

# **Health Consultation**

Fridley Commons Well Field National Priorities List (Superfund) Site  
And Fridley Well 13

Trichloroethene Drinking Water Concentrations 1988 - 2012

City of Fridley, Anoka County, Minnesota

EPA Facility ID: MND985701309

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Prepared by:

The Minnesota Department of Health  
Under Cooperative Agreement with the  
Agency for Toxic Substances and Disease Registry  
U.S. Department of Health and Human Services

## FOREWORD

The Minnesota Department of Health's (MDH) mission is to protect, maintain, and improve the health of all Minnesotans. For communities living near state or federal Superfund sites, MDH's goal is to protect people's health by providing health information the community needs to take actions to protect their health. MDH also evaluates environmental data, and advises state and federal regulatory agencies and local governments on actions that can be taken to protect public health.

This document summarizes public health concerns related to Fridley Commons Well Field Superfund site (U.S. Environmental Protection Agency Facility ID, MND985701309). It is based on a formal site evaluation prepared by the Minnesota Department of Health (MDH). For a formal site evaluation, a number of steps are necessary:

- *Evaluating exposure:* MDH scientists begin by reviewing available information about environmental conditions at the site. The first task is to find out how much contamination is present, where it is found on the site, and how people might be exposed to it. Usually, MDH does not collect its own environmental sampling data. Rather, MDH relies on information provided by the Minnesota Pollution Control Agency (MPCA), the Minnesota Department of Agriculture (MDA), the US Environmental Protection Agency (EPA), private businesses, and the general public.
- *Evaluating health effects:* If there is evidence that people are being exposed—or could be exposed—to hazardous substances, MDH scientists will take steps to determine whether that exposure could be harmful to human health. MDH's report focuses on public health—that is, the health impact on the community as a whole. The report is based on existing scientific information.
- *Developing recommendations:* In the evaluation report, MDH outlines its conclusions regarding any potential health threat posed by a site and offers recommendations for reducing or eliminating human exposure to pollutants. The role of MDH is primarily advisory. For that reason, the evaluation report will typically recommend actions to be taken by other agencies—including EPA and MPCA. If, however, an immediate health threat exists, MDH will issue a public health advisory to warn people of the danger and will work to resolve the problem.
- *Soliciting community input:* The evaluation process is interactive. MDH starts by soliciting and evaluating information from various government agencies, the individuals or organizations responsible for the site, and community members living near the site. Any conclusions about the site are shared with the individuals, groups, and organizations that provided the information. Once an evaluation report has been prepared, MDH seeks feedback from the public. *If you have questions or comments about this report, we encourage you to contact us.*

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# I. Executive Summary

## *Background*

Issue	City of Fridley residents are concerned that they were exposed to elevated levels of trichloroethylene (TCE) in the municipal drinking water supply coming from the Fridley Commons Well Field Superfund site. The Minnesota Department of Health, Minnesota Pollution Control Agency, United States Environmental Protection Agency, and the City of Fridley jointly decided to address public concerns regarding current and past exposures to contaminants in drinking water by evaluating pertinent environmental data and report the findings in this Health Consultation. The contaminants of interest are volatile organic compounds (VOCs). Citizens in the area are aware of the contaminated state and federal superfund sites in the vicinity, and are concerned exposures to site contaminants over time have affected their health by causing cancer.
History	The Fridley Commons Well Field Superfund site (U.S. Environmental Protection Agency Facility ID, MND985701309) is the location of eight drinking water wells serving the City of Fridley (population of 27,515). Another well, Fridley Well 13, is also reviewed in this report because this is a vulnerable well, and water from Well 13 enters the distribution at a different point than the wells in Fridley Commons. If it is pumped it may draw from nearby contaminant sources.

## *Conclusion*

MDH has concluded that the Fridley drinking water poses no apparent human health hazard based on the current drinking water sample data for the Fridley distribution system. However, some individual municipal wells in the Fridley drinking water system may still be vulnerable to contamination, and continued monitoring is necessary to ensure that future exposures do not occur above the MDH TCE Health Based Value of 0.4 µg/L. The Agency for Toxic Substances and Disease Registry Drinking Water criteria are 18 and 5 µg/L for adults and children, respectively.

- Despite the drop in TCE contamination levels in Fridley Wells 6, 7, 8, and 9, the wells remain vulnerable to TCE contamination, because the source is unknown.
- VOC testing frequency for Well 13 warrants further evaluation due to unique environmental conditions.

## *Basis for Conclusion*

Water Sample Data	The water sample data was reviewed for each well in the Fridley drinking water system from 1988 to 2012. The data reviewed were collected and maintained by the City of Fridley, Minnesota Pollution Control Agency, and by the MDH Drinking Water Protection Program.  The VOC detections in the drinking water were compared to the MCL drinking water standards developed by the United States Environmental Protection Agency (USEPA)
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for municipal water systems. The MCLs are legal limits that are intended to both protect human health and be economically feasible for water systems to achieve through the use of best available technology or treatment techniques. ATSDR also has a health-based criterion of 5µg/L to protect children from health effects of TCE for exposures of 15 days and longer.

The MDH developed a TCE health based value (0.4 µg/L) used for evaluating drinking water quality in private wells and for giving health advice to individuals. Fridley drinking water was also compared to this value. ATSDR has developed health-based criterion of 0.76 µg/L for long-term exposures to TCE based on cancer risk. This value is higher than the new MDH value; which is protective for both cancer and non-cancer health effects.

The Fridley Commons Well Field effluent (water outflow) has not exceeded the 5 µg/L TCE MCL standard (measured as the average of 4 quarterly tests). Over half of the effluent test results have shown no detectable TCE (detection limits ranged from < 0.1 µg/L to <1.0 µg/L).

The TCE contamination levels in Fridley Wells 6, 7, 8, and 9 have dropped significantly in the past 10 years. Although the Fridley well field contaminant source has not been identified, the downward trend in TCE levels is expected to continue based on long-term monitoring results.

### ***Recommendations***

1. Continued monitoring of the Fridley Commons water distribution system and the implementation of appropriate actions will help ensure levels of TCE are below those of health concern.
2. Because the source of TCE in Wells 6, 7, 8, and 9 is unknown, actions are need to conduct a comprehensive well receptor survey for private wells within a one mile radius of the site, identify current well water use, and notify well owners of possible contamination.
3. Given the environmental circumstances surrounding Well 13, evaluation of its utility as an emergency backup well is needed.
4. Use a consistent system to denote sample names for Fridley wells to facilitate evaluation of contamination trends.

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## II. Purpose

In the spring of 2012, a group of residents of Fridley contacted the Minnesota Department of Health (MDH) because they believe an unusual number of cancers have been identified among their neighbors. Citizens are aware of several contaminated state and federal superfund sites in the vicinity, and are concerned that exposures to environmental contaminants have affected their health and caused cancers. This Health Consultation is in response to City of Fridley residents' concern that they were exposed to elevated level of trichloroethene (TCE; trichloroethylene) in municipal drinking water coming from the Fridley Commons Well Field Superfund (National Priority List; NPL) site. The Fridley Commons Well Field Superfund site (U.S. Environmental Protection Agency Facility ID, MND985701309) is the location of 8 drinking water wells serving the City of Fridley (population of 27,515). This document reviews volatile organic compound (VOC) data for each well in the Fridley drinking water system from 1988 to 2012. The data are comprised of electronic files from the City of Fridley, Minnesota Pollution Control Agency (MPCA) files, and compliance testing data collected by MDH Drinking Water Protection staff. The VOC levels in the drinking water were found to be well below the Maximum Contaminant Level (MCL) drinking water standards developed by the United States Environmental Protection Agency (EPA) for community water systems. In May 2013, MDH implemented a TCE health based value (0.4 micrograms per liter ( $\mu\text{g/L}$ )) used for evaluating drinking water quality in private wells and for giving health advice to individuals. This health based value was used for evaluating the Fridley drinking water data. The Agency for Toxic Substances and Disease Registry (ATSDR) also has comparison values (CV's) for evaluating health risks from drinking water (0.76  $\mu\text{g/L}$  for cancer effects and 5 $\mu\text{g/L}$  for non-cancer effects). All of these values are discussed in section IV.

## III. Background

### A. Contaminated Sites

The City of Fridley has several Superfund sites within or near its boundaries (See Figure 1). A list of these sites also appears: <http://www.epa.gov/region5/cleanup/fridley/index.html>. The Fridley Commons Park Well Field Superfund Site is the municipal well field for the city. MDH published a Public Health Assessment for the site in 2001 (<http://www.health.state.mn.us/divs/eh/hazardous/sites/anoka/fridley1201.pdf>).

- The Naval Industrial Reserve Ordinance Plant (NIROP) Superfund (NPL) site is located within the southern boundary of Fridley city limits on the east bank of the Mississippi River. Contiguous with the NIROP facility is the FMC Corp. Superfund site. MDH published a NIROP/FMC Public Health Assessment in 1999 (<http://www.atsdr.cdc.gov/hac/pha/pha.asp?docid=674&pg=0>).
- BAE Systems Resource Conservation and Recovery Act (RCRA) site is that the southeastern end of the NIROP site.
- The Kurt Manufacturing Superfund site is located approximately 1 mile northeast of the NIROP Superfund site. A Health Assessment for Kurt Manufacturing can be viewed on MDH's website (<http://www.health.state.mn.us/divs/eh/hazardous/sites/anoka/kurthc1989.pdf>).
- Dealers Manufacturing State Superfund (Permanent List of Priorities; PLP) site is located approximately  $\frac{1}{4}$  mile east of NIROP.

- The Twin Cities Army Ammunitions Plant (TCAAP) Superfund site is located approximately 2 miles east of Fridley's east boundary. MDH published a TCAAP Health Consultation in 2000 that evaluated potential risks associated with private well use near the site (<http://www.health.state.mn.us/divs/eh/hazardous/sites/ramsey/tcaap0200.pdf>). A Public Health Assessment for TCAAP was completed in 1994.
- The Boise Cascade/Onan/Medtronic/ Superfund site is located approximately 1.5 miles northeast of Fridley Commons.

#### B. Fridley Commons Public Health Assessment

In 2001, MDH authored the Fridley Commons Well Field Public Health Assessment which characterized the volatile organic compound (VOC) levels within the Fridley public water supply from 1988 to 1992. The Fridley Commons Well Field Public Health Assessment did not note any exceedance of MCLs in the water supply. MCLs are compared to a rolling average of the 4 most recent effluent quarterly monitoring results. Three unaddressed recommendations from the 2001 Fridley Commons Public Health Assessment are:

- Conduct a comprehensive well receptor survey for private wells within a one mile radius of the site, identify current well water use, and notify well owners of possible contamination.
- Sample Well 13 for VOCs prior to pumping water into the distribution system.
- Identify areas in the distribution system most likely to receive undiluted Well 13 water.

#### C. Fridley Commons Limited Remedial Investigation

In 2002 the Minnesota Pollution Control Agency (MPCA) conducted a Fridley Commons remedial investigation to evaluate if the former Moore Lake Dump is a potential source for volatile organic compounds (VOC) at the water supply wells. The Moore Lake Dump is the nearest potential contaminant source to the Fridley Commons Well Field. The limited remedial investigation included review of updated historical information regarding the site, and additional investigative activities. The MPCA concluded the former Moore Lake Dump was not contributing significantly to well field impacts. The MPCA believed that extensive investigation of the Prairie du Chien aquifer was not cost-effective and had the potential to yield inconclusive results due to complex hydrogeology associated with fractured bedrock at the site (5). In all 24 sampling events at the three monitoring wells, TCE was found to be below the reporting limit (1.0 microgram/Liter ( $\mu\text{g/L}$ )). The proposal for a No Action Record of Decision (ROD) for the Fridley Commons Well Field was announced in July 2005 and a public meeting was held in July 2005 to discuss the proposal. The rationale for the ROD was the declining TCE concentrations since 1994 in Wells 6, 7, 8 and 9 (11). The No Action ROD was signed in September 2005 by the USEPA and MPCA (11).

## IV. Discussion

### A. Community Health Concerns

Using social media a citizen group had documented numerous cancer cases and illnesses in a small radius within their community. The group has approximately 2900 members. To address cancer concerns in the Fridley community, the MDH reviewed cancer incidence rates in Fridley and Anoka County where Fridley is located

(<http://www.health.state.mn.us/divs/hpcd/cdee/documents/AnokaCancerBrief.pdf>). The Minnesota Cancer Surveillance System (MCSS) review covered a time period of 2000-2009, found that total cancers (1,529) were 7.6% higher in Fridley than would be expected compared to cancer rates in Minnesota. Lung cancers were approximately 30% higher than expected and accounted for a considerable portion of the overall excess. This lung cancer elevation was found in males and females but is especially high in females (+49%). Lung cancer rates in Anoka County as a whole were also found to be approximately 21% higher than expected compared to Minnesota. Lung cancer is typically associated with smoking history and past occupational exposures particularly for men. Exposure to radon is also a cause of lung cancer. To address community concerns about the Fridley contamination sites, the EPA has formed a Community Advisory Group (CAG). The first meeting was in March 2013. MDH staff attends CAG meetings.

### B. Contaminant of Concern

The only known potential exposure for Fridley residents to contamination associated with the Fridley area superfund sites is TCE in drinking water. Community water supplies are required to be in compliance with the TCE MCL which was promulgated in 1989. The MDH Drinking Water Protection Section (DWP) enforces these standards. MCLs protect health, but must also take into account other factors such as laboratory methods and treatment costs.

MDH uses Health Risk Limits (HRLs) and Health Based Values (HBVs) for evaluating drinking water quality in private wells and for giving health advice to all individuals (including people served by community water supplies). These are health protective guidance for contaminants in drinking water and are set at levels that pose little or no health risk to humans, including sensitive sub-populations. HRLs are values adopted into Minnesota Rules. HBVs are guidance not yet adopted into rule. In 2002, the EPA re-evaluated scientific information about TCE and concluded that TCE is more hazardous than previously thought. MDH recommended that an exposure limit of 5 µg/L (the same as the MCL) be used to give drinking water advice. In 2007, MDH adopted the federal TCE MCL value as the HRL.

In 2011 EPA completed a review of current human epidemiological and animal toxicity studies, assessing TCE health impacts from inhalation and ingestion (4). In 2013, based on the EPA review,

MDH completed a toxicological review for TCE in drinking water and updated its drinking water guidance. MDH concluded that the main health concerns for the lowest exposures to TCE are immune system effects such as hypersensitivity or risk for auto-immune disease; heart defects in the developing fetus if the pregnant mother is exposed in the first trimester; and an increased risk of cancer from long-term exposure. Human exposures to TCE have been linked to kidney and liver cancer, as well as non-Hodgkin's lymphoma. At higher levels, TCE may also harm the central nervous system, kidney, liver and male reproductive system. TCE is volatile and evaporates readily into air, so its use inside the home for any purpose results in TCE released into indoor air. The 2013 MDH re-evaluation resulted in an updated HBV of 0.4 µg/L. This level protects people exposed to TCE in drinking water used in any way (cooking, showering, dishwashing, laundry, etc.). It protects sensitive populations (infants, children, and people with impaired immunity) exposed at any time during their life from conception through old age. It protects people from increased risk of cancer.

ATSDR also re-evaluated its Comparison Values (CVs) for TCE after the 2011 EPA review. ATSDR concluded that 5 µg/L protects people from non-cancer effects of TCE for exposures in drinking water. The ATSDR CV does not take into account other uses of drinking water such as cooking or washing. ATSDR also concluded that 0.76 µg/L protects people from increased risk of cancers, concluding that an exposure at this level from drinking water would result in a risk no greater than one additional cancer case in 1,000,000 people exposed for a lifetime. The actual cancer risk may in fact be zero.

As will be seen below, since 1989 the Fridley system has always been in compliance with the MCL regulation. A more detailed discussion of any exposures above MDH/ATSDR comparison values occurs in section IV.

### C. Fridley Municipal Water System

The Fridley drinking water system consists of 13 municipal wells. See Table 1 for Fridley municipal well construction information. Eleven of Fridley drinking water system wells are connected to one of 3 treatment plants each containing filters for reducing water hardness and particulate removal. Figures 2 and 3 illustrate the supply wells and filter system configurations. The Commons Park Treatment Plant (Commons Park) is comprised of 8 wells (2, 3, 4, 5, 6, 7, 8, and 9). The Mt. Simon-Hinkley aquifer wells (Wells 2, 3, 4, and 5) range from 830 to 850 feet deep. The Prairie du Chien-Jordan aquifer wells (Wells 6, 7, 8, and 9) range from 250 to 265 feet deep. The Commons Park treatment system is designed to have any combination of the 8 wells operating. The Commons Park system does not mix Mt. Simon-Hinkley and Prairie du Chien water until after they have been filtered and are ready for distribution. This design addresses differing well configurations and water chemistry between the aquifers. Figure 4 illustrates Fridley city limits and drinking water well locations.

Well 13 is 332 feet deep and open to the Prairie du Chien-Jordan aquifer. Well 13 is located approximately 2 miles southwest of the Fridley Commons Well Field and west of the NIROP and Kurt/Dealers Manufacturing Superfund Sites which have associated TCE groundwater plumes (see figure 5). Kurt and Dealers groundwater plumes likely extend to the southwest underneath the railroad tracks. Well 13 is an emergency backup well for occasional use during peak periods in the summer months. When in service Well 13 water is treated with chlorine and fluoride and pumped directly into the distribution system. From the distribution system, some municipal water users located near Well 13 may receive mixed water (Commons Park and Well 13 water). Other users may receive primarily Well 13 water with little or no dilution with other water in the system.

#### D. Fridley Wellhead Protection Plan

In 2009, the MDH Drinking Water Protection Section (DWP) completed a Wellhead Protection Plan for the City of Fridley. A Wellhead Protection Plan assembles information from numerous sources to develop management strategies to protect the drinking water resource. The groundwater model was used to develop the wellhead protection areas for a 1 year and 10-year groundwater travel path assuming maximum groundwater usage at the Fridley Commons Well Field (see Figure 6). The source water for Fridley Commons Park wells originates northeast of the site. The 10 year groundwater travel time and other factors are used to outline a drinking water supply management area (DWSMA) which helps city planners protect the groundwater from land uses that could negatively impact the resource. The farthest southeast edge of the Fridley drinking water supply management area is within a ¼ mile of the Twin Cities Army Ammunitions Plant (TCAAP) ground water plume containing 1 to 10 µg/L TCE. Because Well Nos. 1, 9, and 13 were designated emergency backup wells at the time of the DWSMA study, they were not evaluated in the wellhead protection plans. In 2004, Well 9 was converted to a supply well and its use is not likely to significantly change the drinking water supply monitoring area.

MDH has developed a database with vulnerability information for public water supply wells in Minnesota. The database stores information pertinent to well vulnerability and rates the vulnerability of individual wells. A score is calculated for each well based on factors such as well construction, geology at the well site, and chemical data; higher scores correlate to greater perceived vulnerability (3). Fridley Well Nos. 1, 2, 3, 4, and 5 are considered non-vulnerable because of adequate well construction, presence of protective geologic layers above the aquifer, and water chemistry data. In addition, a sample collected from Fridley Well No. 4 was analyzed using C-14 age-dating techniques – the resultant age was in excess of 1000 years, indicative of a non-vulnerable environment.

The Fridley Wellhead Protection Plan concluded the Prairie du Chien-Jordan Aquifer used by the city wells 6, 7, 8, and 9 is sensitive to contamination in the area near the well field. Well 13 is also a

Prairie du Chien-Jordan well located south of the Commons Park (see Figure 4). The vulnerability status was confirmed at Well Nos. 6, 7, 8, 9, and 13 by the detection of volatile organic compounds in samples from each of the wells (2). In addition, samples collected from Well Nos. 10, 11, and 13 also contained detectable levels of tritium, thus confirming the vulnerable status of Well No. 13 and establishing the vulnerable status of Well Nos. 10 and 11. Tritium levels of 1TU or higher contain a measurable component of water that has recharged the aquifer since 1953. Such relatively young well water is considered susceptible to contamination from activities at the land surface when compared with wells that produce older water.

The Wellhead Protection Plan also included a well survey identifying probable wells found within the Fridley drinking water supply management area. The use and condition of the probable wells is not known. Old and unmaintained wells are a threat to the groundwater because they are a direct conduit to the drinking water resource. Appendix A (business inventory) is an inventory of business addresses potentially using chemicals that could impact groundwater within the monitoring plan area.

#### E. Evaluation of TCE Contamination in the Fridley Drinking Water Supply

This section reviews Fridley drinking water quality data collected by the City of Fridley, MDH and MPCA.

##### 1. Fridley Commons Effluent TCE Concentrations

From 1984 to 1987 (MDH collected) 6 samples from the Fridley water system were collected that contained TCE concentrations ranging from <0.2 to 8.5 µg/L. The City did not provide any additional data for this time period.

Since 1989, MDH has enforced the MCL of 5 µg/L for TCE. By rule (Minnesota Rules 4720), MDH uses a rolling average of 4 consecutive TCE quarterly sampling results for compliance monitoring. If the results exceed the TCE MCL (5 µg/L), the drinking water provider is legally obligated to remedy the situation. Only MDH sample results are used for compliance testing. Because Fridley Commons filtration effluent is finished water, it is sampled for water quality compliance. Since implementation of the TCE MCL in 1989, Fridley Commons has never exceeded the TCE 5 µg/L MCL using the 4 quarter rolling average compliance test. The highest TCE compliance test average was 3.3 µg/L comprised of the following samples:

- November 7, 1990 (2.8 µg/L)
- February 6, 1991 (1.0 µg/L)
- May 10, 1991 (Not detected)
- August 7, 1991 (9.5 µg/l).

Figure 7 (Commons Effluent TCE) is graphical representation of TCE detections in the Fridley Commons distribution system using MDH's and Fridley's data. Figure 7 (Commons Effluent TCE) does not include TCE non-detection results. The TCE non-detections are sample results below the analytical reporting limit (<1.0 to <0.1 µg/L). The TCE non-detections significantly lower compliance testing averages. From 1988 to 2012 the Fridley Commons Well Field was sampled for VOCs 128 times (MDH and Fridley data sets) with 5 excursions above the TCE MCL ranging from 5.2 to 9.5 µg/L. During the same time period 66 TCE non-detections were observed. The most recent single sample result above the TCE 5 µg/L MCL was 5.6 µg/L on July 7, 1992 (see Figure 7 (Commons Effluent TCE)). The most recent sample above 1 µg/L was August 15, 2000 (1.8 µg/L).

From 2003 to 2012, there have been no detections of TCE in the distribution system above 1 µg/L (see Table 2). The four most recent measurements made from 2010 to 2012 were below 0.1 µg/L. All but 8 measurements made (0.1, 0.9, 0.9 and 0.3 µg/L in 2004, 0.2 µg/L in 2005, 0.5 µg/L in 2006, and 0.1 and 0.6 µg/L in 2007) were below the limit of detection which was generally 1 µg/L. Since 2010, the TCE concentrations in Fridley Commons effluent have been less than the updated TCE HBV (0.4 µg/L) as well as ATSDR's Comparison values for cancer of 0.76 µg/L (See Table 2).

These analyses were made more difficult because Fridley's contractors and MDH's sample label nomenclature differ from each other. MDH notes that there were 26 different names used for the Fridley Commons effluent samples. Sample labels did not consistently list which Fridley wells were operating when an effluent sample was collected. The laboratory manifests inconsistently listed which wells were operating during the sample collection, and sometimes the manifest documents were not available (See Appendix B).

## 2. Fridley Commons TCE Concentrations in Vulnerable Wells 6, 7, 8, and 9

MDH also monitors individual wells for water quality with a focus on vulnerable Wells 6, 7, 8, and 9. The Fridley Commons Wells 6, 7, 8, and 9 are Prairie du Chien wells in close proximity to each other and share similar well construction attributes (see Table 1). Wells 6, 7, 8, and 9 have all had TCE detections in them, but for reasons unknown Well 9 is the most impacted and was used only as an emergency backup well from 1990 to 2003 (see Appendix C for water use data). Wells 6, 7 and 8, have remained in service and have been used primarily during times of peak summer water usage (5). A short summary of TCE measurements in these wells appears in Appendix D.

## 3. Additional Municipal Water Sources Not Originating In Fridley Commons

### a) New Brighton Supplemental Water

Every year since 1994 the City of Fridley has received between 55 and 500 million gallons/year of drinking water from the City of New Brighton via the 63<sup>rd</sup> Ave Booster station (approximately 25%

of its drinking water) (Appendix C). This interconnection provides excess water from a groundwater treatment system installed in New Brighton to remediate groundwater affected by the release of TCE from the Twin City Army Ammunition Plant (TCAAP). Most water is supplied in winter, as New Brighton's summer demand leaves little water to be provided to Fridley. The New Brighton carbon filtration treatment plant removes TCE below the detection limit (0.1 µg/L) from each of 6 impacted wells, producing a total of approximately 1200 million gallons/day. The New Brighton carbon filtration system combines water from 6 wells to reduce hardness and VOC concentrations. Next, the water passes through two carbon units in series. The carbon units consist of 8 paired units in series and once the first carbon unit has detectable TCE, it is replaced with the second carbon unit and new carbon placed in the second carbon unit thereby ensuring water is always double filtered with a clean second filter. MDH and the City of Fridley collected 56 VOC effluent samples at the 63<sup>rd</sup> Ave Booster station. All TCE sample results were below detection (<0.1 µg/L). MDH notes that the effluent samples had 6 different names for the same sample station.

b) Emergency Backup Well 13

Fridley Well 13 is a Prairie du Chien well located side gradient to several significant TCE ground water plumes. The Dealers Manufacturing facility, Kurt Manufacturing and Navel Industrial Reserve Ordinance Plant (NIROP) Superfund sites have contaminated the groundwater near Well 13. Kurt Manufacturing contaminated the groundwater with tetrachloroethene (PCE) and TCE. The plume appears to be decaying biologically from PCE to TCE, cis-1, 2-dichloroethene (cis-1, 2-DCE), and trans-1, 2-dichloroethene (trans-1, 2-DCE). The Dealers ground water plume is comprised of primarily of TCE and its decay daughters cis-1, 2-DCE, and trans-1, 2-DCE. A few low level concentrations of PCE have also been identified in the ground water. NIROP has a TCE groundwater plume emanating from under its facility (see Figure 5). The general ground water gradient in the area is to the southwest. Well 13 may become more contaminated with sustained use based on the close proximity of VOC groundwater sources. Because Well 13 is a designated emergency backup well, MDH Drinking Water Protection monitors its water quality much less frequently than a regularly used municipal well. Emergency backup wells are also excluded from wellhead protection plans that model the 1 and 10 year groundwater travel times, and define drinking water supply management areas that help protect water.

Since 1989, the U.S. Navy, City of Fridley, and MDH have sampled Well 13 for VOCs 29 times. There were 4 detections of TCE; all less than 1.7 µg/L. VOC testing has occurred annually in Well 13 since 1989, except in 1990, 2005, 2010, and 2011. In 2012, the TCE decay daughter cis-1, 2-DCE was detected at 0.57 µg/L suggesting that TCE is likely present in the groundwater (the cis-1, 2-DCE HRL is 70 µg/L). Table 3 lists the VOC detections in Well 13 from 1989 to 2012. The 2001 Fridley Commons Well Field Public Health Assessment recommended Well 13 be sampled for TCE prior to

being pumped untreated into the distribution system (2). When operating, Well 13 water is chlorinated and fluorinated before distribution to customers. To facilitate VOC testing and pump tests, Well 13 water can be isolated from the distribution system with a valve diverting flow to a fire hydrant that discharges to the street and storm sewer. The VOC sampling protocol utilized at Well 13 by Fridley and the Navy is not clearly defined. Based on pumping records and VOC sample events, it is not clear if Well 13 is consistently sampled before it is used.

MDH reviewed the Minnesota Division of Natural Resources (DNR) annual pumping records for Well 13 from 1982 to 2012 (see Appendix C, Table 1). The City of Fridley's handwritten water use records for Well 13 were incomplete in 1995, 2000, 2007, and 2011 because the daily log totals do not agree with the DNR annual records (see Appendix C, Table 2). Based on MDH's review of Fridley's hand written records of Well 13 daily use, Fridley under reported water use in 2011, 2007, and 2000. Since 2000, Well 13 water use has been under a million gallons per year (mgal/y) except in 2007 (4.5 mgal/y), 2006 (1.9 mgal/y), 2003 (5.0 mgal/y), and 2001 (3.3 mgal/y) (see Appendix C Table 2).

#### c) Fridley Private Tap Water Quality

Both MDH and the City of Fridley collect water samples from various water taps in the distribution system to help ensure water quality. Since 1983, private tap water in the distribution system was sampled 27 times for TCE resulting in 10 detections ranging from 0.2 to 8.5 µg/L. The most recent private tap TCE detection in 2009 (0.2 µg/L) was sufficiently low to not warrant retesting.

#### F. Evaluation of TCE Contamination in the Fridley Drinking Water Supply

Data collected from the Fridley distribution system since regular measurements were made starting in 1989, indicate only 5 excursions above the MCL of 5 µg/L (and no measurements above 10 µg/L), and no period of quarterly measurements above the regulatory limit (4 consecutive measurements averaging over 5 µg/L). More than half of the sampling events were non-detects (with the detection limit generally at 1 µg/L). The last detection of TCE above 1 µg/L was over 13 years ago. Since 2010, when lower detection limits for TCE were instituted, there have been no TCE measurements above the MDH HBV of 0.4 µg/L.

ATSDR Comparison Values (CVs) for assessment of cancer risk (0.75 µg/L) assume up to a lifetime of exposure to a cancer-causing chemical. While average values in the Fridley water supply are not possible to calculate because the detection limit was generally 1.0 µg/L, taken together, the data collected for the past 25 years suggest that average water concentrations have been near or below the ATSDR CV for cancer of 0.76 µg/L. Therefore, it is highly unlikely that TCE in the Fridley water supply has contributed to cancer risk in the exposed population. The MDH HBV of 0.4 µg/L is protective for all people and for all health effects associated with TCE (including cancer). The HBV is

based on health effects that may be apparent over shorter periods of time (e.g., immunotoxicity in developing fetuses and newborns, fetal heart defects). Therefore, some increased risk for these effects is possible because there have been documented measurements above this level persisting over short time periods. However, the bulk of the data also indicate that over the past 25 years the average water concentrations have been near or below the MDH HBV of 0.4 µg/L. Therefore, it is unlikely that exposures to TCE in Fridley municipal water have in fact contributed to increased risk of these non-cancer health effects. Finally, because there have been no detections of TCE above 0.4 µg/L since 2010, the evidence is unequivocal that the Fridley water is safe for all people.

## V. Child Health Considerations

MDH recognizes that children are at greater risk than adults from certain kinds of exposures to hazardous substances. They receive higher doses of chemical exposure per body weight. The developing body systems of children can sustain permanent damage if toxic exposures occur during critical growth stages. Most importantly, children depend completely on adults for risk identification and management decisions, housing decisions, and access to medical care.

At the present time, child exposures to TCE are well below the TCE MCL (5 µg/L) and near or below the new MDH TCE HBV (0.4 µg/L).

## VI. Conclusion

1. The Fridley drinking water poses no apparent human health hazard based on drinking water sample data for the Fridley distribution system. The Fridley Commons Well Field effluent has never exceeded 5 TCE MCL measured as the average of 4 quarterly measurements. Over half of the tests have shown no detectable TCE (< 0.1 to <1.0 µg/L), and the water is therefore near or below the MDH HBV of 0.4 µg/L. However, some individual municipal wells in the Fridley drinking water system may still be vulnerable to contamination and continued monitoring is necessary to ensure that future exposures do not occur above the MDH TCE HBV of 0.4 µg/L.
  - Despite the drop in TCE contamination levels in Fridley Wells 6, 7, 8, and 9, the wells remain vulnerable to TCE contamination due to an unknown source of the TCE contamination.
  - VOC testing frequency for Well 13 warrants further evaluation due to unique environmental conditions.
2. Inconsistent nomenclature has been in records of contaminant analyses for city wells by the City of Fridley and by MDH.

## **VII. Recommendations**

- Continue monitoring and maintenance of the Fridley Commons water distribution system at current levels of TCE near or below the MDH HBV 0.4 µg/L.
- Because the source of TCE in Wells 6, 7, 8, and 9 is unknown, conduct a comprehensive well receptor survey for private wells within a one mile radius of the site, identify current well water use, and notify well owners of possible contamination.
- Given the environmental circumstances surrounding Well 13, evaluate its utility as an emergency backup well.
- Use a consistent system to denote sample names for Fridley wells to facilitate evaluation of contamination trends

## **VIII. Public Health Action Plan**

- MDH will continue to collaborate with Fridley Public Works to ensure that contaminant concentrations stay below the state's health-based values.
- MDH staff will attend CAG meetings, and continue to respond to citizen concerns.
- MDH will complete Health Consultations/Updates for NIROP/FMC, Kurt Manufacturing, Dealers Manufacturing, BAE Inc., and Boise Cascade/Onan/Medtronic sites.
- MDH is available to answer questions about potential exposures and health impacts related to Superfund sites. References

## **IX. References**

1. Barr Engineering, Evaluation of Groundwater Contamination Fridley Commons Well Field Site. Prepared for the Minnesota Pollution Control Agency. March 1997
2. MDH, Public Health Assessment: Fridley Commons Well Field, Fridley, Anoka County, Minnesota., December 2001.
3. MDH, Wellhead Protection Plan for the City of Fridley: Part I Delineation and Vulnerability Assessment., May 2002
4. U.S. Army, Twin Cities Army Ammunitions Plant Annual Performance Report. Prepared by Wenck 2011
5. MDH, Wellhead Protection Plan for the City of Fridley: Part II May 1, 2009
6. MPCA, Limited Remedial Investigation Report, Fridley Commons Well Field, Fridley, Minnesota, Delta Project NO. A001-103., September 2002
7. MPCA, Fridley Commons Park Well Field Superfund Site: Superfund Program Anoka County Fact Sheet., April 2012
8. MDH, Community Concerns about Cancer in Fridley and Anoka County, Minnesota., August 2012
9. MDH, Cancer and the Environment., June 2012
10. USEPA, Toxicological review of Trichloroethylene (CASRN 79-01-6) in support of summary information on the Integrated Risk Information System (IRIS), EPA/635/R-09/011F, 2011
11. USEPA, Fridley Commons Well Field Superfund Site Record of Decision September 2005.

## **X. Report Preparation**

This Health Consultation for the Fridley Commons Well Field National Priorities List (Superfund) Site and Fridley Well 13: Trichloroethene Drinking Water Concentrations 1988 – 2012 was prepared by the Minnesota Department of Health under a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with the approved agency methods, policies, procedures existing at the date of publication. Editorial review was completed by the cooperative agreement partner. ATSDR has reviewed this document and concurs with its findings based on the information presented. ATSDR's approval of this document has been captured in an electronic database, and the approving agency reviewers are listed below.

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## Tables

**Table 1 Municipal Well Construction City of Fridley**

<b>Municipal Well Construction</b>	<b>Unique No.</b>	<b>Aquifer</b>	<b>Casing Depth (ft)</b>	<b>Well Depth (ft)</b>	<b>Year Constructed</b>	<b>Vulnerability Status</b>
Fridley 1*	206685	Mt. Simon	389	925	1956	Nonvulnerable
Fridley 2	206674	Mt.Simon	675	842	1960	Nonvulnerable
Fridley 3	206670	Mt. Simon	752	850	1961	Nonvulnerable
Fridley 4	201158	Mt. Simon	663	830	1961	Nonvulnerable
Fridley 5	206675	Mt. Simon	656	845	1961	Nonvulnerable
Fridley 6	206673	Prairie du Chien – Jordan	153	255	1972	Vulnerable
Fridley 7	206678	Prairie du Chien – Jordan	138	262	1966	Vulnerable
Fridley 8	206669	Prairie du Chien – Jordan	138	265	1969	Vulnerable
Fridley 9	206672	Prairie du Chien – Jordan	145	262	1972	Vulnerable
Fridley 10	206658	Hillside Sand	128	199	1969	Vulnerable
Fridley 11	206657	Jordan	325	669	1970	Vulnerable
Fridley 12	209207	Jordan	233	276	1970	Vulnerable
Fridley 13*	208996	Prairie du Chien – Jordan	191	332	1970	Vulnerable

\* = Emergency backup well; not included in wellhead protection planning

**Table 2**  
**Fridley Commons Effluent Trichloroethene (TCE) Concentrations 2003 to 2012**

Sample Staff	Date	TCE (µg/L)
Pace Analytical	7/9/2003	<1.0
Pace Analytical	11/20/2003	<1.0
Pace Analytical	1/20/2004	<1.0
MDH	6/8/2004	0.1
Pace Analytical	7/14/2004	<1.0
MDH	8/31/2004	0.9
MDH	9/3/2004	0.9
Pace Analytical	10/19/2004	<1.0
MDH	11/12/2004	0.3
Pace Analytical	3/9/2005	<1.0
MDH	5/16/2005	0.2
Pace Analytical	6/14/2005	<1.0
Pace Analytical	9/12/2005	<1.0
Pace Analytical	5/9/2006	<1.0
MDH	6/15/2006	0.5
Pace Analytical	11/29/2006	<1.0
Pace Analytical	1/22/2007	<1.0
Pace Analytical	4/19/2007	<1.0
MDH	6/14/2007	0.1
Pace Analytical	10/11/2007	<1.0
MDH	7/11/2007	0.6
Pace Analytical	7/12/2007	<1.0
Pace Analytical	1/9/2008	<1.0
Pace Analytical	8/14/2008	<1.0
Pace Analytical	5/26/2009	<1.0
MDH	2/2/2010	<0.1
MDH	7/28/2011	<0.1
MDH	3/26/2012	<0.1
MDH	7/12/2012	<0.1

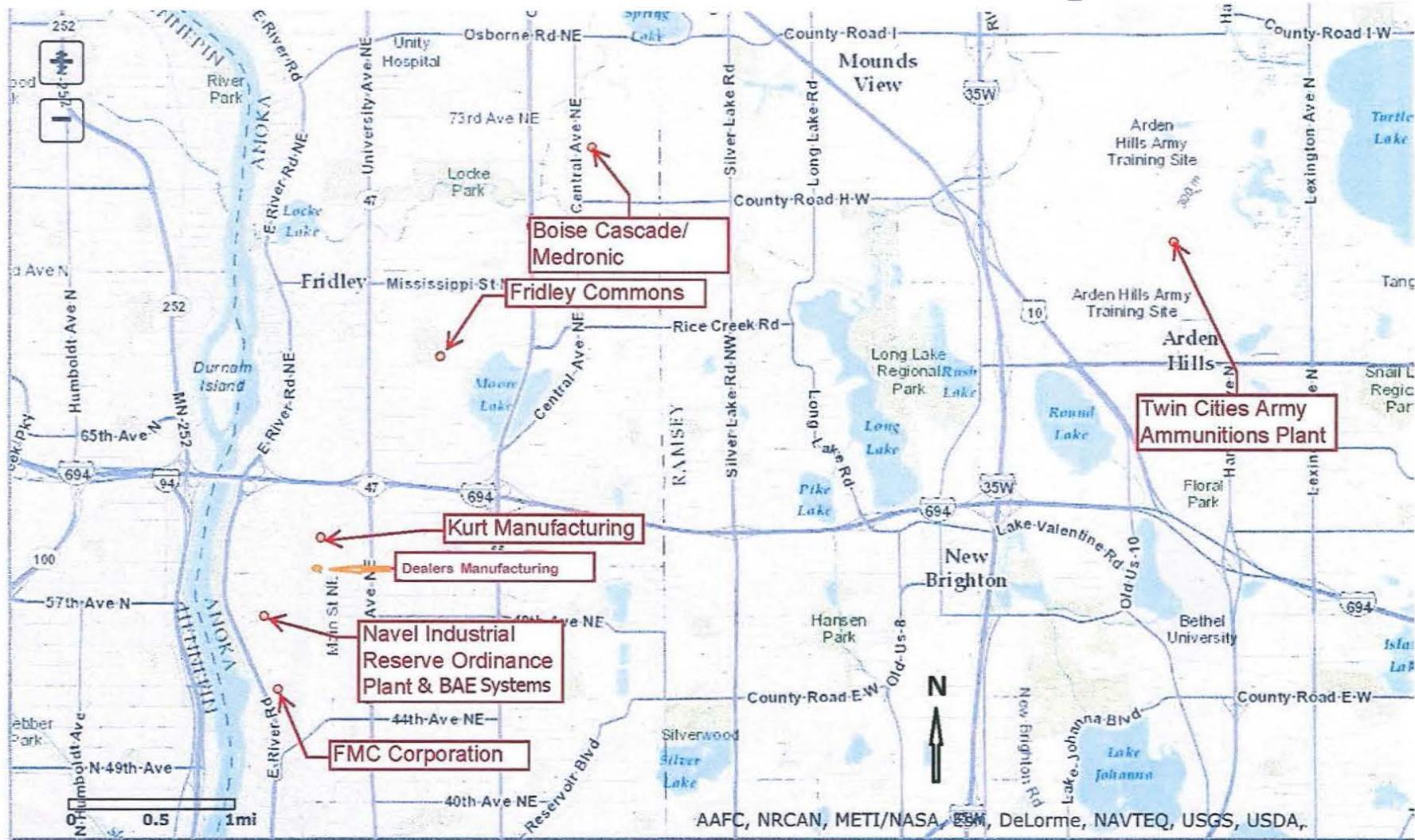
<: Less Than; MDH= Minnesota Department of Health; MDH TCE Health Based Value = 0.4 µg/L (micrograms/liter)

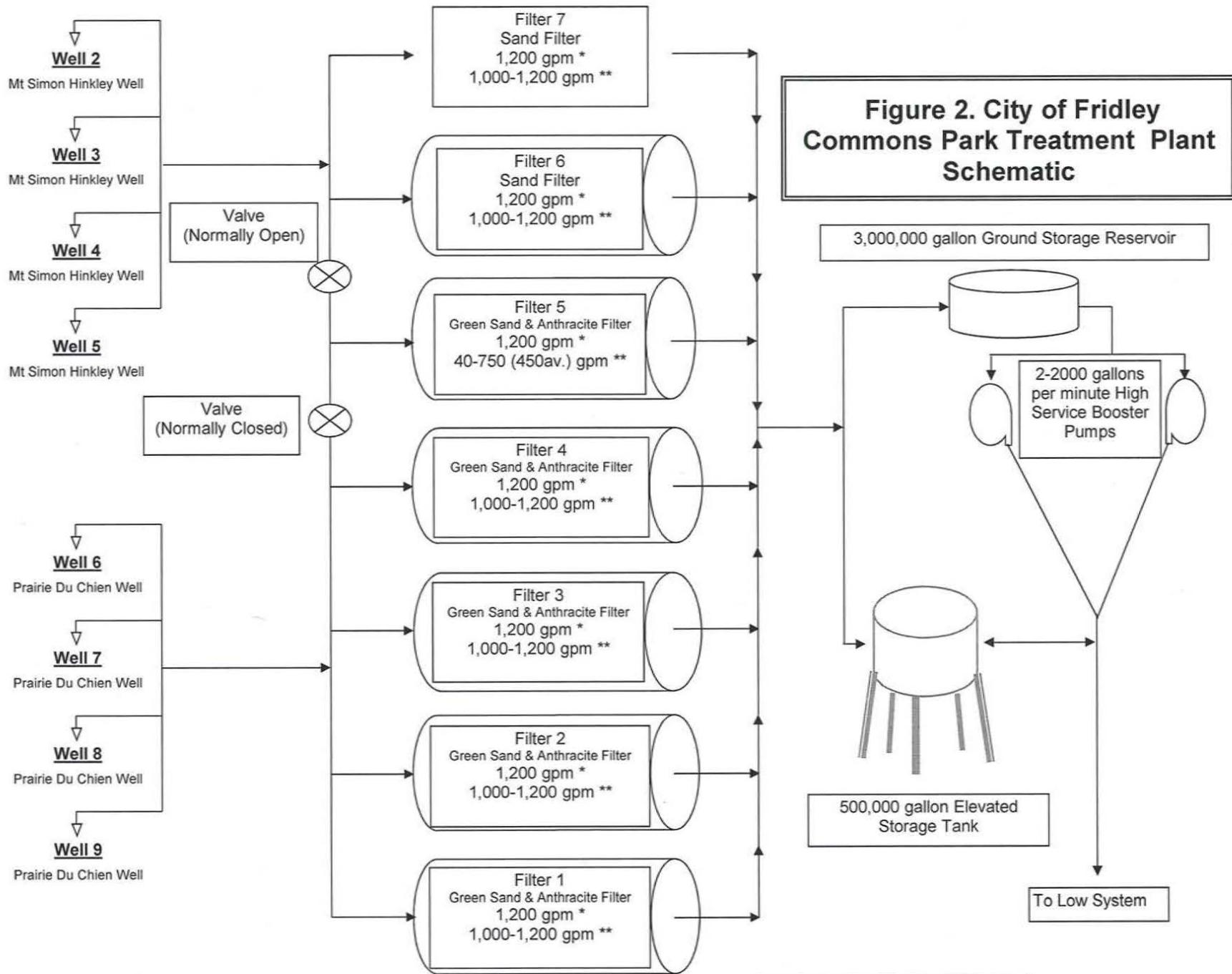
**Table 3**  
**Well 13 Groundwater Volatile Organic Compound Concentrations (µg/L)**  
**from 1989-2012**

Year	Trichloroethene (TCE)	Cis-1, 2-dichloroethene (cis-1, 2-DCE)	Carbon Tetrachloride	Chloroform	O,P, & M-xylene
9/6/95	1.0	0.5	0.4	0.3	
10/26/95	0.3		0.3	0.1	
2/16/96	0.2				
8/15/96	1.6				
5/6/97				0.4	0.6
7/12/12		0.57			
Maximum Contaminant Level	5 µg/L	70 µg/L	5 µg/L	70 µg/L	10,000 µg/L
µg/L=micrograms/liter					

## Figures

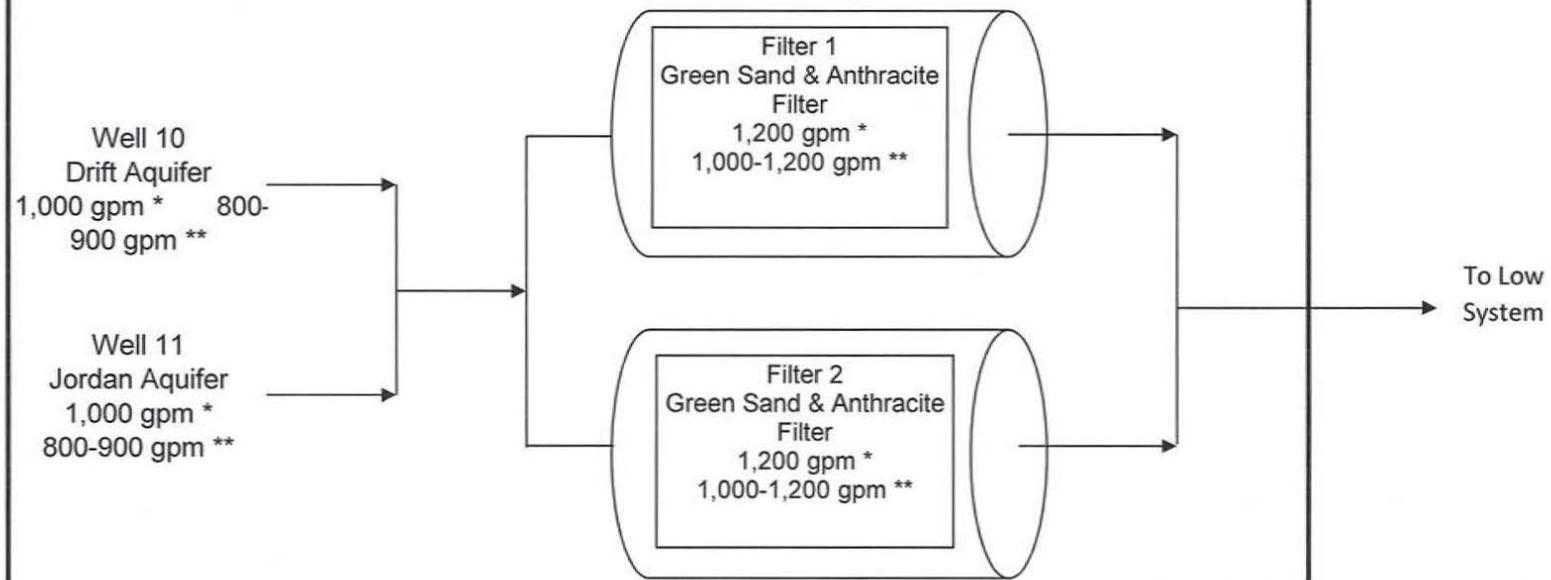
Figure 1 Fridley Area Superfund Sites





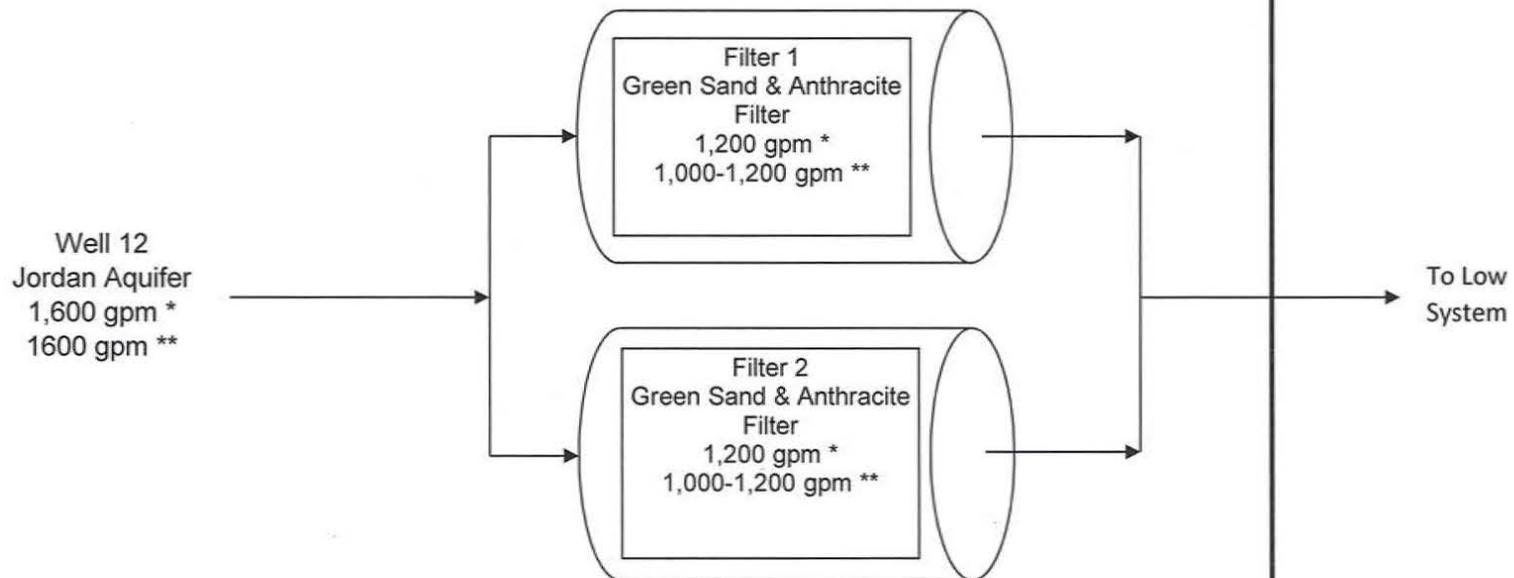
\* = Design Capacity  
 \*\* = Actual Capacity  
 gpm = Gallons per Minute

**Figure 3. City of Fridley Locke Park Filter Plant and Wells**



**City of Fridley Treatment Plant 3**

\* = Design Capacity  
\*\* = Actual Capacity



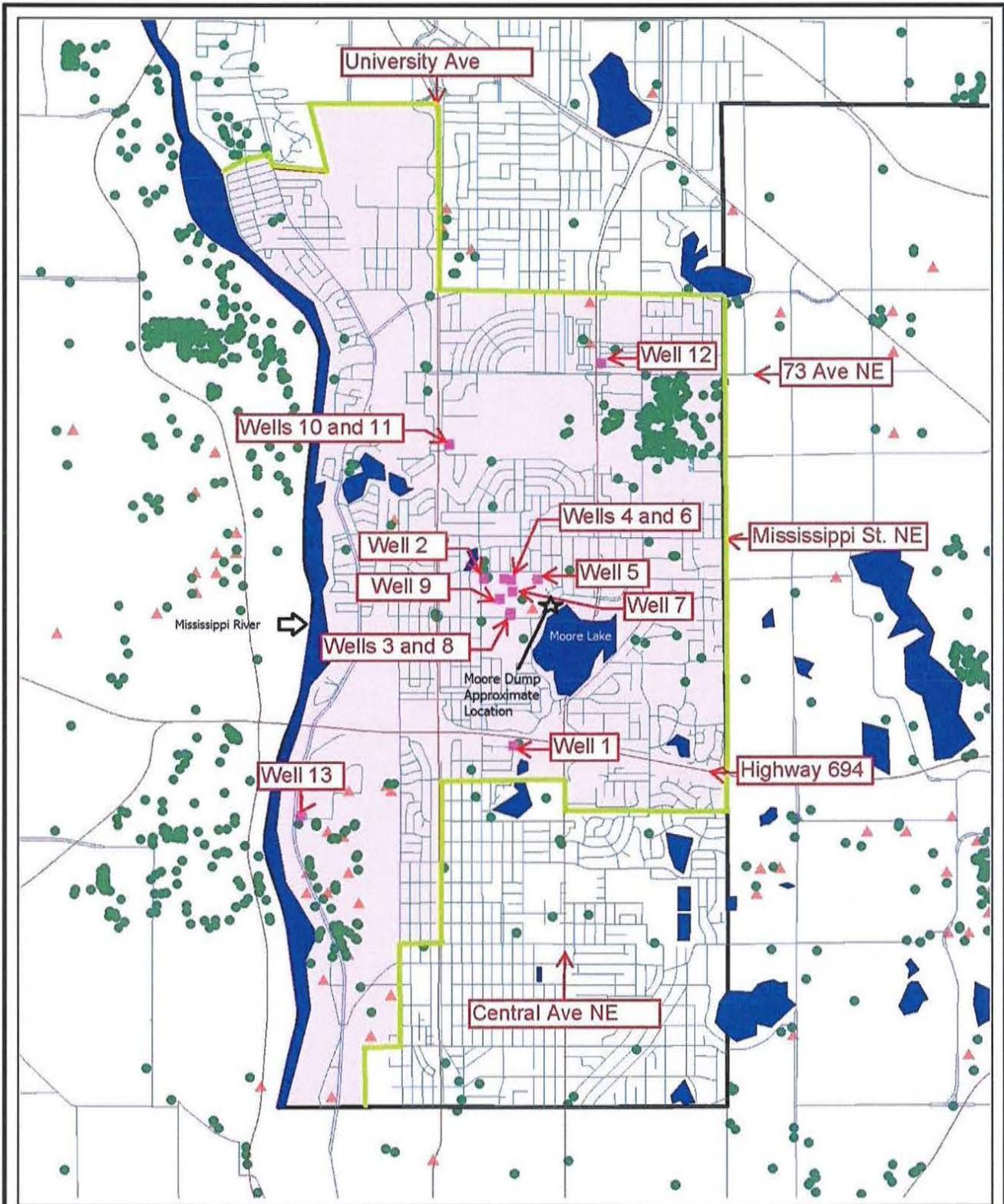


Figure 4. Fridley Drinking Water Wells

- Fridley Wells
- Located Wells
- ▲ Groundwater Appropriation Permit Sources
- Fridley Corporate Limits

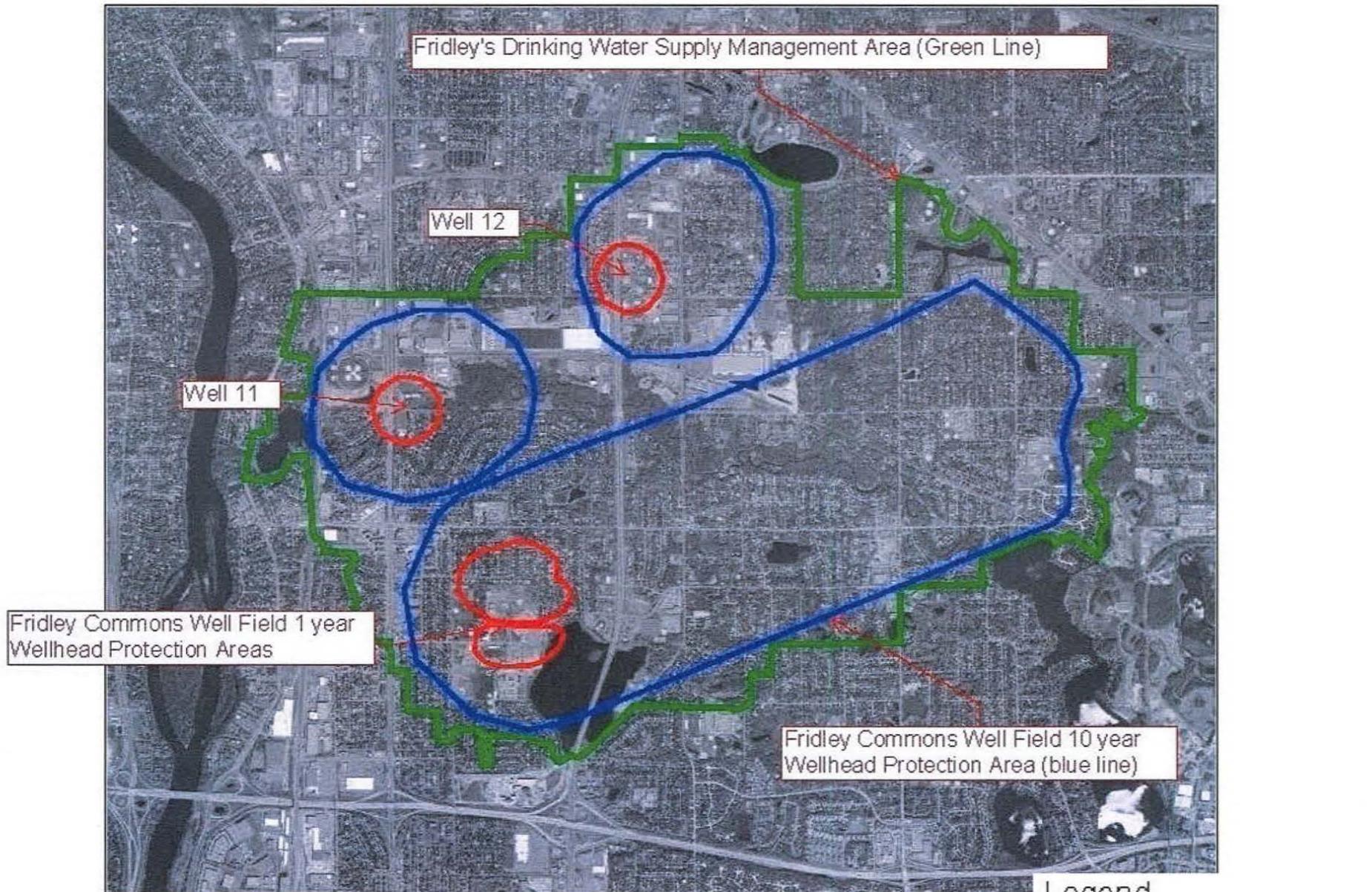
900 0 900 1800 Meters

MDH, Source Water Protection Unit, May 2002



Figure 5. Trichloroethene (TCE) Groundwater Plumes Near Fridley Well 13





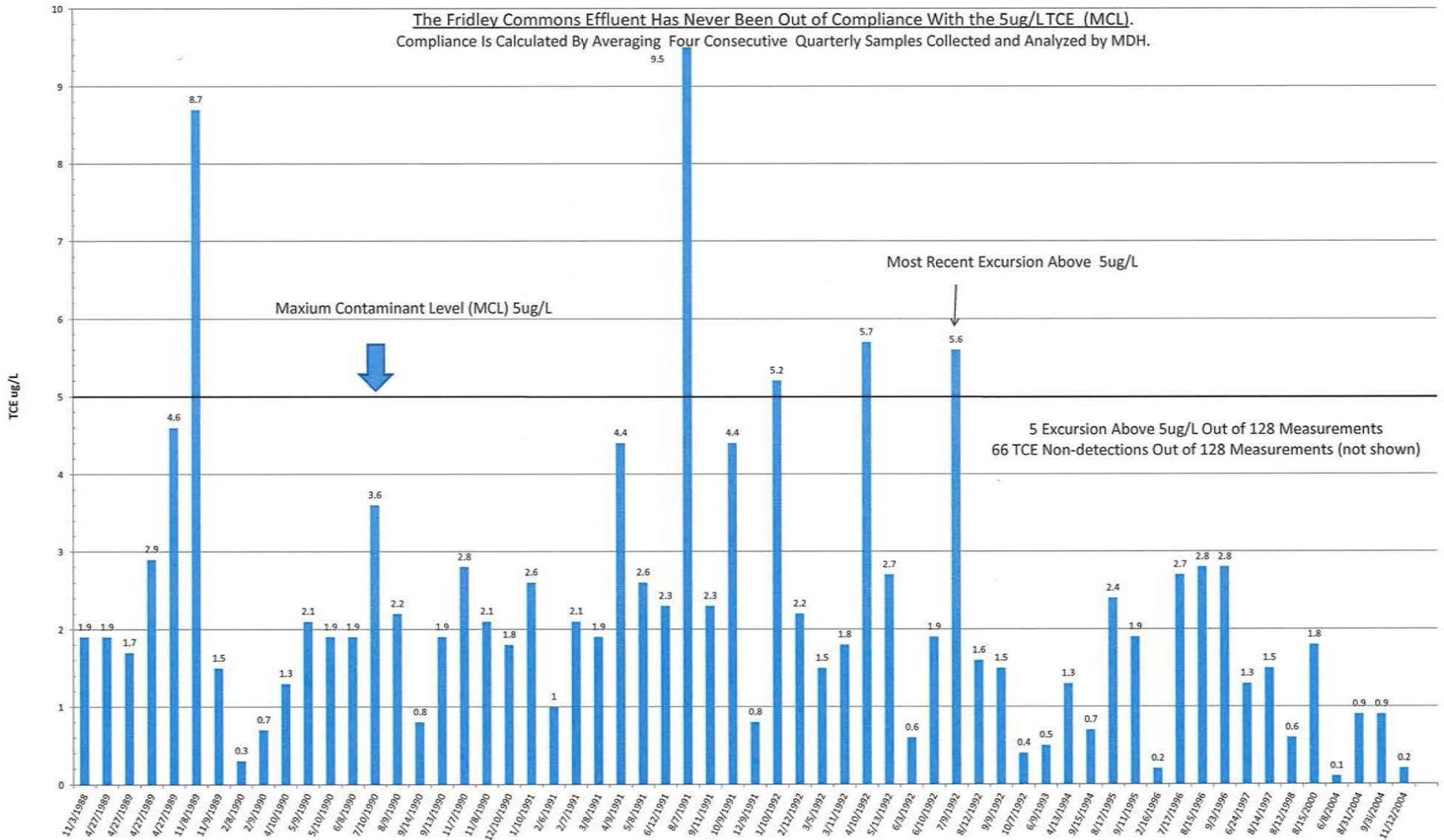
**Figure 6. Wellhead Protection Areas**  
**Well Nos. 6,7,8,11,12**  
**City of Fridley**

700 0 700 1400 Meters



Figure 7

Fridley Commons Effluent Trichloroethene (TCE) Detections From 1988 to 2012



Appendix A  
Potential Contaminant Sources

Appendix A  
Potential Contaminant Inventory

Property ID Number Class & Description Structure Description	Address	Property Owner Name Facility Name	Potential Contaminant Type (bold indicates active)
003-233024120005 4001 Exempt Property	6085 7th St NE	Ind School District #14	
	6085 7th St NE	Community Ed Center	LUST 646 (File Closed)
	6085 7th St NE	Fridley Comm Ed Ctr	LUST 8835 (File Closed)
	6085 7th St NE	Fridley Comm Ed Ctr	<b>Reg Tank #11940 (1 Active)</b>
	6085 7th St NE	Fridley Comm Ed Ctr	<b>Reg Tank #11941 (1 Active)</b>
003-233024210099 2114 Residential Rambler Basement	6120 5th St NE	Nguyen Hoi V & Ruom	
	6120 5th St NE	St. Williams Church	Reg Tank #12926 (Removed)
003-233024210135 3615 Service Station Fair Cl. C Serv. Garage	6071 University Ave NE	Sinclair Oil Corporation	
	6071 University Ave NE	Sinclair Fridley	Haz Waste Gen - Cl. 1 U Oil
	6071 University Ave NE	Sinclair Service Station	LUST 3963 (File Closed)
	6071 University Ave NE	Sinclair Retail	<b>Reg Tank #55 (2 Active)</b>
003-243024120001 2105 Residential		Guiga Kais & Abdel Karim Anwar	
	NW Of Gardena Ave And Arthur	Gardena Avenue Dump	DUMP
003-243024120042 2115 Residential Rambler Basement	1336 Hillcrest Dr NE	Hiestand Thaddeus	
	1336 Hillcrest Dr NE	Bacon Residence	LUST 10157 (File Closed)
003-243024210005 4004 Exempt Property	6028 Central Ave NE	City Of Fridley	
	6028 Old Central Ave	Rush Residence	LUST 9887 (File Closed)
123-073023430083 2110 Residential Rambler	5086 Red Oak Dr	Range,Dale D	
	5086 Red Oak Dr	Precision Lawn Care Inc	Ag Site Unknown (16913)
	5086 Red Oak Dr	Star Lawn Inc	Ag Site Unknown (11442)
123-083023330047 2110 Residential BungaLow	5092 Long Lake Rd	Thill,Charlotte R	
	5092 Long Lake Rd	Williams Pipe Line Co	Reg Tank #50152 (Removed)
123-083023340003 4000 Exempt Property K-12 SCH-Pub.	5100 Edgewood Dr	ISD No 621	
	5100 Edgewood Dr	Edgewood Middle School	LUST 14367 (File Closed)
	5100 Edgewood Dr	Edgewood Middle Sch	<b>Reg Tank #17437 (1 Active)</b>
123-083023340004 4000 Exempt Property Spec. Taxing Dist.	2345 W Co. Rd. H	No Sub San Sewer Dist	
	2345 W Co Rd H	Moundsview Lift Station (L-35)	<b>Reg Tank 50199 (2 Active)</b>
	2345 W Co. Rd. H	MCWSI Moundsview L 35	Haz Waste Gen (MND985679737)

Appendix A  
Potential Contaminant Inventory

Property ID Number Class & Description Structure Description	Address	Property Owner Name Facility Name	Potential Contaminant Type (bold indicates active)
123-173023220043 4000 Exempt Property K-12 SCH-Pub.	2425 Long Lake Rd	Ind School Dist 621	
	2425 Long Lake Rd	Irondale High School	Haz Waste Gen (MNR000015842)
	2425 Long Lake Rd	Irondale Senior High School	LUST 8692 (File Closed)
	2425 Long Lake Rd	Irondale Sr High School	<b>Reg Tank #17438 (1 Active)</b>
123-173023230009 3400 Commercial	2251 Long Lake Rd	Beach,Delore L	
	2251 Long Lake Rd	Beachs Long Lake Serv	Haz Waste Gen (MND981535214)
	2251 Long Lake Rd	Beachs Long Lake Serv	LUST 2582 (File Closed)
	2251 Long Lake Rd	Beachs Long Lake Service	LUST 10328 (File Closed)
	2251 Long Lake Rd	Beachs Long Lake Serv	<b>Reg Tank #3519 (4 Active)</b>
123-183023110094 2110 Residential Bungalow	2430 Long Lake Rd	Kuehn,Matthew	
	2430 Long Lake Rd	Architectural Metal Serv	Haz Waste Gen (MNR000018531)
123-183023210017 2110 Residential Rambler	2678 Eastman Dr	Siercks,Rose M	
	2678 Eastman Dr	Timmers Express	Haz Waste Gen (MND985714526)
123-183023210030 2110 Residential Split Level	2553 Eastman Dr	Knudsen,Timothy D	
	2553 Eastman Dr	Kathleen Fisher	LUST 1120 (File Closed)
123-183023310003 3400 Commercial	2166 Silver Lake Rd	Zitzloff,Lowell R	
	2555 Mississippi St	Lowells AutoSpec	Haz Waste Gen (MND982207599)
	2166 Silver Lake Rd	World Cycle & Fitness	Haz Waste Gen (MN0000066324)
	2172 Silver Lake Rd	McGraw Timothy G DC PA	Haz Waste Gen (MND985673102)
123-183023310004 3400 Commercial		Johnson,Charles H	
	2599 Mississippi St	Commercial Finishes Inc	Haz Waste Gen (MND980898548)
123-183023310061 3400 Commercial		Supervalu Inc	
	2074 Silver Lake Rd	Rice Creek Shop Ctr	Haz Waste Gen (MNR000063230)

Appendix A  
Potential Contaminant Inventory

Property ID Number Class & Description Structure Description	Address	Property Owner Name Facility Name	Potential Contaminant Type (bold indicates active)
123-183023310087 3400 Commercial	2010 Silver Lake Rd	Speedway Superamerica LLC	
	2010 Silver Lake Rd	Superamerica 4116	Haz Waste Gen (MND985767078)
	2010 Silver Lake Rd	Superamerica #4116	LUST 3807 (File Closed)
	2010 Silver Lake Rd	Superamerica #4116	LUST 11389 (File Closed)
	2010 Silver Lake Rd	Superamerica #4116	<b>Reg Tank #3807 (3 Active)</b>
123-183023310088 3400 Commercial	2120 Silver Lake Rd	Enby LLC	
	2128 Silver Lake Rd	Rice Creek Chiropractic	Haz Waste Gen (MND985676097)
	2120 Silver Lake Rd	Snyder Bros Store #5077	Haz Waste Gen (MNR000078394)
123-183023310089 3400 Commercial	2190 Silver Lake Rd	Schill, Dennis D	
	2190 Silver Lake Rd	Dennys Service Center	Haz Waste Gen (MND981778285)
123-183023340076 3400 Commercial	1900 Silver Lake Rd	Roseville LLC	
	1900 Silver Lake Rd Ste 204	Correctcare Chiropractic Ctr	Haz Waste Gen (MNR000034629)
123-183023420101 3400 Commercial	2051 Silver Lake Rd	Momentum Entrprss Nicollet LLC	
	2051 Silver Lake Rd	Superamerica #1354	LUST 258 (File Closed)
	2051 Silver Lake Rd	Superamerica #1354	Reg Tank #10276 (Removed)
123-183023420102 3400 Commercial	2191 Silver Lake Rd	Haad Management Inc	
	2193 Silver Lake Rd	Brandeen Phillip Dr A	Haz Waste Gen MND144700762
Reg Tank: MPCA registered storage tank including current status (as of August 4, 2007) Haz Waste Gen: County licensed hazardous waste generator (as of August 4, 2007)			

Appendix A  
Potential Contaminant Inventory

Property ID Number Class & Description Structure Description	Address	Property Owner Name Facility Name	Potential Contaminant Type (bold indicates active)
003-123024210029 3515 Industrial Fair Cl. C Serv. Garage	7600 Central Ave NE	Anderson Trucking Serv Inc	
	7600 Central Ave NE	Anderson Trucking Serv Inc	Reg Tank #132 (Removed)
	7600 Central Ave NE	Anderson Trucking.	LUST 4778 (File Closed)
	7600 Central Ave NE	Midwest Coast Trans	Haz Waste Gen – VSQG
	7616 Central Ave NE	Williams Electric	Reg Tank #20026 (Removed)
003-123024220003 3415 Commercial Fair Cl. C Serv. Garage	1010 Osborne Rd NE	Fridley Auto Repair	
	1010 Osborne Rd NE	Victory Auto Service	Haz Waste Gen – VSQG
	1010 Osborne Rd NE	Fridley Tire And Auto	LUST 11037 (File Closed)
	1010 Osborne Rd NE	Fridley Tire & Brake	<b>Reg Tank 11830 (1 Active)</b>
003-123024220006 3415 Commercial Fair Cl. D Office	7570 Hwy 65 NE	American Trustee Life	
	7570 Hwy 65 NE	Sam's Auto World	Haz Waste Gen – VSQG
003-123024220008 3615 Service Station Avg Cl. C Shell Bldg.	7680 Hwy 65 NE	Ring Lloyd R	
	7680 Hwy 65 NE	Amoco #5308	LUST 805 (File Closed)
	7680 Hwy 65 NE	Fridley Service/Amoco #5308	<b>Reg Tank #2917 (3 Active)</b>
	7680 Hwy 65 NE	Fridley Amstar Auto	Haz Waste Gen – VSQG
003-123024220026 3515 Industrial Avg Cl. C Light Mfg.	7645 Baker St NE	LAI Midwest Inc	
	7645 Baker St NE	Rms Co	Reg Tank #237 (Removed)
003-123024220029 3415 Commercial	7600 Hwy 65 NE	BDA Dev Corp LLP	
	7600 Hwy 65 NE	Lampert Building Ctr	LUST 1604 (File Closed)
	(Address Unknown)	Lampert Lumber	Reg Tank #52902 (Abandoned)
	7600 Hwy 65 NE	Lampert Building Ctr	Reg Tank #4523 (Removed)
	7610 Hwy 65 NE	Brent Anderson Asso	Haz Waste Gen – VSQG
003-123024230006 3515 Industrial Fair Cl. C Light Mfg.	7345 Baker St NE	Ryanissa LLC	
	7345 Baker St NE	El tronic Precision Inc	Haz Waste Gen (unkn) MND006260194
	E Of 73rd Ave NE & Able St	Electronic Precision	DUMP
003-123024240015 3415 Commercial Avg. Cl. S Warehouse	1201 73 1/2 Ave NE 2	Central Auto Parts Mpls	
	1201 73 1/2 Ave NE	Central Auto Parts	Vol Invest Cleanup (VP 13370)
	1201 73 1/2 Ave NE	Skip's Central Auto Parts	Salvage yard
	1201 73 1/2 Ave NE	Central Auto Parts	Haz Waste Gen - Cl. 2 U Oil
003-123024240022 3415 Commercial Fair Cl. C Warehouse		Haluptzok Harold V	
	73rd Ave NE	Fridley Salvage Yards	Vol Invest Cleanup (VP 13370)
	7300 Central Ave NE	Fridley Auto Parts	Haz Waste Gen - Cl. 2 U Oil
	7300 Old Central Ave NE	Fridley Auto Parts	Salvage yard

Appendix A  
Potential Contaminant Inventory

Property ID Number Class & Description Structure Description	Address	Property Owner Name Facility Name	Potential Contaminant Type (bold indicates active)
003-113024320029 3515 Industrial Avg Cl. C Industrial Flex	7280 Commerce Cir E	Trustee Group Realty Prtn	
	7280 Commerce Cir E	ABW Plating Service, Inc	Haz Waste Gen – SQG
	7277 Commerce Cir W	Service Tradesman	Ag Site Unknown - 18579
	7258 Commerce Cir E	Omnetics Connector Corp	Haz Waste Gen – VSQG
	7165 Commerce Cir W	Flexcon Co Inc	Haz Waste Gen – SQG
	7265 Commerce Cir W	G Franko Screw Machine	Haz Waste Gen – VSQG
	7279 Commerce Cir W	TSI Molding, Inc.	Haz Waste Gen – VSQG
003-113024320030 3515 Industrial Avg Cl. C Industrial Flex	7258 Commerce Cir E	Kopak Packaging Corp	Ag Site Unknown
	7151 Commerce Cir NE	Trustee Group Realty Prtn I Midwest Industrial Painting	Haz Waste Gen – VSQG
003-113024320032 3415 Commercial	7200 University Ave NE	Bally Total Fitness Corp	
	7136 University Ave NE	Assoc Oral & Maxillofacial Surgeons	Haz Waste Gen - VSQG (Silver)
003-113024340002 4013 Exempt Property Columbia Arena	7011 University Ave NE	Minnesota State Of	
	7011 University Ave NE	Columbia Arena	Ag Chem Storage - 00023458
	7011 University Ave NE	Columbia Ice Arena	<b>Reg Tank #4581 (2 Active)</b>
003-113024340003 4017 Exempt Property City Garage		Fridley City of	
	69th Av & Rice Ck Blvd	Columbia/City Of Fridley Demo Fill	DUMP
	400 71st Ave NE	Fridley Public Works	<b>LUST 11381 (Active)</b>
	400 71st Ave NE	City Of Fridley - Maint Ctr	Reg Tank #4525 (Removed)
003-113024340005 4017 Exempt Property	400 71st Ave NE	City Of Fridley	Haz Waste Gen – VSQG
		Fridley City Of	
	6911 University Ave NE	Fridley-Locke Park WTP	NPDES - MN0043664
003-113024420006 3515 Industrial Fair Cl. C Office	500 73rd Ave NE	CSM Properties Inc	
	504 73rd Ave NE	Carter-Day Co Carter Day International Inc	Reg Tank #12403 (Removed) Haz Waste Gen – SQG
003-113024420010 3515 Industrial Avg. Cl. C Warehouse	490 Northco Dr NE	CSM Properties Inc	
		Kwik-File	Haz Waste Gen – SQG
003-123024210008 3515 Industrial Fair Cl. S Light Mfg	7585 Viron Rd NE	Kuban William G	
	7585 Hwy 65 NE	Kurt Mfg – Die Cast	<b>Reg Tank #119785 (1 Active)</b>
		Kurt Mfg Strite Die Cast Div	Haz Waste Gen – VSQG
003-123024210027 3515 Industrial AVG Cl. C Shell Bldg.	1240 Osborne Rd NE	Voigt Darwin A	
	1240 Osborne Rd NE	Voigt's Fridley Bus Co	Haz Waste Gen - Cl. 1 U Oil
	1250 Osborne Rd NE	Voigt's Fridley Bus Co	<b>Reg Tank #19039 (1 Active)</b>

Appendix A  
Potential Contaminant Inventory

Property ID Number Class & Description Structure Description	Address	Property Owner Name Facility Name	Potential Contaminant Type (bold indicates active)
003-123024240040 3415 Commercial	1240 73 1/2 Ave NE	Haluptzok Derek A	
	1240 73 1/2 Ave NE	Sam's Auto Parts	Salvage yard
	1240 73 1/2 Ave NE	Sam's Auto Parts	Haz Waste Gen - Cl. 2 U Oil
003-123024240042 3515 Industrial Fair Cl. C Light Mfg.	7410 Central Ave NE	Gustavson Walt & Floyd	
	7410 Old Central Ave NE	Gustavson Grindgin Inc	Reg Tank #17574 (Removed)
003-123024240047 3415 Commercial Avg Cl. C Quik Lube	7315 Hwy 65 NE	Valvoline Inst Oil Chnge	
	7315 Hwy 65 NE	Valvoline Rapid Oil	<b>Reg Tank 54442 (3 Active)</b>
	7315 Hwy 65 NE	Valvoline Rapid Oil Change 01-37	Haz Waste Gen - Cl. 1 U Oil
003-123024240054 3415 Commercial Avg Cl. C Office	7501 Hwy 65 NE	Dunmoody Inc	
	7501 Hwy 65 NE	Viking Chevrolet	LUST 4945 (File Closed)
	7501 Hwy 65 NE	Friendly Chevrolet/Geo	Reg Tank #15288 (Removed)
	7501 Hwy 65 NE	Viking Chevrolet	<b>Reg Tank #54112 (1 Active)</b>
	7501 Hwy 65 NE	Friendly Chevrolet Geo	Haz Waste Gen - SQG
003-123024240055 3515 Industrial Avg Cl. C Light Mfg.	7490 Central Ave NE	Brenk Brothers Ptnshp	
	7490 Central Ave NE	Brenk Brothers Inc	LUST 8082 (File Closed)
	7490 Central Ave NE	Brenk Brothers Inc	Reg Tank 19020 (Removed)
	7490 Central Ave NE	Brenk Brothers Inc	Haz Waste Gen - Cl. 1 U Oil
003-123024310008 3415 Commercial Fair Cl. C Retail Store	7191 Highway 65 NE	Romano-Jorgenson Ptnsp	
	7191 Hwy 65 NE	Kurt Manufacturing Co	Reg Tank 239 (Removed)
	7191 Hwy 65 NE	Chopper City Sports	Haz Waste Gen - VSQG
003-123024310010 3415 Commercial	7151 Highway 65 NE	Harstad Donald W	
	7101 Hwy 65 NE	D W Harstad Co Inc	Reg Tank #197 (Removed)
003-123024310031 3515 Industrial Avg Cl. C Industrial Flex	1290 73rd Ave NE 1	Bryant Franklin Ptnsp	
	1290 73rd Ave NE	All American Rec	Ag Site Unknown (17361)
	1290 73rd Ave NE	Upper Midwest Seed	Ag Site Unknown (22923)
003-123024310051 3615 Service Station Good Cl. C Conv Store	7299 Hwy 65 NE	Ashland Oil Inc	
	7299 Hwy. 65	SuperAmerica 4199	<b>LUST 15773 (Active)</b>
	7299 Hwy 65 NE	Superamerica #4199	<b>Reg Tank #210 (4 Active)</b>
003-123024310055 3515 Industrial Avg Cl. C Shell Bldg.	1130 73rd Ave NE	Jewel Properties	
	1130 73rd Ave NE	Crysteel Truck Equip	Haz Waste Gen - VSQG
003-123024310056 3515 Industrial Avg Cl. C Shell Bldg.	1131 72nd Ave NE 1	Haarstad Enterprises	
	1131 72nd Ave NE	Hydraulic Specialty Co	Haz Waste Gen - Cl. 1 U Oil

Appendix A  
Potential Contaminant Inventory

Property ID Number Class & Description Structure Description	Address	Property Owner Name Facility Name	Potential Contaminant Type (bold indicates active)
003-123024310057 3515 Industrial Fair Cl. S Shell Bldg.	1241 72nd Ave NE	Determan James R	
	1241 - 72nd Ave NE	Determan Tank	Haz Wst Invest & Cleanup
	1241 72nd Ave NE	Determan Welding	LUST 6912 (File Closed)
	1241 72nd Ave NE	Determan Welding	<b>LUST 11597 (Active)</b>
	1241 72nd Ave NE	Determan Welding	<b>Reg Tank #143 (9 Active)</b>
	1241 72nd Ave NE	Determan Welding &	Ag Site Unknown (18537)
	1241 72nd Ave NE	Determan Brownie Inc	Haz Waste Gen (LQG)
003-123024320004 3615 Service Station Avg Cl. C Convenience Store	7298 Hwy 65 NE	Twin Cities Stores Inc	
	7298 Hwy 65 NE	Fina Station	LUST 3530 (File Closed)
	7298 Hwy 65 NE	Stop and Save	<b>Reg Tank #63 (4 Active)</b>
	7298 Hwy 65 NE	Fina #9550	Vol Invest Cleanup
	1090 73rd Ave NE	Pro Stop Truck Service	Haz Waste Gen – VSQG
003-123024320009 3515 Industrial	7120 Highway 65 NE	Dayton-Hudson Corp	
	1090 73rd Ave NE	Target Distribution Ctr	<b>Reg Tank #53140 (1 Active)</b>
	1090 73rd Ave NE	Target Distribution Ctr	Haz Waste Gen - VSQG
003-123024330005 3515 Industrial Avg Cl. C Office	6982 Hwy 65 NE	6982 Properties Ltd Ptnr	
	6982 Hwy 65 NE	Kuether Dist Co	LUST 9104 (File Closed)
	6982 Hwy 65 NE	Kuether Dist Co	LUST 12019 (File Closed)
	6982 Hwy 65 NE	Kuether Dist Co	Reg Tank #126 (Removed)
003-123024330006 3515 Industrial Avg Cl. C Office	7000 Hwy 65 NE	Meuers Lawrence & V	
	7000 Hwy 65 NE	Pennsylvania Oil Co (Pennzoil)	Haz Wst Invest & Cleanup
	7000 Hwy 65 NE	Pennsylvania Oil Co	LUST 3708 (File Closed)
	7000 Hwy 65 NE	Pennsylvania Oil Co	Reg Tank #35 (Removed)
003-123024340003 3515 Industrial	6970 Central Ave NE	Medtronic Inc	
	7000 Central Ave NE	Medtronic Inc	LUST 4550 (File Closed)
	7000 Central Ave NE	Medtronic Inc	LUST 12651 (File Closed)
	7000 Central Ave NE	Medtronic	Perm List of Priorities
	7000 Central Ave NE	Medtronic Inc	<b>Reg Tank #12925 (1 Active)</b>
	7000 Central Ave NE	Medtronic Inc	Haz Waste Gen (LQG)

Appendix A  
Potential Contaminant Inventory

Property ID Number Class & Description Structure Description	Address	Property Owner Name Facility Name	Potential Contaminant Type (bold indicates active)
003-123024410003 3515 Industrial	1400 73rd Ave NE	Onan Corp	
	1400 - 73rd Ave NE	Onan Corporation	LUST 811 (File Closed)
	1400 73rd Ave NE	Onan Corporation	LUST 1010 (File Closed)
	1400 73rd Ave NE	Onan Corporation	LUST 2182 (File Closed)
	1400 73rd Ave NE	Onan Manufacturing	LUST 14502 (File Closed)
	1400 73rd Ave NE	Onan Corporation	<b>LUST 16048 (Active)</b>
	1400 73rd Ave NE	Cummins/Onan	Vol Invest Cleanup (VP 10430)
	1400 73rd Ave NE	Onan Manufacturing	<b>Reg Tank #164 (16 Active)</b>
	1400 73rd Ave NE	Onan Corporation	Haz Waste Gen (LQG)
003-123024430001 3515 Industrial	6951 Central Ave NE	Medtronic Inc	
	6951 Central Ave NE	Medtronic (Bus & Tech)	<b>Reg Tank #15589 (2 Active)</b>
003-133024130022 3415 Commercial Low Cl. C Serv. Garage	6519 Central Ave NE	Phillips Gary & Patricia	
	6519 Central Ave NE	Northeast Towing Serv	LUST 14676 (File Closed)
	6519 Central Ave NE	Garys Auto Service	<b>Reg Tank #11643 (1 Active)</b>
	6519 Central Ave NE	Garys Auto Of Fridley	Haz Waste Gen - Cl. 1 U Oil
003-133024140118 2114 Residential Split Foyer	6660 Anoka St NE	Youngdahl Ron & Gail	
	6660 Anoka St NE	Complete Grounds Maint	Ag Site Unknown
003-133024310014 2219 Residential Dbl. BungaLow	6428 Dellwood Dr NE	Nelson Gregory P	
	6428 Dellwood Dr NE	Chismar Residence	LUST 9543 (File Closed)
003-133024310072 3415 Commercial	6301 Central Ave NE	KEMK Companies	
	6301 Highway 65 NE	Fmr White Wolf Prop	LUST 12556 (File Closed)
	6301 Hwy 65 NE	Peterson Property	LUST 12639 (File Closed)
003-133024330034 3415 Commercial Fair Cl. C Retail Store	6304 Central Ave NE	Five Crown Dev LLC	
	6304 Hwy 65 NE	Taho Sports	LUST 13665 (File Closed)
003-133024330035 3615 Service Station Avg Cl. C Serv. Garage	6290 Central Ave NE	Sinclair Marketing Inc	
	6290 Hwy 65	Sinclair Retail	LUST 2299 (File Closed)
	6290 Hwy 65	Sinclair Retail	Reg Tank #53 (Removed)
003-133024330037 4006 Exempt Property	6180 Hwy 65 NE	St Philips Lutheran Ch	
	6180 Hwy 65 NE	St Philips Lutheran Ch	Reg Tank #14338 (Removed)
003-133024330039 3415 Commercial Avg Cl. D Office	6230 Hwy 65 NE 102	Peterson Doraine L	
	6280 Hwy 65 NE	Advanced Health Pa	Haz Waste Gen - VSQG (Silver)
	6230 Hwy 65 NE #102	Moore Lake Dental	Haz Waste Gen - VSQG (Silver)

Appendix A  
Potential Contaminant Inventory

Property ID Number Class & Description Structure Description	Address	Property Owner Name Facility Name	Potential Contaminant Type (bold indicates active)
003-133024340025 3415 Commercial Avg Cl. C Shop Ctr	1001 Moore Lake Dr E	Shorewood Plaza&Timmer BA	
	1099 Moore Lake Dr E	Dr John W Cretzmeyer	Haz Waste Gen - VSQG (Silver)
003-133024340026 3415 Commercial Avg Cl. C Discount Store	1000 Moore Lake Dr E	Jacobs Trading Co	
	1000 Moore Lake Rd E	Jacobs Trading Co	Ag Site Unknown (00021200)
003-143024130007 4001 Exempt Property	615 Mississippi St NE	Ind School District #23	
	615 Mississippi	Hayes Elem School	LUST 592 (File Closed)
	615 Mississippi St	Hayes Elem School	<b>Reg Tank #12284 (1 Active)</b>
003-143024210039 2117 Residential Split Level	418 Rice Creek Blvd NE	Seefeld Allan R	
	418 Rice Creek Blvd NE	Pets By Marie	Ag Site Unknown (00017365)
003-143024230064 2114 Residential Rambler Basement	6811 Plaza Crv NE	Freund Roger & Deborah	
	6811 Plaza Crv NE	Dave Fuenberg	Haz Waste Gen (MND982066656)
003-143024230081 3415 Commercial Fair Cl. D Medical Office	201 Mississippi St NE	Lapinski Joseph M	
	201 Mississippi St NE	Lapinski Jm Dental Office	Haz Waste Gen (VSQG-Silver)
003-143024230098 3415 Commercial Avg Cl. C Neighborhood Ctr	6530 University Ave NE	Horizon Mngmnt LLC	
	6528 University Ave NE	Bernies Automotive	Haz Waste Gen – VSQG
	6528 University Ave NE	Fridley Champion Auto	Reg Tank #52979 (Status Unknown)
	6530 University Ave NE	Boot Hill	Ag Site Unknown
003-143024240099 3415 Commercial Good Cl. C Retail Store	6525 University Ave NE	EJA Trust Fridley LLC	
	6525 University Ave NE	Walgreens #4697	Haz Waste Gen – VSQG (Silver)
003-143024310067 2617 Residential, Apt	460 Mississippi St NE Apt 101	Fridley Apartments	
	460 Mississippi St NE	Village Green Apartments	<b>Reg Tank #20446 (1 Active)</b>
003-143024310093 4017 Exempt Property	6431 University Ave NE	Fridley HRA	
	6431 University Ave NE	Fridley City Of	Ag Site Unknown (00013301)
	6431 University Ave NE	City Of Fridley Muni Grg	LUST 8863 (File Closed)
	6431 University Ave NE	City Of Fridley Muni Ctr	Reg Tank #60 (Closed in-place)
003-143024310098 4020 Exempt Property	6341 University Ave NE	Fridley HRA	
	6341 University Ave NE	Fridley Plaza Med Cinc	Haz Waste Gen - VSQG (Silver)

Appendix A  
Potential Contaminant Inventory

Property ID Number Class & Description Structure Description	Address	Property Owner Name Facility Name	Potential Contaminant Type (bold indicates active)
003-013024340012 3610 Service Station Good Cl. C Serv. Garage	1105 Osborne Rd NE	Mack Charles P	
	7701 Hwy 65 NE	Serv Stn #9280-147	<b>Reg Tank #217 (3 Active)</b>
003-013024340016 3410 Commercial Avg Cl. P Shell Bldg.	1173 Osborne Rd NE	Alacrity Investments	
	1173 Osborne Rd NE	Squid Ink Mfg, Inc.	Haz Waste Gen – SQG
003-013024340018 3400 Commercial	1199 Osborne Rd NE	Timo Woodrow Val	
	1199 Osborne Rd NE	Central Rental	Haz Waste Gen – VSQG
003-013024340050 3510 Industrial Low Cl. S Serv. Garage	1229 Osborne Rd NE	Schuur Courtney	
	1229 Osborne Rd NE	North East Terminal	Reg Tank #13565 (Removed)
	1229 Osborne Rd NE	Shorty's Wrecker Serv	Haz Waste Gen - Class 1 Used Oil
003-013024430004 3510 Industrial Fair Cl. C Light Mfg.	7705 Central Ave NE	Plassein Properties	
	7707 Central Ave NE	Plymouth Plastics Inc	Haz Waste Gen – VSQG
003-013024430086 3510 Industrial Fair Cl. C Light Mfg.	7703 Central Ave NE	Cowan Margaret Ann	
	7703 Central Ave NE	Sourceone Graphics	Haz Waste Gen – VSQG
003-013024430087 3510 Industrial Fair Cl. C Warehouse	1313 Osborne Rd NE	Robinson John D	
	1313 Osborne Rd NE	Robinson Coach Inc	Haz Waste Gen – VSQG
	1313 Osborne Rd NE	Robinson Coach, Inc	<b>Reg Tank #20394 (1 Active)</b>
003-113024310020 3515 Industrial Avg. Cl. C Warehouse	350 Northco Dr NE	Willamette Industries Inc	
	350 Northco Dr	Willamette Industries, Inc	<b>Reg Tank #55559 (6 Active)</b>
	350 Northco Dr NE	Weyerhaeuser Corrugated	Haz Waste Gen – VSQG
003-113024320011 3515 Industrial Avg. Cl. S Warehouse	7180 Commerce Cir W	Vandal Michael J	
	7180 W Commerce Cir NE	Frito-Lay Inc	LUST 8822 (File Closed)
	7180 W Commerce Cir NE	Frito-Lay Inc	Reg Tank #4119 (Removed)
003-113024320028 3415 Commercial Low Cl. C Office	7260 University Ave NE 145	Levitan Limited Partnrshp	
	7205 University Ave NE	Associated Skin Care Spec	Haz Waste Gen – SQG
	7245 University Ave NE	Lowells Paint Supply	Haz Waste Gen – VSQG

Appendix A  
Potential Contaminant Inventory

Property ID Number Class & Description Structure Description	Address	Property Owner Name Facility Name	Potential Contaminant Type (bold indicates active)
003-143024320188 4007 Exempt Property	6490 University Ave NE	Fridley HRA/Rottlund	
	6490 University Ave NE	Fridley Fast Lube	LUST 8145 (File Closed)
	6490 University Ave NE	Fast Lube/Kiffe's Auto	Reg Tank #18488 (Removed)
003-143024340004 3415 Commercial Fair Cl. C Retail Store	6257 University Ave NE	Plaza Developments LLC	
	6259 University Ave NE	Plaza Cleaners	Haz Waste Gen – SQG
003-143024340010 3615 Service Station Avg Cl. C Convenience Store	6101 University Ave NE	Twin Cities Avanti LLC	
	6101 University Ave NE	Q Superette	LUST 455 (File Closed)
	6101 University Ave NE	Total Petroleum #2678	LUST 5738 (File Closed)
	6101 University Ave NE	Avanti Store #5678	LUST 12877 (File Closed)
003-143024430036 4001 Exempt Property Commons Park		GEC Citgo Fridley	<b>Reg Tank #167 (2 Active)</b>
		City of Fridley	
003-153024140053 3515 Industrial Fair Cl. S Shell Bldg.	E of 7th St. Between 63rd Ave &	Fridley Commons Park Well Field	<b>National Priorities List</b>
	6750 Main St NE	Voigt Darwin A	
003-153024140082 3515 Industrial Avg Cl. C Light Mfg.	6750 Main St NE	Fridley Bus Co	LUST 11249 (File Closed)
	6750 Main St NE	Fridley Bus Co Inc	Reg Tank #4522 (Removed)
	6536 Main St NE	Stylmark Inc	
003-153024410045 3515 Industrial Avg Cl. S Light Mfg.	6536 Main St NE	Stylmark Inc	<b>Reg Tank #11348 (9 Active)</b>
	6536 Main St NE	Stylmark	Vol Invest Cleanup
	6536 Main St NE	Stylmark Inc	Haz Waste Gen – VSQG
	200 Mississippi St NE	RAO Manufacturing Co	
003-233024110001 4017 Exempt Property - (Park: Dunes)	200 Mississippi St NE	RAO Manufacturing	<b>Reg Tank #55304 (9 Active)</b>
		Fridley City Of	
003-233024110002 4001 Exempt Property	Near W Moore Lake Dr & Carol Dr	Moore Lake Dump	DUMP
	6100 Moore Lake Dr W	Fridley City Of	
	6100 W Moore Lake Dr	Fridley Middle School	LUST 1347 (File Closed)
003-233024110003 4001 Exempt Property	6100 W Moore Lake Dr	Fridley Middle School	<b>Reg Tank #4513 (1 Active)</b>
	6000 Moore Lake Dr W	Ind School District #14	
	6000 Moore Lake Dr W	Fridley High School	Haz Waste Gen – VSQG
	6000 Moore Lake Dr W	Ind School Dist 14	Ag Site Unknown (00013300)
	6000 W Moore Lake Dr	Fridley High School	LUST 1325 (File Closed)
	6000 W Moore Lake Dr	Fridley High School	<b>Reg Tank #4512 (1 Active)</b>

## Appendix B

### Examples of Inconsistent Water Sample Labeling

# Appendix B



## LABORATORIES, Inc.

P.O. BOX 249  
NEW ULM, MN 56073-0249

PHONE (507) 354-8517 WATS (800) 782-3557 FAX (507) 359-2890



☆ *What*  
☆ *Wells* ☆  
☆

Sample Identification: Effluent Job #: 2308

Date Analyzed: 5-17-90

No Laboratory  
 Manifest

	<u>ug/L</u>	<u>MDL ug/L</u>
<b>Purgeable Halocarbons:</b>		
Chloroethane.....	BDL	2.0
Chloromethane.....	BDL	2.0
Bromomethane.....	BDL	2.0
Dichlorodifluoromethane.....	BDL	2.0
Vinyl Chloride.....	BDL	2.0
Methylene Chloride.....	BDL	1.4
Trichlorofluoromethane.....	BDL	0.9
1,1-Dichloroethylene.....	BDL	1.3
1,1-Dichloroethane.....	BDL	0.2
Trans-1,2-Dichloroethylene...	BDL	0.3
Chloroform.....	BDL	1.0
1,2-Dichloroethane.....	BDL	0.6
1,1,1-Trichloroethane.....	BDL	1.1
Carbon Tetrachloride.....	BDL	0.4
Bromodichloromethane.....	BDL	0.7
1,2-Dichloropropane.....	BDL	0.4
Trans-1,3-Dichloropropene....	BDL	0.2
1,1,2-Trichloroethylene.....	(1.9)	(0.4)
Chlorodibromomethane.....	BDL	0.4
1,1,2-Trichloroethane.....	BDL	0.3
Cis-1,3-Dichloropropene.....	BDL	0.5
2-Chloroethylvinyl Ether.....	NQ	ND
Bromoform.....	BDL	0.5
1,1,2,2-Tetrachloroethane....	BDL	0.5
1,1,2,2-Tetrachloroethylene..	BDL	0.4
<b>Purgeable Aromatics:</b>		
Chlorobenzene.....	BDL	0.3
Benzene.....	BDL	2.0
Toluene.....	BDL	2.0
Ethyl Benzene.....	BDL	1.5
1,2-Dichlorobenzene.....	BDL	0.6
1,3-Dichlorobenzene.....	BDL	0.4
1,4-Dichlorobenzene.....	BDL	0.2

MVTL guarantees the accuracy of the analysis done on the sample submitted for testing. It is not possible for MVTL to guarantee that a test result obtained on a particular sample will be the same on any other sample unless all conditions affecting the sample are the same, including sampling by MVTL. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

## Appendix B

Date Collected: \_\_\_\_\_

WATER ANALYSES ONLY

Budget #: HC

Date Received: \_\_\_\_\_

Report To: Metro

Collected by: \_\_\_\_\_

Chain of Custody #: \_\_\_\_\_

☆☆☆

What wells are operating?

Field Blank #: \_\_\_\_\_

Laboratory Number	Field Number	Sample Description	- Container - Number      Type				
910235/	a BB/56	Filter Effluent - <u>Fridley</u>	4	Vials			
	b						
	c						
	d						
	e						
Analyses Request Options		All	a	b	c	d	e
VOLATILE ORGANICS		465	✓	910235/			
VOLATILE HALOGENATED ORGANICS (THM)		464					
GASOLINE/FUEL OIL + HALOGENATED		463					
VOLATILE ORGANICS by GC/MS		468					
CHLOROPHENOXY ACID HERBICIDES (CPA)		574					
POLYNUCLEAR AROMATIC HYDROCARBONS (PAH)		470					
POLYCHLORINATED BIPHENYLS (PCBs)		420					
PHTHALATE ESTERS		490					
PESTICIDES, CHLORINATED		502					
TOXAPHENE		520					
TECHNICAL CHLORDANE		530					
DDT GROUP		550					
PESTICIDES, NITROGEN/PHOSPHOROUS		571					
SPECIAL SAMPLE HOURS		560					
Field Notes:							
Laboratory Notes:							

Appendix C  
City of Fridley Annual Water Usage  
(1982-2011)

Appendix C Table 1 Minnesota Division of Natural Resources Annual Water Use Records for the City of Fridley (1982 - 2011)

Year	Well 1 (KG)	Well 2 (KG)	Well 3 (KG)	Well 4 (KG)	Well 5 (KG)	Well 6 (KG)	Well 7 (KG)	Well 8 (KG)	Well 9 (KG)	Well 10 (KG)	Well 11 (KG)	Well 12 (KG)	Well 13 (KG)	New Brighton water via 63rd Booster [KG]	Total Water Distributed [KG]
2011	6	83376	78311	89572	4497	78503	52936	112408	91181	97957	117754	121797	45	434174	1362517
2010	8	103254	82596	63020	54402	44594	25602	142723	137378	117367	123235	203465	70	367534	1465248
2009	14	38028	78137	102575	86803	74286	57221	123796	116643	147139	183481	253173	98	352259	1613653
2008	8	62339	54954	110177	122274	70167	14561	126360	89475	118729	133735	201763	279	459466	1564287
2007	24	66635	82417	88518	84771	74784	30805	130394	94511	113959	163855	236627	4530	442769	1614599
2006	11	66906	108237	81162	63112	128369	38224	80474	98027	89827	135792	262541	1909	404602	1559193
2005	0	97332	69096	98682	59464	132103	75058	89220	24443	153824	204989	215089	31	384666	1603997
2004	38	95970	26828	116310	118240	51495	107197	43596	109080	124142	171546	116295	40	338531	1419308
2003	0	39386	159526	122289	68915	157617	64461	121167	0	142359	180714	243	4997	378915	1440589
2002	9	1	122408	91806	133988	125463	45719	25854	0	127085	162296	186162	14	480533	1501338
2001	25	10823	141793	112344	122454	120038	45509	128339	101	142782	191744	243639	3345	509205	1772141
2000	10	31085	127393	113161	136547	209043	5374	110212	161	178836	187477	239374	14	425897	1764584
1999	33	62161	117466	86021	82290	144943	23875	11704	0	111889	126860	160876	39	774919	1703076
1998	246	31717	185727	198299	146165	108385	4965	43445	0	220204	208222	267527	53	456888	1871843
1997	2808	106098	209775	204473	133246	90602	3563	24387	6	161098	86248	86248	877	599617	1709046
1996	0	175838	210473	277086	199377	168975	13333	114837	12	334095	237059	17586	12103	142720	1903494
1995	5871	216858	37573	308270	179343	184154	27438	9287	44	325482	220187	47236	24	184005	1745772
1994	24293	236698	0	338371	202453	61434	113498	5449	184	119062	101728	157063	182872	55318	1598423
1993	38202	228204	0	402325	385602	9834	436	4264	43	256660	192678	59245	134755	0	1712248
1992	126876	318439	0	399281	254915	124820	191291	57272	538	137051	102527	165925	412	0	1879347
1991	69553	331871	54	302659	178981	230251	183434	140038	430	104314	207819	147076	21872	0	1918352
1990	5093	303368	2342	297017	354278	273768	56552	317405	355	212149	208438	153468	32476	0	2216709
1989	25854	289106	777	328382	158124	215308	125691	272015	70186	260064	270245	280996	110286	0	2407034
1988	53237	191585	6553	135699	181376	480737	245242	315654	236592	277740	223988	254002	94331	0	2696736
1987	33921	13810	424	8348	4004	465745	362245	490137	555273	194614	156910	151134	101478	0	2538043
1986	83162	2076	4277	4118	2511	378121	252788	439851	271683	259754	192989	250042	57466	0	2198838
1985	23636	28578	9569	58234	45444	573146	314719	487606	213587	152501	81635	22564	10302	0	2021521
1984	29171	62147	44250	185474	104296	304917	93939	405672	185872	388766	159295	21588	11227	0	1996614
1983	29663	92039	46317	121829	178941	184793	118142	273866	207073	315057	129762	6352	7913	0	1711747
1982	42010	65590	21938	201581	151962	187776	136326	255081	179420	324735	147590	7595	5679	0	1727283

KG=1000 gallons

Appendix D  
Summaries of TCE Measurements in  
Fridley Wells 6, 7, 8, and 9

