

Work Plan for Test Boring/Well Installation and Aquifer Testing in the Wagner Road Area

Unit E Aquifer

August 1, 2004

BACKGROUND

Pall Life Sciences (PLS) is proposing to investigate the area near Wagner Road between Dolph Park and the Westover Subdivision (Porter Street) as a possible site for a groundwater extraction system.

The goals of this investigation are as follows:

- Determine the approximate width of the Unit E plume in this area;
- Determine the concentrations of 1,4-dioxane in the Unit E plume in this area;
- Determine aquifer coefficients/characteristics (transmissivity, storativity, thickness) for the Unit E aquifer in this area.

These data will be used to determine:

- Whether groundwater extraction in the Wagner road area would be of value;
- The estimated extraction rates necessary to manage the Unit E plume in the Wagner Road area.

WORK PLAN

Test Boring/Well Installation

PLS proposes to install borings/wells at three locations along Wagner Road between the entrance to Dolph Park and Porter Street. Tentative locations for the test well/borings are shown on the attached map. The actual locations of the borings/wells will be dependent on site access. The proposed test borings will be drilled using hollow stem auger drilling methods to a depth sufficient to encounter bedrock. The proposed sampling methods are split spoon and Simulprobe for collection of soil and soil/groundwater.

Soil samples will be collected as split-spoon samples on 10 foot intervals starting at ground surface. Starting at a depth approximately 30-feet below the ground surface, soil/groundwater samples will be collected using Simulprobe techniques and continue through the aquifer(s) to the total depth of the boring. In water bearing units, Simulprobe

sampling will be performed at a maximum frequency of every 10 feet. Split spoon sampling will not be collected at the Simulprobe intervals, as the Simulprobe will account for the soil sampling. All soil samples will be described/classified based on their physical characteristics during the drilling of each boring by an on-site geologist. Groundwater samples will be collected using a Simulprobe. The groundwater samples will be analyzed for 1,4-dioxane by PLS.

Upon reaching the total depth of the individual borings, the borehole will be geophysically logged using a natural gamma tool. This data will supplement the formation samples and provide additional information regarding site geological conditions.

Wells will be installed at the boring locations assuming 1,4-dioxane is detected. The wells will be installed at a depth corresponding to the highest 1,4-dioxane concentrations in the Unit E aquifer as detected from vertical sampling, unless geological conditions suggest a more appropriate monitoring zone. PLS will discuss all well installation plans with MDEQ.

Wells will be constructed of either 2-inch PVC or galvanized steel casing and equipped with a 5-foot stainless steel well screen. The well will be gravel packed and grouted. The wells will likely be completed as flush mounts, equipped with locking caps and locks.

Soil cuttings derived from the drilling and development water will be transported back to PLS for appropriate management.

Test Extraction Well Installation

PLS will review the test boring/well information and determine the value of installing a test extraction well. If supported by the test boring/well information, PLS will install a test extraction well along the longitudinal axis of the Unit E Plume in the Wagner Road area. The decision of to proceed or not to proceed with installation of a test extraction well will be discussed with MDEQ after the collection and analysis of the test boring/well information.

A test boring will be drilled at the test extraction well site unless data from the aforementioned test borings/wells is sufficient to design the test extraction well screen. From the test boring data, the screen zone and screen size will be determined. The test well will be constructed of at least an 8-inch diameter steel casing. Such a casing size should be sufficient to handle anticipated extraction rate should this well be converted to an extraction well. The well may be gravel packed, depending on the grain size of the material in the proposed screen interval.

The test well will be grouted in accordance with Michigan Water Well Construction and Pump Installation Code (Part 127, Act 368, PA 1978 and Administrative Rules).

Development of the well will be performed using air lifting techniques. Groundwater generated during the development will be transported to PLS for treatment and discharge.

Aquifer Performance Testing

Using the test extraction well, PLS will conduct an aquifer performance test. The test will involve three testing periods: an 8 hour pretest, a 24 hour pumping test and an 8 hour recovery test. During these three testing periods, water levels will be periodically measured in the test well and nearby observation wells using either electric tapes or a combination of electric tapes and pressure transducers equipped with data loggers.

Observation wells to be used for the test include: MW-68, MW-71 and the wells installed as part of this investigation.

The flow rate for the aquifer test will be determined after review of the test boring/well data but is anticipated to be approximately 200 gallons per minute. This flow rate is estimated to be sufficient to stress the aquifer at this site and provide valid aquifer testing information.

In addition to collecting water level measurements, flow measurements will be collected periodically during the test. Climatological records for the testing period will be obtained from the National Oceanic and Atmospheric Administration for the Ann Arbor weather station.

The discharge water will be transferred via tanker truck to PLS for treatment and discharge.

Reporting

PLS will prepare a report of the findings from these investigations and provide the report to MDEQ.

Schedule

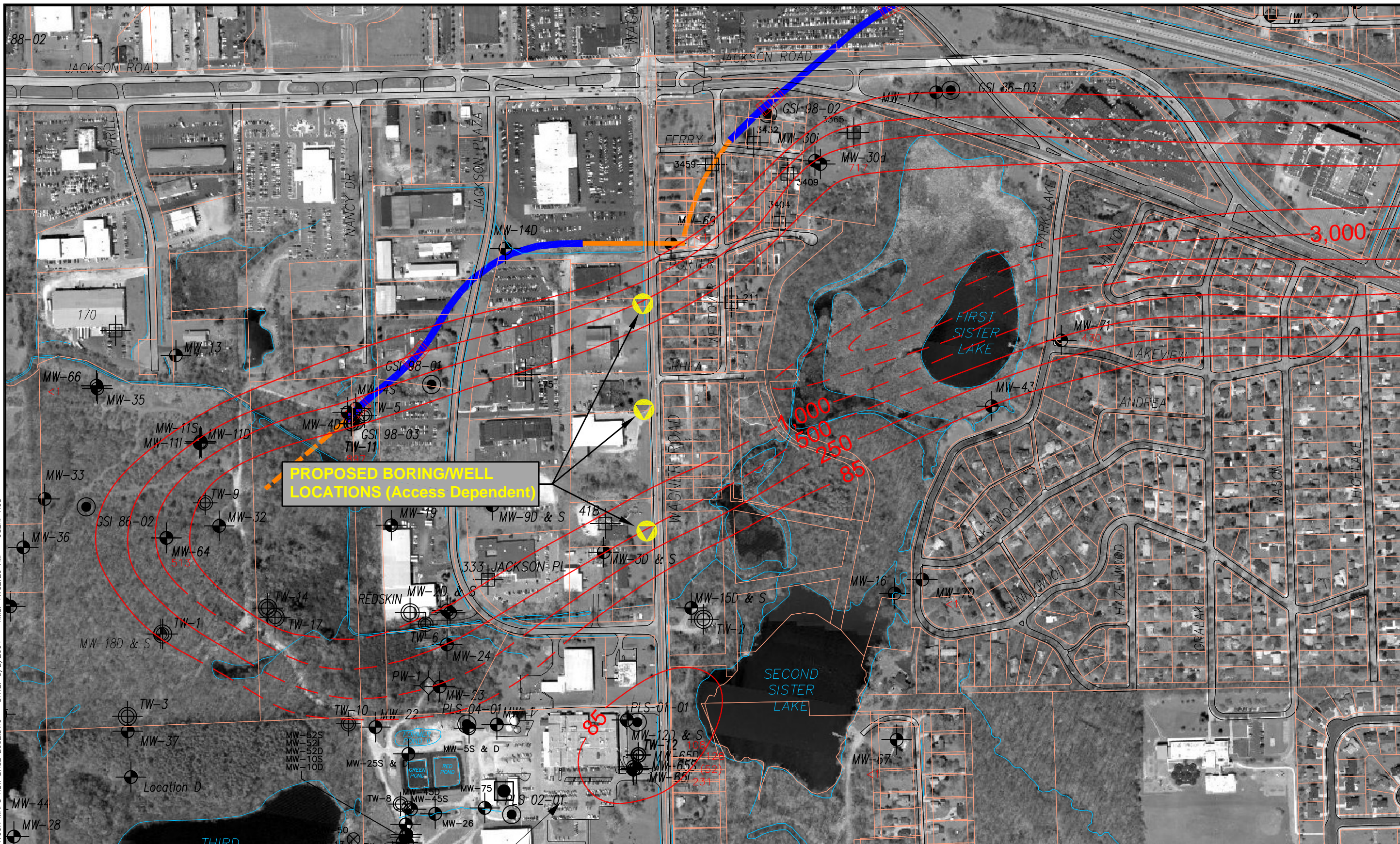
PLS can implement this project immediately upon approval of this work plan by MDEQ. PLS anticipates that this project will take approximately 2-3 months to complete assuming PLS can obtain access to drilling sites.

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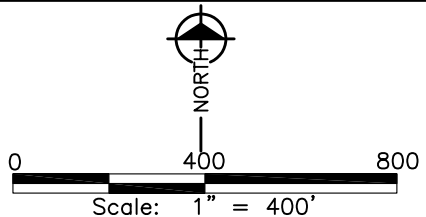
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PLOT INFO: N:\96502\DWG\CONTOUR MAPS NEW BASE 2002.DWG DATE: 8/2/2004 TIME: 11:32:29 AM USER: ACS



- LEGEND**
- ⊕ - MONITOR WELL
 - ⊕ - RESIDENTIAL WELL
 - ⊕ - PURGE WELL
 - ⊕ - HYDROGEOLOGIC TEST BORING
 - ⊕ - UV/OX TREATMENT SYSTEM
 - ⊕ - TEMPORARY PURGE WELL
 - E₁ 1,4-DIOXANE ISOCONCENTRATION CONTOUR (ug/L) JANUARY 2004
 - E₂ 1,4-DIOXANE ISOCONCENTRATION CONTOUR (ug/L) JANUARY 2004
 - 1,4 - 1,4-DIOXANE CONCENTRATION (ug/L)
 - (85) - DATA NOT USED



PROPOSED BORING/WELL LOCATIONS



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PALL LIFE SCIENCES
 SCIO TWP., WASHTENAW COUNTY, MICHIGAN

UNIT E

PROJECT NO.
 F96502