CITY OF SPRING LAKE PARK

WELLHEAD PROTECTION PLAN

Part 1:

• Wellhead Protection Area Delineation

• Drinking Water Supply Management Area Delineation

• Vulnerability Assessment

February 2001
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February, 2001
EXECUTIVE SUMMARY

This report documents the delineation of the wellhead protection areas and drinking water supply management areas for the City of Spring Lake Park, PWS ID No. 1020029. The delineation was performed in accordance with rules (Minnesota Rules 4720.5100 to 4720.5580) for preparing and implementing wellhead protection measures for public water supply wells. The rules are administered by the Minnesota Department of Health (MDH), and the results described in this report were prepared as a group effort involving staff from the following organizations: Anoka County, the City of Spring Lake Park, and the MDH. Key documentation relative to the City of Spring Lake Park’s wellhead protection effort is contained in Appendix A.

The city of Spring Lake Park obtains its drinking water supply from four wells completed in two different bedrock aquifers (Table 1), each of which exhibits confined hydraulic conditions. Two of these wells are completed in both the Franconia-Ironton-Galesville (FIG) aquifer system and the Mt. Simon Sandstone, while the other two are completed in the Mt. Simon only. Well logs for the city wells are presented in Appendix B.

The wellhead protection areas (WHPAs) for the city wells were delineated using a multi-aquifer groundwater flow model developed for the MDH by a private contractor (EOR, KDB Consulting, 2000). This model simulates groundwater flow in the FIG and Mt. Simon aquifer systems, as well as in the overlying Jordan (where applicable). The model input set runs using a groundwater flow code known as MLAEM. The MLAEM model was used to delineate capture zones for all city wells. The drinking water supply management areas (DWSMAS) were determined by overlaying the boundaries of the WHPAs on an aerial photograph and a map showing property parcel boundaries and roadways. The DWSMA was delineated using these features as boundaries. Figure 1 shows the boundaries of both the WHPA and the DWSMA.

The amount of geologic protection documented in well logs from the city wells and regional information is sufficient to classify Spring Lake Park Wells No. 1 and 2 (open, in part, to the FIG) as nonvulnerable. Carbon-14 ($^{14}$C) analysis of water from Well No. 4 (180920) indicates that the relative age of water from the Mt. Simon is ancient (greater than 1000 years old); a typical result for Mt. Simon wells in southern Anoka County. Because of this result and the nature of geologic protection in the area, all wells and aquifers are not vulnerable to current land uses and, thus, the principal means by which they could be affected by land use activities is through wells or boreholes of equal or greater depth. The city wells meet the construction standards of the State Well Code and are not considered a likely avenue for contamination to reach the aquifer from which they pump.
CHAPTER ONE
DATA ELEMENTS and ASSESSMENT (4720.5200)

PART 1. REQUIRED DATA ELEMENTS

A. Physical Environment Data Elements

1. Precipitation - Not considered directly because the aquifers exhibit confined hydraulic conditions.
2. Geology - Interpreted from well records and regional studies.
3. Soils - Not considered because the aquifers exhibit confined hydraulic conditions.
4. Water resources - The Mississippi, Minnesota and St. Croix Rivers were used as far-field boundaries to establish the regional flow field in this aquifer.

B. Land Use Data Elements

1. Land use - Not considered for the Part I wellhead protection activities.
2. Public utility services - City sanitary and storm sewers were not considered potential sources of recharge to the drinking water aquifer because they are hydraulically isolated from aquifers used by the city for a water supply.

C. Water Quantity Data Elements

1. Surface water quantity - Not considered a factor because the aquifers used by the city wells exhibit confined hydraulic conditions.
2. Groundwater quantity - Review of groundwater appropriations permits in the State Water Use Data System data base was performed to identify high capacity wells in the area that might affect delineation of the wellhead protection area.

D. Water Quality Data Elements

1. Surface water quality - Not considered a factor because the aquifers used by the city wells exhibit confined hydraulic conditions.
2. Groundwater quality - Routine monitoring by the Public Water Supply Program shows contamination has been detected occasionally at some of the treatment plants; these detections likely represent spurious results (false positives) as no sustained contamination has been detected in the city wells. The city treats the raw water to add chlorine and fluoride before it is pumped into the distribution system. Carbon-14 age dating methods were applied to water samples from Well No. 4. Recharge water to this well predates 1953.
PART 2. ASSESSMENT OF DATA ELEMENTS USED TO DELINEATE THE WELLHEAD PROTECTION AREA

A. Use of the Wells - The wells used by the city provide different annual volumes of water (Table 2). The wells provide all of the water that is piped to the water distribution system. Projected uses for the city’s wells are also shown on Table 2. This table indicates which values were used for the WHPA delineation analysis.

B. Wellhead Protection Area Delineation Criteria

1. Time of travel - A 10-year time of travel was selected.

2. Flow boundaries - In general, the aquifers used by the city of Spring Lake Park as a water supply are sufficiently deep that they are unaffected by local surface water resources, a conclusion borne out by the results of the $^{14}$C age-dating analysis. Other nearby pumping centers represent hydrologic boundaries in both aquifer systems used by the city that may affect the size and orientation of the city’s wellhead protection areas (WHPAs). These pumping centers were identified by reviewing the State Water Use Database maintained by the Department of Natural Resources (DNR) and by locating other municipal pumping centers in southern Anoka County.

3. Daily volume - Table 2 shows the reported and projected water use data for the Spring Lake Park city wells over a five-year period. The table indicates which annual use was selected for utilization in the WHPA delineation analysis.

4. Groundwater flow field - Regional-scale groundwater flow analysis for the separate FIG and Mt. Simon Sandstone Aquifer systems are summarized in Hansen and Seaberg (2000), Schoenberg (1990), and Woodward and Delin (1984). The data were incorporated into the model development process by using calibration data sets developed by the Minnesota Pollution Control Agency (MPCA) staff to calibrate the groundwater model flow field. Generally, each of the aquifers show groundwater elevations in the center of the metropolitan area that are low due to pumping and radial flow inwards from the margins of the physical extent of the bedrock units. Flow in the Mt. Simon is more dramatically affected by pumping centers near the center of Minneapolis and St. Paul than is the FIG. Groundwater flow in the FIG near Spring Lake Park is to the south-southwest at a very flat gradient. Groundwater flow in the Mt. Simon is to the south-southeast at a similarly small gradient.

5. Aquifer transmissivity - No aquifer test was conducted in any of the Spring Lake Park municipal wells. Aquifer testing was performed in the southern Anoka County area by MDH staff to support the wellhead protection planning process for southern Anoka communities. Results from these nearby aquifer tests or regional values were used in the groundwater flow model development.
C. **Quality and Quantity of Water Supplying the Public Water Supply Well** - Water in the Spring Lake Park water distribution system is regularly sampled and analyzed for contaminants regulated under the federal Safe Drinking Water Act. The following contaminants have been detected at low levels: toluene and gross alpha radiation. The intermittent detections observed to date are considered single episode, false positives and are not considered representative of the overall aquifer water quality. The city disinfects the water with chlorine to safeguard water users from disease organisms.

D. **The Land and Groundwater Uses in the Drinking Water Supply Management Area** - Land use is not believed to have any significant impact on the aquifers used by the city wells because the aquifers exhibit confined hydraulic conditions and are not vulnerable to contamination from land use. This conclusion will be developed in more detail in the vulnerability assessment (Chapter 3).

**CHAPTER TWO**

**WELLHEAD PROTECTION AREA AND DRINKING WATER SUPPLY MANAGEMENT AREA DELINEATION (4720.5205)**

**Hydrogeologic setting** - The city of Spring Lake Park is located in southern Anoka County, at the intersection of Anoka County Highway 10 and Minnesota Highway 65. The city maintains two well fields in different parts of town.

**Subsurface hydrogeology** - Few detailed geologic studies are available that describe subsurface geologic conditions in the area around the city of Spring Lake Park. However, the Anoka County area benefits from a number of regional-scale geologic and hydrogeologic studies. Well construction records were used as necessary to supplement the regional information.

The area around Spring Lake Park is generally characterized by unconsolidated deposits above bedrock. These unconsolidated deposits consist mostly of glacial drift that is several hundred feet thick (e.g., 563006). A major bedrock valley known as the Phalen Channel emerges from northwestern Ramsey County in the Spring Lake Park area. The coarse-grained nature of many of the surficial materials serves to involve surficial processes such as precipitation, snow melt, surface water interactions, and land use in the shallow aquifer dynamics near the city of Spring Lake Park. Deeper bedrock aquifers used by the city for a water supply are more protected, as described below.

The Anoka County area is on the northern part of the Twin Cities structural basin, which is itself located at the northern end of the Hollandale Embayment. The embayment formed during the Paleozoic Era and is a syncline between the Wisconsin Arch to the east and the Transcontinental Arch to the west (Mossler, 1972). The Twin Cities basin is centered approximately where the Minnesota and Mississippi Rivers meet, and is bounded on the east by the St. Croix River and on the north and west by the subcrop of Precambrian rocks in Wright, Sherburne, and Isanti Counties. Beneath the Hollandale Embayment are a series of Proterozoic rocks, some of which are offset locally by faults. There is no evidence these faults extend into the overlying Paleozoic rocks, but they may cause local structural anomalies.
Figure 2 is a bedrock map of southern Anoka County and shows the distribution of bedrock units in the Spring Lake Park area. The major bedrock units in Anoka County, relative to groundwater resources, are the Mt. Simon (and Hinckley) Sandstone aquifer system and the Franconia-Ironton-Galesville Aquifer system. The geologic aspects of these aquifers and the units separating them were reviewed in the Anoka County Deep Aquifer Modeling Report (EOR and KDB Consulting, 2000) and were taken from Mossler (1972).

**Underlying Formations** - The geologic formations underlying the lowest bedrock aquifer are principally comprised of red beds of late Keweenawan age. Their thickness is estimated to be as much as 4000 feet. Because of their generally low permeability, they are regarded as the base of the aquifer systems in the Twin Cities basin.

**Hinckley Sandstone** - The Hinckley Sandstone is a quartzose sandstone that directly overlies the Keweenawan red beds. It is lithologically similar to the overlying Mt. Simon Sandstone and appears to be differentiated in this area primarily by being involved in late Keweenawan faulting. The Hinckley is thickest in western Anoka County, where thicknesses on the order of 250 feet or more have been observed.

**Mt. Simon Sandstone** - The Mt. Simon Sandstone directly overlies the Hinckley with no intervening aquitard. It is a mostly medium- to coarsely-grained, friable quartzose sandstone. It is generally about 250 feet thick along the western margin of the Twin Cities basin and thins to the east.

**Eau Claire Formation** - The Mt. Simon conformably grades upward into the Eau Claire Formation, which is composed of glauconitic siltstones, very fine-grained sandstones and a green shale. The formation is approximately 100 to 125 feet thick in the Twin Cities basin. This formation is regarded as the separating aquitard between the underlying Mt. Simon-Hinckley Aquifer and the overlying Franconia-Ironton-Galesville Aquifer. An isopach map (created by EOR and KDB Consulting [2000] using the County Well Index data) shows that the Eau Claire is largely intact, except in the vicinity of buried bedrock valleys, throughout all but northwestern Anoka County. The isopach map indicates that the average thickness for the Eau Claire is in the order of 90 feet.

**Ironton and Galesville Sandstones** - The Galesville Sandstone unconformably overlies the Eau Claire. Both the Galesville and Ironton Sandstones are medium-grained quartzose sandstones. Their aggregate thickness is 35 to 65 feet in the Twin Cities basin. Because of their similar hydraulic properties and lack of separating layer, these sandstones are regarded as a single aquifer.

**Franconia Formation** - The Ironton-Galesville is conformably overlain by the Franconia Formation, which is generally composed of very fine to fine-grained, glauconitic sandstones and siltstones. The upper portion of this formation is comprised of coarser, non-glauconitic sandstones representing near-shore facies, collectively termed the Mazomanie Member. These are interfingered with the glauconitic sandstones in the northern portion of the basin. The thickness of the Mazomanie varies from approximately 40 feet in the southern portion of Anoka County to approximately 125 feet at its northeastern corner; the Franconia as a whole correspondingly increases in thickness from approximately 140 feet to 180 feet (Runkle, 1995). Because the permeable Mazomanie Member comprises a majority of the Franconia and because a clear underlying aquitard
within the lower Franconia is lacking, the Franconia is commonly included with the Ironton and Galesville Sandstones as part of a Franconia-Ironton-Galesville Aquifer complex.

**The St. Lawrence Formation** - This formation conformably overlies the Franconia and is typically the uppermost bedrock aquitard in the Anoka County vicinity. It is mainly composed of dolomitic siltstone and very fine sandstone of the Lodi Member of the St. Lawrence. It has a maximum thickness of 65 feet (Mossler, 1972). The St. Lawrence has not been completely mapped by the Minnesota Geological Survey in the Anoka County vicinity (Mossler and Tipping, 2000). Existing mapping shows subcrops along the southern boundary of Anoka County that extend as far north as the cities of Anoka, Coon Rapids, Blaine, and Lino Lakes.

**Jordan Sandstone** - The Jordan Sandstone lies above the St. Lawrence and is present only in the southern (principally the southeastern) part of the county. Several large outliers are present beyond its subcrop limits.

**Unconsolidated deposits** - Bedrock is overlain by a sequence of stratified and unstratified drift units. These units can be particularly thick over buried bedrock valleys (such as the Phalen Channel) and may hydraulically connect subcropping aquifers.

**Delineation of the Wellhead Protection Area**

The Minnesota Department of Health delineated the wellhead protection area for the city of Spring Lake Park in response to a request from Anoka County and the Anoka County Municipal Wellhead Planning Group. MDH agreed to provide assistance prior to adopting a policy of providing this service to small-sized public water supply systems (serving 3300 or fewer persons) to address unfunded mandate concerns regarding implementation of the state wellhead protection rule. However, the public water supplier is responsible for adopting the delineated area and developing a wellhead protection plan for it.

**Delineation method** - Delineation of the wellhead protection area was performed using an analytic element model termed MLAEM. A copy of the input files used to delineate the wellhead protection area can be obtained from MDH. These input files are modified slightly from the regional groundwater flow model prepared for the Franconia-Ironton-Galesville and Mt. Simon Aquifer system by a consultant under contract to MDH (EOR and KDB Consulting, 2000).

Aquifers represented in the Anoka County deep bedrock aquifer model (EOR and KDB Consulting, 2000) are assumed to be laterally continuous in the Spring Lake Park area and to respond to boundary conditions in the far field. Recharge is generally represented as leakage from adjacent units but, in the case of the Mt. Simon, the Eau Claire provides little. Most of the recharge to both the Franconia-Ironton-Galesville and the Mt. Simon comes in areas where they subcrop, mostly around the periphery of the Twin Cities Basin and also in deep bedrock valleys. Discharge from these aquifers is assumed to occur to the major river systems, especially in areas where the unit is in direct contact with the river (e.g., along the Minnesota in southern Carver County, and along the St. Croix in eastern Washington County). The relatively distributed nature of the recharge and the somewhat focused discharge together serve as the primary boundary conditions controlling groundwater flow. Wells in these two aquifers collectively have a large influence on water levels and, hence, groundwater flow. Accordingly, wells from the DNR’s...
SWUDs database are included throughout the model domain. Hansen and Seaberg (2000) present a detailed discussion of the conceptual model upon which the Anoka County bedrock model is based and, in addition, provide a detailed summary of how the model input was assembled.

The delineations were done using particle tracking analyses starting near the wells of interest and tracking backward (upgradient). This analysis was conducted using starting elevations near the base of the aquifer and also near the top. The results of these analyses are shown in Figures 3 and 4 for the FIG and Mt. Simon aquifers, respectively. Wells No. 1 and 2, while open to both the CFIG and the CMTS, draw almost exclusively from the CFIG.

The aquifer parameters used in the groundwater flow model are as follows:

<table>
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<th>Layer</th>
<th>Description</th>
<th>Base Elevation</th>
<th>Hydraulic Conductivity</th>
<th>Thickness</th>
<th>Porosity</th>
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<td>Layer 5</td>
<td>Mt. Simon Aquifer</td>
<td>-38 meters</td>
<td>4.2 meters/day</td>
<td>60 meters</td>
<td>0.30</td>
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</table>

Aquifer boundary conditions (including recharge and discharge features) distribution of hydraulic conductivity changes, and definition of leaky areas around wells are patterned after the Minnesota Pollution Control Agency Metro Model (Hansen and Seaberg, 2000) and have been refined as described in EOR and KDB Consulting (2000).

**Uncertainties relating to the accuracy of the calculated wellhead protection area boundaries**

- The main source of uncertainty that had to be managed in making the WHPA delineation analysis had to do with the groundwater flow directions in the Mt. Simon and the FIG Aquifers, which are well characterized regionally but not locally. The hydraulic gradient is sufficiently small, though, that small changes in the groundwater flow direction will have little effect on the delineated WHPA. This uncertainty does not, in this case, create problems in the WHPA analysis.

**Delineation of the DWSMA** - The Drinking Water Supply Management Area (DWSMA) is shown on Figure 1. This area includes all of the wellhead protection areas and was delineated using parcel boundaries and transportation corridors.

**CHAPTER THREE**

**VULNERABILITY ASSESSMENT**

This chapter documents the vulnerability assessments of the wells and drinking water supply management area for the public water supply system operated by the city of Spring Lake Park. This assessment was performed in accordance with rules (Minnesota Rule 4720.5210) for preparing and implementing wellhead protection measures for public water supply wells.
The vulnerability of Spring Lake Park Wells Nos. 1, 2, 4, and 5 (Unique Well Nos. 206638, 223294, 180920, and 563006, respectively) was determined by evaluating available information on the 1) geology, 2) well construction, and 3) chemical and isotopic composition of the well water and comparing these results with the criteria in Minnesota Rule 4720.5550. This process was automated using the well vulnerability database at the MDH.

The vulnerability of the drinking water supply management area for Spring Lake Park was determined by evaluating available information on 1) the lateral continuity of protective geologic materials overlying the aquifer and 2) the chemical and isotopic composition of well water from the aquifer.

**Well vulnerability assessment** - The MDH has developed a database of community and non-community nontransient public water supply wells in Minnesota which 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. A numeric cutoff (of 40 and below) is used to identify vulnerable from nonvulnerable wells (MDH, 1993). Vulnerable wells are also identified based on the presence of contamination, such as nitrate-nitrogen in excess of 10 mg/l, or young (post-1953) water, as indicated by the presence of 1 tritium unit or greater in the well water. The results of this assessment for the Spring Lake Park wells are described below. Printouts from the MDH vulnerability database are shown in Appendix C.

On the strength of the review criteria mentioned above, all the Spring Lake Park wells are considered not vulnerable to contamination from activities at the land surface. At each of these wells, this determination is based on a sequence of low-permeability protective materials above the aquifer in which the well is completed, no chemical data indicating influence by land surface activities, and documentation of sound construction. In addition, water samples from Well No. 4 were subjected to a carbon-14 ($^{14}$C) age-dating analysis. The $^{14}$C test results indicate the water from the well, and presumably water in the aquifer in the vicinity of the wells, entered the ground over 1000 years ago. Wells that produce such old water are generally not considered susceptible to anthropogenic contamination (Alexander and Alexander, 1989).

**Drinking Water Supply Management Area Vulnerability Assessment** - The vulnerability of land parcels located within the drinking water supply management area (DWSMA) for the Spring Lake Park wells was evaluated primarily on the basis of 1) geologic logs from wells located in the vicinity of the well fields and 2) regional studies.

The Spring Lake Park city wells draw from two different aquifers. Two of the wells are completed in two different aquifers (multi-aquifer wells). The two deep aquifers in the Spring Lake Park area, the FIG and the Mt. Simon Sandstone, are covered by low permeability deposits that are considered confining units. These confining units are present throughout the area of the DWSMA for Wells Nos. 1, 2, 4, and 5. Accordingly, the DWSMAs for these wells are considered nonvulnerable.
References:


Minnesota Department of Health, 1993, Methodology for Phasing Wells into Minnesota’s Wellhead Protection Program.


Mossler, John H. and Robert G. Tipping, 2000, Bedrock Geology and Structure of the Seven-County Twin Cities Metropolitan Area, Minnesota, Minnesota Geological Survey Miscellaneous Map Series, Map 104, 1pl.

Runkle, Anthony, November 15, 1995, written communication to John Seaberg, Minnesota Pollution Control Agency.


APPENDIX A

WHPA PROGRAM MATERIALS
PUBLIC WATER SUPPLY PROFILE

PUBLIC WATER SUPPLY
NAME  City of Spring Lake Park
ADDRESS  1301 Eighty First Avenue Northeast
                  Spring Lake Park, MN  55432
TELEPHONE NUMBER  763-784-6491
E-MAIL

WELLHEAD PROTECTION MANAGER
NAME  Ms. Barbara L. Nelson
ADDRESS  1301 Eighty First Avenue Northeast
                  Spring Lake Park, MN  55432
TELEPHONE NUMBER  763-784-6491

CONSULTANT
The groundwater flow model used to delineate the wellhead protection area was done under contract to the Minnesota Department of Health by Emmons and Oliver Resources and KDB Consulting. The well and aquifer vulnerability assessments were performed by MDH staff.

MDH Staff Hydrologist:  Steve Robertson
ADDRESS:  121 East Seventh Place, P.O. Box 64975, St. Paul, MN 55164-0975
TELEPHONE NUMBER:  651-215-1322
E-MAIL:  steve.robertson@health.state.mn.us
FAX NUMBER:  651-215-0775

GENERAL INFORMATION
UNIQUE WELL NUMBER(S):  Well 1 (206638), Well 2 (223294), Well 4 (180920), Well 5 (563006) are the primary water supply wells.
SIZE OF POPULATION SERVED  Approximately 7100
COUNTY  Anoka
# DOCUMENTATION LIST

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APPENDIX B

CITY OF SPRING LAKE PARK MUNICIPAL WELL LOGS

February, 2001
## Well Information

### Wellname: SPRING LAKE PARK 1
- **Well Owner:** SPRING LAKE PARK 1
- **Contact:** CITY OF SPRING LAKE PARK
- **Well Address:** 1301 81ST AV NE
- **Well Location:** SPRING LAKE PARK, MN 55432

### Well Details
- **Well Depth Completed:** 741.00 ft.
- **Date Well Completed:** 1961/10/13
- **Drilling Method:** Cable Tool
- **Drilling Fluid:** Water
- **Well Hydrofractured?** No
- **Use:** Community Supply
- **Casing Type:** Steel (black or low)
- **Drive Shoe?** Yes
- **Open Hole(ft.)** From 350.0 to 741.0

### Grouting Information
- **Grouting Material:** Screen
- **Screen Diameter:** 20.00 in. from 0.00 to 154.00 ft. lbs/ft
- **Screen Length:** 16.00 in. from 0.00 to 350.00 ft. lbs/ft

### Static Water Level
- **Pumping Level (below land surface):** 201.00 ft.
- **Date measured:** 1961/10/04
- **Rate:** 12.00 hrs. pumping
- **Volume:** 1000.00 g.p.m.

### Well Head Completion
- **Model:** Bergerson-Caswell
- **MdL or Reg No.:** 27058
- **License Business Name:** Bergerson-Caswell
- **Name of Driller:** Bergerson-Caswell

## Aquifer Information
- **First Bedrock:** CJDN
- **Aquifer:** Franconia-MtSimon
- **Last Strat:** PMFL
- **Depth to Bedrock:** 234.00 ft.

### Wellhead Protection
- **At-grate (Environmental Wells and Borings ONLY):** YES
- **Basement offset:** YES
- **12 in. above grade:** YES
- **Casing Protection:** YES

### Nearest Known Source of Contamination
- **Well disinfected upon completion?** Yes

### Pump Information
- **Model:** Bergerson-Caswell
- **Manufacturer's name:** Bergerson-Caswell
- **HP:** 1000
- **Volts:** Turbine

### Abandoned Wells
- **Does property have any not in use and not sealed well(s)?** Yes
- **Was a variance granted from the MDH for this well?** No

### License Business Name
- **Lic. or Reg No.:** Bergerson-Caswell 27058

### Well Disinfected Upon Completion
- **Yes**
- **No**
**Well Details**

- **Well Name**: SPRING LAKE PARK 2
- **Well Owner**: SPRING LAKE
- **Contact**: CITY OF SPRING LAKE PARK

**Location**
- **County**: Anoka
- **Quad**: Minneapolis North
- **Quad Id**: 120D

**Well Data**

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<td>SANDSTONE-THIN SHALE LENS</td>
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<td>GREEN SHALE-BROWN LAYERS</td>
<td>BRN/GRN</td>
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<td>677</td>
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</tbody>
</table>

**Drilling Method**: Cable Tool

**Drilling Fluid**: Well Hydrofractured?
- No

**Use**: Community Supply

**Casing**
- Type: Steel (black or Iod)
- Diameter: 16
- Depth: 329
- Hole Diameter (in.)
- Make: Open Hole (ft.)
- From: 329 ft. to 694 ft.
- Diameter: 16
- Slot: 16
- Length Set: 329

**Static Water Level**: 128.00 ft.

**Pumping Level**
- Below land surface: 238.00 ft.
- Hrs. pumping: 1200.00
- Type: g.p.m.

**Well Head Completion**

**Grouting Information**
- Well grouted?: Yes

**Nearest Known Source of Contamination**
- Well disinfected upon completion?: No

**Pump**
- Model: LAYNE
- Manufacturer's name: LAYNE
- Model number: LAYNE
- HP: 0.00
- Material: Cast Iron
- Length of drop pipe: 10 ft.
- Capacity: 10 g.p.m.
- Type: Submersible

**Abandoned Wells**
- Does property have any not in use and not sealed well(s)? No

**Name of Driller**: BENEKE, R.

**Unique Well Number**: 180920  
**County**: Anoka  
**Quad**: Minneapolis North  
**Quad Id**: 1200

**MINNESOTA DEPARTMENT OF HEALTH**  
**WELL AND BORING RECORD**  
**MINNESOTA STATUTES CHAPTER 1031**

| Entry Date | 1994/04/04 |
| Update Date | 2004/12/27 |
| Received Date | |

**Wellname**: SPRING LAKE PARK 4  
**Township**: 30  
**Range**: 24W  
**Dir**: 2  
**Section**: CABCAC  
**Field Located**: MGS  
**Elevation**: 882.00 ft.  
**MGS Depth**: 726.00 ft.  
**Date Well Completed**: 1982/05/28

**Well Owner**: WYLDWOOD LA  
**Contact**: CITY OF SPRING LAKE PARK  
**Address**: 1301 81ST AV NE

**Drilling Method**: Cable Tool  
**Drilling Fluid**:  
**Well Hydrofractured?**: [ ] YES [ ] NO

**Use**: Community Supply  
**Screen**: No  
**Open Hole(ft.) From**: 533.0 to 726.0

**Casing**
- **Type**: Steel (black or lco)
  - **Drive Shoe?**: [ ] YES [ ] NO
  - **Depth**: 533
    - **16.00 in. from 0.00 to 153.00 ft.**: 118.60 lbs/ft
    - **24.00 in. from 0.00 to 285.00 ft.**: 94.60 lbs/ft
    - **16.00 in. from 0.00 to 533.00 ft.**: 62.60 lbs/ft

**Make**
- **Model**
- **Diameter**:  
- **Slot**:  
- **Length Set**:  

**Static Water Level**: 162.00 ft.  
**Land surface**: Date measured 1982/05/05

**Pumping Level (below land surface)**
- **130.00 ft. after 60.00 hrs. pumping**: 1000.00 g.p.m.

**Well Head Completion**
- **Pitless adapter manufacturer**:  
- **Model**:  
- **Casing Protection**:  
- **Al-grade (Environmental Wells and Borings ONLY)**:  
- **Basement offset**:  

**Grouting Information**
- **Well grouted?**: [ ] YES [ ] NO
- **Material**: Neat Cement  
  - **From**: 0.0 To 285.0 ft.  
  - **From**: 0.0 To 533.0 ft.

**Nearest Known Source of Contamination**
- **Well disinfected upon completion?**: [ ] YES [ ] NO

**Pump**
- **Manufacturer's name**:  
- **Model number**:  
- **HP**: 0.00  
- **Length of drop pipe**:  
- **Material**:  
- **Capacity**: g.p.m.

**Abandoned Wells**
- **Does property have any not in use and not sealed well(s)?**: [ ] YES [ ] NO

**Variance**
- **Was a variance granted from the MDH for this well?**: [ ] YES [ ] NO

**Well Contractor Certification**
- **Renner E.H. & Sons**: 02015

**License Business Name**: Lic. or Reg No.
- **SIGAFOOS, G.**

**Name of Driller**:  
**Date**: HE-01202-07 (Rev. 2/09)

**Description**
- **Color**:  
- **Hardness**:  
- **From**:  
- **To (ft.)**:  

- **FILL**: BLUE  
  - 0  
  - 6

- **SANDY SOIL-WET**: TAN  
  - 6  
  - 10

- **FINE SANDY MUSH**: GRAY  
  - 10  
  - 35

- **CLAY**: GRAY  
  - 35  
  - 60

- **STONES, SAND, BINDER**: DARK  
  - 60  
  - 80

- **NO RECORD**: RED  
  - 80  
  - 85

- **CLAY**: GRAY  
  - 85  
  - 105

- **CLAY & STONE**: DARK  
  - 105  
  - 140

- **CLAY & ROCK**: TAN  
  - 140  
  - 145

- **SHALE**: YELLOW  
  - 145  
  - 175

- **SHAKOPEE ROTTEN**: BROWN  
  - 175  
  - 190

- **JORDAN**: BROWN  
  - 190  
  - 200

- **JORDAN SOFT**: BROWN  
  - 200  
  - 230

- **JORDAN CHUNKY**: WHIT/BRN  
  - 230  
  - 240

- **JORDAN COARSE**: BROWN  
  - 240  
  - 278

- **ST. LAWRENCE**: YELLOW  
  - 278  
  - 290

- **ST. LAWRENCE**: TAN  
  - 290  
  - 305

- **SHALE**: BLU/GRN  
  - 305  
  - 325

- **SHALE**: BLU/GRN  
  - 325  
  - 350

- **SHALE STICKY**:  
  - 350  
  - 370

- **SHALE**: GREEN  
  - 370  
  - 400

- **SHALE**: GREEN  
  - 400  
  - 455

- **SHALE**: LT. BLU  
  - 455  
  - 462

- **SANDSTONE**: WHITE  
  - 462  
  - 482

- **SANDSTONE & SHALE**: RED  
  - 482  
  - 509

- **SANDSTONE & SHALE**: RED  
  - 509  
  - 545

- **SHALE**: BLUE  
  - 545  
  - 547

- **SHALE**: RED  
  - 547  
  - 550

- **SHALE**: VARIED  
  - 550  
  - 560

- **SHALE**: GREEN  
  - 560  
  - 570

- **SHALE**: BLU/GRN  
  - 570  
  - 585

**Remarks**
- GAMMA LOGGED 3-1-1982. M.G.S. NO.1689. TOTAL OF 30 YDS. OF GROUT USED.

**County Well Index v.5**  
**REPORT**  
**Printed on**: 8/8/2007
## MINNESOTA DEPARTMENT OF HEALTH
### WELL AND BORING RECORD

**Minnesota Statutes Chapter 1031**

| Unique No. | 00206637 |
| County Name | Anoka |
| Township Name | 30 24 W 2 CACCA |
| Well Name | SPRING LAKE PARK 3 |
| Contact’s Name | SPRING LAKE PARK 3 UNIVERSITY N AV SPRING LAKE PARK MN |

### GEOLOGICAL MATERIAL

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<th>To</th>
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<td>WHITE</td>
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<td>CLAY &amp; STONE</td>
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<td>BROW HARD</td>
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<td>151</td>
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<td>166</td>
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### REMARKS, ELEVATION, SOURCE OF DATA, etc.

- USGS Quad: Minneapolis North Elevation: 878
- Aquifer: MTPL Alt Id: 72-0123

### Well Depth
- Depth Completed: 726 ft.
- Date Well Completed: 1970/06/02

### Drilling Method
- CABLE TOOl

### Drilling Fluid

- Well Hydrofractured? Yes / No
- From ft. to ft.

### Use
- Municipal

### Casing

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<tr>
<th>Casing Diameter</th>
<th>Weight(lbs/ft)</th>
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<td>30 in. to 182 ft.</td>
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<tr>
<td>24 in. to 283 ft.</td>
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<tr>
<td>16 in. to 299 ft.</td>
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</tbody>
</table>

### Screen
- N Open Hole From 299 ft. to 726 ft.

### Static Water Level

- Date

### PUMPING LEVEL (below land surface)

- ft. after hrs. pumping g.p.m.

### Well Head Completion

- Casing Protection
  - Model
  - 12 in. above grade
- At-grade(Environmental Wells and Borings ONLY)

### Grouting Information

- Well grouted? Yes / No

### Nearest Known Source of Contamination

- ft. direction type
- Well disinfected upon completion? Yes / No

### Pump

- Mfr name
- Model
- HP
- Volts
- Drop Pipe Length ft.
- Capacity g.p.m
- Type

### Any not in use and not sealed well(s) on property

- Yes / No

### Well CONTRACTOR CERTIFICATION

- Lic. Or Reg. No. 27058
- License Business Name Bergerson-caswell
- Name of Driller

Report Copy
Unique Well Number: 563006  
County: Anoka  
Quad: New Brighton  
Quad Id: 119C

MINNESOTA DEPARTMENT OF HEALTH  
WELL AND BORING RECORD  
MINNESOTA STATUTES CHAPTER 1031

Entry Date: 1999/04/20  
Update Date: 2005/03/11  
Received Date:

Wellname: SPRING LAKE PARK 5  
Township Range Dir Section Subsection: 30 24 W 1 ADDCBA  
Field Located MGS Elevation: 910.00 ft.

Well Owner: SPRING LAKE PARK 5  
8250 ARTHUR ST  
SPRING LAKE PARK  
MN  55432

Contact: SPRING LAKE PARK  
1301 BIST AV NE  
SPRING LAKE PARK  
MN  55432

Well Depth: 783.00 ft  
Depth Completed: 783.00 ft  
Date Well Completed: 1998/12/01

Drilling Method: Cable Tool

Drilling Fluid: Bentonite

Well Hydrofractured?  
From ft. to ft.  
Yes  NO

Use: Community Supply

Casing Type: Steel (black or loc)  
Drive Shoe?  
Depth 650  
Diameter 18

- Hole Diameter (In.)  
35.01 To 100.0  
29.01 To 332.0  
24.01 To 354.0  
18.01 To 783.0

Make:  
Diameter:  
Slot:  
Length Set:  
Open Hole(ft.) From: 650.0 to 783.0

Screen Type:  
No

Static Water Level  
240.00 ft.  
Top of breather pipe: Date measured 1999/11/09

Pumping Level (below land surface):  
312.00 ft. after 24.00 hrs. pumping 1400.00 g.p.m.

Well Head Completion:  
Model:  
Casing Protection:  
At-grade (Environmental Wells and Borings ONLY):  
Basement offset:  
12 In. above grade

Grouting Information:  
Well grouted?  
Yes  NO

Material Neat Cement:  
From 0.0 To 320.0 ft.  
7.00 Cubic yards

Material Neat Cement:  
From 0.0 To 488.0 ft.  
26.70 Cubic yards

Material Neat Cement:  
From 0.0 To 650.0 ft.  
33.00 Cubic yards

Nearest Known Source of Contamination:  
feet  
Direction  
Type

Well disinfect was upon completion?  
Yes  NO

Pump:  
Not Installed  
Date Installed: 1999/04/00

Manufacturer's name: FAIRBANKS-MORSE

Model number: 12M7000-6  
HP 200.00  
Volts 480

Length of drop pipe:  
Material:  
Type:  
Turbine

Abandoned Wells:  
Does property have any not in use and not sealed well(s)?  
Yes  NO

Variance:  
Was a variance granted from the MDH for this well?  
Yes  NO

Well Contractor Certification:  
Renner E.H. Well  
71015

License Business Name:  
Lic. or Reg No.  
COLBURN, S.

Name of Driller:  
Date:  
HE-01205-07 (Rev. 2/99)

Remarks:  

First Bedrock:  
CJDN

Aquifer: Mt.Simon-Hinckley  
Depth to Bedrock: 245.00 ft.

County Well Index v.5  
REPORT  
Printed on 8/8/2007


APPENDIX C

VULNERABILITY ASSESSMENT WORKSHEETS
<table>
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<tr>
<th>CRITERIA</th>
<th>DESCRIPTION</th>
<th>POINTS</th>
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<tbody>
<tr>
<td>Aquifer Name</td>
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<td>Geologic Data From</td>
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<tr>
<td>Year Constructed</td>
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<td>Construction Method</td>
<td>Cable Tool/Bored</td>
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<td>Cement grout between casings?</td>
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<td>All casings extend to land surface?</td>
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<td>Gravel-packed casings?</td>
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<tr>
<td>Wood or masonry casing?</td>
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<td>Holes or cracks in casing?</td>
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Wellhead Protection Score: 25
Wellhead Protection Vulnerability Rating: NOT VULNERABLE

COMMENTS
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<td>Gravel-packed casings?</td>
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Wellhead Protection Score: 15
Wellhead Protection Vulnerability Rating: NOT VULNERABLE
PWSID: 1020029  
SYSTEM NAME: Spring Lake Park  
WELL NAME: Well #3  
TIER: 5  
WHP RANK: 0  
UNIQUE WELL #: 00206637

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<th>RANGE: 24</th>
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<th>QUARTERS: CACB</th>
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<td>Gravel-packed casings?</td>
<td>No</td>
<td>0</td>
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<tr>
<td>Wood or masonry casing?</td>
<td>No</td>
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</tr>
<tr>
<td>Holes or cracks in casing?</td>
<td>Unknown</td>
<td>0</td>
</tr>
<tr>
<td>Isolation distance violations?</td>
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<td>0</td>
</tr>
<tr>
<td>Pumping Rate</td>
<td>800</td>
<td>10</td>
</tr>
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<td>Non-THMS VOCs detected?</td>
<td>Unknown</td>
<td>0</td>
</tr>
<tr>
<td>Pesticides detected?</td>
<td>Unknown</td>
<td>0</td>
</tr>
<tr>
<td>Maximum nitrate detected</td>
<td>&lt;0.4 10/02/1989</td>
<td>0</td>
</tr>
<tr>
<td>Maximum tritium detected</td>
<td>Unknown</td>
<td>0</td>
</tr>
<tr>
<td>Carbon-14 age</td>
<td>Unknown</td>
<td>0</td>
</tr>
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</table>

Wellhead Protection Score: 25  
Wellhead Protection Vulnerability Rating: NOT VULNERABLE

COMMENTS
**PWSID**: 1020029  
**SYSTEM NAME**: Spring Lake Park  
**WELL NAME**: Well #4  
**TIER**: 5  
**WHP RANK**: 0  
**UNIQUE WELL #**: 00180920

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>DESCRIPTION</th>
<th>POINTS</th>
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<tbody>
<tr>
<td>Aquifer Name</td>
<td>MT. SIMON</td>
<td></td>
</tr>
<tr>
<td>DNR Geologic Sensitivity Rating</td>
<td>VL L Score: 17</td>
<td></td>
</tr>
<tr>
<td>Geologic Data From</td>
<td>Well Record</td>
<td></td>
</tr>
<tr>
<td>Year Constructed</td>
<td>1982</td>
<td></td>
</tr>
<tr>
<td>Construction Method</td>
<td>Cable Tool/Bored</td>
<td></td>
</tr>
<tr>
<td>Casing Depth</td>
<td>533</td>
<td></td>
</tr>
<tr>
<td>Well Depth</td>
<td>726</td>
<td></td>
</tr>
<tr>
<td>Casing grouted into borehole?</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Cement grout between casings?</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>All casings extend to land surface?</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Gravel-packed casings?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Wood or masonry casing?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Holes or cracks in casing?</td>
<td>Unknown</td>
<td></td>
</tr>
<tr>
<td>Isolation distance violations?</td>
<td>Unknown</td>
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<tr>
<td>Pumping Rate</td>
<td>900</td>
<td></td>
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<td>Non-THMS VOCs detected?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Pesticides detected?</td>
<td>Unknown</td>
<td></td>
</tr>
<tr>
<td>Maximum nitrate detected</td>
<td>&lt;0.4 10/02/1989</td>
<td></td>
</tr>
<tr>
<td>Maximum tritium detected</td>
<td>Unknown</td>
<td></td>
</tr>
<tr>
<td>Carbon-14 age</td>
<td>Ancient</td>
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</tr>
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</table>

Wellhead Protection Score: -10  
Wellhead Protection Vulnerability Rating: **NOT VULNERABLE**

**COMMENTS**
PWSID : 1020029  
SYSTEM NAME: Spring Lake Park  
WELL NAME : Well #5  
TIER : 5  
WHP RANK : 0  
UNIQUE WELL #: 00563006

<table>
<thead>
<tr>
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<th>DESCRIPTION</th>
<th>POINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquifer Name</td>
<td>MT. SIMON-HINCKLEY</td>
<td>10</td>
</tr>
<tr>
<td>DNR Geologic Sensitivity Rating</td>
<td>VL L Score: 9</td>
<td></td>
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<tr>
<td>Geologic Data From</td>
<td>Well Record</td>
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<tr>
<td>Year Constructed</td>
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<td>0</td>
</tr>
<tr>
<td>Construction Method</td>
<td>Cable Tool/Bored</td>
<td>0</td>
</tr>
<tr>
<td>Casing Depth</td>
<td>650</td>
<td>0</td>
</tr>
<tr>
<td>Well Depth</td>
<td>783</td>
<td>0</td>
</tr>
<tr>
<td>Casing grouted into borehole?</td>
<td>Yes</td>
<td>0</td>
</tr>
<tr>
<td>Cement grout between casings?</td>
<td>Yes</td>
<td>0</td>
</tr>
<tr>
<td>All casings extend to land surface?</td>
<td>Yes</td>
<td>0</td>
</tr>
<tr>
<td>Gravel-packed casings?</td>
<td>No</td>
<td>0</td>
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<td>Wood or masonry casing?</td>
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<tr>
<td>Holes or cracks in casing?</td>
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<td>0</td>
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<td>Isolation distance violations?</td>
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<td>Non-THMS VOCs detected?</td>
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<td>0</td>
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<tr>
<td>Pesticides detected?</td>
<td>Unknown</td>
<td>0</td>
</tr>
<tr>
<td>Maximum nitrate detected</td>
<td>&lt;0.1 09/09/1999</td>
<td>0</td>
</tr>
<tr>
<td>Maximum tritium detected</td>
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<td>0</td>
</tr>
<tr>
<td>Carbon-14 age</td>
<td>Unknown</td>
<td>0</td>
</tr>
</tbody>
</table>

Wellhead Protection Score : 30  
Wellhead Protection Vulnerability Rating: NOT VULNERABLE
TABLE 1
Municipal Water Supply Well Information
Spring Lake Park, Minnesota

<table>
<thead>
<tr>
<th>Local Well Name</th>
<th>Unique Number</th>
<th>Aquifer</th>
<th>Casing Depth (ft)</th>
<th>Well Depth (ft)</th>
<th>Date Constructed</th>
<th>Vulnerability Status ¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>206638</td>
<td>Franconia-Ironton-Galesville, Mt. Simon</td>
<td>350</td>
<td>741</td>
<td>1961</td>
<td>Not Vulnerable</td>
</tr>
<tr>
<td>2</td>
<td>223294</td>
<td>Franconia-Ironton-Galesville, Mt. Simon</td>
<td>329</td>
<td>694</td>
<td>1965</td>
<td>Not Vulnerable</td>
</tr>
<tr>
<td>4</td>
<td>180920</td>
<td>Mt. Simon</td>
<td>533</td>
<td>726</td>
<td>1982</td>
<td>Not Vulnerable</td>
</tr>
<tr>
<td>5</td>
<td>563006</td>
<td>Mt. Simon</td>
<td>650</td>
<td>783</td>
<td>1998</td>
<td>Not Vulnerable</td>
</tr>
</tbody>
</table>

Note: 1. Vulnerability status based on MDH staff review of well construction, geologic materials encountered during drilling, well use, and water quality. See Chapter 3 and Appendix D for further information.
2. Spring Lake Park Well No. 3 was permanently abandoned and sealed in early 2001.
### TABLE 2
**Spring Lake Park Municipal Well Pumpage**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring Lake Park 1</td>
<td>206638</td>
<td>93,526,000</td>
<td>92,419,000</td>
<td>72,100,000</td>
<td>108,202,000</td>
<td>53,081,000</td>
<td>62,021,000</td>
<td>95,000,000</td>
<td>90,000,000</td>
<td>90,000,000</td>
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</tr>
<tr>
<td>Spring Lake Park 2</td>
<td>223294</td>
<td>96,189,000</td>
<td>100,128,000</td>
<td>86,441,000</td>
<td>16,336,000</td>
<td>107,011,000</td>
<td>91,639,000</td>
<td>95,000,000</td>
<td>90,000,000</td>
<td>90,000,000</td>
<td>90,000,000</td>
</tr>
<tr>
<td>Spring Lake Park 3</td>
<td>206637</td>
<td>6,813,000</td>
<td>7,000</td>
<td>25,367,000</td>
<td>11,253,000</td>
<td>8,372,000</td>
<td>0</td>
<td>Permanently Sealed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spring Lake Park 4</td>
<td>180920</td>
<td>100,637,000</td>
<td>129,435,000</td>
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<td>94,493,000</td>
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<td>130,000,000</td>
<td>130,000,000</td>
</tr>
<tr>
<td>Spring Lake Park 5</td>
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<td>71,066,000</td>
<td>100,000,000</td>
<td>100,000,000</td>
<td>110,000,000</td>
<td>110,000,000</td>
</tr>
</tbody>
</table>

**Note:** Shaded areas designate values used in the WHPA delineation analysis.
City of Spring Lake Park

WELLHEAD PROTECTION PLAN

Part 2:

Potential Contaminant Source Management Strategy

Draft
January 24, 2008
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   Wellhead Protection Awareness Project

II. Other Wells Management
   Seal Abandoned Wells
   Monitor Well Construction

III. Water Quality and Quantity Management
   Groundwater Quality Protection
   Minimize Demand on Water Supply System and Groundwater

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Chapter 1
Data Elements and Assessment

I. REQUIRED DATA ELEMENTS

In accordance with the Minnesota Department or Health’s second Scoping Decision Notice (July 1, 2002) the following data elements are presented and assessed as it relates to Spring Lake Park’s municipal wells. Spring Lake Park’s Wellhead Protection Areas (WHPA) and Drinking Water Supply Management Areas (DWSMA) are not vulnerable to contamination from ground surface and near surface sources.

PHYSICAL ENVIRONMENT

Geology
The geologic environment surrounding Spring Lake Park wells influence the delineation of their WHPAs and vulnerability classification. The configuration of geologic strata directly affects the infiltration of water and aquifer characteristics making it an important factor in the vulnerability of the municipal well to contamination and DWSMA delineation.

A county geologic atlas does not exist and focused geologic studies in the metro region do not provide relevant data for the City’s wellhead protection plan. No surface geophysical information was identified. The Minnesota Department of Health performed a geologic and hydrologic assessment of the region surrounding the City wells to aid in determining the wellhead protection area and vulnerability. Part 1 of this plan describes the WHPA, DWSMA, geologic strata and vulnerability of the City’s well.

Review of representative borehole geophysical and well construction records in the DWSMA indicates that the aquifer units used by the City’s wells (Franconia-Ironton-Galesville and Mount Simon) are under layers of low-permeability protective materials typically described as clay and shale.

The geologic review indicates that land use, precipitation, soil characteristics, and surface water resources do not significantly influence the aquifer units used by City wells. And, the wells are not vulnerable to surface or near-surface land use contaminants. However, a well penetrating the low-permeable geologic layers overlying the aquifer used by the City can introduce contaminants rapidly to the City’s wells.

Precipitation
Precipitation is not considered a planning element because the aquifer units used by City wells exhibit confined hydraulic conditions. Therefore, precipitation is assumed not to directly influence the DWSMA.

Soils
Soils information is not considered a planning element because the aquifer units used by City wells exhibit confined hydraulic conditions. Therefore, the soils are assumed not to directly influence the DWSMAs.

Surface Water Resources
Lakes and wetlands are not considered a planning element because the aquifer units used by City wells exhibit confined hydraulic conditions. Therefore, the surface water resources are assumed not to directly influence the DWSMAs.
Land Use Data Elements

Land Use
Residential land use accounts for 86% of the City. Public and institutional land use (city hall, parks, vacant, and right of way) makes up of 3% of the area in the City. The remaining 9% is comprised of commercial and industrial land use.

Community Setting
The City of Spring Lake Park is located primarily in Anoka County with a small area in the western part of Ramsey County. The City is comprised of over 2,300 parcels encompassing 1,117 acres in southern Anoka County. The City of Fridley borders Spring Lake Park on the south and west. The City of Blaine shares Spring Lake Park's northern border and Mounds View (Ramsey County) is to the east. Figure 1 provides a map of parcel lines, City borders, wells, and DWSMAs.

The 2000 census determined Spring Lake Park’s population at 6,772. This represents a 1% population increase from the 1990 census report. The City’s population has remained stable (between 6,417 and 6,772) over the past 30 years.

<table>
<thead>
<tr>
<th>Past and Projected Population and Households</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
</tr>
<tr>
<td>Households</td>
</tr>
</tbody>
</table>

Source: Metropolitan Council Blueprint 2030

The region, that includes Spring Lake Park, was predominantly agricultural prior to development, which began in the 1950s. When the City incorporated, in 1953, its population was under 1,100. The post World War II housing boom fueled residential development. The population leveled out by the 1970s as the City approached full development.

Current Land Use
There are over 2,300 parcels located within the City of Spring Lake Park (2,337 as of September, 2003). The greatest majority of land use is residential with 1,997 parcels improved and 58 vacant. Commercial land use is a distant second with 121 improved and 77 vacant parcels. Industrial accounts for only 9 improved and 4 vacant parcels. The remaining 70 parcels are tax-exempt properties consisting of parks, schools, churches, and government buildings and vacant land. Figure 2 provides a map of current zoning classifications within the City.

Residential land is comprised primarily of single-family detached dwellings. A majority of the single-family housing dates from the 1950s and 1960s. A small number of duplexes and two mobile home parks are also found in the City. In the mid-1990s multiple single-family detached dwellings have been redeveloped into multiple dwelling developments of 8 or fewer units per building.

Spring Lake Park does not have a wide range of commercial and industrial businesses. Commercial and industrial land use is concentrated along the major transportation routes. Commercial businesses capture pass-by traffic along Highway 65, County Road 10, and
University Avenue. The majority of commercial businesses are either retail stores or service firms. There are a small number of commercial office buildings.

Light industrial businesses are located east of Highway 65. They are concentrated in three areas: along Sunset Road; near the intersection of Central Avenue and Osborne Road; and between 81st Avenue and County Road 10. Light industrial businesses in the City are typical of those found in industrial parks, including a large lumber yard, a manufacturer of plastic materials and forms, and a manufacturer of medical devices.

Figure 3 provides a map of the existing land use (circa 1999) within the City.

Land use within the DWSMAs is determined using the Anoka County Geographic Information System and the Property Tax Records databases. The parcel Property Identification Numbers (PIN) and land use status (agricultural, residential, commercial, industrial, and tax exempt) are cataloged within each DWSMA. Tax exempt parcels can include government-owned land, parks, public works facilities, public and private schools, and religious institutions.

The purpose of reviewing land use is to determine the extent of existing classes of land use and predicting future changes that may require additional city wells or system capacity. Also, by using the existing records of development the City is able to predict which properties within their DWSMA potentially have a well.

There are 540 parcels located within the City's two DWSMAs that cover part of Spring Lake Park and Fridley (see Figure 1). Of the 540 parcels, 92 are located in Fridley. Land use classification for parcels in the City's DWSMAs are: 415 residential (single family homes, double bungalows, mobile homes, apartments); 71 commercial; 25 industrial; and 29 tax-exempt. The tax-exempt parcels are: 14 associated with Unity Hospital and Clinic, 5 associated with churches, and 9 belonging to the City (including the municipal wells and water towers).

The Fridley parcels represent a significant portion of the total commercial and industrial land use inside Spring Lake Park's DWSMA. Land use classification for the 92 Fridley parcels are: 31 residential, 23 commercial, 22 industrial, and 16 exempt (all Unity Medical Center). These properties are located on the City's western border (University Avenue) and southern border (Osborne Road).

**Future Land Use Development and Redevelopment**

The City of Spring Lake Park Comprehensive Plan Update (December, 2000) states:

"Future land use designations will be unchanged from existing designations. Spring Lake Park is virtually fully developed, with few parcels that are either vacant or are potentially developable."

No significant changes to land use is expected to take place.

**Wells and Well Probability**

Early development within the City typically preceded the presence of the municipal water supply system. As the City initiated and expanded its water supply system, existing homes and other buildings, with private wells, were encouraged to connect to the municipal system.

Wells represent a potential threat to City wells and groundwater resources if not properly sealed when they are abandoned. Contaminants spilled or leaked on the ground must
migrate through many geologic formations before entering deep aquifers used by City wells. This separation acts as a natural barrier. However, pollutants entering a well through a damaged cap or corroded casing are rapidly introduced to the aquifer - contaminating the water supply of nearby wells.

The City has performed a survey of each property in its DWSMAs to determine their potential to have a well. The survey compared the recorded year of construction with the year that City water was made available. Buildings constructed before City water was available were determined "probable" to have a well on the property. Building that were constructed in the same year, or later, were determined "not probable" to have a well on the property.

Of the 540 parcels located within the City's DWSMAs, 167 have been identified as probable to contain a well. Matching the property locations with the Minnesota Department of Health well sealing records have determined that 12 of the probable well sites have sealed wells.

Appendix A presents information on parcels that are "probable" to have a well.

**Public Utilities**

The City of Spring Lake Park is committed to providing cost-effective and responsive services to the residents and businesses of the City. These services are consistent with community goals and priorities as well as the City's responsibility to protect community resources.

**Pipelines (Transmission)** The City has not identified any hazardous substance transmission pipelines within its DWSMA. The MDH has determined that pipelines are not a required planning element of the City's Wellhead Protection Plan.

**Municipal Water Supply** The City of Spring Lake Park owns and operates a municipal water system. The system provides water to 7,061 people and consists of four wells, a series of trunk and lateral distribution lines and two elevated water storage tanks. The City shares three interconnections with Blaine water supply system that may be utilized to supplement the City's supply during an emergency. The distribution system is fully developed, serving all areas of the City. Figure 4 shows the location of the wells, storage tanks, and water distribution system.

The Minnesota Department of Health has completed a Source Water Assessment for Spring Lake Park's wells (see Appendix B). The MDH determined the City's wells are not sensitive because they meet Well Code construction standards and do not present a pathway for contamination to enter the water supply. The aquifers used by the City's have a low sensitivity because they are covered by one or more layers of fine-grained material that probably protects it from potential sources of contamination.

**Municipal Sewer System** The City of Spring Lake Park operates a sanitary sewer collection system and is part of the Twin Cities Metropolitan Wastewater Treatment System. The sanitary sewer system serves all areas of the City. Sewage is collected through a network of building service pipes and city sewer mains. Two lift stations transport wastewater in areas where sewer mains cannot flow by the force of gravity. Wastewater is ultimately directed to the Pig's Eye Wastewater Treatment Plant. One home that utilizes an on-site sewage treatment system. Figure 5 depicts the sanitary sewer collection system.

**Public Drainage** Public drainage systems are maintained and monitored by watershed management organizations and State agencies under surface water and storm water programs. Drainage information is not considered a planning element because the aquifer
units used by the City's wells exhibits confined hydraulic conditions. Therefore, drainage is assumed not to directly influence the DWSMAs.

Transportation  Roads provide the principal mode of transportation within the City. The roads serving Spring Lake Park include: State Highways and County State Aid Highways providing transportation across the metro region and State; County roads providing transportation across the County, and City streets providing access to properties. The major transportation arteries in the City are Highway 65, Highway 10, University Avenue, Osborne Road, 85th Avenue, and Central Avenue. Increased traffic volume trend has been measured on these arteries. A map of major transportation routes is provided in Figure 6.

WATER QUANTITY DATA ELEMENTS

Groundwater Quantity
The City's wells utilize the Franconia-Ironton-Galesville and Ms. Simon aquifer units to supply water to its public water supply system. Other aquifers in the area include the Quaternary and Prairie du Chien-Jordan.

The Minnesota Geological Survey's (MGS) County Well Index (CWI) and the Minnesota Department of Natural Resources' (DNR) State Water Use Database System (SWUDS) were utilized to identify high-capacity wells in the area that could affect the delineation of the City's WHPA. With the exception of the four municipal wells - no groundwater appropriations permits have been identified for wells within the City's DWSMAs. No groundwater observation wells have been identified within the City's DWSMAs.

DNR data of groundwater elevations provide information on trends in groundwater quantity in the area. Also, the pumping records and static water levels of the City's wells continue to be collected to determine the trends in groundwater quantity and availability.

No well interference problems have been identified by the DNR within Spring Lake Park's DWSMA or the region.

WATER QUALITY DATA ELEMENTS

Groundwater Quality
Groundwater samples, from the City's wells are routinely collected and analyzed for a wide variety of elements, minerals, compounds, and radioactive substances. Annual reports of the results of the analysis of City water are provided to users of the water system and available at City Hall.

Appendix C provides the City's annual Water Quality Reports for 2005.

No contaminants have been detected in the City water supply at or above the State regulatory standards. Some minerals and metals were detected in trace amounts but no health-based violations were found.

The MDH determined that the water from the Well 4 entered the ground over 1,000 years ago. Wells that produce such water are not considered to be susceptible from land-surface or near-surface contamination. The results of the testing are presented and discussed in Part 1. No other groundwater tracer studies are known to exist in the wellhead protection area.
II. ASSESSMENT OF DATA ELEMENTS

Use of Well
The City's well and 1977 interconnection with the City of Blaine provides ample water volume for the foreseeable future using peak demand controls during high water demand for lawn watering. The system provides water to all areas within the City. Monitoring and maintenance will continue for the upkeep of the wells. The wells will continue to be used as groundwater quantity and quality monitoring points.

Quantity and Quality of Water
There is a sufficient quantity of groundwater available to supply the City's system in the foreseeable future. However, long-term groundwater availability is not taken for granted and must be evaluated periodically to determine if City or regional issues develop. The City supports the Minnesota Department of Natural Resources programs to monitor and evaluate groundwater resources.

The quality of water from City wells meets the safe drinking water criteria of the MDH. Regular monitoring has not identified water quality issues. The City will continue to cooperate with the MDH to monitor its well water quality to identify any developing issues.

Land Use in DWSMA
The majority of the land within the City's DWSMA consists of single- and multi-dwelling residential use. The City's Comprehensive Plan indicates that current land classifications will remain consistent.

Groundwater Use in DWSMA
The City's wells represent the dominant use of groundwater in the DWSMAs. Groundwater use is expected to remain relatively consistent with current use.
Part 2 - Chapter 2
Impact of Changes on City Wells

I. CHANGES IDENTIFIED IN:

Physical Environment and Land Use
The City of Spring Lake Park is fully developed. The physical environment within the City is expected to remain unchanged. The physical environment within the City's DWSMA that crosses into the City of Fridley is expected to remain unchanged.

Land use zoning classifications within the City of Spring Lake Park will not change. Land use zoning within the City’s DWSMAs, that cross into the City of Fridley, are expected to remain unchanged.

Surface Water and Groundwater
No significant changes are expected to surface water or groundwater within the City and the City’s DWSMAs.

II. IMPACT OF CHANGES

Expected Changes in Water Use
A marginal increase (less than 10%) in the demand on the City's water system is expected to take place over the next 10 years.

Influence of Existing Water and Land Programs and Regulation
The City's zoning and development controls guide development within the community principally to establish compatible land use development and redevelopment. The City’s development programs require property owners to comply with the environmental programs of the State.

The State has numerous environmental management statutes, rules, and programs that influence construction, location, and maintenance of facilities and land use activities that represent potential contaminant sources (e.g. underground petroleum tank program, water appropriations permits, well management program, etc).

Administrative, Technical, and Financial Considerations
No significant changes are planned within the City's DWSMAs. Administrative, technical, and financial considerations are not expected to affect changes to the DWSMAs.
Part 2 - Chapter 3
Issues, Problems, and Opportunities

I. LAND USE ISSUES RELATED TO THE AQUIFER, WELL WATER AND DRINKING WATER SUPPLY MANAGEMENT AREAS

Other Wells
Unused, old, abandoned, and improperly maintained wells pose a significant threat of groundwater utilized by the City's wells. Such wells can act as a conduit for introduction of contaminants directly into the groundwater aquifers used by the City. Since 1974, the MDH, through its Well Management Program, has permitted the construction of wells and licensed contractors. State law and rules apply to all wells, including those constructed before 1974. Through the Well Code (MN Rule 4725) the MDH regulates the construction of new wells and sealing of unused wells. The City is prohibited from managing well construction.

A problem with managing other wells within the DWSMAs is that the existence, location and status of a majority are unknown. The City has an opportunity to enhance wellhead protection by cooperating with the MDH Well Management Program in locating and sealing abandoned wells and documenting the construction of new wells within its building permit program.

Federal and State Support
The wellhead protection requirements of Federal and State laws represent an unfunded mandate of the City. The City is using a unique method to cooperate with other municipal water suppliers and Anoka County to develop a cost-effective wellhead protection program. However, this project is being initiated at a time when State aid to local government funding has been drastically reduced requiring the City to balance its shrinking resources with its mandated activities.

II. ISSUES DISCLOSED AT PUBLIC MEETINGS AND SUBMITTED COMMENTS
The Metropolitan Council submitted the following comments on regarding development of the City's wellhead protection plan:
- Upon submittal of WHPA delineations, the Met Council will determine the adequacy for review as a local comprehensive plan amendment, and notify each city on how it will proceed.
- The Met Council will be looking for special protective measures for the numerous Drift wells, particularly in the vicinity of known groundwater contamination areas.
Ultimate Goal
The ultimate goal is the sustained quality and quantity of groundwater for the City's water supply system. To achieve this, the City has identified goals to be incorporated into a plan of action.

I. PUBLIC EDUCATION

Wellhead Protection Awareness Project
An education program is essential to protect the City's water supply and gain the cooperation of property owners within the DWSMA. Each property owner, within the City’s DWSMA, will be provided with information regarding the City's wellhead protection initiatives.

The Wellhead Protection Plan will be incorporated into the City's Comprehensive Plan during the next update.

B. Hazardous Materials Management Education
Educate residents regarding proper handling, use, storage, and disposal of household hazardous waste within the City's DWSMA through augmentation of existing environmental education programs.

II. WELL MANAGEMENT

A. Seal Abandoned Wells
Cooperate with the MDH Well Management Program to seal all abandoned wells within the DWSMAs. The City has developed a list of properties, within its DWSMAs, that have the probability of having a well based on the date of the construction of the building and the date when City water main was available to the property.

B. Monitor Well Construction
Cooperate with the MDH Well Management Program to monitor and maintain accurate records of the construction of wells within the City's DWSMAs. This project will improve the location accuracy of constructed wells by having a local official verify the location information submitted by the licensed well contractor.

III. WATER QUALITY AND QUANTITY MANAGEMENT

A. Groundwater Quality Protection
Monitor the chemistry of the aquifer units providing water to its wells and investigate significant changes in water quality.

B. Minimize Demand on the Water Supply System and Groundwater
Efficiently use the groundwater resources available to the City.
Part 2 - Chapter 5
Plan of Action

I. PUBLIC EDUCATION PROGRAM
An education program is essential to protect the City's water supply and gain the cooperation of the owners of the 540 properties within the two DWSMAs. An information packet will be distributed to provide wellhead protection materials to the property owners and others within the DWSMA. Additional packets will be available to new property owners.

A. Wellhead Protection Awareness Project
Objective: The cooperation of property owners, facility operators and others is critical for the City to achieve our wellhead protection goals. The Wellhead Protection Awareness Program is intended to: inform property owners that they are located in a DWSMA; present the benefits of protecting the City's water supply wells; and gain the cooperation of residents and business operators.

Actions:
(1) The Wellhead Protection Manager will notify property owners whether they are located within the City's DWSMA. The notification will include a wellhead protection education packet providing information on the City's wellhead protection program. Additional packets will be distributed to new residents in the DWSMA.
   • Cooperators: None
   • Time Frame: Initiate within one year of plan approval, then ongoing
   • Estimated Cost: 2,500.00 (4.50 per parcel in DWSMA)
   • Goal Achieved: Preparation and delivery of a wellhead protection information packets.

(2) The Wellhead Protection Manager will submit wellhead protection information to be included in the City's annual Water Quality Report of their water supply system.
   • Cooperators: City Utilities Director
   • Time Frame: Ongoing
   • Estimated Cost: 165.00 (0.30 per parcel in DWSMA)
   • Goal Achieved: Submission of WHP promotion materials to Water Quality Report.

(3) The Wellhead Protection Manager will prepare press releases and issue a briefing report for newspaper and other media outlets on timely issues that coincides with WHP initiatives such as an abandoned well information meeting or the installation of DWSMA zone signs.
   • Cooperators: Anoka County Municipal Wellhead Planning Group
   • Time Frame: Ongoing
   • Estimated Cost: 270.00 (0.50 per parcel in DWSMA)
   • Goal Achieved: Submission of press release(s) and other wellhead data to media contacts.

(4) The City will make DWSMA maps and wellhead protection information available to real-estate agents, consultants, and other interested persons that perform environmental evaluations. The wellhead protection manager will make, or cooperate in, presentations to civic and business organizations regarding the impact of the City's wellhead protection efforts on municipal water supply, land use, and quality of life.
   • Cooperators: Anoka County Municipal Wellhead Planning Group
• Time Frame: Initiate within one year of plan approval, then ongoing
• Estimated Cost: 2,500.00 (4.50 per parcel in DWSMA)
• Goal Achieved: Preparation of WHP materials and presentations to interested groups.

B. Household Hazardous Materials Management Education

Objective: Educate residents and businesses regarding proper handling, use, storage, and disposal of hazardous materials within the DWSMAs through augmentation of existing environmental education programs. This initiative will not address businesses that are currently licensed hazardous waste generators which are required to meet State management standards.

Actions:
(1) The Wellhead Protection Manager will include proper management of hazardous materials and waste information to the WHP education packet. The packet will include contact numbers to obtain consultative services from City, County and State program staff (i.e. utilities, hazardous waste management, and petroleum tanks program).
• Cooperators: Anoka County Integrated Waste Management Unit
• Time Frame: Ongoing
• Estimated Cost: 1,100.00 (2.00 per parcel in DWSMA)
• Goal Achieved: Inclusion of household hazardous waste information in the WHP education packet.

(2) The Wellhead Protection Manager will utilize newsletters, cable access, news releases and other forums to promote the proper management of household hazardous materials including use of the Anoka County Household Hazardous Waste drop-off facility.
• Cooperators: Anoka County Integrated Waste Management Unit and Anoka County Municipal Wellhead Planning Group
• Time Frame: Ongoing
• Estimated Cost: 270.00 (0.50 per parcel in DWSMA)
• Goal Achieved: 5% increase in the number of Spring Lake Park households that utilizes the Anoka County Household Hazardous Waste drop-off facility as monitored by the Anoka County Integrated Waste Management Unit.

II. OTHER WELLS MANAGEMENT

The presence of other wells within the City's DWSMAs presents the potential for contamination sources, at or near land surface, to be rapidly introduced into the aquifers used by the City's wells. Eventually, all wells become unused or unusable. State law requires unused wells to be properly sealed. However, the location and status of wells has not been adequately monitored.

A. Seal Abandoned Wells

Objective: Cooperate with the MDH Well Management Program to seal all abandoned wells within the DWSMAs. The City has developed a list of properties, within its DWSMAs, that have the probability of having a well.

Actions:
(1) The Wellhead Protection Manager will investigate potential sources of financial assistance and the establishment of a program to assist property owners in sealing their abandoned wells. The investigation will include Federal and State grant programs and a City low-interest loan program.
• Cooperators: Anoka County Municipal Wellhead Planning Group
• Time Frame: Investigation completed within six months of plan approval
• Estimated Cost: 3,000.00 (staff time)
• Goal Achieved: Completion of the investigation and necessary actions to apply and respond to grant application criteria.

(2) The Wellhead Protection Manager will notify property owners within the DWSMAs of the probability of a well located on their property. The notification will include contact numbers for property owners to obtain consultative services regarding methods to locate and seal abandoned wells and an announcement of a public informational meeting.
• Cooperators: None
• Time Frame: Notify all property owners within 2 years of plan approval
• Estimated Cost: 1,100.00 (2.00 per parcel in DWSMA)
• Goal Achieved: Mailing of notification

(3) The Wellhead Protection Manager will sponsor a public meeting with invited MDH Well Management staff to provide abandoned well sealing information and answer questions. Consideration will be given to holding a multi-city meeting with ACMWPG partners to maximize limited city, county, and state resources.
• Cooperators: Anoka County Municipal Wellhead Planning Group, and MDH
• Time Frame: Notify all property owners within 2 years of plan approval
• Estimated Cost: 1,100.00 (2.00 per parcel in DWSMA)
• Goal Achieved: Completion of a public meeting

(4) The Wellhead Protection Manager will request that the MDH provide the City with a copy of new well sealing reports within its DWSMA. The location of the sealed wells will be verified and placed in the City Building Official's property files.
• Cooperators: Minnesota Department of Health
• Time Frame: Request made within 6 months of plan approval then ongoing
• Estimated Cost: 140.00 (0.25 per parcel in DWSMA)
• Goal Achieved: Completion of the request, number of sealing logs submitted, and incorporated into the City Building Official's corresponding property file.

(5) The City has developed a list of parcels with probable wells within the DWSMA. The Wellhead Protection Manager will request that probable well locations be incorporated into the City Building Official's property file. When a building or demolition application is made the records will be reviewed to determine if a well search is necessary.
• Cooperators: None
• Time Frame: Request made within 6 months then ongoing
• Estimated Cost: 280.00 (0.50 per parcel in DWSMA)
• Goal Achieved: Request for, and completion of, incorporation of results of Well Probability Study into the City Building Official's corresponding property file.

B. Monitor Well Construction
Objective: Cooperate with the MDH Well Management Program to monitor and maintain accurate records of the construction of wells within the City's DWSMA.
Actions:
(1) The Wellhead Protection Manager will provide the MDH Well Unit with a copy of its DWSMA map and request that they perform on-site inspections of all future constructed wells.
   - Cooperators: Minnesota Department of Health
   - Time Frame: Request made within 6 months – inspection ongoing
   - Estimated Cost: 20.00 (0.18 per parcel in DWSMA)
   - Goal Achieved: Request for, and performance of on-site inspections of well construction.

(2) The Wellhead Protection Manager will request that the MDH Well Unit provide a copy of submitted Well Construction Report for wells located within the City's DWSMA. The City will verify the parcel location of the well and place the copy into the City Building Official's property file. If information regarding the location of the well is insufficient to determine the parcel location - the City will request that the MDH follow up with the licensed well contractor to obtain sufficient information.
   - Cooperators: None
   - Time Frame: Request made within 6 months then ongoing
   - Estimated Cost: 540.00 (1.00 per parcel in DWSMA)
   - Goal Achieved: Request for, submission and incorporation of Well Construction Reports into the City Building Official's corresponding property file.

(3) The Wellhead Protection Manager will request that the City Building Official place the copy of the well record into the City's property file. The file is subject to review when application is made for building permits or lot development. At that time, the building official will determine the status of the well.
   - Cooperators: None
   - Time Frame: Request made within 6 months then ongoing
   - Estimated Cost: 85.00 (0.75 per parcel in DWSMA)
   - Goal Achieved: Request for, and ongoing monitoring of wells by the Building Official and expansion/maintenance of the City's Address File.

(4) The Wellhead Protection Manager will seek the cooperation of the City of Fridley to address wells located in their DWSMAs that cross into each others municipality. Such a cooperative effort will attempt to address wells in a coordinated manner.
   - Cooperators: City of Fridley
   - Time Frame: Meeting(s) will take place within the first two years.
   - Estimated Cost: Unknown
   - Goal Achieved: Contact with the City of Fridley and subsequent cooperative endeavors.

III. WATER QUALITY AND QUANTITY MANAGEMENT

A. Groundwater Quality Protection
   Objective: Monitor the chemistry of the aquifer units providing water to its wells and investigate significant changes in water quality.

Actions:
(1) The City Utilities Director will continue to monitor the water quality of its public water supply well in accordance with MDH rules.
• Cooperators: None
• Time Frame: Ongoing
• Estimated Cost: 8,000.00 (staff, contract services, and equipment)
• Goal Achieved: Continued water quality monitoring.

(2) The City will continue to provide results of its water quality monitoring in the City’s annual Water Quality Report.
• Cooperators: None
• Time Frame: Ongoing
• Estimated Cost: 6,000.00
• Goal Achieved: Publication of an annual Water Quality Report.

(3) The City will maintain its historical database of water quality testing results for its well. The monitored parameters include concentrations of organic and inorganic compounds, radiological results, and microorganisms detected. The database will be reviewed periodically to determine trends in water quality changes.
• Cooperators: None
• Time Frame: Ongoing
• Estimated Cost: 250.00
• Goal Achieved: A database that tracks possible trends in water quality.

(4) The Utilities Director will annually review the water quality database and determine if significant trends have developed. The Utilities Director will prepare a Water Quality Trends Report to the City Council and Wellhead Protection Manager that summarizes the annual review. If there are significant changes in the concentration of a contaminant, the Wellhead Protection Manager will attempt to identify the source(s) of the pollutant in a cooperative manner with the Minnesota Department of Health and Minnesota Pollution Control Agency.
• Cooperators: Minnesota Department of Health and Minnesota Pollution Control Agency
• Time Frame: In response indications of water quality impact
• Estimated Cost: Unknown
• Goal Achieved: Preparation and presentation of annual Water Quality Trends Report. Response to a significant change in contaminant concentration.

B. Minimize Demand on Water Supply System and Groundwater
Objective: Efficient use of groundwater resources available to the City. Encourage water system patron to conserve.

Actions:
(1) The City will continue to enforce odd-even sprinkling ban to conserve water during high-demand summer months.
• Cooperators: None
• Time Frame: Ongoing
• Estimated Cost: 1,000.00 (staff time)
• Goal Achieved: Continued enforcement of odd-even sprinkling ban.
(2) The City will continue its efforts to educate residents and businesses on good water use practices and water conservation through mailings, cable access, and staff-resident contact.
- Cooperators: City Utilities Director
- Time Frame: Ongoing
- Estimated Cost: 2,500.00
- Goal Achieved: Continued water conservation education.

(3) The City will continue to require water-conserving fixtures in construction ordinances according to state policies and codes.
- Cooperators: None
- Time Frame: Ongoing
- Estimated Cost: 20,000.00
- Goal Achieved: Continued enforcement of plumbing code standards for installation of water-conserving fixtures.

(4) The Wellhead Protection Management will investigate changing from a decreasing block rate water charge to a uniform or increasing rate. A report of this investigation will be made to the City Council.
- Cooperators: City Utilities Director
- Time Frame: Within two years of plan approval
- Estimated Cost: 1,400.00 (2.50 per parcel in DWSMA)
- Goal Achieved: A report and presentation to the City Council.
Part 2 - Chapter 6
Evaluation Program

The evaluation program will determine the progress of the City to implement its plan of action. Evaluations must be conducted at least every 2.5 years or when the wellhead plan is amended. To evaluate progress in achieving plan goals the City will perform the following.

I. WELLHEAD PROTECTION PROGRESS REPORT

Every two years the City will publish a Wellhead Protection Progress Report that will:

1. Discuss recent developments that have affected the wellhead protection plan;
2. Briefly discuss the outcomes of the Wellhead Protection Awareness Project and Hazardous Materials Management Education Project;
3. List the number of wells sealed in the City since adoption of the plan;
4. Summarize the historical and most recent water quality monitoring results;
5. Summarize the historical and most recent water use data and briefly discuss progress in reducing water demand; and
6. Present a plan for action to meet the remaining objectives of the wellhead protection plan.

II. COMMUNICATIONS

The City will maintain records of contacts for the distribution the wellhead plan and Wellhead Protection Awareness Project.
Part 2 - Chapter 7
Water Supply Plan

In 1996 the City of Spring Lake Park prepared its Water Supply Plan. The following summarizes the City's water supply emergency prepared and water conservation sections of the plan. Water system characteristics, water user priority, emergency equipment and contact numbers can be found in the plan.

I. WATER SYSTEM EMERGENCY PREPAREDNESS PLAN

The purpose of this plan is to prepare a detailed description of procedures to follow in the event of a disruption to normal water service. The plan cannot address all potential disasters. It is intended to give the water utility staff a guideline to allow them to quickly restore normal water service with a minimum of disruption, and to minimize any potential health risks.

Emergency Telephone List. The City maintains an emergency list of personal telephone numbers for key staff to be contacted during non-working hours. The key staff includes the Public Works Director, Water and Sewer Operator, City Administrator, and Water/Sewer Operations staff. The list also includes contractors and individuals that provide support services to the City's water system including a well driller and excavator.

Current Water Source and Service Area. Spring Lake Park's DNR appropriations permit number is 720123. This are a total of 1,971 service connections as of January 1, 1995. Spring Lake Park does not have any surface water sources. Spring Lake Park has four (4) wells, all of which are permanent sources.

<table>
<thead>
<tr>
<th>Well Water Records for Spring Lake Park</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well #1</td>
</tr>
<tr>
<td>Unique No.</td>
</tr>
<tr>
<td>Casing Diameter</td>
</tr>
<tr>
<td>Casing Depth</td>
</tr>
<tr>
<td>Well Depth</td>
</tr>
<tr>
<td>Capacity (GPM)</td>
</tr>
</tbody>
</table>

Interconnect with Adjacent Communities. Currently, the City shares an interconnection with the City of Blaine, which may only be utilized if the City of Spring Lake Park is under a total water ban. The interconnection has only been used once, during the Summer of 1988.

Conjunctive Use of Surface and Ground Waters. The conjunctive use of surface and ground waters is not a viable option for the City of Spring Lake Park.

Alternative Sources of Water. The City has no alternative source of water. In the event of contamination or depletion of the Mt. Simon aquifer, the City would need to bring potable water in via trucks, or investigate the possibility of purchasing water from neighboring communities.
Demand Reduction Procedures. Demand reduction procedures are initiated during unusually high demand periods or shortage of water. Restrictions relate to the severity of the shortage.

Short-Term Demand Reductions Procedures. The following measures are part of the City’s water conservation plan.

2. Sprinkling Bans: Odd/even sprinkling ban. A total ban may be applied in an extreme emergency.
3. Water Allocation Restrictions: Based on the severity of emergency allocation of water can be based on priority established in the water conservation section of this plan.

Procedures for Water Allocation. Initial emergency response will include actions to augment supplies and/or reduce demand. However, severe water shortages may require the City of allocate water based on the following priorities (established in Minnesota Statute 103G.261).

First Priority. Domestic water supply, excluding industrial and commercial uses and use for power production. [Notify all customers]
Second Priority. Water uses involving consumption of less than 10,000 gallons per day. [Notify all commercial/industrial customers]
Third Priority. Agricultural irrigation and process on agricultural products. [Does not apply to Spring Lake Park]
Fourth Priority. Power production in excess of the use provided for in the contingency plan under first priority. [Does not apply to Spring Lake Park]
Fifth Priority. Uses, other than agricultural irrigation, processing of agricultural products, and power production. [Including “Aggressive Industries” and “Perfect Ten Car Wash”]
Sixth Priority. Non-essential uses. These uses are defined by Minnesota Statutes 103G.291 as lawn sprinkling, vehicle washing, golf course and park irrigation, and other non-essential uses. [Notify all customers]

While initial emergency responses may include action to augment supplies and/or reduce demands, severe water shortages would require water allocation in accordance with these priorities.

Triggers for Implementing Plan Components. The critical factor in the Spring Lake Park water system is the well pump capacity. For reliability, the system must have one well pump in the standby or back-up position. Therefore the capacity of the supply facilities is the capacity with the largest well pump out of service or the “firm capacity.” The total firm capacity is 2.7 million gallons per day (MGD). As water demand reaches the firm capacity, demand reduction measures must be initiated. The following triggers are based on the percentage demand of firm capacity.
<table>
<thead>
<tr>
<th>Measure</th>
<th>Trigger % of Firm Capacity</th>
<th>Volume (MGD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voluntary Reduction Measures</td>
<td>Always</td>
<td>N/A</td>
</tr>
<tr>
<td>Odd/Even Sprinkling Ban</td>
<td>Always</td>
<td>N/A</td>
</tr>
<tr>
<td>Total Sprinkling Ban</td>
<td>95%</td>
<td>2.56 MGD</td>
</tr>
<tr>
<td>Eliminate 6th Priority Allocation</td>
<td>96%</td>
<td>2.60 MGD</td>
</tr>
<tr>
<td>Eliminate 5th Priority Allocation</td>
<td>97%</td>
<td>2.62 MGD</td>
</tr>
<tr>
<td>Eliminate 2nd Priority Allocation</td>
<td>100%</td>
<td>2.70 MGD</td>
</tr>
</tbody>
</table>

**Enforcement.** The focus of Spring Lake Park’s short-term demand reduction plan is on voluntary reduction of non-essential uses of water. Enforcement will become more stringent as the emergency progresses. Odd/even sprinkling bans will be monitored and enforced by the water and police departments. The following warnings and penalties will be given out as necessary.

1. First Violation – Written Notification of Water Restriction.
2. Second Violation – Misdemeanor.

Total sprinkling bans and other allocation eliminations will be monitored by the Water Utility staff and enforced as needed.

**Water Supply Protection**

**Analysis of Previous Supply Problems.** The City’s water system has operated for over 32 years with only maintenance and minor water main breaks having occurred. The Water Department has all necessary tools and agreements with suppliers to rapidly respond to water system problems.

**Wellhead Protection.** Water supply protection is an essential part of the Spring Lake Park emergency plan. A wellhead protection plan will be developed when the Minnesota Department of Health (MDH) rules are formally adopted.

**Resource Monitoring.** The City periodically measures the static water levels in all of its wells to detect trends and changes in its groundwater resources. The City cooperates with MDH to collect and analyze water quality samples to insure that the system is providing water that meets the standards of the Safe Drinking Water Act. The City will cooperate with the Minnesota Department of Natural Resources to identify trends with regional aquifer units utilized by the its wells.

**II. WATER CONSERVATION PLAN**

**Role of Conservation.** The water conservation plan for the City of Spring Lake Park is intended to reduce the demand for water, improve water use efficiency, and reduce loss. Reducing peak water use reduces the necessity for the City to develop additional source and storage capacity.

The City’s conservation goal is to reduce both average and maximum day demand. The City has adopted a conservation goal of lowering the maximum day demand of 449 gallons
per capita per day (gpcd) by 20%. Demand reduction will target used associated with peak demand, such as outdoor water practices.

**Water Conservation Potential.** The City is fully developed community with a stable population base. Demand on the water system has not increased dramatically over the past ten years.

Water Conservation Programs. The City implements several short-term and long-term conservation measures to assist in its overall water conservation program. The short-term measures utilized by the City for emergency purposes include voluntary reductions, sprinkling bans, and water restrictions. Long-term measures to improve water efficiency are listed below.

1. **Metering:** All current and future water users are metered.
2. **Water Audits, Leak Detection and Repair:** Unaccounted water use has varied from 21.5% to 0.9% with a ten year average at 14.5%. The majority of unaccounted water loss is due to main breaks, leaks in the system etc. The City will continue to monitor these losses and work toward maintaining a water unaccounted loss of below 10%. The City is conducting a leak detection program in conjunction with its pavement management program.
3. **Conservation-Oriented Water Rates:** The City currently uses a uniform rate system and bills its customers quarterly. The quarterly base rate for the first 18,000 gallons is charged plus a set rate per 1,000 gallons thereafter. The following rates are in effect January 1, 1995.
   
   Base Rate (per first 18,000 gallons) $22.00
   Water Rate (per 1,000 gal thereafter) $0.95
4. **Regulation:** The City utilizes on the following regulations to provide short-term demand and long-term improvements in water use efficiencies.
   - State plumbing code requiring water efficient fixtures;
   - City odd/even sprinkling ban; and
   - City Conservation Plan and Codes to address water supply emergencies.
5. **Education and Information Programs:** The City has made a strong effort to educate water users on the proper way to water lawns. The City will continue its efforts to educate the public on the benefits of water conservation with regular "bill stuffers" pamphlets, school curriculums on water resources (National Drinking Water Week), and direct mailings to encourage voluntary water use reduction.
6. **Retrofitting Program:** The City Building Inspector will enforce the plumbing code related to retrofitting existing water fixtures. As homeowners replace aging fixtures efficient water fixtures will replace the efficient fixtures.
7. **Pressure Reduction:** The City water system has been designed to maintain water pressure between 30 and 90 pounds per square inch (psi). Users with pressure above 80 psi will be required to install individual pressure reducing valves. The only method the City has to reduce pressure is to lower the level in its water towers. This is unacceptable because it results in a reduction of available fire protection.
8. **Outdoor Water Use:** The City encourages schools and parks outdoor sprinkling systems to be equipped with water sensors to ensure that sprinklers do not operate when it is raining.
The shaded zones represent the Drinking Water Supply Management Areas (DWSMA) for members of the Anoka County Municipal Wellhead Protection Planning Group. Spring Lake Park's DWSMA for wells 1, 2, and 4 extend from the southwest corner of the City into the City of Fridley. Fridley's DWSMA depicted Spring Lake Parks

- NOT VULNERABLE - Light shading indicates that the DWSMA is not vulnerable.
- MODERATE - Dark shading indicates that the DWSMA is moderately vulnerable.

Aquifer and well construction evaluation has determined the vulnerability of the municipal wells and surrounding groundwater to contamination.

Spring Lake Park's two DWSMAs are classified as non-vulnerable. Part 1 of this plan details the vulnerability determination of the DWSMAs. The portion of Fridley's DWSMA that extends into southern Spring Lake Park is determined to have low and moderate vulnerability zones.
*From the City of Spring Lake Park Comprehensive Plan Update (2000)
Figure 4
WATER SUPPLY AND DISTRIBUTION

*Modified from the City of Spring Lake Park Comprehensive Plan Update (2000)
*From the City of Spring Lake Park Comprehensive Plan Update (2000)
Figure 6
Transportation Routes*


<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>State Highway 65 (south of Hwy 10)</td>
<td>34,000</td>
<td>34,000</td>
<td>36,500</td>
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<td>State Highway 65 (south of 81\textsuperscript{st} Ave.)</td>
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<td>34,000</td>
<td>35,000</td>
<td>37,000</td>
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<td>County State Aid Highway 10* (west of Hwy 65)</td>
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<td>41,500</td>
<td>42,500</td>
<td>45,000</td>
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<tr>
<td>County State Aid Hwy. 10* (east of Hwy. 65)</td>
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<td>37,500</td>
<td>40,000</td>
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<tr>
<td>University Avenue (State Hwy. 47)</td>
<td>29,500</td>
<td>33,000</td>
<td>35,000</td>
<td>37,000</td>
</tr>
<tr>
<td>Osborne Rd. (County State Aid Hwy 8 &amp; County Rd. 108)</td>
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<td>12,000</td>
<td>12,800</td>
<td>13,000</td>
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<tr>
<td>85\textsuperscript{th} Avenue (County State Aid Highway 32)</td>
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## City of Spring Lake Park – Wellhead Protection Plan

### Appendix A

#### Location of Probable Wells

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### Location of Probable Wells

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(1) Because information is not available regarding the year the parcel is developed additional investigation is necessary to determine if the property is probable to have a well.

See attached map (page 6)
SOURCE WATER ASSESSMENT FOR SPRING LAKE PARK*

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<th>ID Number: 1020029</th>
<th>Facility Contact:</th>
<th>MDH Contact:</th>
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<tr>
<td>Terry Randall, (763) 784-5491</td>
<td></td>
<td>Art Persons, (507) 292-5138</td>
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<tr>
<td>Spring Lake Park</td>
<td></td>
<td>18 Wood Lake Drive Southeast</td>
</tr>
<tr>
<td>1301 – 81ST Avenue NE</td>
<td></td>
<td>Rochester, MN 55904</td>
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<tr>
<td>Spring Lake Park, MN 55432</td>
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<td><a href="mailto:art.persons@health.state.mn.us">art.persons@health.state.mn.us</a></td>
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Status of the Source Water Protection Plan:
The water supply system is preparing a protection plan for the wellhead protection area(s) that have been approved by the Minnesota Department of Health under provisions of Minnesota Rules Chapter 4720.

Source Water Protection Area (SWPA) -
Yes - A Source Water Protection Area has been designated for this well.
No - A Source Water Protection Area has yet to be designated for this well.

Description of the source water - The water supply for Lexington is obtained from 1 primary well. Well depth (in feet), well status, aquifer(s) used, and sensitivity of the source(s) of drinking water are listed in the following table.

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<th>Well Use</th>
<th>Aquifer</th>
<th>Aquifer Sensitivity</th>
<th>Well Sensitivity</th>
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<td>Low</td>
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Well construction assessment - 180920, 223294, 563006 meet current standards for construction and maintenance. These factors do not contribute to the susceptibility of the source water to contamination; and The Minnesota Department of Health considers 206638 potentially vulnerable to contamination because there is insufficient information to document well construction.

Well Sensitivity - Well sensitivity refers to the integrity of the well due to its construction and maintenance. It is based on the results of the well construction assessment. It can be one of the following:
1. The well is not susceptible because it meets well construction standards and does not present a pathway for contamination to readily enter the water supply.
2. The well is susceptible because it does not meet well construction standards and does not present a pathway for contamination to readily enter the water supply.

Aquifer Sensitivity - Aquifer sensitivity refers to the degree of geological protection afforded the aquifer(s) used by the public water supply.
Low - The bedrock aquifer is covered by one or more layers of fine-grained material that probably protect it from potential sources of contamination.

Source Water Susceptibility - Source water susceptibility refers to the likelihood that a contaminant will reach the source of drinking water. It reflects the results of assessing well sensitivity, aquifer sensitivity, and water quality data. The source of drinking water is considered susceptible because one or more wells exhibit a high sensitivity. Past results indicate that at least one entry point from this community public water system may exceed the Radium Maximum Contaminant Level (MCL) of 6 pCi/L. Radium is a naturally-occurring contaminant and is found in southern and central Minnesota.

Contaminants of concern - The following statement summarizes the potential contaminants for which a source of drinking water may be at risk:
One or more contaminants regulated under the federal Safe Drinking Water Act for this public water supply system have been detected in the source water. However, the water supplied to users meets state and federal drinking water standards for potability. For further information, please contact the MDH representative listed at the beginning of this assessment.

*Adapted from Minnesota Department of Health Source Water web page (1/23/2008)
Appendix C

City of Spring Lake Park
Drinking Water Report 2005
City of Spring Lake Park
2005 Drinking Water Report

The City of Spring Lake Park is issuing the results of monitoring done on its drinking water for the period from January 1 to December 31, 2005. The purpose of this report is to advance consumers' understanding of drinking water and heighten awareness of the need to protect precious water resources.

Source of Water

The City of Spring Lake Park provides drinking water to its residents from a groundwater source: four wells ranging from 694 to 783 feet deep, that draw water from the Franconia-Mt. Simon and the Mt. Simon-Hinckley aquifers.

The water provided to customers may meet drinking water standards but the Minnesota Department of Health has determined that one or more sources of water is potentially susceptible to contamination. If you wish to obtain the entire source water assessment regarding your drinking water, please call 651-201-4670 or 1-800-818-9318 (and press 5) during normal business hours. Also, you can view it on line at www.health.state.mn.us/divs/eh/water/swp/swa.

Call Terry Randall at (763) 784-6491 if you have questions about the City of Spring Lake Park’s drinking water or would like information about opportunities for public participation in decisions that may affect the quality of the water.

Results of Monitoring

The results contained in the following table indicate an exceedance of a federal standard. Some other contaminants were detected in trace amounts that were below legal limits. The table that follows shows the contaminants that were detected in trace amounts last year. (Some contaminants are sampled less frequently than once a year; as a result, not all contaminants were sampled in 2005. If any of these contaminants were detected the last time they were sampled for, they are included in the table along with the date that the detection occurred.)

Key to abbreviations:

MCLG-Maximum Contaminant Level Goal: The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLG’s allow for a margin of safety.

MCL-Maximum Contaminant Level: The highest level of a contaminant that is allowed in drinking water. MCL’s are set as close to the MCLG’s as feasible using the best available treatment technology.

MRDL-Maximum Residual Disinfectant Level.

MRDLG-Maximum Residual Disinfectant Level Goal.

AL-Action Level: The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

90th Percentile Level-This is the value obtained after disregarding 10 percent of the samples taken that had the highest levels. (For example, in a situation in which 10 samples were taken, the 90th percentile level is determined by disregarding the highest result, which represents 10 percent of the samples.) Note: In situations in which only 5
samples are taken, the average of the two with the highest levels are taken to determine the 90th percentile level.

**pCi/l-PicoCuries per liter (a measure of radioactivity).**

**ppb-Parts per billion, which can also be expressed as micrograms per liter (ug/l).**

**ppm-Parts per million, which can also be expressed as milligrams per liter (mg/l).**

N/A – Not Applicable (does not apply).

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<th>MCLG</th>
<th>MCL</th>
<th>Level Found Range (2005)</th>
<th>Level Found Average/Result*</th>
<th>Typical Source of Contaminant</th>
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<td>Barium (ppm) (5/23/2002)</td>
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<td>.15</td>
<td>Discharge of drilling wastes; Discharge from metal refineries; erosion of natural deposits.</td>
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<td>Combined Radium (pCi/l)</td>
<td>0</td>
<td>5.4</td>
<td>1.6-5.8</td>
<td>5.8**</td>
<td>Erosion of natural deposits.</td>
</tr>
<tr>
<td>Fluoride (ppm)</td>
<td>4.0</td>
<td>4.0</td>
<td>.93-1.1</td>
<td>1.12</td>
<td>State of Minnesota requires all municipal water systems to add fluoride to the drinking water to promote strong teeth; Erosion of natural deposits. Discharge from fertilizer and aluminum factories.</td>
</tr>
<tr>
<td>Haloacetic Acids (HAA5) (ppb)</td>
<td>0</td>
<td>60</td>
<td>N/A</td>
<td>.7</td>
<td>By-product of drinking water disinfection.</td>
</tr>
<tr>
<td>TTHM (Total trihalomethanes) (ppb)</td>
<td>0</td>
<td>80</td>
<td>N/A</td>
<td>2.2</td>
<td>By-product of drinking water disinfection.</td>
</tr>
<tr>
<td>Xylenes (ppm)</td>
<td>10</td>
<td>10</td>
<td>.0003-.0034</td>
<td>.01</td>
<td>Discharge from petroleum factories; Discharge from chemical factories.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Contaminant (units)</th>
<th>Level Found Range (2005)</th>
<th>Level Found Average/Result*</th>
<th>Typical Source of Contaminant</th>
</tr>
</thead>
</table>

*This is the value used to determine compliance with federal standards. It sometimes is the highest value detected and sometimes is an average of all the detected values. If it is an average, it may contain sampling results from the previous year.

**During the year, we had an ongoing violation for Combined Radium. Some people who drink water containing radium 226 or 228 in excess of the MCL over many years
may have an increased risk of getting cancer. Due to installation of a treatment unit, our system was returned to compliance for combined radium. Average results of samples collected in 2005 were below the MCL.

Radon is a radioactive gas which is naturally occurring in some groundwater. It poses a lung cancer risk when gas is released from water into air (as occurs during showering, bathing, or washing dishes or clothes) and a stomach cancer risk when it is ingested. Because radon in indoor air poses a much greater health risk than radon in drinking water, an Alternative Maximum Contaminant Level (AMCL) of 4,000 picoCuries per liter may apply in states that have adopted an Indoor Air Program, which compels citizens, homeowners, schools, and communities to reduce the radon threat from indoor air. For states without such a program, the Maximum Contaminant Level (MCL) of 300 pCi/l may apply. Minnesota plans to adopt an Indoor Air Program once the Radon Rule is finalized.

<table>
<thead>
<tr>
<th>Contaminant (units)</th>
<th>MRDLG</th>
<th>MRDL</th>
<th>Highest and Lowest Monthly Average</th>
<th>Highest Quarterly Average</th>
<th>Typical Source of Contaminant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorine (ppm)</td>
<td>4</td>
<td>4</td>
<td>.8-1.6</td>
<td>1.33</td>
<td>Water additive used to control microbes.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Contaminant (units)</th>
<th>MCLG</th>
<th>AL</th>
<th>90% Level</th>
<th># sites over AL</th>
<th>Typical Source of Contaminant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper (ppm)(6/29/2004)</td>
<td>NA</td>
<td>1.3</td>
<td>.2</td>
<td>0 out of 20</td>
<td>Corrosion of household plumbing systems; Erosion of natural deposits.</td>
</tr>
</tbody>
</table>

Some contaminants do not have Maximum Contaminant Levels established for them. These “unregulated contaminants” are assessed using state standards known as health risk limits to determine if they pose a threat to human health. If unacceptable levels of an unregulated contaminant are found, the response is the same as if an MCL has been exceeded; the water system must inform its customers and take other corrective actions. In the table that follows are the unregulated contaminants that were detected:

<table>
<thead>
<tr>
<th>Contaminant (units)</th>
<th>Level Found Range (2002)</th>
<th>Level Found Average/Result</th>
<th>Typical Source of Contaminant</th>
</tr>
</thead>
</table>
Compliance with National Primary Drinking Water Regulations

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

**Contaminants that may be present in source water include:**

*Microbial contaminants,* such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

*Inorganic contaminants,* such as salts and metals, which can be naturally occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.

*Pesticides and herbicides,* which may come from a variety of sources such as agriculture, urban storm water runoff, and residential uses.

*Organic chemical contaminants,* including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, and septic systems.

*Radioactive contaminants,* which can be naturally occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (EPA) prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration regulations establish limits for contaminants in bottled water, which must provide the same protection for public health.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency’s Safe Drinking Water Hotline at 800-426-4791.

*Some people may be more vulnerable to contaminants in drinking water than the general population.* Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk for infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium are available from the Safe Drinking Water Hotline at 800-426-4791.

*Note: You will not receive a copy of this report by mail. A report will be kept on file at City Hall.*