STRATA SERVICES
P.O. Box 116 Defiance, MO 63341
(314) 808-5858

June 16, 2011

Wildhorse Homeowners' Association, Inc.
c/o Smith Management Group
1630 Des Peres Rd./Suite 210
St. Louis, MO 63131

RE: Water Balance, Dye Trace and
Water Shed Evaluations
Lasiandra Lake
1544 Wildhorse Pkwy. Dr.
Wildwood, MO

Gentlemen,

During the period May 31 through June 6, 2011 our firm performed all field work at the referenced lake to delineate seepage related problems.

Watershed

Evaluation of watershed, based on USGS topographic information, indicates approximately 46 acres of watershed area and 5 acres of lake basin. Therefore, the watershed ratio is approximately 9.2 to 1. In our geographic area a 10 to 1 ratio watershed ratio is generally thought to be adequate. The existing 9.2 to 1 ratio of Lasiandra is close enough to be acceptable.

Dye Trace

A dye trace was conducted during the period May 31 through June 6, 2011. Background receptor packets were placed and retrieved 24 hours prior to installation of dye. On June 1, 2011 sixteen pounds of fluorescein water tracing dye was mixed into the lake water. For a period of approximately five days, the entire lake was a bright fluorescent green color. During the test period, receptor packets were placed and changed in the lake water and in Bonhomme Creek at the Wildhorse Parkway Bridge near Bridgewater Circle.

On June 2, 2011, approximately 24 hours following dye placement, a strong visual dye hit was observed emanating from a spring that flows into Bonhomme Creek. This spring is located approximately fifteen feet north of the 90° right hand bend in the walking trail about 500 feet north of the Wilding Place cul-de-sac.

Cumulative flow from the spring was estimated at 150 to 200 GPM. Temperature of the spring water was 56° F.

Fluorescein dye colored water flowing from the spring and into Bonhomme Creek was visible well past the Wildhorse Parkway Bridge from June 2 through June 6, 2011. The Dye Trace Sampling and Crawford Laboratory attachments document intensity of dye contact.

Water Balance

A water balance was performed during the same basic period, May 31 through June 6, 2011. There was no rainfall observed during the test period.

At the start of the test, at approximately 1200 hours on May 31, 2011, the lake water level was -92" below normal pool. At the end of the test, six days later, at approximately 1200 hours on June 6, 2011, the water level was -97.25" below normal pool. Cumulative loss of water during the six day period was 5.25" or .875" per day. Evaporation losses during the period are estimated at .15" per day. Therefore actual loss to seepage appears to be approximately .725" per day. This average loss, based on a reservoir area of five acres, equates to a continuous seepage loss of approximately 68.5 gallons per minute at the pool elevation during testing.

Conclusions

In conclusion, at a pool elevation approximately eight feet below normal pool, the rate of seepage appears to be approximately 68.5 GPM.

Based on dye trace observations, leaking lake water appears to infiltrate vertically from the reservoir basin through residuum and or fractured bedrock. The leaking water then travels subsurface and down gradient for a distance of approximately 2,000 feet and exfiltrates from the spring adit along Bonhomme Creek.

Recommendations

- Allow the lake to naturally recede through the summer months.

- A volunteer(s) will be required to observe the lake. Periodically place and date shoreline stakes, record rain gauge data and record general observations.

- As the lake naturally recedes, observe for a stabilization point or set point elevation where the seepage basically stops and the lake level remains at the same elevation.

- I will return from my consulting projects out west in mid-August. At that time, I will meet with the volunteer to discuss changes and observations.

- We are looking for a leakage related feature that may be exposed along the shoreline as the lake level recedes. If we can be patient and find this feature, it could be relatively simple and cost-effective to repair in comparison to clay padding or liner installation.

Please feel free to call if you require further explanation. Thank you for allowing **Strata Services** the opportunity to assist with your lake and dam leakage problems.

Respectfully yours,

STRATA SERVICES, INC.

David G. Taylor, RG, CPG
President

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DYE TRACE SAMPLING

Test Packet	In	Out	Location
1	1201 5-31-11	1041 6-01-11	Bridge (Background)
2	1130 5-31-11	1104 6-01-11	Lake (Background)
	(16# fluorescent dye mixed with lake water6-01-11 @ 1200 hrs.)		
3	1050 6-01-11	0940 6-03-11	Bridge (weak visual)
4	1110 6-01-11	1008 6-03-11	Lake (strong visual)
5	0945 6-03-11	1028 6-06-11	Bridge (moderate visual)
6	1010 6-03-11	1040 6-06-11	Lake (weak visual)

Crawford Hydrology Lab * Hoffman Environmental Research Institute

* Hydrogeologists, Geologists, Environmental Scientists * Karst Geophysical Subsurface Investigations
* Karst Groundwater Investigations * Fluorescent Dye Analysis

Western Kentucky University
Bowling Green, KY 42101
(270) 745-9224
E-mail: Crawford.Hydrology@wku.edu

LABORATORY REPORT SHEET

FLUORIMETRIC ANALYSIS RESULTS

Crawford Hydrology Laboratory

Analysis requested by:

DAVE TAYLOR/STRATA SERVICES

Fluorescein

Color Index:

Acid Yellow 73

Activated Charcoal
Analysis by:
Spectrofluorophotometer

CHARCOAL SAMPLES

FLUORESCEIN
PQL in Eluent: 0.005 ppb
PQL in Water: 0.010 ppb
λ in Eluent: 516.0 nm
λ in Water: 510.0 nm

Lab ID	Event	Date Collected	Feature Name	TIME	Peakfit	Results	Conc in ppb	Peak Center (nm)	Comments
ELUENT-1			QA-Eluent			ND			Control
EL-FL-1			QA-FLUORESCEIN			+	0.006		0.005PPB
EL-FL-1A			QA-FLUORESCEIN			+	0.105		0.1PPB
EH-FL-1			QA-FLUORESCEIN			+	9.845		10.000 ppb
EL-001-0	BG1	06/01/11	#1 POND	1041		IB	0.375	515.2	
EL-002-0	BG1	06/01/11	#2 BRIDGE	1104		IB	0.226	515.6	
EH-003-0	02	06/03/11	#3 POND	940		+?	88.799	515.8	
EH-004-D	02	06/03/11	#4 BRIDGE	1008		+?	167.500	515.6	DILUTED 1:100
EH-005-D	03	06/06/11	#5 POND	1028		+?	340.000	515.8	DILUTED 1:100
EH-006-0	03	06/06/11	#6 BRIDGE	1040		+?	8.992	516.2	
ELUENT-2			QA-Eluent			ND			Control
EL-FL-2			QA-FLUORESCEIN			+	0.006		0.100 ppb
EL-FL-2A			QA-FLUORESCEIN			+	0.105		1.000 ppb
EH-FL-2			QA-FLUORESCEIN			+	9.776		10.000 ppb

Analyzed by: C.Davis on 06/15/11 Peakfit needed for acurate results

Entered by: L.Bledsoe on 06/15/11

Comments:

DUP = Field Duplicate
B = Background
ND = No Detection
IB = Initial Background
NS = No Sample Recovered
GS = Grab Sample
NPI = No Peak Identified
POR = Peak Out of Range
Q = Lab Duplicate
+ = Positive
?+ = Questionable Positive, needs two hits in a row to equal +
Peakfit Utilized