12 and 13 would be from the fractured shale units that underlie Los Berros Creek, the magnitude of the recharge being controlled by the thickness of the sub-alluvial outcrop area, the permeability of the fractured shale, and the hydraulic gradient. In earlier reports, Cleath suggests that creek recharge to the Monterey formation aquifer is as much as 90 percent of the overall recharge, the balance being from infiltration of precipitation on the outcrop area. While we agree with the relative importance of this creek recharge, the absolute amount of annual recharge can be considered only a gross estimate. The actual sub-alluvial outcrop area is not precisely known, nor is the permeability, number of days of surface flow that would contribute to recharge, or variations in hydraulic gradient. Nonetheless the dominant recharge source to the Monterey formation aquifer is the creek system. As stated in the DEIR, this impact (*i.e.*, use of Well Nos. 12 and 13) is a significant unavoidable impact that can not be mitigated.

Well Nos. 14 and 15.

As stated, Well Nos. 14 and 15 would replace Well Nos. 12 and 13 as a source of the project's water supply. Both wells were drilled in 2006, briefly tested (as described further below) and have apparently sat idle since that time. Cleath provides a State Well Completion Report, pump test data, and water quality data for both of these wells. Both wells, which are located in a small valley of approximately 80 acres in size with no incised creek, penetrate and extract groundwater from the Monterey formation shale and are completed to depths of about 600 feet with 8-inch diameter PVC casing with variable perforated intervals. The small north-south trending valley is inferred to be capped with about 20 to 40 feet of fractured shale alluvium. The shale unit of the Monterey formation that constitutes the aquifer is of limited thickness (actual thickness is not estimated by Cleath), that is inclined to the north at about 45 degrees. The aquifer is interpreted by Cleath to extend to the east and west into separate watersheds about 100 acres in size. Recharge by direct infiltration of precipitation to the aquifer is considered by Cleath to be very small.

Using the same approach as in earlier reports, Cleath estimates the "sustainable yield" from both of the wells to include an amount of groundwater in storage, resulting in a combined estimated amount of 190 acre-feet for both wells. How this amount of ground water in storage is calculated is not provided, but presumably, as in previous reports, considers a specific yield for the fractured shale and an assumed aquifer volume. For an assumed three-year drought, this aquifer storage volume would yield 63 AFY. Recharge to the bedrock aquifer wells during the same three-year drought is estimated for the three contiguous watersheds (i.e., the watershed to the east, the 80-acre valley itself, and the watershed to the west of some 100 acres). Cleath then uses a range of from 5% to 20% of precipitation falling in these watersheds as available recharge to the two wells, adjusted somewhat for below-average precipitation during droughts. A component of surface flow from Adobe Canyon Creek to the west is also considered as available recharge. An annual recharge of 30 AFY is assumed, to which Cleath adds an additional 63 AFY as groundwater in storage that would be provided during a drought.

Combining this amount with Well Nos. 10 and 11, a sustainable well yield of 169 AFY is advanced.

Relative to the inferred sustainable supply, we previously commented that using ground water in storage as a component of sustainable yield is not appropriate. Sustainable yield, per CEQA guidelines, is that which does not result in depletion of ground water in storage. However, the sustainable yield as described by Cleath includes a component of water in storage. Sustainable yield is, by definition, considered to be average annual recharge to the aquifer which in this case is based on a number of gross assumptions. Based on the Cleath analysis and discounting the availability of groundwater in storage as a component of the sustainable yield, it appears that the annual recharge amounts would be 11 AFY for Well No. 10, 24 AFY for Well No. 11, and 15 AFY each for Well Nos. 14 and 15, for an estimated total of 74 AFY. It should be emphasized that there is considerable uncertainty associated with these recharge estimates. Furthermore, there is little factor of safety associated with the water supply estimate relative to the revised project demand of 73.7 AFY.

The Cleath letter provides pump test and recovery data for Well Nos. 14 and 15, although no discussion of the pump test data other than static water level data is provided in the letter. Well No. 14 was tested in June, 2006 for three days at a constant rate of about 233 gallons per minute (gpm). Monitoring of Well No. 15 during the pump test was apparently not performed. Severe declines in the pumping water level were observed starting early in the test period and a stable pumping level at the test discharge rate was never obtained. Interpretation of the drawdown data indicates the presence of a discharge boundary after about 600 minutes of pumping that reflects an aquifer of limited areal extent. Groundwater flow in the fractured bedrock shale in the vicinity of the well is likely linear rather than radial. The anticipated well yield would be considerably less than the pumping rate used in the test. Assuming that a stable, albeit much reduced pumping rate in the well could be achieved, it raises the question whether significant induced recharge from adjacent watersheds several thousand feet away could be achieved.

The recovery data following the cessation of pumping was observed for slightly more than one day. At the completion of the monitored recovery period, the water level in the well exhibited about 50 feet of residual drawdown, suggesting there was a significant depletion of groundwater in storage during the 3-day pumping test. Generally, the recovery period was of insufficient duration to reach meaningful conclusions, but the results of the data suggest to us an aquifer that was over-pumped during the 3-day period and susceptible to mining. Specific comments related to the pump test and recovery data for Well No. 14 are summarized below:

1) The well was pumped for three days (4,320 minutes) at an average pumping rate of 233 gpm. The static water level at the start of the test was 108 feet, with a final pumping water level of 214 feet. The top of uppermost perforated interval is at a depth of 170 feet.

2) The calculated transmissivity (T) value is 3,400 gallons per day per foot of aquifer (gpd/ft) (based on a Δs of 18 feet) which equals a hydraulic conductivity (K) value of 1.3 feet/day. The final specific capacity was 2.2 gallons per minute per foot of

drawdown (gpm/ft). The pumping rate gradually declined from about 250 gpm to 230 gpm during the testing, after a brief initial rate of 360 gpm.

3) It appears that a discharge boundary condition was encountered beginning at about 600 minutes that increased the Δs to 56 (about 3 times the original slope).

4) At 1440 minutes, when the water level declined into the top of the screen at a depth of 170 feet, the Δs increased to 104 feet (about 6 times the original slope). The increasing slope at this point is likely due to a combination of decreasing saturated thickness below the top of the well screen as well as discharge boundary conditions.

5) Recovery data were collected for 1,487 minutes compared to a pumping time of 4,320 minutes. At the end of the recovery time of 1,487 minutes, approximately 52% of the total pumping drawdown had been achieved.

6) The conclusion is that the well cannot sustain a long-term pumping rate of 233 gpm. It is likely that an appropriate long-term pumping rate is much less than 100 gpm.

7) Subject to the issue of the estimated annual recharge to the bedrock aquifer, consideration could be given to retesting of the well for a longer pumping duration at a lower (and constant) pumping rate, with a recovery time equal to the pumping time.

Well No. 15 was similarly pumped for a 3-day period in July 2006. During this pump test, monitoring of Well No. 14 was apparently not performed. The well was tested at a rate of 150 gpm although the data sheet records only two discharge rate measurements during the 3-day period, at the beginning of the test and at the end of the test. If indeed the rate of discharge was constant during the entire test, the drawdown data show several minor boundary condition effects (at about 600 and 1100 minutes). Recovery data were collected for three hours. Specific comments related to the pump test and recovery data for Well No. 15 are summarized below:

1) The well was pumped for three days (4,320 minutes) at a pumping rate of 150 gpm. The static water level was 204 feet with a final pumping water level of 305 feet. The top of the uppermost perforated interval is at a depth of 310 feet.

2) The calculated T value is 1,650 gpd/ft (based on a Δs of 24 feet), and the K value is 1.1 feet/day. The specific capacity at the end of the test was 1.5 gpm/ft.

3) The available data do not indicate that a boundary condition was encountered during the three days of pumping.

4) By the end of the pumping portion of the test, the water level had declined to within about five feet of the top of the screen (pumping water level of 305 feet and top of screen at 310 feet). Continued pumping at the test rate of 150 gpm would have led to the water level declining into the screened interval, which may have resulted in an increase in the steepness of the time-drawdown slope.

5) Recovery data were collected for 197 minutes, compared to a pumping time of 4,320 minutes. At the end of the recovery period, approximately 83% of the total pumping

drawdown had recovered. However, the rate of recovery at the end of the recovery period was slowing, suggesting that further recovery may have been limited.

6) The conclusion is that the well cannot sustain a long-term pumping rate at the pumping test rate of 150 gpm. It is likely that an appropriate long-term pumping rate is less than100 gpm.

7) Subject to the issue of the estimated annual recharge to the bedrock aquifer, consideration could be given to retesting the well for a longer pumping duration at a lower (and constant) pumping rate, with a recovery time equal to the pumping time.

We understand that there has not been further testing of these wells since 2006 nor has there been the collection of additional water level data.

Conclusions.

The approach to calculating the revised water demand estimate appears reasonable. Thus, the revised project water demand estimate of 73.7 AFY provided by Cleath appears to be generally valid, given the constraints and limitations that would apparently be imposed on the development upon project approval. If County staff agree with the final demand estimates, and if mechanisms are in place as part of the project approval process to both restrict and enforce the limited water use outlined by Cleath, then the final demand estimate appears reasonable. If not, we recommend that a civil engineer qualified in estimating residential water demands (both interior and exterior) for projects similar to the proposed development be retained to provide a rigorous water demand analysis that considers local standards, conservation measures, project phasing, seasonal peaking factors, and project construction water demands.

The inferred stream flow impacts on Los Berros Creek related to the use of Well Nos. 12 and 13 were correctly identified in the DEIR as an impact that could not be mitigated. This conclusion appropriately led to the proposed use of Well Nos. 14 and 15 as replacement supply wells. We agree that the dominant source of recharge to Well Nos. 12 and 13 would be the creek.

Based on the pumping test data for Well Nos. 14 and 15, it is our opinion that the wells cannot sustain the tested discharge rates on a long-term operational basis. It appears that the sustainable operational discharge rate for each well is much less than 100 gpm. This conclusion could be tested with controlled long-term pumping tests, as outlined in our April 23, 2009 letter. We understand that Cleath is considering such testing, using standards for testing of wells in bedrock aquifers recently promulgated in Title 17 and 22 of the California Code of Regulations Related to Drinking Water (2009 State of California Department of Public Health (DPH) guidelines). We would be pleased to review the proposed Cleath well testing program when available.

Regardless of the outcome of the retesting of the four proposed project water supply wells, it should be understood that the estimates of annual recharge (*i.e.*, sustainable groundwater supply) is very small and essentially equal to the revised project water demand. It is our opinion that the proper definition of sustainable yield is the yield of an aquifer that does not result in depletion of groundwater in storage. By that definition, utilization of the groundwater in storage as a component of sustainable yield is not appropriate. Per the cited DPH regulations, recovery of water levels in bedrock aquifers is to be within 95% of the total drawdown as measured after a duration equal to the length of the pumping test. Based on the well test data we have reviewed and described above, it is unlikely that this condition will be met by retesting the wells in accordance with the DPH guidelines. Based on the Cleath analysis and discounting the availability of groundwater in storage as a component of the sustainable yield, it appears that the annual recharge to the aquifer may be an estimated 74 AFY. It should be emphasized that there is considerable uncertainty associated with these recharge estimates.

Based on an assumed aquifer yield of 74 AFY, there is little factor of safety associated with the water supply estimate relative to the revised project demand of 73.7 AFY.

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If you have any questions, please do not hesitate to call us.

Sincerely,

Fugro West, Inc.

Paul A. Sorensen, C.Hg 154
Principal Hydrogeologist

David A. Gardner, C.Hg 122
Principal Hydrogeologist
Senior Vice President

Copies Submitted: (1-Pdf) Addressee

Enclosure #9

Appendix A – Reference Evapotranspiration for California Cities

Eureka	27.5	Santa Monica	44.2	Modesto	49.7	Lamont	54.4
Ferndale	27.5	San Juan	44.2	Los Banos	50	Chino	54.6
Crescent City	27.7	Chula Vista	44.2	Farmington	50	Gerber	54.7
Fort Bragg	29	Windsor	44.2	Los Angeles	50.1	Pine Valley	54.8
Point Arena	29.6	Yountville	44.3	Monrovia	50.2	Angwin	54.9
Fort Ross	31.9	Bennett Valley	44.4	Turlock	50.2	Beaumont	55
Hal Moon Bay	33.7	Los Alamos	44.6	Nicolaus	50.2	Elsinore	55
Garberville	34.9	Moraga	44.9	Oakdale	50.3	Kesterson	55.1
Weed	34.9	Ravendale	44.9	Otay Lake	50.4	Firebaugh	55.4
San Francisco	35.1	Carpenteria	44.9	Raymond	50.5	Gerber Dryland	55.5
Happy Camp	35.1	Hollister	45.1	Fair Oaks	50.5	San Bernardino	55.6
Soda Springs	35.4	Fairfield	45.2	Auburn	50.6	Esparto	55.8
Tahoe City	35.5	San Jose	45.3	Lindcove	50.6	Warner Springs	56
Hoopa	35.6	Pittsburg	45.4	Corning	50.7	Riverside UC	56.4
San Rafael	35.8	Lower Lake	45.4	Visalia	50.7	McFarland/Kern	56.5
Monterey	36	Solvang	45.6	Williams	50.8	Blackwells Corner	56.6
Mt Shasta	36	Gonzales	45.7	Crestline	50.8	Orange Cove	56.7
Castroville	36.2	Carneros	45.8	Coalinga	50.9	Temecula East II	56.7
Truckee	36.2	Pajaro	46.1	Putah Creek	51	Winchester	56.8
Santa Cruz	36.6	Valley of the Moon	46.1	Winters	51	Lost Hills	57.1
Salinas North	36.9	Camarillo	46.1	Thousand Oaks	51	Corcoran	57.1
Watsonville	37.7	Pleasanton	46.2	Bryte	51	Cathedral City	57.1
San Simeon	38.1	Walnut Creek	46.2	Durham	51.1	Hastings Tract	57.1
Salinas	39.1	Webb	46.2	Fresno	51.1	Panoche	57.2
Yreka	39.2	El Dorado	46.3	Santee	51.1	Patterson	57.3
Portola	39.4	San Diego	46.5	Red Bluff	51.1	Bakersfield/Bonanza	57.9
Oakland Foothills	39.6	Lodi West	46.7	Kerman	51.2	Bakersfield/Greenlee	57.9
Sierraville	39.6	Yuba City	46.7	Taft	51.2	Twitchell Island	57.9
Petaluma	39.6	McArthur	46.8	Manteca	51.2	Big Bear Lake	58.6
Long Beach	39.7	Fremont	47	La Grange	51.2	Lake Arrowhead	58.6
Novato	39.8	Rio Vista	47	Dinuba	51.2	Stratford	58.7
Torrey Pines	39.8	Miramar	47.1	Friant	51.3	Westlands	58.8
Morro Bay	39.9	Livermore	47.2	Reedley	51.3	Belridge	59.2
Arroyo Grande	40	San Benito	47.2	Willows	51.3	Cuyama	59.7
Weaverville	40	Camino	47.3	Claremont	51.3	Pearblossom	59.9
Hay Fork	40.1	Badger	47.3	Clovis	51.4	Kettleman	60.2
Quincy	40.2	Nevada City	47.4	Chowchilla	51.4	FivePoints	60.4
Benicia	40.3	Santa Maria	47.4	Denair	51.4	Santa Clarita	61.5
Blue Canyon	40.5	Brownsville	47.4	Oroville	51.5	Piru	61.5
Markleeville	40.6	Pomona	47.5	Hanford	51.5	Mendota	61.7
Santa Barbara	40.6	Groveland	47.5	Madera	51.5	Caruthers	62.7
Green Valley Rd	40.6	Sonora	47.6	Merced	51.5	Independence	65.2
Cloverdale	40.7	Soledad	47.7	Kingsburg	51.6	Palmdale	66.2
De Laveaga	40.8	Oakville	47.7	Ramona	51.6	La Quinta	66.2
Healdsburg	40.8	Colfax	47.9	Alpaugh	51.6	Victorville	66.2
Hopland	40.9	Courtland	48	Woodland	51.6	Lower Haiwee Res.	67.6
Ukiah	40.9	Grass Valley	48	Chico	51.7	Ripley	67.8
Burney	40.9	Goleta	48.1	Lemoore	51.7	Palo Verde II	68.2
Guadalupe	41.1	Santa Ana	48.2	Burbank	51.7	Bishop	68.3
Lompoc	41.1	Brentwood	48.3	Buntingville	51.8	Oasis	68.4
Downieville	41.3	Suisun Valley	48.3	Gridley	51.9	Calipatria/Mulberry	70.7
Yosemite Village	41.4	Isabella Dam	48.4	Arvin	51.9	Mecca	70.8
Oakland	41.8	Tracy	48.5	Sacramento	51.9	Lancaster	71.1
Martinez	41.8	Santa Ynez	48.7	Lincoln	51.9	Palm Springs	71.1
Fall River Mills	41.8	Shanandoah Valley	48.8	Parlier	52	Westmoreland	71.4
Santa Rosa	42	San Andreas	48.8	Buttonwillow	52	Blythe	71.4
Glenburn	42.1	Coulterville	48.8	Delano	52	Rancho Mirage	71.4
Oxnard	42.3	Redding	48.8	San Fernando	52	Meloland	71.6
Redondo Beach	42.6	Jackson	48.9	Orland	52.1	Yuma	71.6
Lakeport	42.8	Mariposa	49	Shafter	52.1	Palm Deser	71.6
Redwood City	42.8	San Ardo	49	Nipomo	52.1	Salton Sea North	71.7
Oceanside	42.9	Paso Robles	49	Dixon	52.1	Barstow NE	71.7
Los Gatos	42.9	San Miguel	49	Porterville	52.1	Inyokern	72.4
Tule lake FS	42.9	MacDoel	49	Roseville	52.2	Thermal	72.8
Black Point	43	Sanel Valley	49.1	Pasadena	52.3	China Lake	74.8
Point San Pedro	43	Long Valley	49.1	Bakersfield	52.4	Lucerne Valley	75.3
Bridgeport	43	San Juan Valley	49.1	Gorman	52.4	Seeley	75.4
Palo Alto	43	Stockton	49.1	Davis	52.5	Newberry Springs	78.2
Modoc/Alturas	43.2	Betteravia	49.1	Arroyo Seco	52.6	Death Valley Jct	79.1
Laguna Beach	43.2	Sisquoc	49.2	King City-Oasis Rd.	52.7	El Centro	81.7
Concord	43.4	Newman	49.3	Colusa	52.8	Twentynine Palms	82.9
Port Hueneme	43.5	Winters	49.4	Hollywood Hills	52.8	Oasis	83.1
Ventura	43.5	Grapevine	49.5	Zamora	52.8	Indio	83.9
Gilroy	43.6	Greenfield	49.5	Tehachapi	52.9	Brawley	84.2
Glendale	43.7	Rancho California	49.5	Browns Valley	52.9	Holtville	84.7
Atascadero	43.7	Woodside	49.5	Famoso	53.1	Baker	86.6
San Luis Obispo	43.8	Morgan Hill	49.5	Glendora	53.1	Coachella	88.1
Susanville	44	King City	49.6	Delano	53.6	Desert Center	90
St Helena	44.1	Irvine	49.6	Fresno State	53.7	Needles	92.1
Union City	44.2	Goleta Foothills	49.6	Escondido SPV	54.2		