PALL LIFE SCIENCES
LITTLE LAKE AREA SYSTEM GROUNDWATER MONITORING PLAN
ANN ARBOR, MICHIGAN
April 2011

BACKGROUND

The purpose of this monitoring plan is to collect data necessary to verify the effectiveness of the Little Lake Area System in meeting the Little Lake Area Non-Expansion Cleanup Objective and monitoring requirements set forth in Sections V.C.1 and V.C.3 of the Consent Judgment (CJ). These sections are provided below:

Little Lake Area System

1. Little Lake Area System Non-Expansion Objective. The objective of the Little Lake Area System is to prevent expansion of the horizontal extent of any groundwater contamination located in this area.

3. Monitoring Plan. Within 45 days of entry of this Third Amendment, Defendant shall submit to the MDNRE for approval under Section X of this Consent Judgment a revised Monitoring Plan that identifies which of the existing monitoring wells will be used as compliance wells to verify the effectiveness of the Little Lake Area System in meeting the non-expansion objective of Section V.C.1. Defendant shall continue to implement the current MDNRE-approved monitoring plan until MDNRE approves the Monitoring Plan required by this Section. If a form of active remediation other than batch purging or land use or resource use restrictions are approved by the MDNRE, Defendant shall submit a revised monitoring plan, modified as necessary to verify the effectiveness of such response activities.

The monitoring plan shall be continued until terminated pursuant to Section V.E.

PROPOSED MONITORING LOCATIONS

PLS has been installing monitoring wells and collecting groundwater samples in the Little Lake Area for approximately 25 years. Wells have been installed from shallow depths to the bedrock surface allowing for the monitoring of all key hydrostragraphic units. Numerous isoconcentration maps have been prepared over the years depicting the extent of 1,4-dioxane in the Little Lake area. No monitoring wells in the Little Lake area are detecting concentrations of 1,4-dioxane over 85 ug/L. Only one well, the Ann Arbor Supply extraction well, is detecting concentrations of 1,4-dioxane over 85 ug/L. The most recent concentration of 1,4-dioxane at this location was 103 in a sample collected April 7, 2011.

PLS has carefully selected approximately 27 locations to periodically collect groundwater samples for 1,4-dioxane analysis and water level measurements. The locations, along with other relevant information, are listed on Table 1. Figure 1 identifies wells included in the monitoring well network, and highlights wells in the Compliance Well Network (green).

Groundwater Quality Sampling

Purpose Designations

The monitoring locations have been assigned the following purpose designations:

Compliance Monitoring (CM) – These wells will be used to determine compliance with the Non-Expansion Cleanup Objective in the CJ.

General Monitoring (GM) – These wells will be monitored to track the general distribution of 1,4-dioxane in the Little Lake Area.

Monitoring Locations

The locations of the monitoring wells that will be part of this plan are shown on Figure 1.

Monitoring Frequencies

PLS has reviewed the past water quality data and position of the wells relative to the boundaries of the plumes and has assigned each well with a monitoring frequency. These frequencies are:

Quarterly (Q) – Quarterly sampling frequencies have been assigned to many wells since it is anticipated that there will be significant extraction rate changes in the near future. It is anticipated that many wells assigned a quarterly frequency will be changed to longer frequencies in the next revision of this plan.

Semi-annual (S) – Semi-annual sampling frequencies were generally assigned to locations where routine data are important, but either due to historic trends or location, monitoring at slightly less frequent basis than quarterly will be adequate to identify significant trends or changes.

Annual (A) – Annual sampling frequencies were generally assigned to locations where routine data are important, but either due to historic trends or location, monitoring at slightly less frequent basis than semi-annual will be adequate to identify significant trends or changes.

Biennial (B) – Biennial sampling frequencies were generally assigned to locations where historic concentrations have shown that trends indicate subtle/negligible changes over time and frequent monitoring is not warranted.

Omit (O) – PLS is proposing the elimination of selected wells from the monitoring program. Historic trends at these locations have shown that 1,4-dioxane concentrations at these locations have consistently been below 85 ppb, alternative nearby locations can and will be monitored, or the wells are no longer functional.

Water Level Measurements

Objectives

The overall objectives of measuring water levels are:

1. Assessing groundwater flow patterns.

2. Evaluating potential changes in groundwater flow from changes in extraction rates and locations.

Locations

The wells to be monitored for water levels are shown on Figure 1.

Frequencies

Water level measurements in this plan will be made on a semi-annual basis. PLS believes this frequency is sufficient because, unlike the Western Area Compliance Well Network, the Little Lake Area System is not proximate to the "Core Area" extraction wells and, as a result, should not be affected by changes in the purge rates of these wells. PLS has collected water level data in this area for many years so the baseline conditions are well established. It is anticipated that this frequency will be changed in many wells in the next version of this monitoring plan.

Sampling Methods and Analysis

Groundwater samples collected from monitoring wells will be collected by PLS in a manner consistent with PLS sampling protocols and sample handling procedures that are currently being used for PLS' routine monitoring. These sampling methods generally employ a 3 to 5 casing volume purge prior to sample collection, strict equipment decontamination procedures, and standard sample handling and documentation procedures.

Groundwater samples will be analyzed for 1,4-dioxane by the PLS laboratory using a U.S. Environmental Protection Agency-approved modified GC/MS method capable of detection levels of 1 ppb.

REPORTING AND PLAN UPDATES

Data from the monitoring will be made digitally available to the Michigan Department of Environmental Quality (MDEQ) via the PLS water quality database. The database can be used by the MDEQ and others having access to prepare reports and trend graphs.

On a semi-annual basis, PLS will prepare and submit to the MDEQ isoconcentration and potentiometric surface maps for the various aquifers, similar to those currently being provided to MDEQ.

On an annual basis, starting with the approval date of this plan, PLS may propose to adjust sampling and submittal frequencies and submit revisions to the MDEQ for review and comment before implementation.

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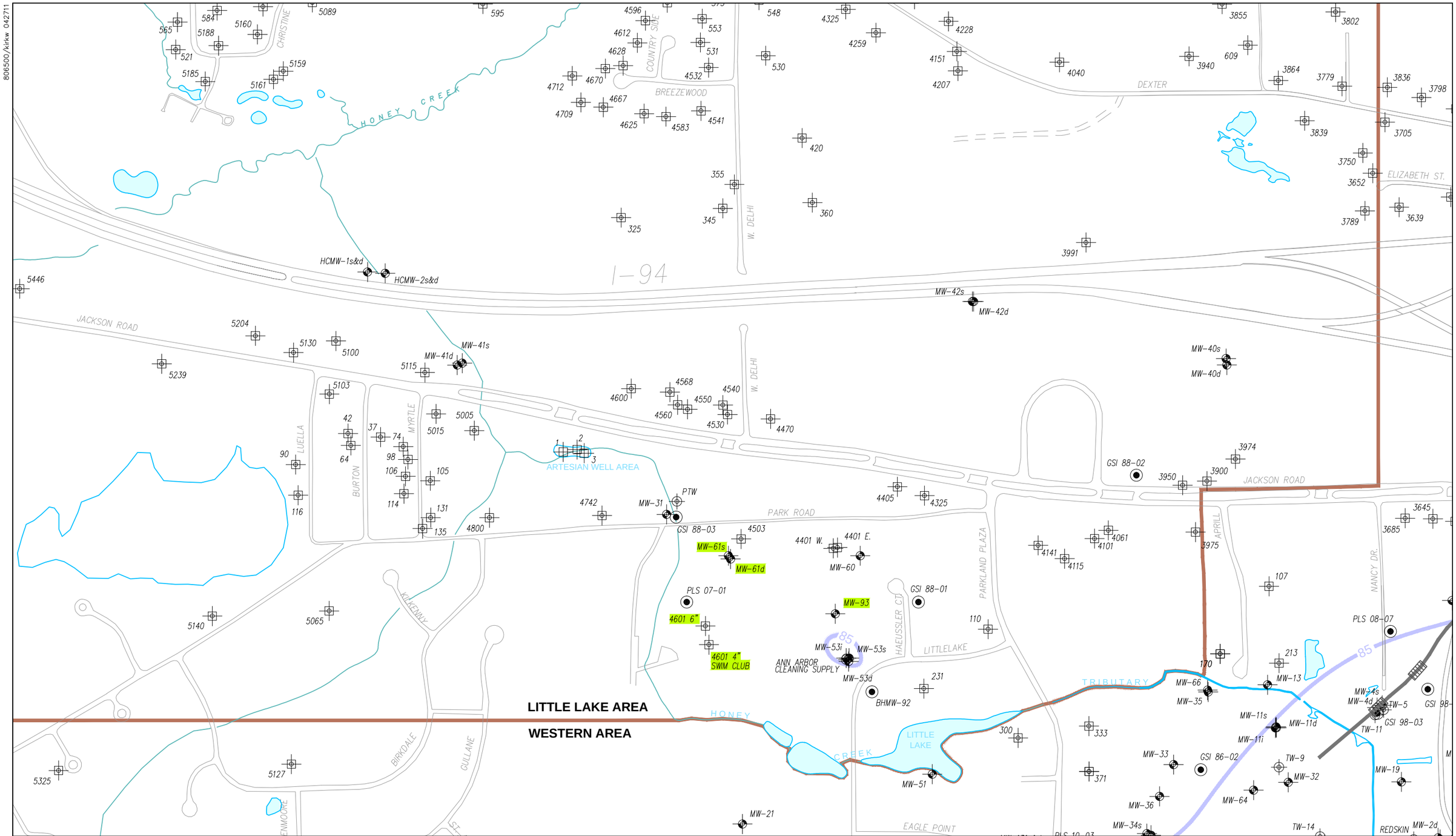

SOME DOMESTIC WELL LOCATIONS PROVIDED BY THE WELLOGIC DATABASE. OTHER WELL LOCATIONS PROVIDED BY PLS.

NORTH

LEGEND

- COMPLIANCE MONITOR WELL
- MONITORING WELL
- EXTRACTION WELL
- DOMESTIC WELL
- HYDROGEOLOGICAL TEST BORING
- LITTLE LAKE AREA SYSTEM
- CURRENT INTERPRETATION OF 85 µg/L ISOCONCENTRATION LINE

0 600 1200

SCALE IN FEET

NOTE: NOT ALL DOMESTIC WELLS ARE ACTIVELY USED FOR DRINKING WATER SUPPLY.

FLEIS & VANDENBRINK ENGINEERING, INC.

PALL LIFE SCIENCES
WASHTENAW COUNTY, MI

Hard copy is intended to be 11"x17" when plotted.

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APRIL 2011 806500

Table 1 - Little Lake Area Groundwater Monitoring Program (to be revised annually)

Well Name	Aquifer	Site Area	Most Recent 1,4-Dioxane Result (ppb)	Date Sampled	Purpose for Sampling	Current Sampling Frequency	Revised Groundwater Sampling Frequency	Water Level Measurement Frequency
ARTESIAN #1	D0	Little Lake	6	8/21/00	-	R		
ARTESIAN #2	D0	Little Lake	26	5/11/01	-	R		
ARTESIAN #3	D0	Little Lake	21	7/31/10	GM	A	A	-
MW-31	D0	Little Lake	22	7/27/10	GM	A	A	S
MW-40s	D0	Little Lake	ND	7/15/10	GM	A	A	S
MW-40d	D0	Little Lake	ND	7/15/10	GM	A	A	S
MW-41s	D0	Little Lake	19	10/29/10	GM	S	S	S
MW-41d	D0	Little Lake	30	10/29/10	GM	S	S	S
MW-42s	D0	Little Lake	ND	7/22/10	GM	A	A	S
MW-42d	D0	Little Lake	ND	7/22/10	GM	A	A	S
MW-51	D0	Little Lake	ND	7/13/10	GM	A	A	S
MW-53s	D0	Little Lake	ND	7/13/10	GM	A	A	S
MW-53i	D0	Little Lake	40	1/26/11	CM	Q	Q	S
MW-53d	D0	Little Lake	2	7/13/10	GM	A	A	S
MW-60	D0	Little Lake	8	7/22/10	GM	A	A	S
MW-61s	D0	Little Lake	21	7/27/10	GM	A	S	S
MW-61d	D0	Little Lake	ND	7/27/10	GM	A	S	S
MW-93	D0	Little Lake	5	8/5/10	CM	A	S	S
A2 Cleaning Supply	D0	Little Lake	94	3/3/11	GM-E	M	M	-
4141 Jackson Rd	D0	Little Lake	7	7/21/10	GM	A	A	S
5005 Jackson Rd	D0	Little Lake	30	1/7/11	GM	Q	Q	-
5115 Jackson Rd	D0	Little Lake	ND	7/20/10	GM	A	A	-
114 Myrtle	D0	Little Lake	ND	8/21/00	GM	R	R	-
131 Myrtle	D0	Little Lake	ND	8/21/00	GM	R	R	-
110 Parkland Plaza	D0	Little Lake	4	7/29/10	GM	A	A	S
4401 Park West	D0	Little Lake	7	7/22/10	GM	A	A	S
4601 Park 4 inch	D0	Little Lake	1	7/27/10	GM	A	S	S
4601 Park 6 inch	D0	Little Lake	2	7/27/10	GM	A	S	S
4742 Park Rd	D0	Little Lake	19	7/22/10	GM	A	A	S

Frequency Codes:

M = Monthly

M*=Monthly while operating, otherwise randomly sampled

Q = Quarterly

S = Semi-Annually

A = Annually

B = Biannually

R = Randomly

O = No longer sample (statics if applicable)

Measured

Analytical Codes:

ND = Non-Detect

Sampling Purpose Codes:

CM = Compliance Monitoring

GM = General Monitoring

GM-E = General Monitoring - Extraction Well