COMPREHENSIVE PROPOSAL
TO MODIFY CLEANUP PROGRAM

I. Introduction.

This Comprehensive Proposal sets forth Pall Life Sciences' ("PLS") plan for modifying the current groundwater cleanup program for the Gelman Sciences, Inc. site. Both PLS and the Michigan Department of Environmental Quality ("MDEQ") agree that it is important to update the program to ensure that it reflects the progress made to date and the parties' current understanding of the nature and extent of the remaining contamination. Central to this effort is the need to establish a sustainable program with clear and coordinated cleanup objectives. PLS and the MDEQ have discussed how best to revise the cleanup program for a number of months, and while this Proposal has not been approved by the MDEQ, it reflects the comments and perspective of both parties.

II. Background.

PLS and its predecessor Gelman Sciences, Inc. have been remediating the groundwater contamination associated with past operations on the 600 S. Wagner Road property (the "PLS Property") since the late 1980's. The parties' original agreement outlining the work necessary to address the contamination is set forth in the October 26, 1992 Consent Judgment entered by the Court in *State of Michigan v Gelman Sciences, Inc.* (the "Consent Judgment").[1] More recently, the Court issued two remediation orders to move the cleanup forward and to address the discovery of a new area of contamination. The Consent Judgment and remediation orders provide the legal framework for the cleanup and identify the objectives PLS must attain.

A. Consent Judgment Objectives

The original system objectives are spelled out in the Consent Judgment. In general terms, the Consent Judgment requires PLS to do two things: (a) prevent the most highly contaminated groundwater in the shallow aquifer (referred to as the "Core Area") from migrating offsite; and (b) intercept and prevent further migration of the leading edge of the two plumes (the Evergreen/D_2 plume and the Western plume) of contamination that had already migrated off the PLS Property. PLS is required to reduce contaminant levels throughout the site to below the drinking water criterion ("DWC") before the system can be turned off, but there is no deadline for reaching the cleanup criterion or mass removal obligation beyond containment of the Core Area contamination. The Consent Judgment requires PLS to use pump-and-treat technology in order to contain and remove the groundwater contamination. The Consent Judgment, which pre-dated the 1995 amendments to Part 201, does not utilize the type of institutional controls authorized by those amendments to prevent unacceptable exposures to the contaminated groundwater. (See MCL 324.20120(b)(4) and (5).)

[1] The Consent Judgment has been amended twice, in 1996 and 1999.

B. Remediation Enforcement Order Objectives

The Consent Judgment objectives were modified by the Court's July 17, 2000 Remediation Enforcement Order ("REO"), which required PLS to prepare a plan that identified the steps needed to reduce contaminant concentrations within the drinking water aquifers to below the DWC within five years. A key aspect of PLS' 5-Year Plan, which both the MDEQ and the Court approved, was the authority given to PLS to make changes to the remedial system with notice to, but without the necessity of prior approval from, the MDEQ. This change allowed PLS to move forward without being bogged down in the previously-required prior-approval process and permitted the MDEQ to focus on its oversight function. Armed with this authority, PLS quickly implemented steps to increase the pace of the cleanup. PLS began purging water from the previously installed Horizontal Well and installed eleven additional extraction wells on or near its property to remove the most heavily contaminated groundwater. This additional infrastructure allowed PLS to increase its overall purge rate from approximately 300 to 1,200-1,300 gpm while continuing to contain the leading edge of the offsite plumes. By focusing increased efforts on the areas where contaminant concentrations were the highest, PLS was able to increase the rate of contaminant mass removal and decrease concentrations throughout the site.

C. Unit E Order Objectives

The Court's December 14, 2004 Order and Opinion Regarding Remediation Of The Contamination Of The "Unit E" Aquifer (the "Unit E Order") sets forth the requirements and cleanup objectives for the subsequently discovered contamination in the deeper Unit E aquifer. After considering the proposals of each party, the Court established the "Prohibition Zone," which prohibits the use of groundwater within its boundaries as a means of preventing exposure to the contaminated groundwater. PLS is responsible for monitoring the plume as it migrates to the Huron River to ensure that it does not move beyond the Prohibition Zone boundaries. This type of institutional control is one of the new remedial techniques authorized by the 1995 amendments to Part 201, and has been implemented at sites of contamination throughout the state.

The Unit E Order does require PLS to utilize pump-and-treat technology on a limited basis to prevent contamination above the level that is protective of surface water – the groundwater surface water interface ("GSI") criterion of 2,800 ppb – from migrating past Maple Road. This provides additional assurance that groundwater containing concentrations above the GSI criterion will not reach the Huron River. The Unit E Order also requires PLS to prevent groundwater in the deeper Unit E aquifer with concentrations above 85 ppb from migrating east of Wagner Road if that goal can be accomplished without slowing down the shallower aquifer (D_2 and C_3) cleanup.[2]

[2] PLS' total treatment capacity is limited to the 1,300 gpm it is allowed to discharge to Honey Creek. The Court refused to require PLS to capture 85 ppb at Wagner Road if accomplishing this goal would require it to reduce its shallower aquifer extraction.

D. Progress to Date

The remediation carried out under the Consent Judgment and the Court's recent remediation orders has been very successful. The groundwater remediation system developed by PLS and overseen by the Court and the MDEQ has prevented unsafe human and environmental exposures. PLS' proprietary treatment systems, including its current state-of-the-art ozone treatment system, have successfully treated 4.9 billion gallons of highly contaminated groundwater to trace levels, removing 79,000 pounds of 1,4-dioxane. This program has significantly reduced contaminant concentrations across the site, particularly since the Court's REO and the adoption of PLS' 5-Year Plan. The dramatic decrease in concentrations attributable to the effort mandated by the REO and PLS' 5-Year Plan is illustrated in Figure 1, which compares groundwater concentrations in the D_2/C_3 aquifers before adoption of the 5-Year Plan to current levels. Although the highest contaminant concentrations remain above the current 85 ppb DWC, contaminant concentrations throughout the affected area and the risk to the public have been significantly reduced. PLS has achieved similar decreases in concentrations in the subsequently discovered Unit E plume. The rapidly declining concentrations in the water purged from the Unit E extraction wells (TW-11, TW-12, TW-17 and TW-18) are set forth in Figure 2.

E. Current Situation – Issues to be Addressed

The parties' understanding of the nature and extent of the contamination and, in particular, the geology of the relevant aquifer systems has evolved and improved since the Consent Judgment was entered in 1992 and even since the Unit E Order was issued in 2004. Differing cleanup objectives based on distinctions between aquifers that made sense in the past do not necessarily make sense now. Both PLS and the MDEQ agree that it makes sense to take a fresh look at the cleanup program and to modify it to reflect the current state of knowledge of the hydrological and geological conditions affecting the remediation, with the goal being to improve the program's efficiency, sustainability, and effectiveness.

The legal framework of the cleanup program has also evolved over time and needs to be modified to reflect the parties' current understanding of the aquifer systems and the post-Consent Judgment amendments to Part 201. It is now apparent that the cleanup objectives and compliance points set forth in the judicial orders described above, which reflected the parties' understanding at the time, are in many cases inconsistent with each other and at times redundant. The 1995 amendments to Part 201, which reflect the evolution of environmental laws nationally, also provide the parties and the Court with more options for addressing the contamination than were available when the Consent Judgment was entered. The Consent Judgment objectives need to be reevaluated in light of the new legal mechanisms like institutional controls that are now available.

Another concern is that certain cleanup objectives have proven to be unsustainable or unachievable. In some cases, changing aquifer conditions have made it impracticable for PLS to continue to capture and contain certain portions of the plume. In other areas, the technical challenges associated with determining if PLS is in compliance with outdated cleanup objectives has led to repeated technical disputes and legal challenges and the resulting diversion of scarce resources. The cleanup objectives should be modified so that they can be successfully implemented while remaining protective.

Finally, although PLS has been successful in dramatically lowering the highest site concentrations, this increased level of effort has not achieved the goal of reducing concentrations to below the current 85 ppb DWC. It has become apparent that this goal cannot be achieved in the near term given the limits of pump-and-treat technology. The reduction in concentrations in almost every onsite purge well has flattened out and become asymptotic at levels well above the DWC. (Figure 2). The US EPA and others have published materials that confirm that this is a common characteristic of pump-and-treat remedial systems, particularly in areas with complex geology like that present at the Gelman site and a hydrophilic contaminate like 1,4-dioxane. The cleanup objectives should be revised to reflect this reality.

III. Overview of Current Legal Requirements and Remedial Infrastructure.

A. Current System -- Infrastructure

PLS has installed extraction wells, pipelines, treatment systems and other related infrastructure in order to satisfy the objectives of each system. The decision to modify the cleanup objectives should take into account the effect of such modifications on the existing infrastructure and whether it can continue to be efficiently utilized.

1. Evergreen System (Consent Judgment)

Objective: Capture the leading edge of the contamination above the drinking water criterion in the area of the Evergreen Subdivision to prevent it from migrating further east.

Infrastructure: Two extraction wells (LB-1 and LB-3) located in the middle of the Evergreen Subdivision and one extraction well (AE-3), which is currently operating at a low purge rate (~15 gpm) due to poor aquifer conditions located further east on Allison Drive. The REO requires PLS to purge a total of 200 gpm from these extraction wells. The purged groundwater is then transported from these wells to the Wagner Road facility for treatment via the deep Horizontal Well/Transmission line.[3] The still-operational southern portion of the Horizontal Well and three traditional extraction wells (TW-5, 9 and 14) provide additional upgradient extraction in the D_2 aquifer. These wells currently extract approximately 245 gpm.

Institutional Control: None.

Sustainability: Poor. LB-1 and LB-3 have served their mass-removal function well for many years with only routine maintenance. The transmission line that PLS installed to convey water from the Evergreen extraction wells back to the Wagner Road facility failed in 2006, but the converted Horizontal Well now provides a reliable long-term conveyance. The current leading edge capture well (AE-3) is, however, the third well PLS has been

[3] The portion of the transmission line from the Evergreen Subdivision to the Gelman-owned property on Porter Street failed in 2006. PLS converted the northern portion of the Horizontal Well into a transmission line by inserting a durable liner into the well.

forced to install at the Allison Street location and is almost inoperable due to poor aquifer conditions at this location. PLS does not believe that continuing to capture the leading edge of the contamination at this location is practical in the long-term. Moreover, this area has been the source of the majority of the technical and legal disputes between the MDEQ and PLS regarding delineation of the plume and compliance with the Consent Judgment objectives. This has resulted in a tremendous waste of resources by both the MDEQ and PLS with no corresponding environmental benefit.

2. Maple Road Interim Response (Unit E Order)

Objective: Prevent contamination above 2,800 ppb from migrating east of Maple Road. The system is designed to purge and treat up to 200 gpm of contaminated groundwater. PLS has been operating the pump-and-treat system as part of a general effort to reduce concentrations and mass, even though concentrations above 2,800 ppb have not reached Maple Road.

Infrastructure: Groundwater is extracted from a single extraction well located just west of Maple Road and then transported by shallow pipelines to a nearby mobile treatment unit located north of the extraction well. After treatment with ozone, the treated water is then disposed of by reinjecting it back into the aquifer using two injection wells located north and south of the extraction well on the west side of Maple Road.

Institutional Control: The Court established a Prohibition Zone that prevents groundwater use within its boundaries. The Prohibition Zone covers the entire area of the Unit E plume east of Wagner Road and its expected migration pathway to the Huron River.

Sustainability: Poor. The extraction well and the mobile treatment unit have performed well. The injections wells, however, have been difficult to operate at high injection rates due to chronic bio-fouling. This leaves PLS with no reliable long-term method of disposing of the treated water.

3. Wagner Road (Unit E Order)

Objective: To prevent groundwater present in the Unit E aquifer at concentrations above 85 ppb from migrating east of Wagner Road, *but only* if this objective can be accomplished without reducing the rate at which the shallower aquifers are being remediated.

Infrastructure: One extraction well with 250 gpm capacity (TW-18) and related piping that bring the groundwater back to the plant for treatment and discharge into the Honey Creek Tributary. There are also three additional upgradient on-site extraction wells (TW-11, 12, and 17) that are currently extracting 192 gpm from the Unit E.

Institutional Control: The Prohibition Zone extends from Wagner Road to the Huron River, covering the Unit E plume and its expected migration pathway.

Sustainability: Poor. The infrastructure for this system is new and is likely to remain operational for the foreseeable future and is accessible if maintenance is necessary. However, the current method of performance monitoring to determine compliance with the mid-plume capture objective has proven to be unworkable and is the source of significant technical disputes.

4. Core Area (Consent Judgment/REO)

Objective: Source control (Consent Judgment) and mass removal (5-Year Plan). The Consent Judgment requires PLS to prevent expansion of the portion of the shallow C_3 aquifer that has concentrations of 500 ppb or more from expanding. The 5-Year Plan, however, allows PLS to modify its purge rates as it sees fit in order to maximize mass removal.

Infrastructure: PLS has installed six extraction wells that withdraw contaminated groundwater from the shallow C_3 aquifer. Five of these wells are currently being operated with a combined purge volume of approximately 332 gpm. Near surface pipelines transport the groundwater to the on-site treatment system.

Institutional Control: None. The Prohibition Zone does not extend west of Wagner Road.

Sustainability: Moderate. The infrastructure for this system is located on-site and is relatively easy to maintain. The biggest sustainability issue is the ability of pump-and-treat technology to reduce concentrations to levels below the drinking water criterion.

5. Western System (Consent Judgment)

Objective: The objectives of the Western System are: (a) to contain downgradient migration of any plume(s) of groundwater contamination emanating from the PLS Property that are located outside the Core Area and to the northwest, west, or southwest of the PLS facility; (b) to remove groundwater contaminants from the affected aquifer(s); and (c) to remove all groundwater contaminants from the affected aquifer or upgradient aquifers within the site that are not otherwise removed by the Core System as set forth in Section V.B of the Consent Judgment or the GSI Property Remediation Systems set forth in Section VI of the Consent Judgment.

Infrastructure: PLS has operated one extraction well in the Western System. This well is "batch" purged monthly. Each month, approximately 36,000 gallons of water are purged from the well and transferred to PLS for treatment.

Institutional Control: None.

Sustainability/Comments: Over 20 years of monitoring have demonstrated downward or stable 1,4-dioxane trends in the Western System. Since 2003, the extraction

well located at the Ann Arbor Supply property has been the only monitoring point in the Western System with concentrations above the DWC. The last sample collected from this well had a concentration of 98 ppb (March 5, 2009) – just above the DWC.

6. Soils System (REO)

Objective: Pursuant to the 5-Year Plan as required by the REO of July 17, 2000, PLS agreed to conduct soil sampling at the Soils System area prior to the termination of the response activities regarding the Core System. According to the REO, sampling is required in order to confirm that 1,4-dioxane concentrations in the soil are either below the default generic residential leaching to groundwater criteria, or determined on a site-specific basis not to leach above the generic residential groundwater criteria.

Infrastructure: None.

Institutional Control: None.

Sustainability/Comments: Available soil quality data indicate that there are very limited areas within the Soils System where 1,4-dioxane concentration in the soil exceed the MDEQ soil criterion protective of residential drinking water of 1,700 µg/kg. Soil sample data collected in February 1998 indicate concentrations of 1,4-dioxane exceed this standard at three soil sample locations in the former Pond 1 area and several sample locations in the former Burn Pit area.

7. Marshy Area (Consent Judgment)

Objective: The objectives of this system are to: (a) remove contaminated groundwater from the Marshy Area located north of former Ponds I and II; (b) reduce the migration of contaminated groundwater from the Marshy Area into other aquifers; and (c) prevent the discharge of contaminated groundwater from the Marshy Area into the Honey Creek Tributary in quantities which cause the concentration of 1,4-dioxane at the groundwater-surface water interface of the Tributary to exceed 2,800 ppb.

Infrastructure: PLS operates one extraction well in the Marshy Area (PW1). This well is purged at its maximum flow rate (approximately 5 gpm). Water is transferred via pipeline to the PLS treatment system.

Institutional Control: None.

Sustainability/Comments: The infrastructure for this system is located on-site and is relatively easy to maintain. Installing additional infrastructure in this area is very difficult due to wetlands and accessibility issues. Additionally, the yield of water-bearing deposits in the Marshy Area is very low, significantly limiting the volume of water that can be extracted in this area.

IV. Goals of Proposed Remedial Modifications

After discussions with the MDEQ, PLS has identified the following goals to be achieved by any modifications to the cleanup program.

A. Maintain Protectiveness of Cleanup Program.

Any modifications to the cleanup program must, at a minimum, maintain the same level of protectiveness as the current program.

B. Eliminate Inconsistent Cleanup Objectives.

A number of cleanup objectives discussed above are inconsistent, and the distinctions between the systems are outdated. For instance, the distinction between the Wagner Road cleanup objectives for the Unit E aquifer (capture 85 ppb, if possible) and for the shallower D_2/C_3 aquifers (none) is no longer justified based on current information. Recent investigations have shown that these two units have significant hydraulic connection.[4]

Similarly, the distinction between the Evergreen and Maple Road cleanup objectives makes little sense, based on current exposure pathways and the parties' understanding of the relationship between the D_2 and Unit E aquifers. Since 1992, the Consent Judgment has required Gelman/PLS to capture the leading edge of the 85 ppb plume within the Evergreen Subdivision area shortly before it would otherwise reach Maple Road. At that time many of the homes in the area utilized private water wells. Under those circumstances, requiring Gelman/PLS to halt migration of the plume before it caused additional wells to become contaminated was reasonable and appropriate. However, that has remained the cleanup objective for the Evergreen System even though municipal water is now available to the entire subdivision and there are only a handful of homes still utilizing private supply wells.

In contrast, in 2004 the availability of municipal water and the absence of private wells in the affected area allowed the Court to utilize an institutional control (the Prohibition Zone) to eliminate any unacceptable exposures to the Unit E plume. Consequently, the cleanup objective selected did not include capture of the leading edge of the plume of contamination above the DWC. Rather, the plume is allowed to migrate to the Huron River so long as PLS prevents concentrations greater than the GSI criterion of 2,800 ppb from migrating east of Maple Road. There is little doubt that this would have also been the cleanup objective for the Evergreen plume if it had been discovered at the same time as the Unit E plume. Moreover, the parties now realize that the Evergreen plume and the shallower portion of the Unit E plume are hydraulically connected and, in reality, part of the same plume. The Evergreen extraction wells may in fact be pulling contaminated groundwater from the Unit E north into the Evergreen Subdivision area. As

[4] Moreover, requiring PLS to capture the Unit E contamination above the DWC does not increase the protectiveness of the overall remedy. Use of the groundwater is already illegal east of Wagner Road by virtue of the Prohibition Zone. It is also inconsistent with the Unit E Order's Maple Road remedial objective (Unit E groundwater contamination below 2,800 ppb is allowed to migrate).

recently confirmed, the Evergreen plume would migrate east and merge with the Unit E plume if it was allowed to do so. Establishing different cleanup objectives for different parts of what the parties now know is a single plume is not logical.

C. Develop Sustainable Cleanup Objectives and Infrastructure for the Evergreen and Maple Road Systems.

The ongoing difficulties with the Allison Street extraction wells will make it increasingly difficult, if not impossible, to continue to capture the leading edge of the Evergreen plume at that location. Modifications to the existing program are needed so that the non-achievable objective of capturing the leading edge of the plume can be abandoned without affecting the protectiveness of the cleanup program. Similarly, the Maple Road system may not be sustainable as currently configured. Groundwater re-injection does not appear to be a reliable long-term method of disposing of treated groundwater. The existing program must be modified to provide a reliable disposal method for water purged by the Maple Road extraction system.

D. Modify Goal of Accelerated Cleanup and Focus on Mass Removal.

In its attempt to achieve the Court's 5-year cleanup goal, PLS increased its overall purge rates from approximately 300 gpm to 1,200-1,300 gpm. Although PLS has been successful in dramatically lowering the highest site concentrations, this increased level of effort has not achieved the goal of reducing concentrations to below the 85 ppb drinking water criterion. Indeed, the extent of the groundwater contamination above 85 ppb is largely unchanged. The reduction in concentrations in most onsite purge wells has flattened out and become asymptotic, indicating that further significant reduction in concentrations will not occur in the foreseeable future. (Figure 2.) The US EPA and others have published materials that confirm that this is a common characteristic of pump-and-treat remedial systems, particularly in areas with complex geology and a hydrophilic contaminate like 1,4-dioxane. Focusing the cleanup effort on the areas where the concentrations are the highest will yield the most benefit for a given level of effort and will help ensure that downgradient containment objectives are met (e.g., containment of 2,800 ppb at Maple Road and containment of the plume within Prohibition Zone boundaries).

E. Structure Cleanup Objectives to Minimize Future Disputes and Waste of Scarce Resources.

Nearly all of PLS' disputes with the MDEQ have arisen from PLS' efforts to capture the leading edge of the Evergreen plume and to confirm that this objective has been satisfied. PLS anticipates similar disputes in the near future arising from the Unit E mid-plume capture objective at Wagner Road. Modifying these cleanup objectives is necessary to avoid costly legal disputes, which require scarce technical and legal resources.

V. PROPOSED MODIFICATIONS TO REMEDIAL PROGRAM

PLS is proposing to simplify the legal structure of the cleanup program by reducing the number of remedial systems and cleanup objectives. Under this proposal, there will be only two remedial systems, which will be defined by geography and the presence/absence of an

institutional control: (1) the area west of Wagner Road where no property or use restrictions are in place (the "Western Area"); and (2) the area east of Wagner Road, including the area encompassed by the Prohibition Zone (the "Eastern Area"). As set forth below, each Area will have straight-forward cleanup objectives that will increase the sustainability and effectiveness of the overall program.

A. Western Area

The proposed modified cleanup program for the Western Area includes the following elements:

1. Mass Reduction. PLS is proposing to focus its efforts on reducing contaminant mass and contaminant concentrations in the Western Area. Initially, PLS plans to operate nine extraction wells in the Western Area. This includes installing the new extraction well at the MW-94 location described in paragraph 3, below. Four of the low-producing extraction wells currently in operation will be taken out of service. The extraction wells that PLS intends to operate and the initial proposed purge rate for each well are set forth in the spreadsheet attached as Table 1. The locations of these wells are identified in Figures 2 and 4.

2. Clear and Enforceable Cleanup Objectives. Operation of these mass reduction wells will achieve the following cleanup objectives for the Western Area system:

   a. Containment. PLS will prevent the areas impacted by contaminant concentrations of 85 ppb or greater from expanding in directions that do not lead to the Prohibition Zone east of Wagner Road, consistent with R 299.5705(5).

   b. Mass Removal. PLS will operate the mass reduction wells until they are no longer productive in terms of removing mass and lowering concentrations. Specifically, PLS will continue to operate these wells so long as the concentration of the purged water remains above 500 ppb.[5] If the concentration of an extraction well falls below 500 ppb, PLS will evaluate whether the well can be operated effectively (i.e., with concentrations above 500 ppb) at a lower extraction rate. The current concentrations and initial proposed purge rates for these extraction wells are set forth in the spreadsheet attached as Table 1.

3. Increased Wagner Road Extraction. PLS will install a new extraction well in the area of MW-94 where high concentrations have been detected. PLS will operate the new extraction well together with TW-18 to reduce the

[5] In the event the DWC is modified, the 500 ppb threshold will be modified appropriately.

mass of contaminants migrating into the Eastern Area. PLS is proposing to eliminate the Unit E Order's mandate of preventing concentrations above 85 ppb from migrating east of Wagner Road in the Unit E aquifer. As the parties have discovered while implementing the Court's Unit E Order, there is significant communication between the Unit E and D_2 aquifers in the Wagner Road area such that they are effectively a single aquifer. It has proven impracticable to determine if PLS is in compliance with the Unit E objective, in part because of the difficulty in distinguishing between the aquifers. More importantly, the Unit E cleanup objective provides no additional environmental or public health benefit. The Prohibition Zone already effectively prevents any unacceptable exposures to the groundwater contamination that migrates east of Wagner Road from west to east.

4. Performance Monitoring. PLS has prepared a Comprehensive Groundwater Monitoring Plan ("Monitoring Plan") that identifies the monitoring wells that will be used to evaluate the performance of the Western Area remedial system in achieving the cleanup objectives. PLS' proposed Monitoring Plan is attached as Appendix 1.

5. Termination Criteria.

   a. DWC Containment Objective. PLS will continue to operate the Western Area extraction wells deemed necessary to prevent the areas impacted by contaminant concentrations of above DWC from expanding in directions that do not lead to the Prohibition Zone until PLS can establish that groundwater extraction is no longer necessary to prevent such expansion. Long-term monitoring will be implemented as provided in the Consent Judgment.

   b. Mass Removal Objective. PLS will continue to operate individual extraction wells for mass removal purposes until contaminant concentrations in the well fall below 500 ppb.[6] Once the concentration of an extraction well falls below 500 ppb, PLS will evaluate whether the well can be operated effectively (i.e., with concentrations above 500 ppb) at a lower extraction rate.

6. Institutional Controls. Prior to terminating active remediation in the Western Area (i.e., groundwater extraction), PLS will evaluate the extent of any areas where contaminant concentrations still exceed the DWC. PLS will obtain and record restrictive covenants that prevent unacceptable exposures to the groundwater on any affected properties. Groundwater extraction will continue until such restrictive covenants or other acceptable institutional controls are in place.

[6] In the event the DWC is modified, the 500 ppb threshold will be modified appropriately.

PLS anticipates that after evaluating the performance of its system, it may make adjustments to the extraction well system in order to meet the revised cleanup objectives. PLS may make such changes either to remove the known areas of contamination more efficiently or to address subsequently discovered areas of contamination. These adjustments may include installing additional extraction wells, moving or replacing extraction wells, converting monitoring wells to extraction wells by installing jet pumps, or varying the purge rates of the purge wells. Consistent with the procedures set forth in the approved 5-Year Plan, PLS will give MDEQ prior written notice (by mail or electronic mail) of the proposed changes unless PLS is responding to an emergency situation. A description of implemented changes will be provided in PLS' quarterly reports. This prior notice approval process will be incorporated in changes to Section X of the Consent Judgment and all other Consent Judgment provisions requiring prior approval.

B. Eastern Area

PLS is proposing to consolidate the Evergreen Subdivision and Maple Road systems and their conflicting cleanup objectives into one coordinated response action system. Addressing the Evergreen/D_2 plume in the same way as the Unit E plume makes sense for several reasons. The defining feature of the area east of Wagner Road is the availability of municipal water. With very few exceptions, no one east of Wagner Road in the affected area is using the groundwater as a drinking water source. It was this circumstance that allowed the Court to establish the Prohibition Zone to address the Unit E plume. Although it was not the case in 1992 when the Consent Judgment was entered, municipal water is now available in the Evergreen Subdivision area and nearly all the homes are connected. This changed circumstance and the parties' greater understanding of the interrelated nature of the Evergreen and Unit E plumes – they are, in reality, part of the same plume – provide sufficient justification for modifying the cleanup objectives of the Evergreen system. The significant sustainability problems associated with both systems essentially require this logical modification.

The proposed modified cleanup program for the Eastern Area includes the following elements:

1. Elimination of Drinking Water Pathway by Expansion of Prohibition Zone. PLS is proposing to expand the Prohibition Zone to include the Evergreen Subdivision area. The proposed new boundary of the Prohibition Zone is shown on Figure 4. The requirements of the Unit E Order regarding replacement of wells and connection to municipal water would apply. PLS has identified six private water wells in this area, and, if this modification is approved, PLS will connect these properties to municipal water. PLS' Well Identification Plan will also be supplemented to include examination of this area to confirm the absence of other private wells.

2. Unified 2,800 ppb Containment Cleanup Objective. The cleanup objective of capturing the leading edge of the Evergreen plume above the drinking water criterion would be eliminated. Any remnants of the Evergreen plume would be allowed to migrate east to the Huron River, within the expanded Prohibition Zone. The Maple Road objective of preventing contaminant

concentrations above 2,800 ppb would apply to this area of the plume as well. Elimination of the capture objective would allow PLS to abandon the unsustainable Allison Street extraction well operation.

3. Continued Evergreen Groundwater Extraction. PLS would continue to operate the LB extraction wells as mass reduction wells at reduced extraction rates. Operation of these wells would ensure that groundwater concentrations that migrate past Maple Road remain well below 2,800 ppb. This operation would also ensure that any northern expansion of the plume in the Evergreen area is minimal and contained within the expanded Prohibition Zone boundary. PLS' initial proposed purge rates for the LB wells are listed on Table 1.

4. Potential Installation of an Additional Extraction Well. After reducing the extraction rates of the Evergreen wells, PLS will evaluate whether to install a new groundwater extraction well in the vicinity of soil boring GSI-96-01, near the intersection of Rose and Valley Streets. This potential well location is shown on Figure 3. PLS believes that this area – where there does not appear to be a geologic barrier between the D_2 and the deeper Unit E aquifers – is near the source of the higher contaminant concentrations that have migrated toward the Dupont Circle area, where concentrations have risen over time. This area is also upgradient of the LB wells. It may prove advantageous to extract groundwater from this location to lower downgradient concentrations and to help control any potential expansion of the plume in the Dupont Circle area that might otherwise occur with the reduction of the LB extraction well purge rates. A new extraction well at this location could be connected to the existing transmission pipeline that transfers water from the Evergreen extraction wells to the main plant without requiring significant additional pipeline installation (or the associated access issues).

5. Installation of Pipeline to Connect the Maple Road and Evergreen Systems. PLS intends to install a pipeline to convey purged groundwater from the Maple Road extraction system to the Horizontal Well/Transmission line in the Evergreen Subdivision. This will allow PLS to cease using the unreliable groundwater reinjection wells as its primary water disposal method. The approximate route of this pipeline is shown on Figures 3 and 4.

6. Maple Road Extraction Well. PLS will continue to operate TW-19 as necessary to ensure that contaminant concentrations above 2,800 ppb do not migrate past Maple Road and to remove contaminant mass as appropriate. Water extracted from TW-19 will be conveyed to the Wagner Road treatment facility for treatment via the Horizontal Well/Transmission line, as described in paragraph 5, above.

7. Downgradient Monitoring. PLS will continue to monitor the plume, including the Evergreen area portion, as it migrates to the Huron River to insure that it does not move outside the expanded Prohibition Zone boundaries. (See Monitoring Plan attached as Appendix 1).

8. Termination Criteria.

   a. GSI Containment Objective. PLS will operate TW-19 as needed to meet this objective until all approved monitoring wells upgradient of Maple Road are below the GSI criterion *or* PLS can establish that additional purging is no longer necessary to satisfy the containment objective at this location. Long-term monitoring will be implemented as provided in the Consent Judgment.

   b. Prohibition Zone Containment Objective. PLS will continue to monitor the plume above the DWC as it migrates to the Huron River until all approved monitoring wells upgradient of the Huron River are below the DWC, *or* PLS can establish that continued monitoring is not necessary to satisfy the Prohibition Zone containment objective.

In developing this proposal, PLS evaluated what effect, if any, the proposed reduction in extraction rates from the Evergreen System wells would have on groundwater flow direction. Both PLS and the MDEQ wanted to be sure that the proposed change in rates would not allow groundwater from the Evergreen area to flow toward the north or northeast and beyond the boundary of the expanded Prohibition Zone. The results of this MDEQ-approved investigation are documented in PLS' March 2009 Evergreen Water Level Study Report, which is available on the MDEQ's Gelman Sciences website at http://www.michigan.gov/deq/0,1607,7-135-3311_4109_9846_9847-71595--,00.html. As stated in this report, the data collected from this test indicate that reducing or terminating groundwater extraction from the Evergreen extraction wells will not cause any significant change in the groundwater flow directions in the Evergreen Area. The water level data suggest that any portion of the plume migrating beyond the capture of the Evergreen System wells will migrate to the east under reduced flow conditions and ultimately merge with the Unit E plume. There are no data that suggest that the Evergreen plume is currently migrating to the northeast, or that it would migrate to the northeast if groundwater extraction from the Evergreen System purge wells is reduced or terminated. Therefore, this risk is minimal.

VI. Conclusion

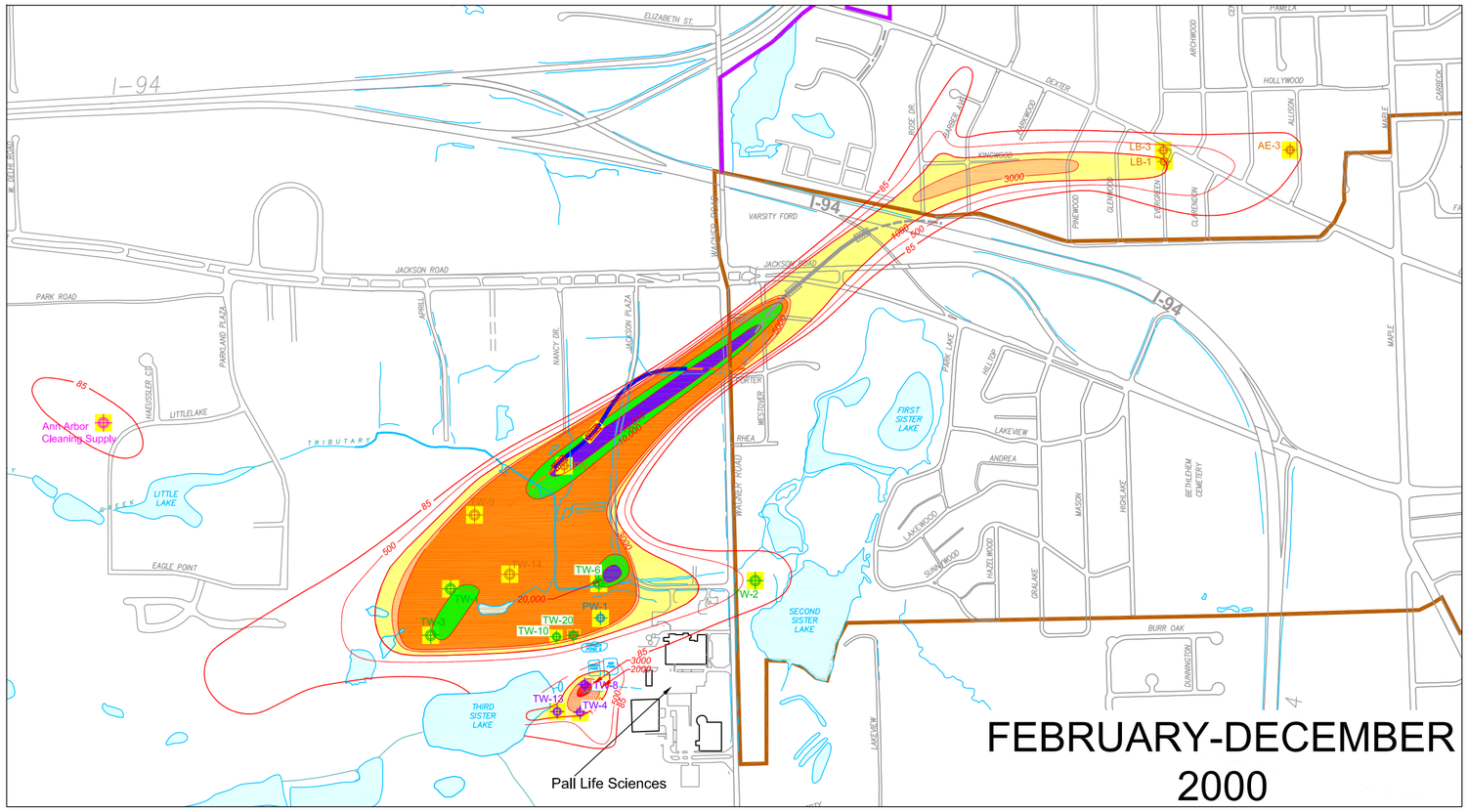
The modifications PLS is proposing directly address each of the goals identified above and significantly benefit both the overall cleanup program and the environment. These modifications include clear and definable cleanup objectives that can be effectively communicated to the public. The revised program will be more protective than the existing program because the few remaining homes using private water wells in the Evergreen Subdivision area will be connected to municipal water. These changes also alleviate the sustainability issues

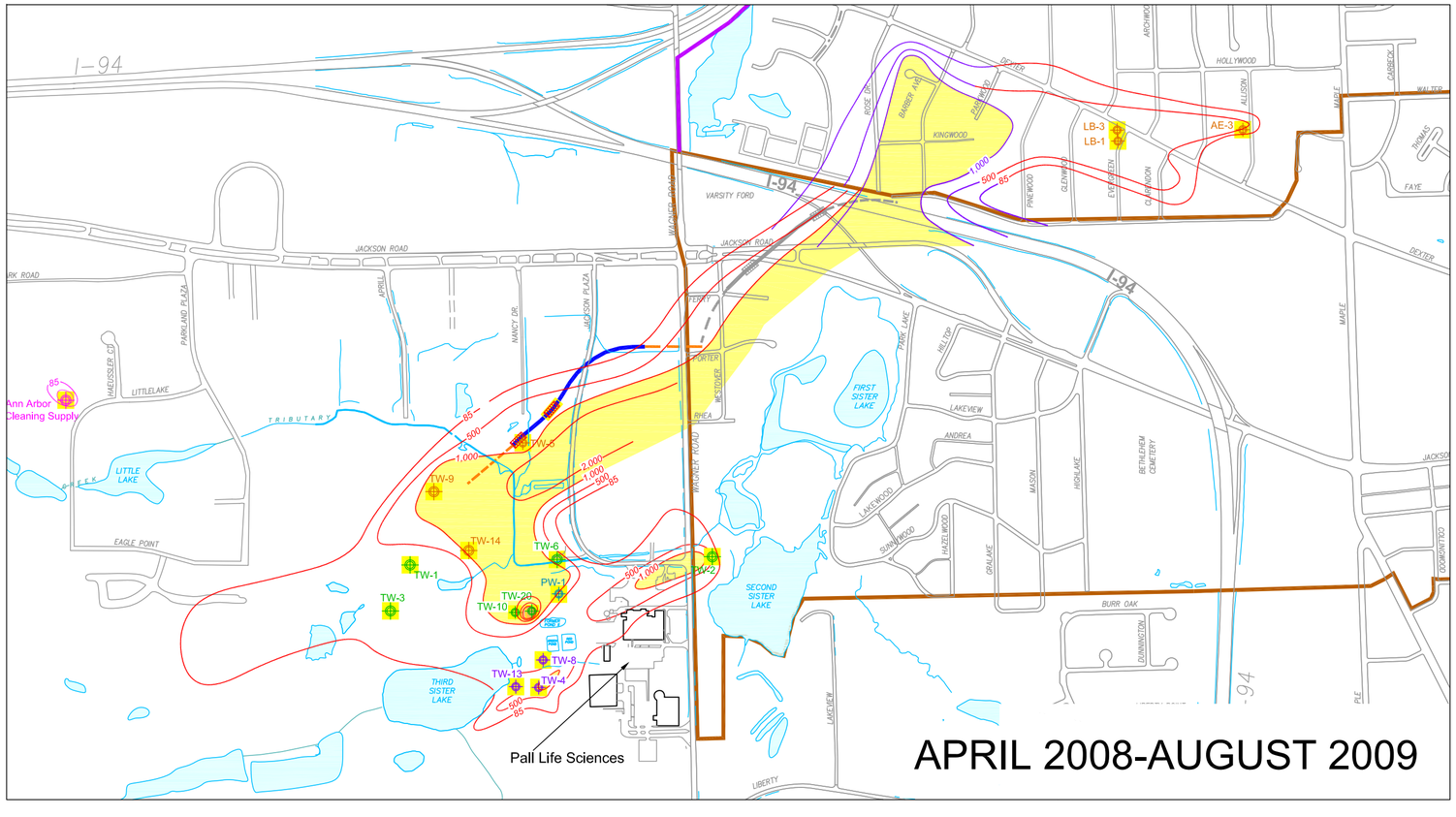
affecting the Evergreen and Maple Road systems and the inconsistent cleanup objectives of the previous cleanup program.

PLS' efforts will be focused on efficiently removing contaminant mass and reducing the highest concentrations in the site. The modifications take into account the widely acknowledged limitations of large-scale pump-and-treat cleanups in complex hydrogeological settings and properly focus on source and mass removal.

Finally, reconfiguring the program as suggested will also move this site toward a more self-sustaining mode where neither of the parties will be required to commit scarce resources to nonproductive enforcement-related and litigation-intensive activities. Such disputes not only waste resources, they also negatively affect the public's perception of what has been a very effective cleanup effort.

Figures





LEGEND

1,4-DIOXANE (µg/L)

- 1,000 - 3,000
- 3,000 - 5,000
- 5,000 - 10,000
- 10,000 - 20,000
- >20,000

NORTH

GRAPHIC SCALE
0 400 800'

EXTRACTION WELLS

- UNIT C3
- WESTERN SYSTEM
- UNIT D2
- SOUTHWEST AREA
- MARSHY AREA

COMPARISON OF 2000-2009 1,4-DIOXANE CONCENTRATIONS

fic&h

engineers
scientists
architects
constructors

fishbeck, thompson, carr & huber, inc.

Pall Life Sciences

Scio Twp., Washtenaw County, Michigan

Comprehensive Proposal to Modify Cleanup Plan

Drawn By	ACS
Designer	ACS
Reviewer	JWB
Manager	JWB

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PROJECT NO.
F96502

FIGURE
1

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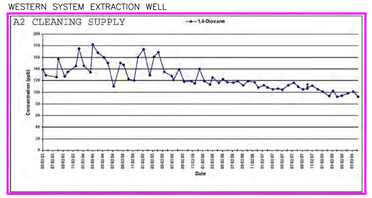
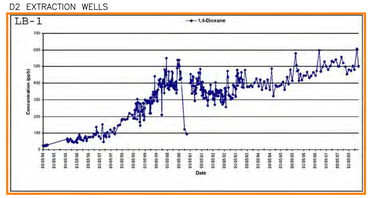
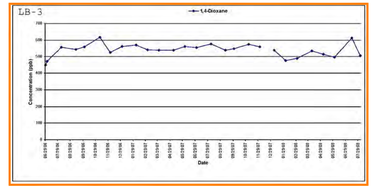
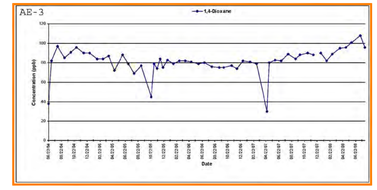
WESTERN SYSTEM EXTRACTION WELL

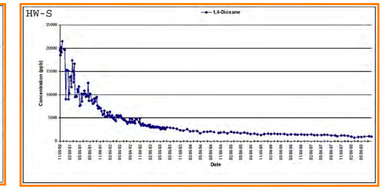


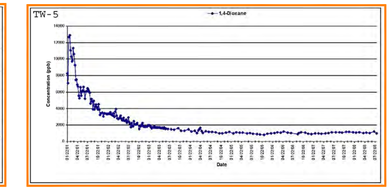
D2 EXTRACTION WELLS



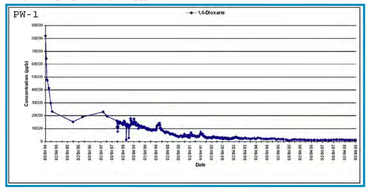


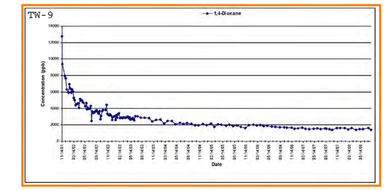




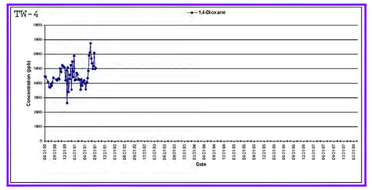


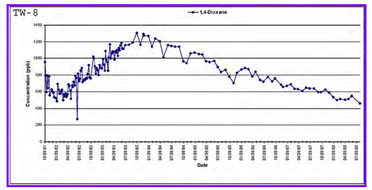
MARSHY AREA EXTRACTION WELL

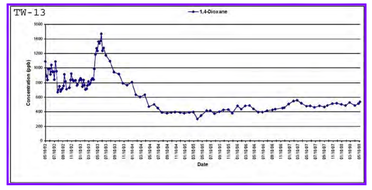


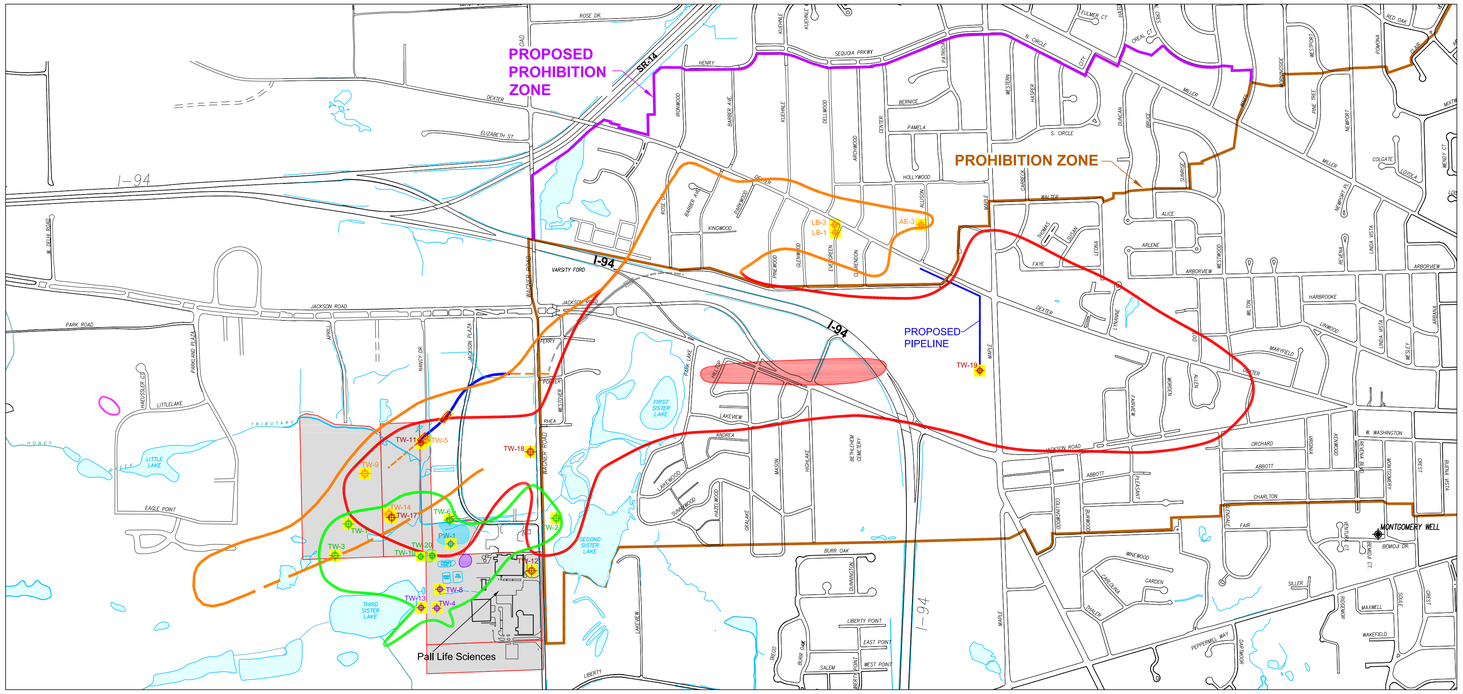


SOUTHWEST PROPERTY EXTRACTION WELLS

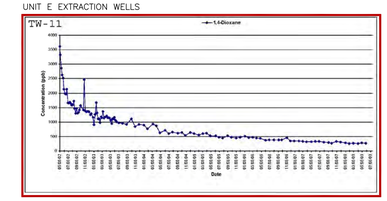


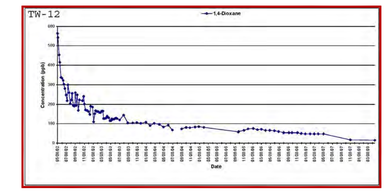


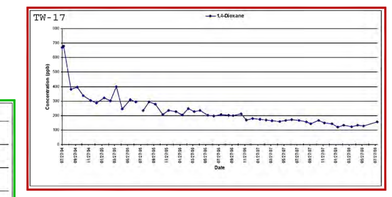




UNIT E EXTRACTION WELLS







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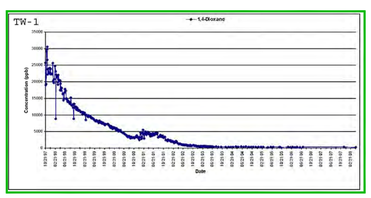

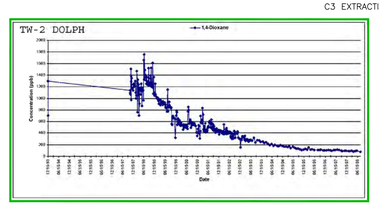

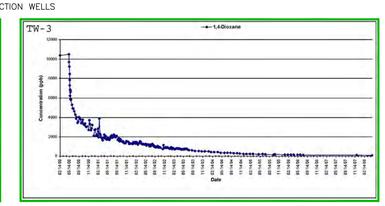

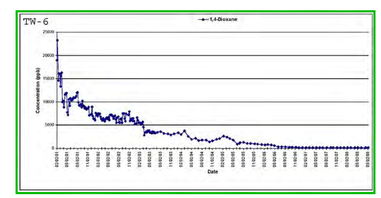

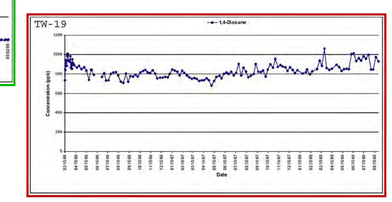

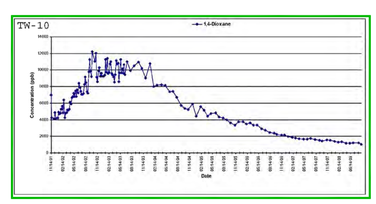

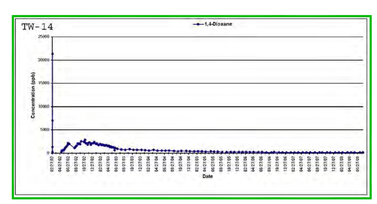

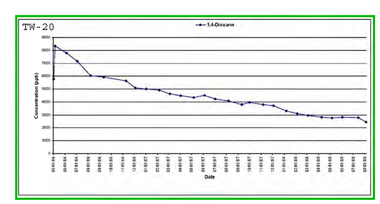

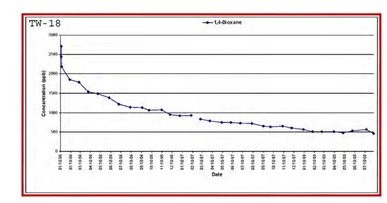

LEGEND

EXTRACTION WELLS
- UNIT C3
- WESTERN SYSTEM
- UNIT D2
- UNIT E
- SOUTHWEST AREA
- MARSHY AREA

EXTENT OF 1,4-DIOXANE
- UNIT C3 85 ppb
- WESTERN SYSTEM 85 ppb
- UNIT D2 85 ppb
- UNIT E 85 ppb
- UNIT E >2,800 ppb
- UNIT C3 >2,800 ppb
- MARSHY AREA >2,800 ppb
- SHALLOW WATER BEARING UNIT >2,800 ppb
- PALL LIFE SCIENCES PROPERTIES

NORTH

GRAPHIC SCALE
0 400 800'

BASE MAP SHOWING
EXTENT OF 1,4-DIOXANE (85 μg/L AND 2800 μg/L),
EXTRACTION WELLS AND
TIME v. 1,4-DIOXANE FOR EXTRACTIONS WELLS

fTC&h

engineers
scientists
architects
constructors

fishbeck, thompson, carr & huber, inc.

Pall Life Sciences
Scio Twp., Washtenaw County, Michigan
Comprehensive Proposal to Modify
Cleanup Program

Drawn By	ACS
Designer	ACS
Reviewer	JWB
Manager	JWB

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PROJECT NO.
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FIGURE NO.
2

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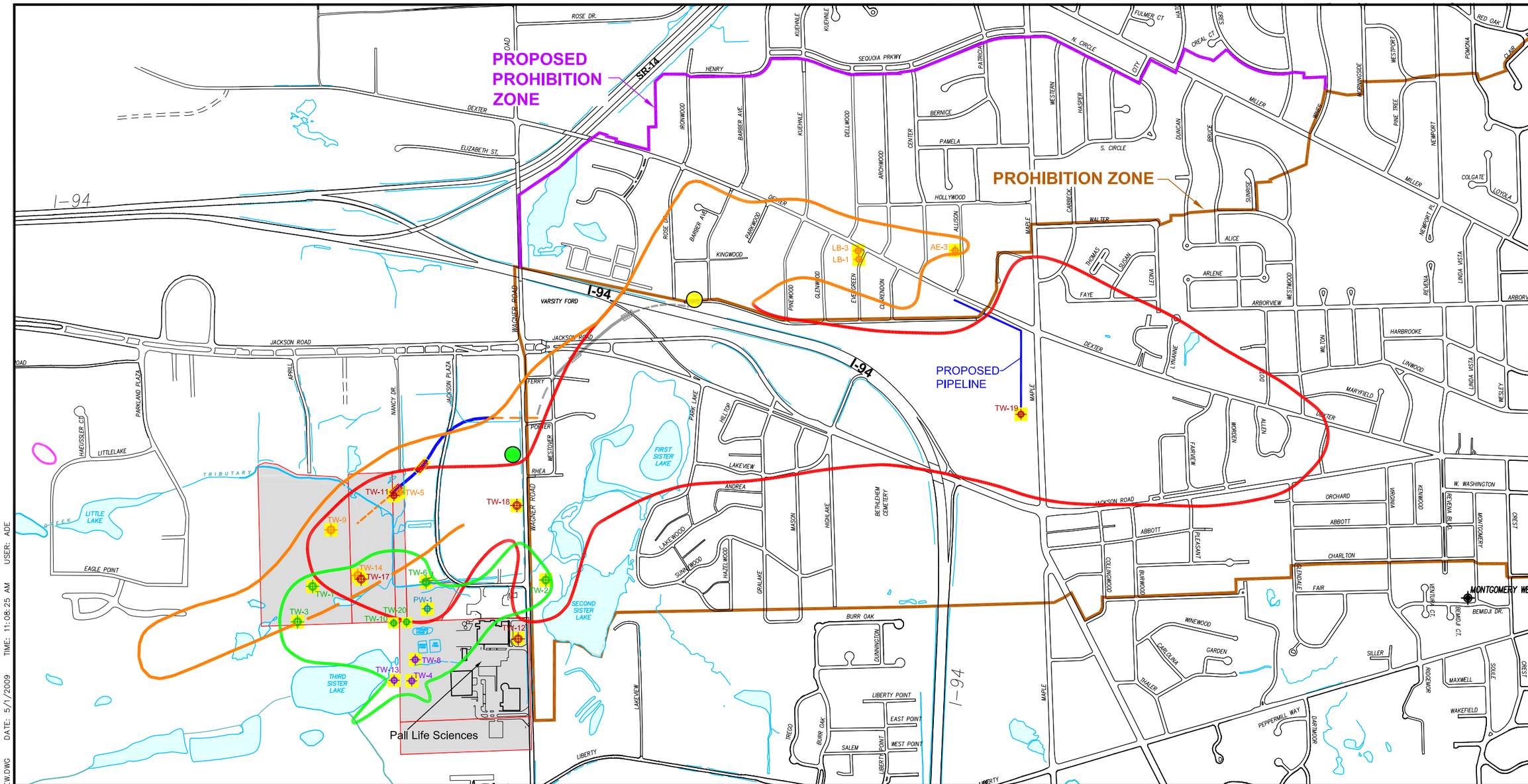

LEGEND

- PROPOSED EXTRACTION WELL
- POTENTIAL EXTRACTION WELL

EXTRACTION WELLS

- UNIT C3
- WESTERN SYSTEM
- UNIT D2
- UNIT E
- SOUTHWEST AREA
- MARSHY AREA

EXTENT OF 1, 4 - DIOXANE

- UNIT C3 85 ppb
- WESTERN SYSTEM 85 ppb
- UNIT D2 85 ppb
- UNIT E 85 ppb
- PALL LIFE SCIENCES PROPERTIES

NORTH

GRAPHIC SCALE
0 500 1000'

PROPOSED EXTRACTION WELL LOCATION

fti&h
engineers
scientists
architects
constructors

fishbeck, thompson, carr & huber, inc.

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Pall Life Sciences
Scio Twp., Washtenaw County, Michigan
Comprehensive Proposal to Modify Cleanup Program

PROJECT NO.
F96502

FIGURE NO.
3

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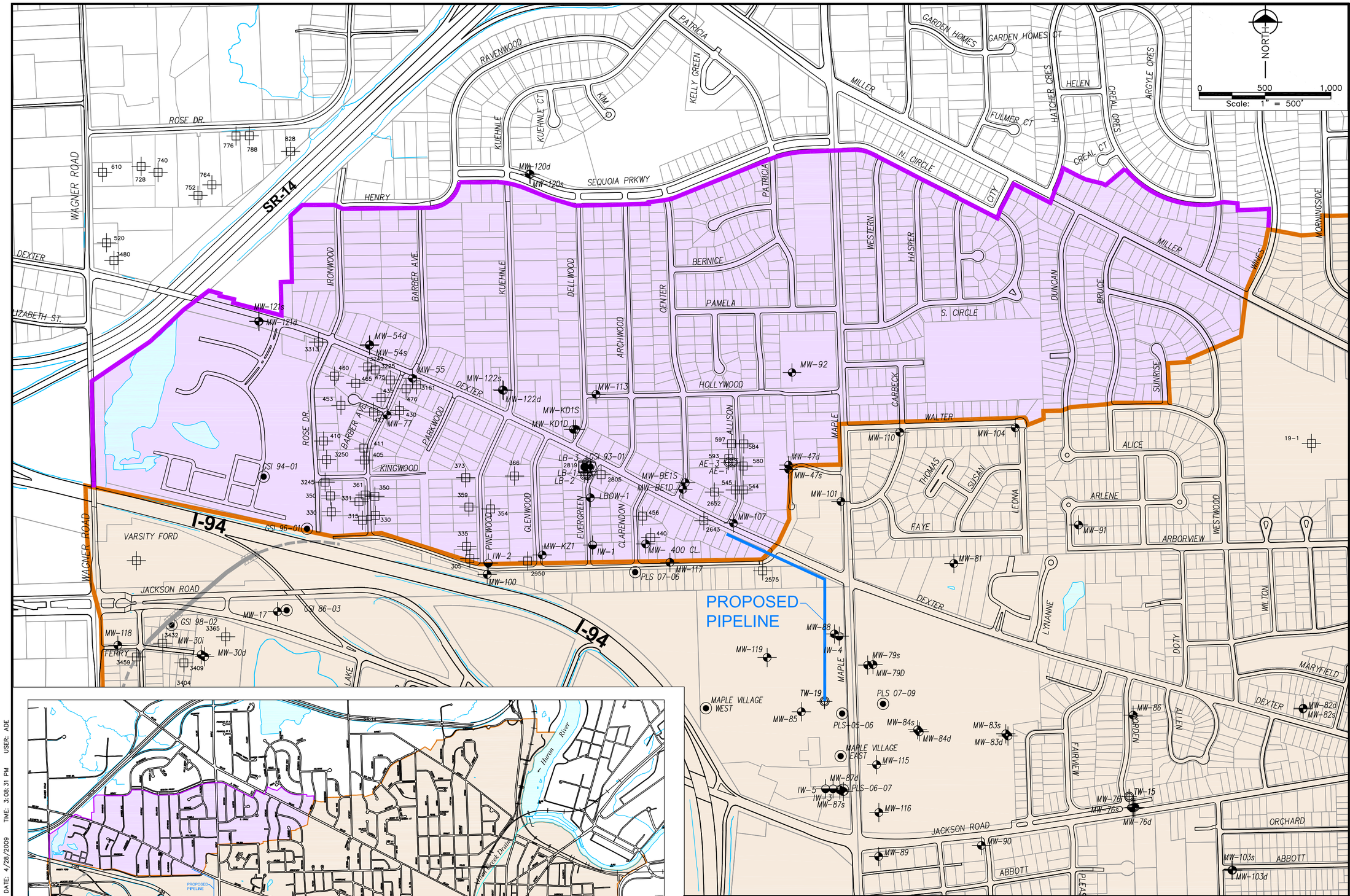

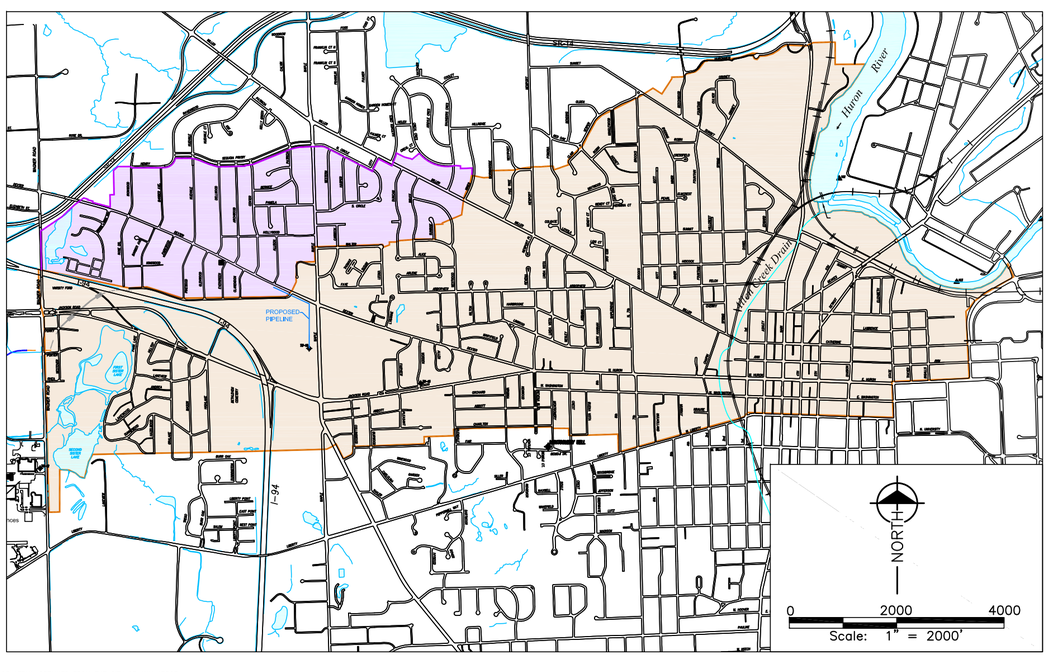

2003 AERIAL OBTAINED FROM THE CITY OF ANN ARBOR.
PARCEL BOUNDARIES OBTAINED FROM WASHTENAW COUNTY GIS

LEGEND

Proposed Prohibition Zone Expansion

Current Prohibition Zone

PROPOSED PROHIBITION ZONE EXPANSION

fitc&h

engineers
scientists
architects
constructors

fishbeck, thompson, carr & huber, inc.

Pall Life Sciences

Scio Twp., Washtenaw County, Michigan

Comprehensive Proposal to Modify Cleanup Program

Drawn By

Designer

Reviewer

Manager

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PROJECT NO.

F96502

FIGURE NO.

4

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U:\CADD\96502\REF\WASHTENAW CNTY PARCELS.DWG

Tables

Proposal for Extraction Well Modifications

Extraction Well	Feb.-March 2009 Concentration (ug/L)	March 2009 Flow Rate (gpm)	Proposed Objective	Proposal/Rationale	Proposed Initial Flow Rate (gpm)
AE-3	92	15	NA	Terminate operation of well when well is no longer functional.	0
HW-S	900	24	Mass Reduction	Operate well since concentration is above 500 ug/L.	24
LB-1	516	100	Mass Reduction	Mass Reduction/Operate well to extent necessary to prevent expansion of 85 ug/L outside PZ.	75
LB-3	518	75	Mass Reduction	Mass Reduction/Operate well to extent necessary to prevent expansion of 85 ug/L outside PZ.	75
PW-1	1035	5	Protection of Surface Water	Operate well to protect surface water (HCT).	5
SW Wells (TW-8, TW-13)	530	38	Prevent expansion of 85 ug/L	Operate wells to prevent expansion of 85 ug/L.	38
MW-50	880	Included with SW Wells	Prevent expansion of 85 ug/L	Operate wells to prevent expansion of 85 ug/L.	-
TW-2 (Dolph)	94	56	NA	Terminate operation since concentration below 500 ug/L. Monitor quarterly.	0
TW-5	949	81	Mass Reduction	Operate well since concentration is above 500 ug/L.	95
TW-6	131	15	Mass Reduction	Terminate operation since concentration below 500 ug/L and trend is asymptotic.	0
TW-9	1238	50	Mass Reduction	Operate well since concentration is above 500 ug/L.	50
TW-10	818	82	Mass Reduction	Operate well since concentration is above 500 ug/L.	100
TW-14	NA	0	Mass Reduction	Terminate operation since concentration below 500 ug/L and trend is asymptotic.	0
TW-17	NA	0	Mass Reduction	Terminate operation since concentration below 500 ug/L and trend is asymptotic.	0
TW-18	367	253	Mass Reduction	Lower flow when new Wagner Road extraction well comes on-line. Operate as appropriate to meet mass reduction objective.	125
TW-19	838	23	Containment of 2800 ug/L	Operate well when/if needed for containment of 2800 ug/L.	50
TW-20	1895	45	Mass Reduction	Operate well since concentration is above 500 ug/L.	50
Totals		**862**			**687**
Proposed Well					
Wagner Road (Near MW-94)	NA	0	Mass Reduction	Reduce mass in shallower portion of aquifer.	125
Totals					**812**

Appendix 1

PALL LIFE SCIENCES INC.
COMPREHENSIVE GROUNDWATER MONITORING PLAN
ANN ARBOR, MICHIGAN
MAY 4, 2009

BACKGROUND

Pall Life Sciences Inc. (PLS) is in the process of modifying its remedial program to improve its efficiency, sustainability, and effectiveness. In order to be consistent with the goals and objectives of the modified remedial program, PLS has developed a comprehensive groundwater quality and level monitoring program. This program is intended to replace any existing groundwater monitoring programs developed individually over the years for the various site areas.

PROPOSED MONITORING LOCATIONS

PLS has carefully selected approximately 175 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 and shown on Figures 1 and 2.

Groundwater Quality Sampling

Objectives

The overall objectives of groundwater sampling are to:

1. Track the general distribution and trends of the 1,4-dioxane plumes.

2. Demonstrate that the objectives of the remedial systems are being met:

   - Areas West of Wagner Road (Western Area) – Preventing expansion of the areas impacted by contaminant concentrations of 85 parts per billion (ppb) or greater in directions that do not lead to the Prohibition Zone , consistent with R 299.5705(5)

   - Eastern Area – Preventing groundwater containing 2,800 ppb from migrating east of Maple Road; demonstrating that the plume(s) are not expanding beyond the Prohibition Zone (PZ) boundary.

3. Track the concentrations of 1,4-dioxane in the extraction wells for purposes of determining their efficiency and whether termination criteria are met.

Purpose Designations

The monitoring locations have been assigned the following purpose designations:

Performance Monitoring (PM) – These wells are considered most critical to determine the effectiveness of the remedial systems in meeting their intended objectives.

General Monitoring (GM) – These wells are generally positioned beyond the PM wells and will be monitored periodically to track the general distribution of the plumes.

General Monitoring - Extraction Well (GM-E) – This purpose designation has been assigned to extraction wells where water quality data will be used to track trends in extraction wells and determine whether termination criteria are met.

Monitoring Locations

The locations of the monitoring wells that will be monitored 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 were generally assigned to more critical locations, based on their location or historic 1,4-dioxane trends. Earlier detection of significant changes or trends are most important at these locations.

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. With minor exceptions (MW-23 and MW-24), 1,4-dioxane concentrations at these locations are below 85 ppb.

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, or alternative nearby locations can and will be monitored.

Water Level Measurements

Objectives

The overall objectives of measuring water levels are:

1. Assessing groundwater flow patterns.

2. Evaluating capture areas for extraction wells and potential changes in groundwater flow from changes in extraction rates and locations.

Locations

Locations to be used in water level monitoring are shown on Figure 2.

Frequencies

Water level data will be collected at the time groundwater quality samples are taken. In addition, one comprehensive round of water level data will be collected annually to gather sufficient data to prepare potentiometric surface maps.

For at least one year, water levels in the Evergreen Area will be measured on a quarterly basis. This frequency, along with the rest of the groundwater monitoring program, will be revaluated on an annual basis.

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.

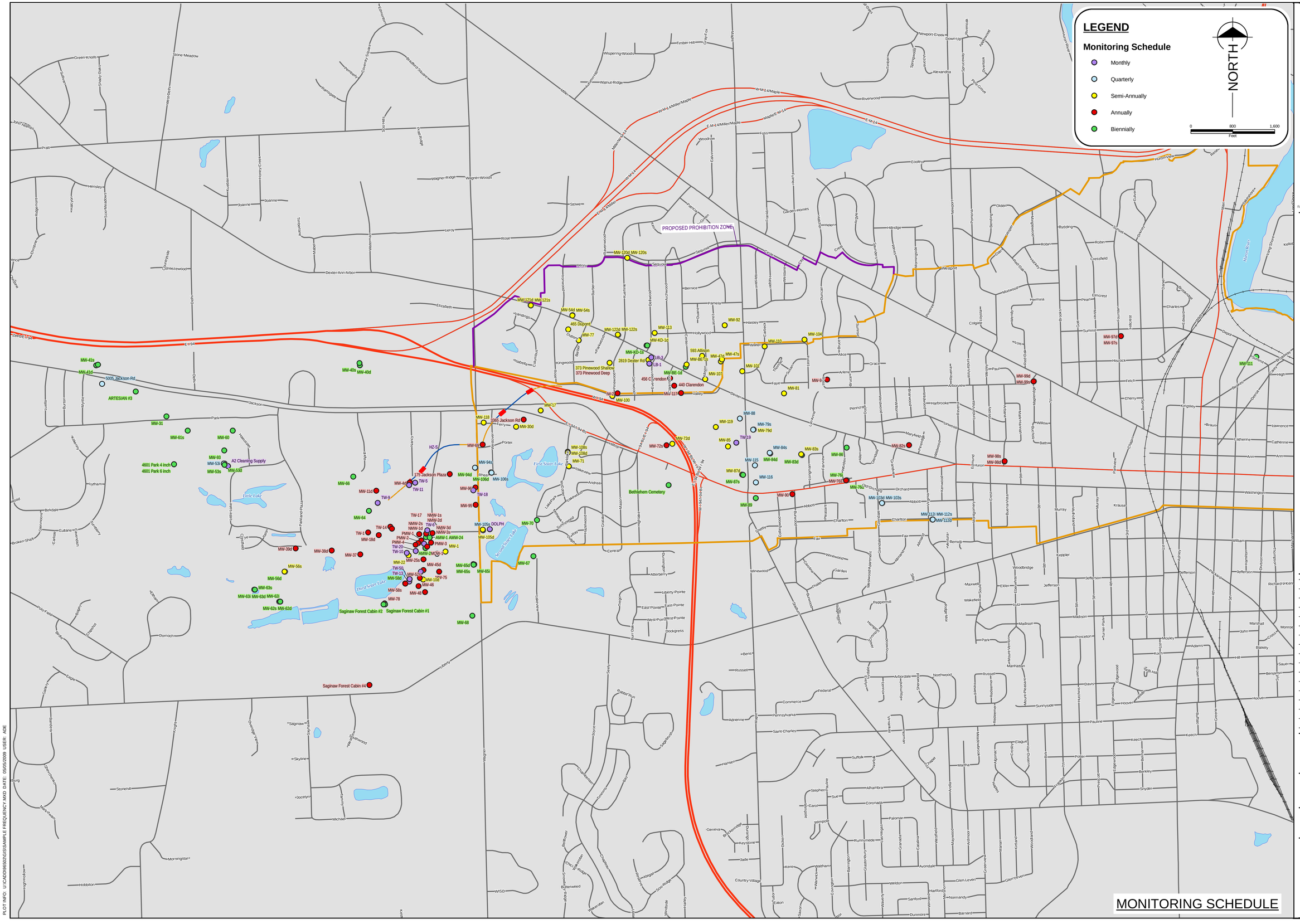
REPORTING

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 an 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 the MDEQ.

For a period of one year after extraction rates in the Evergreen Area are reduced, PLS will submit quarterly potentiometric surface maps for the Evergreen Area.

On an annual basis, starting with the approval date of this plan, PLS will adjust sampling frequencies and submit revisions to the MDEQ for review.



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Pall Life Sciences

Scio Twp., Washtenaw County, Michigan

Groundwater Monitor Program

Drawn By:

Designer:

Reviewer:

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PROJECT NO.

F96502

FIGURE NO.

1

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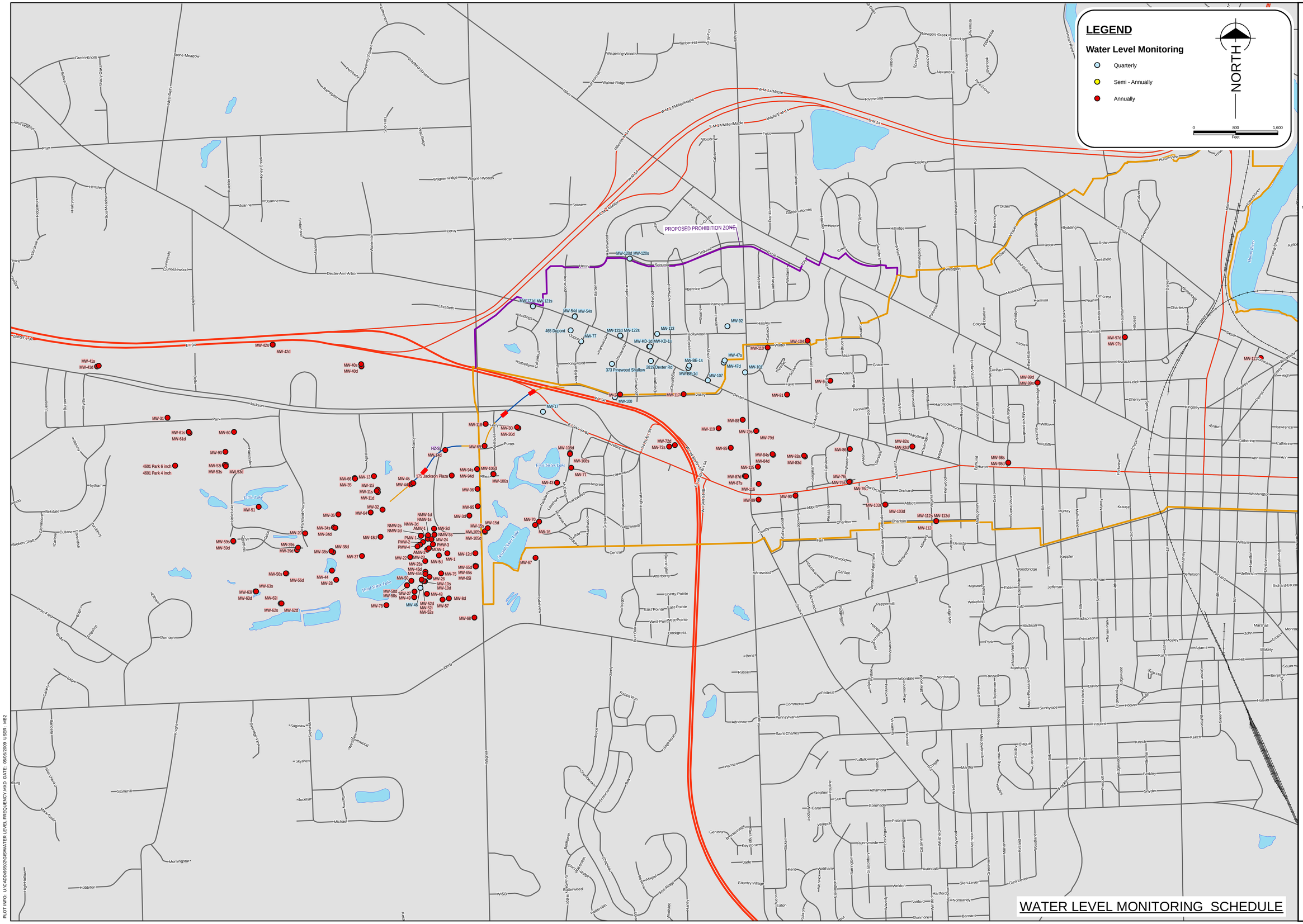
PLOT INFO: U:\CAD\96502\GIS\SAMPLE FREQUENCY.MXD DATE: 05/05/2009 USER: ADE



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2

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

Well Name	Recent 1,4-Dioxane Result (ppb)	Date Sampled	Current Sampling Frequency	Revised Groundwater Quality Sampling Frequency	Purpose for Sampling	Revised Water Level Frequency
AE-3	110	4/6/09	A	O	-	NM
AMW-1	352	7/30/08	A	B	PM	A
AMW-2	190	7/30/08	A	B	PM	A
ARTESIAN #1	3	5/23/89	R	O	-	NM
ARTESIAN #2	26	5/11/01	R	O	-	NM
ARTESIAN #3	21	7/28/08	A	B	GM	NM
HZ-S	960	1/6/09	M	M	GM-E	NM
IW-2	23	10/9/08	M	A	GM	A
LB-1	535	4/6/09	M	M	GM-E	NM
LB-3	538	4/6/09	M	M	GM-E	NM
MOW-1	942	7/30/08	A	A	PM	A
MW-1	940	10/24/08	S	S	PM	A
MW-2s	10	11/7/07	R	O	-	NM
MW-2d	34	8/8/08	A	O	-	A
MW-3s	5	8/18/93	R	O	-	NM
MW-3d	ND	8/7/08	A	O	-	A
MW-4s	3	8/8/08	A	O	-	A
MW-4d	617	10/22/08	S	A	PM	A
MW-5s	1	7/20/04	A	O	-	NM
MW-5d	21,500	2/10/09	Q	Q	PM	A
MW-8d	ND	8/13/08	A	O	-	A
MW-9d	ND	8/7/08	A	O	GM	NM
MW-10s	39	8/12/08	A	O	-	A
MW-10d	1,173	10/21/08	S	S	PM	A
MW-11s	ND	8/13/08	S	O	-	A
MW-11i	13	10/24/08	S	O	-	A
MW-11d	293	10/24/08	S	A	PM	A
MW-12d	ND	8/11/08	A	O	-	A
MW-13	ND	7/28/08	A	O	-	A
MW-14d	ND	7/23/08	A	O	-	A
MW-15s	ND	7/16/08	A	O	-	A
MW-15d	1	7/16/08	A	O	-	A
MW-16	ND	7/28/08	A	O	-	A
MW-17	764	4/2/09	Q	S	PM	Q
MW-18d	272	10/10/08	S	A	PM	A
MW-20	ND	7/29/08	A	O		A
MW-22	4,296	10/24/08	S	S	PM	A
MW-23	185	7/30/08	A	B	PM	A

Frequency Codes:
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Table 1 - Groundwater Monitoring Program (to be revised annually)

Well Name	Recent 1,4-Dioxane Result (ppb)	Date Sampled	Current Sampling Frequency	Revised Groundwater Quality Sampling Frequency	Purpose for Sampling	Revised Water Level Frequency
MW-24	1,070	7/30/08	A	B	PM	A
MW-25s	575	8/13/08	A	A	PM	A
MW-25d	423	1/16/03	A	O	-	NM
MW-26	7	8/12/08	A	O	-	A
MW-27	10	8/12/08	A	O	-	A
MW-28	ND	7/11/08	A	O	-	A
MW-30i	ND	10/9/08	S	O	-	A
MW-30d	1,167	1/20/09	Q	S	PM	A
MW-31	28	7/24/08	A	B	GM	A
MW-32	30	7/15/08	A	O	-	A
MW-34s	ND	7/15/08	A	O	-	A
MW-34d	ND	7/15/08	A	O	-	A
MW-35	7	7/15/08	A	O	-	A
MW-36	ND	7/15/08	A	O	-	A
MW-37	309	10/15/08	S	A	PM	A
MW-38s	ND	7/15/08	A	O	-	A
MW-38d	117	1/26/09	Q	A	PM	A
MW-39s	28	1/20/09	Q	O	-	A
MW-39d	242	1/20/09	Q	A	PM	A
MW-40s	ND	7/25/08	A	B	GM	A
MW-40d	ND	7/25/08	A	B	GM	A
MW-41s	19	10/20/08	S	B	GM	A
MW-41d	35	10/20/08	S	B	GM	A
MW-42s	ND	7/28/08	A	O	-	A
MW-42d	ND	7/28/08	A	O	-	A
MW-43	ND	7/24/08	A	O	-	A
MW-44	ND	7/11/08	A	O	-	A
MW-45s	15	10/10/08	S	O	-	A
MW-45d	307	10/10/08	S	A	PM	A
MW-46	102	8/12/08	A	A	PM	A
MW-47s	ND	2/24/09	Q	S	PM	Q
MW-47d	ND	2/24/09	Q	S	PM	Q
MW-48	142	10/21/08	S	A	PM	A
MW-49	ND	8/12/08	A	O	-	A
MW-50	751	1/6/09	M	M	GM-E	A
MW-51	ND	7/25/08	A	O	-	A
MW-52s	901	10/21/08	S	A	PM	A
MW-52i	ND	8/12/08	A	O	-	A

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

Well Name	Recent 1,4-Dioxane Result (ppb)	Date Sampled	Current Sampling Frequency	Revised Groundwater Quality Sampling Frequency	Purpose for Sampling	Revised Water Level Frequency
MW-52d	ND	8/12/08	A	O	-	A
MW-53s	ND	7/23/08	A	B	GM	A
MW-53i	47	1/20/09	Q	Q	PM	A
MW-53d	2	7/23/08	A	B	GM	A
MW-54s	ND	10/22/08	S	S	PM	Q
MW-54d	33	2/24/09	Q	S	PM	Q
MW-55	8	10/16/08	S	0	-	NM
MW-56s	118	4/2/09	Q	S	PM	A
MW-56d	ND	7/14/08	A	B	PM	A
MW-57	ND	8/13/08	A	O	-	A
MW-58s	182	10/15/08	S	A	PM	A
MW-58d	9	8/12/08	A	B	PM	A
MW-59s	ND	7/25/08	A	O	-	A
MW-59d	ND	7/25/08	A	O	-	A
MW-60	17	7/25/08	A	B	GM	A
MW-61s	30	7/24/08	A	B	GM	A
MW-61d	ND	7/24/08	A	O	-	A
MW-62s	ND	7/11/08	A	B	GM	A
MW-62i	ND	7/17/08	A	B	GM	A
MW-62d	ND	7/11/08	A	B	GM	A
MW-63s	ND	7/11/08	A	B	PM	A
MW-63i	ND	7/11/08	A	B	PM	A
MW-63d	ND	7/11/08	A	B	PM	A
MW-64	62	10/10/08	S	B	PM	A
MW-65s	30	8/14/08	A	B	PM	A
MW-65i	2	8/14/08	A	B	PM	A
MW-65d	37	11/3/08	S	B	PM	A
MW-66	2	7/15/08	A	B	PM	A
MW-67	ND	8/14/08	A	B	GM	A
MW-68	ND	8/11/08	A	B	GM	A
MW-69	ND	8/7/08	A	A	PM	A
MW-70	ND	7/28/08	A	B	GM	A
MW-71	1,268	1/27/09	Q	S	PM	A
MW-72s	26	1/13/09	Q	A	PM	A
MW-72d	3,021	1/13/09	Q	S	PM	A
MW-75	70	10/10/08	S	A	PM	A
MW-76s	133	10/21/08	S	A	PM	A
MW-76i	18	10/21/08	S	B	PM	A

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Well Name	Recent 1,4-Dioxane Result (ppb)	Date Sampled	Current Sampling Frequency	Revised Groundwater Quality Sampling Frequency	Purpose for Sampling	Revised Water Level Frequency
MW-76d	3	10/21/08	S	B	PM	A
MW-77	904	2/23/09	Q	S	PM	Q
MW-78	36	10/23/08	S	A	PM	A
MW-79s	460	4/2/09	M	S	PM	A
MW-79d	3	4/2/09	Q	O	-	A
MW-81	464	2/25/09	Q	S	PM	A
MW-82s	59	1/26/09	Q	A	PM	A
MW-82d	ND	7/18/08	A	O	-	A
MW-83s	520	4/2/09	Q	S	PM	A
MW-83d	ND	7/2/08	A	B	PM	A
MW-84s	542	1/9/09	Q	Q	PM	A
MW-84d	ND	1/9/09	Q	B	PM	A
MW-85	1,847	4/3/09	M	S	PM	A
MW-86	ND	7/21/08	A	B	PM	A
MW-87s	12	3/19/09	M	B	PM	A
MW-87d	577	3/19/09	M	S	PM	A
MW-88	460	4/2/09	M	Q	PM	A
MW-89	ND	7/21/08	A	B	PM	A
MW-90	56	1/13/09	Q	A	PM	A
MW-91	4	10/14/08	S	A	PM	A
MW-92	21	1/8/09	Q	S	PM	Q
MW-93	7	7/29/08	A	B	PM	A
MW-94s	2,626	11/4/08	Q	Q	PM	A
MW-94d	ND	11/4/08	Q	B	PM	A
MW-95	96	2/2/09	Q	A	PM	A
MW-96	137	11/5/08	Q	A	PM	A
MW-97s	ND	7/21/08	A	A	GM	A
MW-97d	ND	7/21/08	A	A	GM	A
MW-98s	ND	11/6/08	S	A	GM	A
MW-98d	8	11/6/08	Q	A	GM	A
MW-99s	ND	7/18/08	A	A	GM	A
MW-99d	ND	7/18/08	A	A	GM	A
MW-100	226	1/7/09	M	S	PM	Q
MW-101	415	1/8/09	Q	S	PM	Q
MW-103s	35	2/2/09	Q	Q	PM	A
MW-103d	13	2/2/09	Q	Q	PM	A
MW-104	ND	2/25/09	Q	S	PM	A
MW-105s	1,704	1/23/09	Q	S	PM	A

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

Well Name	Recent 1,4-Dioxane Result (ppb)	Date Sampled	Current Sampling Frequency	Revised Groundwater Quality Sampling Frequency	Purpose for Sampling	Revised Water Level Frequency
MW-105d	654	1/23/09	Q	Q	PM	A
MW-106s	824	1/23/09	Q	Q	PM	A
MW-106d	1	11/7/08	Q	B	PM	A
MW-107	19	2/23/09	Q	S	PM	Q
MW-108s	2,775	11/6/08	Q	S	PM	A
MW-108d	3,025	11/6/08	Q	S	PM	A
MW-110	27	2/25/09	Q	S	PM	A
MW-111	ND	7/18/08	A	B	GM	A
MW-112s	ND	1/30/09	Q	Q	GM	A
MW-112i	4	1/30/09	Q	Q	GM	A
MW-112d	ND	1/30/09	Q	Q	GM	A
MW-113	30	2/20/09	Q	S	PM	Q
MW-115	960	1/5/09	M	Q	PM	A
MW-116	453	1/5/09	Q	Q	PM	A
MW-117	3	2/20/09	Q	A	PM	A
MW-118	214	4/2/09	Q	S	PM	A
MW-119	240	4/3/09	Q	S	PM	A
MW-120s	ND	2/20/09	Q	S	PM	Q
MW-120d	ND	2/20/09	Q	S	PM	Q
MW-121s	ND	1/8/09	Q	S	PM	Q
MW-121d	ND	1/8/09	Q	S	PM	Q
MW-122s	109	12/16/08	Q	S	PM	Q
MW-122d	ND	12/16/08	Q	S	PM	Q
MW-BE-1s	474	10/22/08	S	S	PM	Q
MW-BE-1d	5	10/22/08	S	B	PM	Q
MW-KD-1s	30	2/23/09	Q	B	PM	Q
MW-KD-1d	166	2/23/09	Q	S	PM	Q
MW-KZ-1	ND	10/28/08	S	O	-	NM
NMW-1s	2,331	7/30/08	A	A	PM	A
NMW-1d	757	7/30/08	A	A	PM	A
NMW-2s	3,168	7/30/08	A	A	PM	A
NMW-2d	762	7/30/08	A	A	PM	A
NMW-3s	245	7/30/08	A	A	PM	A
NMW-3d	1,226	7/30/08	A	A	PM	A
PMW-1	182	7/30/08	A	A	PM	A
PMW-2	5,097	7/30/08	A	A	PM	A
PMW-3	10,500	7/30/08	A	A	PM	A
PMW-4	1,672	7/30/08	A	A	PM	A

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Well Name	Recent 1,4-Dioxane Result (ppb)	Date Sampled	Current Sampling Frequency	Revised Groundwater Quality Sampling Frequency	Purpose for Sampling	Revised Water Level Frequency
PW-1	903	4/6/09	M	M	GM-E	NM
Surface Water-1M	ND	7/30/08	A	A	PM	A
Surface Water-2M	ND	7/30/08	A	A	PM	A
Surface Water-3M	ND	7/30/08	A	A	PM	A
SW-COMB	546	1/6/09	M	M	GM-E	NM
TW-1	172	11/13/08	S	A	GM-E	NM
TW-2 (DOLPH)	88	1/6/09	M	Q	GM-E	NM
TW-3	66	11/13/08	S	O	-	NM
TW-4	40	11/14/08	S	O	-	NM
TW-5	950	1/6/09	M	M	GM-E	NM
TW-6	109	1/6/09	M	M	GM-E	NM
TW-8	501	1/6/09	M	M	GM-E	NM
TW-9	1,324	4/6/09	M	M	GM-E	NM
TW-10	991	1/6/09	M	M	GM-E	NM
TW-11	266	3/3/08	M	M	GM-E	NM
TW-12	17	11/13/08	S	O	-	NM
TW-13	610	1/6/09	M	M	GM-E	NM
TW-14	130	1/6/09	M	A	GM-E	NM
TW-15	163	4/3/09	M	O	-	NM
TW-17	105	1/6/09	M	A	GM-E	NM
TW-18	400	1/6/09	M	M	GM-E	NM
TW-19	932	4/6/09	M	M	GM-E	NM
TW-20	1,803	4/6/09	M	M	GM-E	NM
544 Allison	6	8/7/08	A	O	-	NM
545 Allison	12	1/8/09	Q	O	-	NM
593 Allison	502	2/23/09	Q	S	PM	NM
170 Aprill	18	7/29/08	A	O	-	NM
427 Barber			R	O	-	NM
430 Barber East	ND	8/1/08	A	O	-	NM
430 Barber West	15	2/23/09	Q	O	-	NM
476 Barber	ND	7/28/08	A	O	-	NM
Bethlehem Cemetery	ND	9/19/06	R	B	GM	NM
33-37 Burton	ND	7/11/03	R	O	-	NM
MW-400 Clarendon	2	10/28/08	S	O	-	NM
440 Clarendon	192	1/12/05	R	A	PM	NM
456 Clarendon	594	10/8/08	S	A	PM	NM
2643 Dexter Rd	10	10/8/08	S	O	-	NM
2652 Dexter Rd	26	10/27/08	S	O	-	NM

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Well Name	Recent 1,4-Dioxane Result (ppb)	Date Sampled	Current Sampling Frequency	Revised Groundwater Quality Sampling Frequency	Purpose for Sampling	Revised Water Level Frequency
2819 Dexter Rd	940	10/14/08	S	S	PM	Q
3225 Dexter Rd	ND	1/26/09	Q	O	-	NM
3249 Dexter Rd	ND	1/28/09	Q	O	-	NM
453 Dupont	3	1/28/09	Q	O	-	NM
465 Dupont	1,173	1/13/09	Q	S	PM	Q
3365 Jackson Rd	418	10/23/08	S	A	PM	NM
4141 Jackson Rd	7	7/29/08	A	O	-	NM
5005 Jackson Rd	41	1/26/09	Q	Q	GM	NM
5015 Jackson Rd	ND	5/28/08	R	O	-	NM
5115 Jackson Rd	ND	7/17/08	A	O	-	NM
175 Jackson Plaza	640	10/27/08	S	A	PM	A
333 Jackson Plaza	28	7/23/08	A	O	-	NM
3245 Kingwood	4	7/29/08	A	O	-	NM
105 Myrtle	ND	8/21/00	R	O	-	NM
114 Myrtle	ND	8/21/00	R	O	-	NM
131 Myrtle	ND	8/21/00	R	O	-	NM
110 Parkland Plaza	5	7/29/08	A	O	-	NM
371 Parkland Plaza #1	1	1/29/01	R	O	-	NM
371 Parkland Plaza #2	ND	1/29/01	R	O	-	NM
4401 Park East	25	12/14/00	R	O	-	NM
4401 Park West	11	7/25/08	A	O	-	NM
4601 Park 4 inch	2	7/28/08	A	B	PM	A
4601 Park 6 inch	4	7/28/08	A	B	PM	A
4742 Park Rd	22	7/24/08	A	O	-	NM
441 Parkwood	13	8/6/08	A	O	-	NM
305 Pinewood	ND	1/28/09	Q	O	-	NM
354 Pinewood	3	7/28/08	A	O	-	NM
373 Pinewood Shallow	921	10/28/08	S	S	PM	Q
373 Pinewood Deep	ND	10/28/08	S	A	GM	NM
2575 Valley	75	8/1/08	A	O	-	NM
A2 Cleaning Supply	97	1/13/09	M	M	PM	NM
Sag. Forest Cabin #1	31	7/31/08	A	B	GM	NM
Sag. Forest Cabin #2	2	7/31/08	A	B	GM	NM
Sag. Forest Cabin #4	ND	7/31/08	A	A	GM	NM

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