Final

Source Water Assessment

for the

Northern High School Water System

Garrett County, Maryland

Prepared for:

Maryland Department of the Environment
Water Management Administration
Water Supply Program
1800 Washington Boulevard, Suite 625
Baltimore, Maryland 21230-1719

Prepared by:

EA Engineering, Science, Technology, Inc.
15 Loveton Circle
Sparks, Maryland 21152
(410) 771-4950

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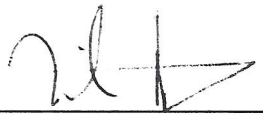
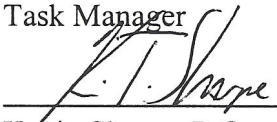


Mike Hertz, P.G.
Task Manager



Kevin Sharpe, P.G.
Project Manager

February 2004

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AST	Aboveground Storage Tank
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Act Information System
CHS	Controlled Hazardous Substances
COMAR	Code of Maryland Regulations
DWEL	Drinking Water Equivalent Level
ft	Foot/Feet
gpd	Gallon(s) Per Day
gpm	Gallon(s) Per Minute
GPS	Global Positioning System
GWUDI	Ground Water Under the Direct Influence
in.	Inch(es)
IOC	Inorganic Compound
LUST	Leaking Underground Storage Tank
MCL	Maximum Contaminant Level
MDE	Maryland Department of the Environment
mg/L	Milligram(s) Per Liter
MGS	Maryland Geological Survey
NPL	National Priorities List
pCi/L	Picocurie(s) Per Liter
PWSID	Public Water System Identification
SDWA	Safe Drinking Water Act
SDWR	Secondary Drinking Water Regulations
SOC	Synthetic Organic Compound
SWAP	Source Water Assessment Plan
SWPA	Source Water Protection Area
SWPP	Source Water Protection Plan
µg/L	Microgram(s) Per Liter
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
UST	Underground Storage Tank
VOC	Volatile Organic Compound
WHPA	Well Head Protection Area

EXECUTIVE SUMMARY

EA Engineering, Science, and Technology was tasked to perform a Source Water Assessment for the Northern High School water system in Garrett County, Maryland. The Maryland Department of the Environment (MDE) identifies this water system as Public Water System Identification (PWSID) 1110005. EA has performed this study under Purchase Order No. U00P9200205, as authorized by MDE.

The required components of this report, as described in Maryland's Source Water Assessment Plan (SWAP), are:

- Delineation of the area that contributes water to the source
- Identification of potential sources of contamination
- Determination of the susceptibility of the water supply to contamination
- Recommendations for protecting the drinking water supply

The source of the Northern High School water supply is the Hampshire Formation, which is an unconfined, sandy-shale aquifer. The Source Water Protection Area (SWPA) for the one ground-water supply well was delineated using the watershed delineation method for fractured bedrock wells. The SWPA is based on land topography, nearby streams, and a calculation of the total ground-water contributing area during a drought. The SWPA is approximately 115 acres and is irregular in shape.

Potential point and non-point sources of contamination within the assessment area were identified based on site visits, a review of MDE databases, and a review of sewer service area and land use maps. Several point sources for contaminants were observed within and adjacent to the SWPA, including two underground storage tank (USTs) sites, an aboveground storage tank (AST), an automobile dealership, and a septic system drain field. Commercial areas and forests were observed within the SWPA. Commercial areas and forests account for 92 percent of the SWPA, and commercial areas can be considered a non-point source of contaminants. Generally, forests are not associated with pollution sources. Well information and water quality data were also reviewed.

The susceptibility analysis for the Northern High School water supply is based on a review of the water quality data, potential sources of contamination, aquifer characteristics, and well integrity. It was determined that Northern High School's water supply is moderately susceptible to volatile organic compounds, radionuclides, and microbiological contaminants. The system has a low susceptibility to synthetic organic compounds, inorganic compounds, and microbiological contaminants.

Recommendations to protect the ground-water supply include creating a SWPA team, employee awareness, required ground-water sample analysis, and communication with County officials about future planning and land use.

1. INTRODUCTION

EA Engineering, Science, and Technology was tasked to perform a Source Water Assessment for the Northern High School water system in Garrett County, Maryland. EA has performed this study under Purchase Order No. U00P3200205, as authorized by the Maryland Department of the Environment (MDE).

The Northern High School water system serves the students, faculty, and staff of Northern High School in Garrett County. The water treatment plant and supply well for the system are located within the Northern High School premises adjacent to the baseball field. The Northern High School water system serves a population of 600 with one connection. One well supplies water for this system (Figure 1).

1.1 GROUND-WATER SUPPLY SYSTEM INFORMATION

After reviewing MDE databases, no construction information was found (construction date, total depth, casing depth, or permit number). Well 1 is assumed to have an average yield of 15,000 gallons per day (gpd) based on the population of the system and an average daily usage per person of 25 gpd. The wellhead, with casing extending above the ground surface, was observed to be in good repair with a secure cap. Table 1 contains a summary of the available well construction data.

TABLE 1. WELL INFORMATION

Source ID	Source Name	Permit No.	Total Depth (ft)	Casing Depth (ft)	Aquifer
01	Well 1	--	--	--	Hampshire Formation

According to MDE, the point of contact for this system is Michael Sines of the Garrett County Board of Education. The operator for the Northern High School WATER system is Dave Browning (T-II).

Presently, sodium hypochlorite is used in the system for disinfection.

1.2 HYDROGEOLOGY

Garrett County lies entirely within the Appalachian Plateau physiographic province, and is the westernmost county in Maryland. Pleistocene terraces and recent flood plains found along the larger streams and consolidated sedimentary rocks of the mid-Paleozoic (Devonian, Mississippian, and Pennsylvanian age) dominate the surface and subsurface geology. The Mid-Paleozoic units are folded into broad anticlines and synclines that trend northeast-southwest. The anticlinal structures are underlain by Devonian rocks and contain three distinct gas fields. The synclinal structures form the coal basins of the region are underlain by Pennsylvanian rocks.

The ground water used by Northern High School (Well 1) is from a production well drilled in the Paleozoic (Upper Devonian age) Hampshire Formation. The rocks of Devonian age consist of sandy shale, shale, siltstone, and thin-bedded sandstone. The Devonian rocks in general have a lower percentage of sandy units than the Mississippian and Pennyslvanian rock. The Hampshire formation is a "brown and green sandy shale with shale, thin-bedded sandstone and red beds." This is an important water-bearing unit in the Deer Park and Accident anticlines [Maryland Geological Survey (MGS) 1980].

The source of ground water in Garrett County is from precipitation in the form of rainfall or snowmelt. The availability of ground water in the predominantly sedimentary bedrock depends on the lithology of the rock, the permeability of the substrate, and the presence or absence of secondary openings from fracturing and weathering. The well yields from the Hampshire Formation, from 165 wells, are 1 to 60 gallons per minute (gpm), with an average yield of 8 gpm (MGS 1980).

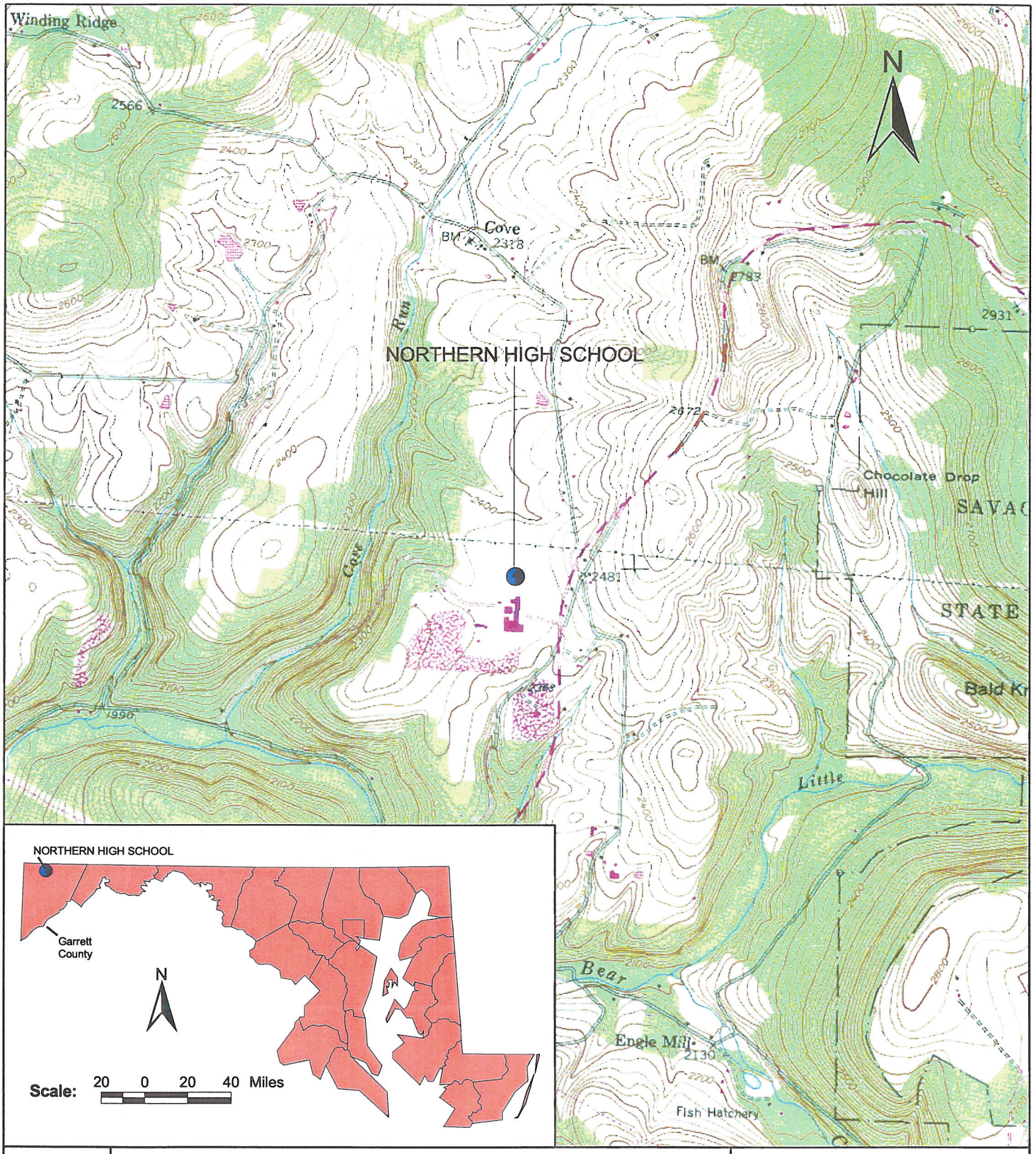


Figure 1. Northern High School Location Map of the Supply Well

Source Water Assessment Program
2003

Legend:

Supply Well

Source: United States Geologic Survey. 1947 (photorevised 1981). *7.5-minute Series Topographic Map for Accident, Maryland-Pennsylvania.*

Scale:

1000 0 1000 2000 Feet

2. DELINEATION OF THE AREA CONTRIBUTING WATER TO SOURCE

For ground-water systems, a wellhead protection area (WHPA) is considered to be the source water protection area (SWPA) for the system. Consistent with the recommended delineation in the Maryland Source Water Assessment Plan (SWAP) (MDE 1999), the watershed drainage area that contributes ground water to the supply wells methodology was used.

This original delineation shape was modified by accounting for surface water bodies, topography, significant land features, and by using a conservative calculation of total ground-water recharge during a drought. For conservative purposes, a drought condition recharge value of 400 gpd per acre (or approximately 5.4 in. per year) was used to estimate the total ground-water contribution area required to supply the well.

For Northern High School, an average withdrawal of 15,000 gpd was assumed. To determine the total ground-water contribution area during a drought, the following equation was used:

Recharge Area (acre) = Average Use (gpd)/Drought Condition Recharge (gpd/acre)

From the equation above, the total ground-water contributing area during a drought is approximately 38 acres. The delineated SWPA is approximately 115 acres (Figure 2), and is therefore adequate to meet the average daily ground-water usage during a drought.

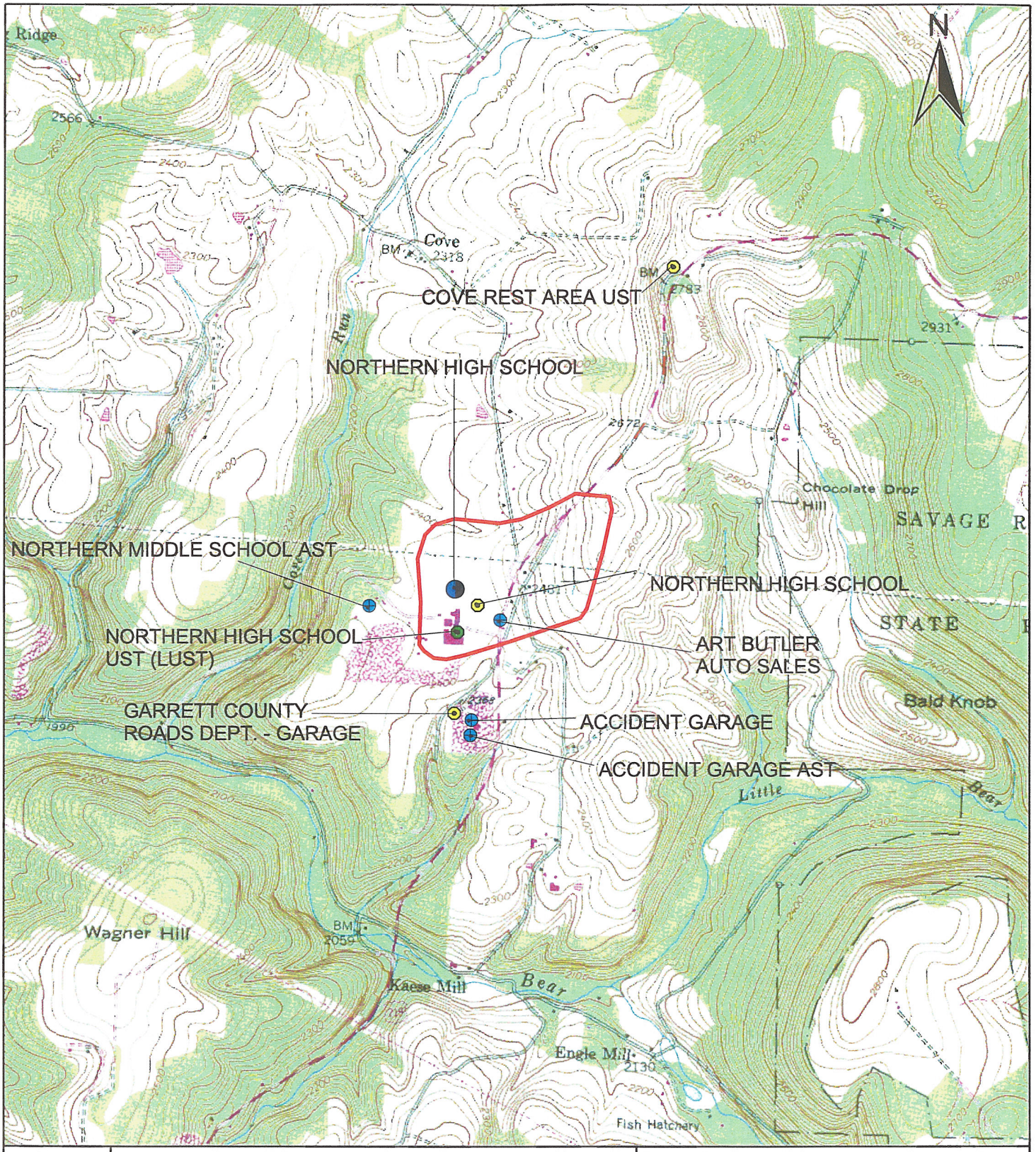


Figure 2. Northern High School Source Water Protection Area Map with Potential Sources of Contamination

Source Water Assessment Program
2003

Legend:
- Supply Well
- SWPA Boundary
- UST
- Miscellaneous
- LUST

Source: United States Geologic Survey. 1947 (photorevised 1981). *7.5-minute Series Topographic Map for Accident, Maryland-Pennsylvania.*

Scale:
1000 0 1000 2000 Feet

3. INVENTORY OF POTENTIAL CONTAMINANTS WITHIN THE DELINEATED AREA

A field survey was performed on 17 December 2002 to confirm potential sources of contamination around the ground-water well that were identified in MDE databases. These databases include the Comprehensive Environmental Response, Compensation, and Liability Act Information System (CERCLIS), which includes National Priorities List (Superfund) sites, Maryland Registered Underground Storage Tank (UST) sites, Maryland Leaking Underground Storage Tank (LUST) sites, landfills, pesticide dealers, ground-water discharge permits, and Controlled Hazardous Substances (CHS) generator sites.

During the field survey, other sources of potential contamination not in the MDE databases were noted and the location was surveyed using a global positioning system (GPS) receiver for mapping purposes (Figure 2).

3.1 POINT SOURCES

Northern High School was identified as having two UST sites. USTs have the potential to release petroleum hydrocarbons into the ground water. A facility classified as a LUST was also listed on MDE's database for LUST sites in Garrett County. However, from a conversation with a representative of the MDE's Waste Management Division-Oil Control Program in Hagerstown, Maryland, the LUST case (94-1398GA) was closed on 19 August 2002. Therefore, it is unlikely that this former LUST site will impact ground-water quality in the SWPA.

Art Butler Auto Sales is approximately 800 ft southeast of the supply well. Improper disposal or accidental releases of fuels, lubricants, and/or solvents from the services garages could impact the ground-water with volatile organic compound (VOC) and synthetic organic compound (SOC) contaminants.

Also, Northern Middle School has an aboveground storage tank (AST) that is approximately 600 ft from the SWPA. The AST contains heating oil for offices adjacent to Northern High School. If the integrity of the AST is compromised, it can release petroleum hydrocarbons into the soil and possibly into the ground water.

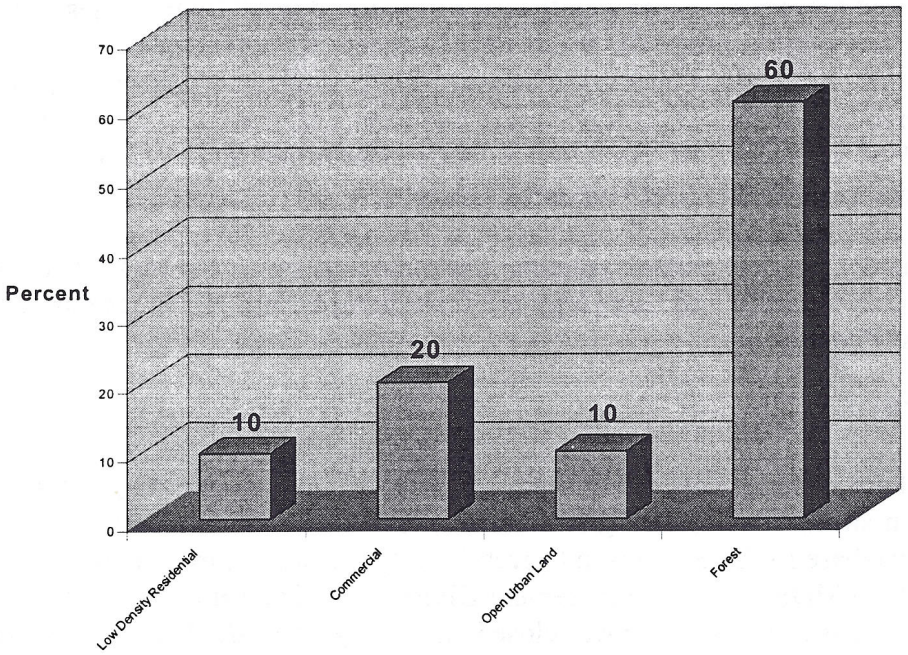
Septic system drain fields are present on-site. Effluent from septic system drain fields contains nitrogen at levels much greater than the drinking water standard. While nitrate-nitrogen compounds are expected to be present in ground water influenced by septic discharge, the soil treatment zone is designed to remove bacterial pathogens before entry into the ground water. Septic system discharge can also contain contaminants that the system is not designed to treat, such as solvents and fuels.

3.2 NON-POINT SOURCES

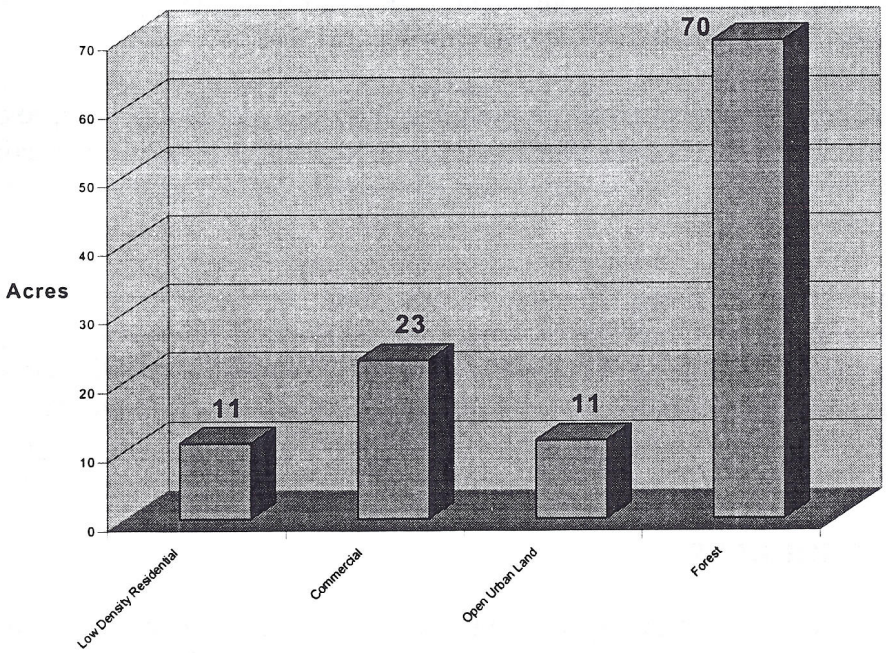
Using the Maryland Office of Planning's 2000 Land Use/Land Cover map for Garrett County, potential non-point sources within the SWPA were also evaluated by land use designation

(Figure 3). A summary of the percent and acreage of each type of land use is presented in the graphs on the following page.

PERCENTAGE OF EACH LAND USE TYPE



ACREAGE OF EACH LAND USE TYPE



From an interpretation of the graphs, forest (69 acres) and commercial (23 acres) account for the majority of the SWPA (115 acres). Commercial land can be a source for nitrates from septic discharge and leakage from unreported USTs or other contaminant releases. Therefore, there is potential for the migration of potential contaminants into the ground water.

Using the 1993 Maryland Office of Planning's Garrett County sewerage coverage, potential non-point sources from other septic system users in the SWPA were assessed (Figure 4). By overlaying the SWPA on the sewerage coverage layer in ArcView GIS, it was determined that 100 percent of the SWPA does not have public sewer service and is not planned for service for at least 10 years.

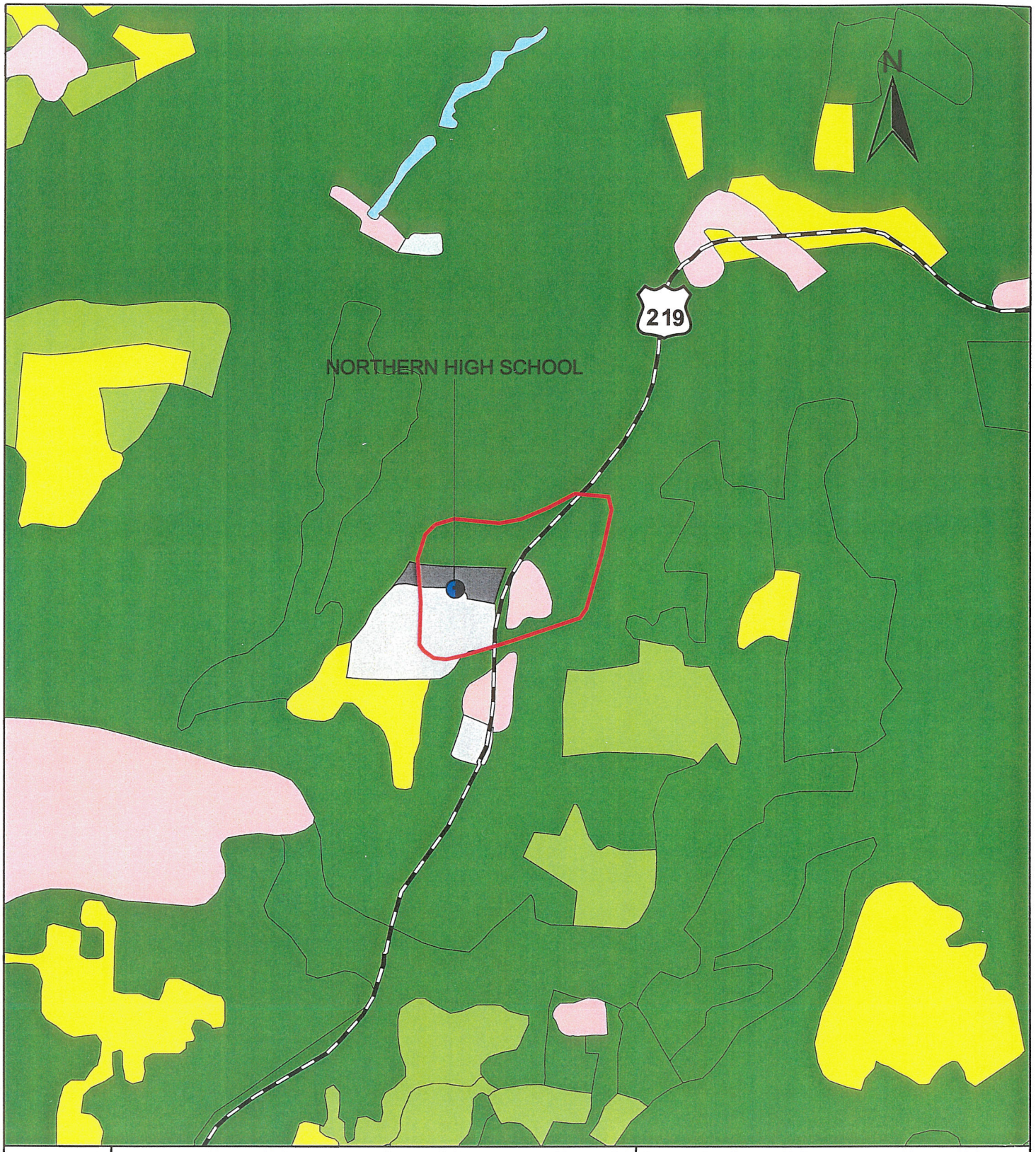


Figure 3. Northern High School Land Use Map of the Source Water Protection Area

Source Water Assessment Program
2003

Scale: 2000 0 2000 Feet

Legend:

- Supply Well
- SWPA Boundary
- Major Roads

Land Use

- Low Density Residential
- Commercial
- Open Urban Land
- Cropland
- Pasture
- Forest
- Wetlands

Source: Maryland Office of Planning, 2000.

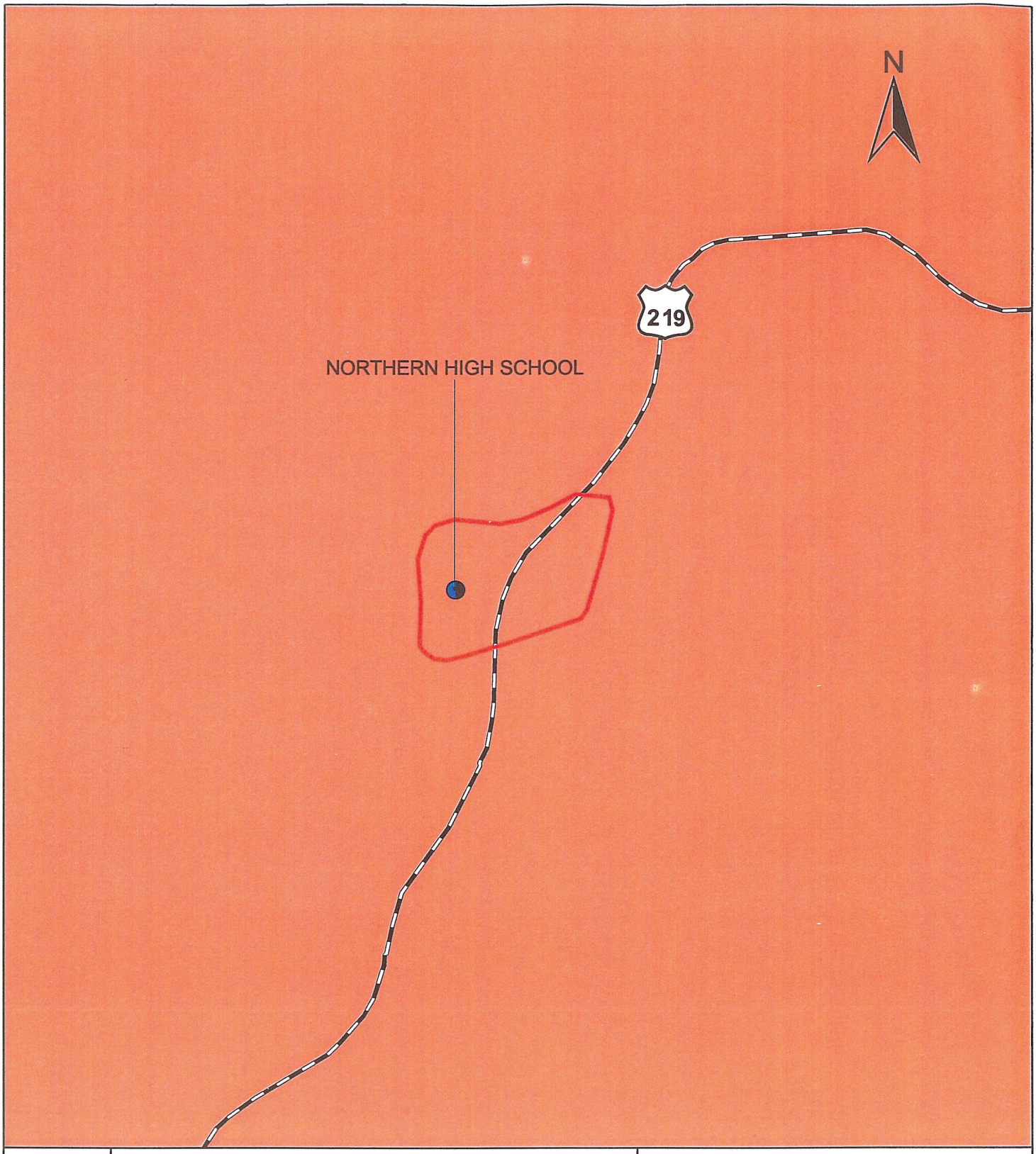


Figure 4. Northern High School Sewer Service Map of the Source Water Protection Area

Source Water Assessment Program
2003

Legend:

- Supply Well
- Major Roads
- SWPA Boundary
- Sewer
- No planned service area

Source: Maryland Office of Planning, 1993.

Scale: 1000 0 1000 2000 Feet

4. REVIEW OF WATER QUALITY DATA

Water quality data were obtained from the MDE Water Supply Program database of Safe Drinking Water Act (SDWA) contaminants. The results reported are for finished (treated) ground water (unless noted).

A review of the water quality data from 1990-2002 has been performed for Northern High School's finished water samples. A summary of ground-water sample analysis results are shown in Appendix A.

Ground-water analytical results were compared to 50 percent of the USEPA Maximum Contaminant Levels (MCLs) or the USEPA Secondary Drinking Water Regulations (SDWR). If no MCL or SDWR was available, the Drinking Water Equivalent Level (DWEL) was substituted as recommended by the USEPA Office of Water.

4.1 GENERAL WATER QUALITY PARAMETERS

No general water quality parameters were reported in the ground-water samples greater than 50 percent of the comparison criteria.

One water sample was reported with a pH of 7.8, which is within the normal range.

4.2 VOLATILE ORGANIC COMPOUNDS

No VOCs were reported in the ground-water samples greater than 50 percent of the comparison criteria.

The disinfection by-products bromodichloromethane and chloroform (commonly known as trihalomethanes) were detected in the water samples at concentrations of 4.2 and 0.6 µg/L in a single sample collected on 27 March 1998. The current MCL for total trihalomethanes is 100 µg/L. The MCL will be lowered to 80 µg/L in January 2004.

4.3 SYNTHETIC ORGANIC COMPOUNDS

Di(2-ethylhexyl)phthalate (7.4 µg/L) was detected in ground-water samples collected on 19 October 1995 at concentrations greater than the USEPA MCL (6 µg/L). A summary of all di(2-ethylhexyl)phthalate concentrations in the ground-water samples collected is shown in Table 2.

TABLE 2. SUMMARY OF DI(2-ETHYLHEXYL)PHTHALATE ANALYSIS

Plant ID	Sample Date	Contaminant	Result	Unit
01	10/19/95	di(2-ethylhexyl)phthalate	**7.4**	µg/L
01	3/4/00	di(2-ethylhexyl)phthalate	**1.1**	µg/L
01	11/29/00	di(2-ethylhexyl)phthalate	**1.2**	µg/L

Note: Shaded values are greater than the MCL.

4.4 INORGANIC COMPOUNDS

The inorganic compound (IOC) nickel (0.013 mg/L) was detected in ground-water samples collected 22 on October 1998 at a concentration that is below the DWEL of 0.7 mg/L. A summary of all nickel concentrations in the ground-water samples collected is presented in Table 3.

TABLE 3. SUMMARY OF NICKEL ANALYSIS

Plant ID	Sample Date	Contaminant	Result	Unit
01	10/19/95	Nickel	--	mg/L
01	10/22/98	Nickel	0.013	mg/L
01	3/9/00	Nickel	--	mg/L

Notes:
-- Non Detect.

Low-level concentrations of nitrate were detected in ground-water samples collected between 8 February 1993 and 16 January 2002, which ranged from 0.4 to 3.9 mg/L. Low levels of nitrite (0.002 mg/L) were detected in ground-water samples collected 19 October 1995. These reported nitrate and nitrite concentrations are lower than the MCL of 10 and 1 mg/L, respectively.

Sodium was detected in ground-water samples collected on 22 October 1998 (8.2 mg/L) and 9 March 2000 (5.69 mg/L) below the USEPA advisory range for sodium (for taste) between 30 and 60 mg/L.

A sulfate concentration of 10.3 mg/L was detected in the ground-water samples collected on 19 October 1995, which is below the SDWR of 250 mg/L.

Low-level concentrations of barium were detected in ground-water samples collected between 19 October 1995 and 9 March 2000. Samples ranged from 0.15 and 0.22 mg/L and are reported lower than the MCL of 2 mg/L.

Additionally, chloride (15 mg/L) was detected in ground-water samples collected on 16 January 2002 below the SDWR of 250 mg/L.

4.5 MICROBIOLOGICAL CONTAMINANTS

No total or fecal coliform has been detected in samples of the waters system's finished water from December 1996 to April 2002.

4.5.1 Ground Water Under the Direct Influence (GWUDI)

Surface water that directly recharges the aquifer through major fractures in rock does not pass through the soil overburden that both filters and contains beneficial microorganisms that break down contaminants. If significant variances in the ground-water results from dry and storm conditions are observed, it is possible that the ground water is under the direct influence of surface water.

To assess the potential of Ground Water Under the Direct Influence (GWUDI) of surface water, ground-water sampling records (during dry and storm conditions) in MDE databases were assessed and information from Public Water Reports was reviewed. One set of raw water wet weather results on May 13, 2003 indicated a total coliform count of 28.5 MPN (most probable number). There was no fecal coliform present in the sample.

4.6 RADIONUCLIDES

No water samples have been submitted for laboratory analysis of radionuclides.

5. SUSCEPTIBILITY ANALYSIS

To evaluate the integrity of the ground-water source, the following criteria were used to conduct the susceptibility analysis:

1. Available water quality data
2. Presence of potential contaminant sources in the SWPA
3. Aquifer characteristics
4. Well integrity
5. Likelihood of change to the natural conditions

The aquifer that supplies the Northern High School drinking water is unconfined. In general, unconfined aquifers are more susceptible to contamination from surface activities than confined aquifers, which are naturally protected by a layer of generally impermeable material such as clay. However, the unconfined aquifers utilized by these systems are overlain by relatively thick soil overburden, which serves as a natural microbiological and chemical filter for contaminants. According to the Soil Survey of Garrett County, Maryland [U.S. Department of Agriculture (USDA) 1974], the soils in Garrett County are generally stoney to silty loams, which both generally have a high organic carbon content. Depending on the physical properties of the contaminant, the depth of the overburden, and the size of the spill, contaminants could partition to the organic carbon in the soil before reaching the ground-water aquifer.

For the Susceptibility Analysis in this report, rankings of "high," "moderate," and "low" susceptibility to contamination were utilized after a review of current information. However, other SWAP reports for the State of Maryland also utilized rankings of "is," "may be," and "is not" susceptible to contamination. For consistency between the ranking systems, the following details their equivalence. The ranking of "highly susceptible" is equivalent to "is susceptible," "moderately susceptible" is equivalent to "may be susceptible," and "low susceptibility" is equivalent to "is not susceptible."

5.1 VOLATILE ORGANIC COMPOUNDS

No VOCs were reported greater than 50 percent of the MCL.

The trihalomethanes reported in the water samples are likely byproducts of the chlorination process to eliminate waterborne bacteria. The reported concentrations were less than the MCL of 100 µg/L and the future planned MCL of 80 µg/L.

The presence of a UST and an automobile service center within the SWPA is a potential source of VOC contamination. Releases at either of these sites to the surface or subsurface soil could impact the bedrock aquifer.

Based on the water quality reviewed and the presence of a UST and an AST within, and immediately adjacent to the SWPA, the water supply for Northern High School is moderately susceptible to VOC contamination.

5.2 SYNTHETIC ORGANIC COMPOUNDS

Di(2-ethylhexyl)phthalate (7.4 µg/L) was detected at a concentration greater than the MCL (6 µg/L) in one water sample from October 1995. The compound was detected in two other samples at concentrations less than the MCL. Di(2-ethylhexyl)phthalate is a common laboratory cross-contaminant found in blank samples and is therefore not present in the ground water.

No other SOC contaminants were detected in water samples collected. SOCs generally do not readily dissolve in water and have a high affinity to sorb to soil particles.

Based on the water quality reviewed and the lack of observed point sources, the water supply for Northern High School has a low susceptibility to SOC contamination.

5.3 INORGANIC COMPOUNDS

Nickel was detected (0.013 mg/L) at a concentration less than the DWEL (0.7 mg/L) in one sample from October 1998. No nickel was reported in the subsequent water sample collected in March 2000. A DWEL is a non-enforceable contaminant level that assumes a lifetime exposure to the analyte will not cause adverse health effects. From the limited data reviews, the reported concentration of nickel is an isolated event and is not likely representative of actual ground-water quality.

One hundred percent of the SPWA is not served by public sanitary sewer systems. Elevated nitrate levels could occur due to the influx of agricultural animal waste, agricultural chemicals or fertilizers, and/or septic system effluent into the drinking water. Septic systems for the school were observed on-site and are a possible source of nitrate in ground water. However, no concentrations of nitrate have been reported greater than 3.9 mg/L. No trends in the reported nitrate concentrations in the water samples have been observed over time.

Sodium, sulfate, and chloride were detected in samples at concentrations that are consistent with the Garrett County general water quality parameters (MGS 1980). All of the compounds were less than the respective SDWR.

Based on the water quality reviewed, and the absence of elevated nitrate concentrations from septic systems, the water supply for Northern High School has a low susceptibility to IOC contamination.

5.4 RADIONUCLIDES

No water samples have been submitted for laboratory analysis of radionuclides to date.

Other samples collected from the Hampshire Formation in Garrett County have been reported with radon-222 concentrations that exceeded the MCL [300 picocuries per liter (pCi/L)] and as high as 2,170 pCi/L. Also, gross beta and gross alpha have been detected at low concentrations in this aquifer.

Based on the lack of data and the potential for the Hampshire Aquifer to contain radon-222 with elevated concentrations, the water supply at Northern High School has a moderate susceptibility to radionuclides.

5.5 MICROBIOLOGICAL CONTAMINANTS

No total or fecal coliforms have been detected in finished water samples from Northern High School.

Raw water GWUDI testing conducted on May 13, 2003 showed levels of total coliform at 28.5 MPN after four consecutive days of rainfall. No fecal coliform was present in this sample.

From documentation reviewed, the date of construction of the single supply well was unavailable. The wellhead was observed to be in good repair.

Based on the recent GWUDI water quality data reviewed, and the absence of well construction data including the completion date, the water supply for Northern High School has a moderate susceptibility to microbiological contamination.

6. RECOMMENDATIONS FOR PROTECTING THE WATER SUPPLY

With the information contained in this report, Northern High School has a basis for better understanding of the risks to its drinking water supply. Being aware of the SWPA, knowing potential contaminant sources, evaluating current and future development, working with agricultural producers and soil conservation agencies, and effective outreach and education are examples of management practices that will help protect the water supply.

Recommendations for the protection of the ground-water supply are intended for the water supplier and its employees. Specific management recommendations for consideration are listed below.

6.1 PROTECTION TEAM

The team should represent all the interests in the community, such as water suppliers, community associations officers, the County Health Department, local planning agencies, local businesses, developers, property owners, and residents within and near the SWPAs. The team should work to reach a consensus on how to protect the water supply.

6.2 PUBLIC AWARENESS AND OUTREACH

The water supplier should consider discussing with property owners and businesses located within the SWPA the activities that could have impacts to the ground water and its quality.

The water supplier should also consider sending pamphlets, flyers, or bill stuffers to its employees to educate them about the SWPA. An example pamphlet, "Gardening in a Wellhead Protection Area," is available from MDE. The employees should also be encouraged to notify the water supplier of any significant spills from gasoline or any other potentially hazardous substances.

The school should take precautions to ensure proper function of the septic system over time. The drain field should be inspected periodically and kept void of vegetation, such as the roots of trees and deep-rooted bushes, which can disrupt function. The disposal of non-sanitary waste into septic systems should not be permitted and employees, students, and other users should be reminded of this by posting signs or circulating pamphlets. Septic systems are not designed to treat substances such as paint, drain cleaners, motor oils, solvents, nail polish, or nail polish remover and could impact the ground-water aquifer with contaminants.

6.3 PLANNING/NEW DEVELOPMENT

The water supplier should also inform the Garrett County Health and Planning Departments of any concerns about future development or zoning changes for properties that are within the SWPA.

The water supplier should be aware of the SWPA limits and evaluate the possible effects to the quality of the ground water prior to building or making any changes.

6.4 MONITORING

The water supplier should continue to monitor the ground water for all SDWA contaminants as required by MDE.

Annual raw water sampling at each well for microbiological contaminants is a good way to check the integrity of each well.

Group 3 (moderate risk source) GWUDI testing is required to be conducted as soon as weather permits to determine if the ground-water quality of the well is affected by surface water runoff.

6.5 CONTINGENCY PLAN

The water supplier should develop a Spill Contingency Plan. Quick and effective spill response in the event of accidental spills or leaks is an important element in the water supplier's SWPP. This plan should identify the procedures and resources to be used to mitigate any discharge of oil or hazardous substances in the SWPA. It should also establish responsibilities, duties, procedures, and resource containment, mitigation, and cleanup of accidental discharges of oil and hazardous substances that may occur within the SWPA. In all cases when spills may present a significant risk of contamination to ground water within the SWPA the local fire department should be notified of the incident.

6.6 CHANGES IN USES

The water supplier is required to inform the Water Supply Program at MDE of any changes to pumping rates and when a change in the number of wells used is anticipated. Any changes to the pumping rate and/or the number of supply wells will affect the size and shape of the SWPA.

6.7 CONTAMINANT SOURCE INVENTORY UPDATES/INSPECTIONS

The water supplier should conduct its own survey of the SWPA to ensure that there are no additional potential sources of contamination.

A regular inspection and maintenance program of the supply well should be considered to prevent a failure in the well's integrity, which could provide a pathway for contaminants to the aquifer.

Any depressions around the wellhead should be filled and graded to prevent surface water ponding that could occur during rain events. This will help to prevent surface water infiltration into the well.

6.8 PURCHASE CONSERVATION EASEMENTS OR PROPERTY

Loans are available for the purchase of property or for the purchase of easements for protection of the water supply. Eligible property must lie within the designated SWPA. Loans are currently offered at zero percent interest and zero points. Please contact the Water Supply Program of MDE for more information.

7. REFERENCES

The following sources of information were consulted as a part of this investigation:

1. United States Department of Agriculture Soil Conservation Service. 1974. Soil Survey of Garrett County, Maryland. Washington, D.C.

2. Maryland Department of the Environment (MDE), Water Supply Program. 1999. *Maryland's Source Water Assessment Plan.* 36 pp.

3. United States Environmental Protection Agency (USEPA). 1999. *Proposed Radon in Drinking Water Rule.* EPA 815-F-99-006. USEPA Office of Water.

4. Maryland Geological Survey (MGS). 1980. *Garrett County Water-Well Records, Chemical-Quality Data, Ground-Water Use, Coal Test-Hole Data and Surface-Water Data.* 102 pp.

SOURCES OF DATA

Water Appropriation and Use Database
Public Water Supply Inspection Reports
Monitoring Reports
MDE Water Supply Program Oracle Database
MDE Waste Management Sites Database
Maryland Office of Planning 2000 Garrett County Land Use Map
Maryland Office of Planning 1993 Garrett County Sewer Service Map
USGS Topographic 7.5-minute Quadrangle Map – 1947 Accident, Maryland Quad

Appendix A

Results of Ground-Water Sample Analysis

RESULTS OF GROUND-WATER SAMPLE ANALYSIS FOR NORTHERN HIGH SCHOOL

Plant ID	Sample Date	Contaminant Name	Result	MCL
Volatile Organic Compounds			µg/L	µg/L
01	12/14/1990	1,1,1,2-TETRACHLOROETHANE	--	
01	1/17/1995	1,1,1,2-TETRACHLOROETHANE	--	
01	4/17/1996	1,1,1,2-TETRACHLOROETHANE	--	
01	2/11/1997	1,1,1,2-TETRACHLOROETHANE	--	
01	3/27/1998	1,1,1,2-TETRACHLOROETHANE	--	
01	3/9/2000	1,1,1,2-TETRACHLOROETHANE	--	
01	12/14/1990	1,1,1-TRICHLOROETHANE	--	
01	1/17/1995	1,1,1-TRICHLOROETHANE	--	
01	4/17/1996	1,1,1-TRICHLOROETHANE	--	
01	2/11/1997	1,1,1-TRICHLOROETHANE	--	
01	3/27/1998	1,1,1-TRICHLOROETHANE	--	
01	3/9/2000	1,1,1-TRICHLOROETHANE	--	
01	1/17/1995	1,1,2,2-TETRACHLOROETHANE	--	
01	4/17/1996	1,1,2,2-TETRACHLOROETHANE	--	
01	2/11/1997	1,1,2,2-TETRACHLOROETHANE	--	
01	3/27/1998	1,1,2,2-TETRACHLOROETHANE	--	
01	3/9/2000	1,1,2,2-TETRACHLOROETHANE	--	
01	12/14/1990	1,1,2-TRICHLOROETHANE	--	
01	1/17/1995	1,1,2-TRICHLOROETHANE	--	
01	4/17/1996	1,1,2-TRICHLOROETHANE	--	
01	2/11/1997	1,1,2-TRICHLOROETHANE	--	
01	3/27/1998	1,1,2-TRICHLOROETHANE	--	
01	3/9/2000	1,1,2-TRICHLOROETHANE	--	
01	12/14/1990	1,1-DICHLOROETHANE	--	
01	1/17/1995	1,1-DICHLOROETHANE	--	
01	4/17/1996	1,1-DICHLOROETHANE	--	
01	2/11/1997	1,1-DICHLOROETHANE	--	
01	3/27/1998	1,1-DICHLOROETHANE	--	
01	3/9/2000	1,1-DICHLOROETHANE	--	
01	12/14/1990	1,1-DICHLOROETHYLENE	--	
01	1/17/1995	1,1-DICHLOROETHYLENE	--	
01	4/17/1996	1,1-DICHLOROETHYLENE	--	
01	2/11/1997	1,1-DICHLOROETHYLENE	--	
01	3/27/1998	1,1-DICHLOROETHYLENE	--	
01	3/9/2000	1,1-DICHLOROETHYLENE	--	
01	1/17/1995	1,1-DICHLOROPROPENE	--	
01	4/17/1996	1,1-DICHLOROPROPENE	--	
01	2/11/1997	1,1-DICHLOROPROPENE	--	
01	3/27/1998	1,1-DICHLOROPROPENE	--	
01	3/9/2000	1,1-DICHLOROPROPENE	--	
01	1/17/1995	1,2,3-TRICHLOROBENZENE	--	
01	4/17/1996	1,2,3-TRICHLOROBENZENE	--	
01	2/11/1997	1,2,3-TRICHLOROBENZENE	--	
01	3/27/1998	1,2,3-TRICHLOROBENZENE	--	
01	3/9/2000	1,2,3-TRICHLOROBENZENE	--	
01	1/17/1995	1,2,3-TRICHLOROPROPANE	--	
01	4/17/1996	1,2,3-TRICHLOROPROPANE	--	

--=Not Detected
*=Secondary Drinking Water Regulation
^=Drinking Water Equivalence Level
+=Drinking Water Advisory Level
#=Total Trihalomethane

RESULTS OF GROUND-WATER SAMPLE ANALYSIS FOR NORTHERN HIGH SCHOOL

Plant ID	Sample Date	Contaminant Name	Result	MCL
Volatile Organic Compounds			µg/L	µg/L
01	2/11/1997	1,2,3-TRICHLOROPROPANE	--	
01	3/27/1998	1,2,3-TRICHLOROPROPANE	--	
01	3/9/2000	1,2,3-TRICHLOROPROPANE	--	
01	1/17/1995	1,2,4-TRICHLOROBENZENE	--	
01	4/17/1996	1,2,4-TRICHLOROBENZENE	--	
01	2/11/1997	1,2,4-TRICHLOROBENZENE	--	
01	3/27/1998	1,2,4-TRICHLOROBENZENE	--	
01	3/9/2000	1,2,4-TRICHLOROBENZENE	--	
01	1/17/1995	1,2,4-TRIMETHYLBENZENE	--	
01	4/17/1996	1,2,4-TRIMETHYLBENZENE	--	
01	2/11/1997	1,2,4-TRIMETHYLBENZENE	--	
01	3/27/1998	1,2,4-TRIMETHYLBENZENE	--	
01	3/9/2000	1,2,4-TRIMETHYLBENZENE	--	
01	12/14/1990	1,2-DICHLOROETHANE	--	
01	1/17/1995	1,2-DICHLOROETHANE	--	
01	4/17/1996	1,2-DICHLOROETHANE	--	
01	2/11/1997	1,2-DICHLOROETHANE	--	
01	3/27/1998	1,2-DICHLOROETHANE	--	
01	3/9/2000	1,2-DICHLOROETHANE	--	
01	12/14/1990	1,2-DICHLOROPROPANE	--	
01	1/17/1995	1,2-DICHLOROPROPANE	--	
01	4/17/1996	1,2-DICHLOROPROPANE	--	
01	2/11/1997	1,2-DICHLOROPROPANE	--	
01	3/27/1998	1,2-DICHLOROPROPANE	--	
01	3/9/2000	1,2-DICHLOROPROPANE	--	
01	1/17/1995	1,3,5-TRIMETHYLBENZENE	--	
01	4/17/1996	1,3,5-TRIMETHYLBENZENE	--	
01	2/11/1997	1,3,5-TRIMETHYLBENZENE	--	
01	3/27/1998	1,3,5-TRIMETHYLBENZENE	--	
01	3/9/2000	1,3,5-TRIMETHYLBENZENE	--	
01	1/17/1995	1,3-DICHLOROPROPANE	--	
01	4/17/1996	1,3-DICHLOROPROPANE	--	
01	2/11/1997	1,3-DICHLOROPROPANE	--	
01	3/27/1998	1,3-DICHLOROPROPANE	--	
01	3/9/2000	1,3-DICHLOROPROPANE	--	
01	12/14/1990	1,3-DICHLOROPROPENE	--	
01	1/17/1995	1,3-DICHLOROPROPENE	--	
01	4/17/1996	1,3-DICHLOROPROPENE	--	
01	2/11/1997	1,3-DICHLOROPROPENE	--	
01	3/27/1998	1,3-DICHLOROPROPENE	--	
01	3/9/2000	1,3-DICHLOROPROPENE	--	
01	1/17/1995	2,2-DICHLOROPROPANE	--	
01	4/17/1996	2,2-DICHLOROPROPANE	--	
01	2/11/1997	2,2-DICHLOROPROPANE	--	
01	3/27/1998	2,2-DICHLOROPROPANE	--	
01	3/9/2000	2,2-DICHLOROPROPANE	--	
01	12/14/1990	BENZENE	--	

--=Not Detected
*=Secondary Drinking Water Regulation
^=Drinking Water Equivalence Level
+=Drinking Water Advisory Level
#=Total Trihalomethane

RESULTS OF GROUND-WATER SAMPLE ANALYSIS FOR NORTHERN HIGH SCHOOL

Plant ID	Sample Date	Contaminant Name	Result	MCL
Volatile Organic Compounds			µg/L	µg/L
01	1/17/1995	BENZENE	--	
01	4/17/1996	BENZENE	--	
01	2/11/1997	BENZENE	--	
01	3/27/1998	BENZENE	--	
01	3/9/2000	BENZENE	--	
01	1/17/1995	BROMOBENZENE	--	
01	4/17/1996	BROMOBENZENE	--	
01	2/11/1997	BROMOBENZENE	--	
01	3/27/1998	BROMOBENZENE	--	
01	3/9/2000	BROMOBENZENE	--	
01	1/17/1995	BROMOCHLOROMETHANE	--	
01	4/17/1996	BROMOCHLOROMETHANE	--	
01	2/11/1997	BROMOCHLOROMETHANE	--	
01	3/27/1998	BROMOCHLOROMETHANE	--	
01	3/9/2000	BROMOCHLOROMETHANE	--	
01	12/14/1990	BROMODICHLOROMETHANE	--	
01	4/17/1996	BROMODICHLOROMETHANE	--	
01	2/11/1997	BROMODICHLOROMETHANE	--	
01	3/27/1998	BROMODICHLOROMETHANE	4.2	100 #
01	3/9/2000	BROMODICHLOROMETHANE	--	
01	12/14/1990	BROMOFORM	--	
01	4/17/1996	BROMOFORM	--	
01	2/11/1997	BROMOFORM	--	
01	3/27/1998	BROMOFORM	--	
01	3/9/2000	BROMOFORM	--	
01	12/14/1990	BROMOMETHANE	--	
01	1/17/1995	BROMOMETHANE	--	
01	4/17/1996	BROMOMETHANE	--	
01	2/11/1997	BROMOMETHANE	--	
01	3/27/1998	BROMOMETHANE	--	
01	3/9/2000	BROMOMETHANE	--	
01	12/14/1990	CARBON TETRACHLORIDE	--	
01	1/17/1995	CARBON TETRACHLORIDE	--	
01	4/17/1996	CARBON TETRACHLORIDE	--	
01	2/11/1997	CARBON TETRACHLORIDE	--	
01	3/27/1998	CARBON TETRACHLORIDE	--	
01	3/9/2000	CARBON TETRACHLORIDE	--	
01	12/14/1990	CHLOROETHANE	--	
01	1/17/1995	CHLOROETHANE	--	
01	4/17/1996	CHLOROETHANE	--	
01	2/11/1997	CHLOROETHANE	--	
01	3/27/1998	CHLOROETHANE	--	
01	3/9/2000	CHLOROETHANE	--	
01	12/14/1990	CHLOROFORM	--	
01	4/17/1996	CHLOROFORM	--	
01	2/11/1997	CHLOROFORM	--	
01	3/27/1998	CHLOROFORM	0.6	100 #

--=Not Detected
*=Secondary Drinking Water Regulation
^=Drinking Water Equivalence Level
+=Drinking Water Advisory Level
#=Total Trihalomethane

RESULTS OF GROUND-WATER SAMPLE ANALYSIS FOR NORTHERN HIGH SCHOOL

Plant ID	Sample Date	Contaminant Name	Result	MCL
Volatile Organic Compounds			µg/L	µg/L
01	3/9/2000	CHLOROFORM	--	
01	12/14/1990	CHLOROMETHANE	--	
01	1/17/1995	CHLOROMETHANE	--	
01	4/17/1996	CHLOROMETHANE	--	
01	2/11/1997	CHLOROMETHANE	--	
01	3/27/1998	CHLOROMETHANE	--	
01	3/9/2000	CHLOROMETHANE	--	
01	12/14/1990	cis-1,2-DICHLOROETHYLENE	--	
01	1/17/1995	cis-1,2-DICHLOROETHYLENE	--	
01	4/17/1996	cis-1,2-DICHLOROETHYLENE	--	
01	2/11/1997	cis-1,2-DICHLOROETHYLENE	--	
01	3/27/1998	cis-1,2-DICHLOROETHYLENE	--	
01	3/9/2000	cis-1,2-DICHLOROETHYLENE	--	
01	12/14/1990	DIBROMOCHLOROMETHANE	--	
01	4/17/1996	DIBROMOCHLOROMETHANE	--	
01	2/11/1997	DIBROMOCHLOROMETHANE	--	
01	3/27/1998	DIBROMOCHLOROMETHANE	--	
01	3/9/2000	DIBROMOCHLOROMETHANE	--	
01	1/17/1995	DIBROMOMETHANE	--	
01	4/17/1996	DIBROMOMETHANE	--	
01	2/11/1997	DIBROMOMETHANE	--	
01	3/27/1998	DIBROMOMETHANE	--	
01	3/9/2000	DIBROMOMETHANE	--	
01	12/14/1990	DICHLORODIFLUOROMETHANE	--	
01	1/17/1995	DICHLORODIFLUOROMETHANE	--	
01	4/17/1996	DICHLORODIFLUOROMETHANE	--	
01	2/11/1997	DICHLORODIFLUOROMETHANE	--	
01	3/27/1998	DICHLORODIFLUOROMETHANE	--	
01	3/9/2000	DICHLORODIFLUOROMETHANE	--	
01	12/14/1990	ETHYLBENZENE	--	
01	1/17/1995	ETHYLBENZENE	--	
01	4/17/1996	ETHYLBENZENE	--	
01	2/11/1997	ETHYLBENZENE	--	
01	3/27/1998	ETHYLBENZENE	--	
01	3/9/2000	ETHYLBENZENE	--	
01	1/17/1995	HEXACHLOROBUTADIENE	--	
01	4/17/1996	HEXACHLOROBUTADIENE	--	
01	2/11/1997	HEXACHLOROBUTADIENE	--	
01	3/27/1998	HEXACHLOROBUTADIENE	--	
01	3/9/2000	HEXACHLOROBUTADIENE	--	
01	1/17/1995	ISOPROPYLBENZENE	--	
01	4/17/1996	ISOPROPYLBENZENE	--	
01	2/11/1997	ISOPROPYLBENZENE	--	
01	3/27/1998	ISOPROPYLBENZENE	--	
01	3/9/2000	ISOPROPYLBENZENE	--	
01	12/14/1990	m-DICHLOROBENZENE	--	
01	1/17/1995	m-DICHLOROBENZENE	--	

--=Not Detected
*=Secondary Drinking Water Regulation
^=Drinking Water Equivalence Level
+=Drinking Water Advisory Level
#=Total Trihalomethane

RESULTS OF GROUND-WATER SAMPLE ANALYSIS FOR NORTHERN HIGH SCHOOL

Plant ID	Sample Date	Contaminant Name	Result	MCL
Volatile Organic Compounds			µg/L	µg/L
01	4/17/1996	m-DICHLOROBENZENE	--	
01	2/11/1997	m-DICHLOROBENZENE	--	
01	3/27/1998	m-DICHLOROBENZENE	--	
01	3/9/2000	m-DICHLOROBENZENE	--	
01	12/14/1990	METHYLENE CHLORIDE	--	
01	1/17/1995	METHYLENE CHLORIDE	--	
01	4/17/1996	METHYLENE CHLORIDE	--	
01	2/11/1997	METHYLENE CHLORIDE	--	
01	3/27/1998	METHYLENE CHLORIDE	--	
01	3/9/2000	METHYLENE CHLORIDE	--	
01	1/17/1995	METHYL-TERT-BUTYL-ETHER	--	
01	1/17/1995	METHYL-TERT-BUTYL-ETHER	--	
01	4/17/1996	METHYL-TERT-BUTYL-ETHER	--	
01	4/17/1996	METHYL-TERT-BUTYL-ETHER	--	
01	2/11/1997	METHYL-TERT-BUTYL-ETHER	--	
01	2/11/1997	METHYL-TERT-BUTYL-ETHER	--	
01	3/27/1998	METHYL-TERT-BUTYL-ETHER	--	
01	3/27/1998	METHYL-TERT-BUTYL-ETHER	--	
01	3/9/2000	METHYL-TERT-BUTYL-ETHER	--	
01	3/9/2000	METHYL-TERT-BUTYL-ETHER	--	
01	12/14/1990	MONOCHLOROBENZENE	--	
01	1/17/1995	MONOCHLOROBENZENE	--	
01	4/17/1996	MONOCHLOROBENZENE	--	
01	2/11/1997	MONOCHLOROBENZENE	--	
01	3/27/1998	MONOCHLOROBENZENE	--	
01	3/9/2000	MONOCHLOROBENZENE	--	
01	1/17/1995	m-XYLENE	--	
01	4/17/1996	m-XYLENE	--	
01	2/11/1997	m-XYLENE	--	
01	3/27/1998	m-XYLENE	--	
01	3/9/2000	m-XYLENE	--	
01	1/17/1995	NAPHTHALENE	--	
01	4/17/1996	NAPHTHALENE	--	
01	2/11/1997	NAPHTHALENE	--	
01	3/27/1998	NAPHTHALENE	--	
01	3/9/2000	NAPHTHALENE	--	
01	1/17/1995	N-BUTYLBENZENE	--	
01	4/17/1996	N-BUTYLBENZENE	--	
01	2/11/1997	N-BUTYLBENZENE	--	
01	3/27/1998	N-BUTYLBENZENE	--	
01	3/9/2000	N-BUTYLBENZENE	--	
01	1/17/1995	n-PROPYLBENZENE	--	
01	4/17/1996	n-PROPYLBENZENE	--	
01	2/11/1997	n-PROPYLBENZENE	--	
01	3/27/1998	n-PROPYLBENZENE	--	
01	3/9/2000	n-PROPYLBENZENE	--	
01	1/17/1995	o-CHLOROTOLUENE	--	

--=Not Detected
*=Secondary Drinking Water Regulation
^=Drinking Water Equivalence Level
+=Drinking Water Advisory Level
#=Total Trihalomethane

RESULTS OF GROUND-WATER SAMPLE ANALYSIS FOR NORTHERN HIGH SCHOOL

Plant ID	Sample Date	Contaminant Name	Result	MCL
Volatile Organic Compounds			µg/L	µg/L
01	4/17/1996	o-CHLOROTOLUENE	--	
01	2/11/1997	o-CHLOROTOLUENE	--	
01	3/27/1998	o-CHLOROTOLUENE	--	
01	3/9/2000	o-CHLOROTOLUENE	--	
01	12/14/1990	o-DICHLOROBENZENE	--	
01	1/17/1995	o-DICHLOROBENZENE	--	
01	4/17/1996	o-DICHLOROBENZENE	--	
01	2/11/1997	o-DICHLOROBENZENE	--	
01	3/27/1998	o-DICHLOROBENZENE	--	
01	3/9/2000	o-DICHLOROBENZENE	--	
01	1/17/1995	o-XYLENE	--	
01	4/17/1996	o-XYLENE	--	
01	2/11/1997	o-XYLENE	--	
01	3/27/1998	o-XYLENE	--	
01	3/9/2000	o-XYLENE	--	
01	1/17/1995	p-CHLOROTOLUENE	--	
01	4/17/1996	p-CHLOROTOLUENE	--	
01	2/11/1997	p-CHLOROTOLUENE	--	
01	3/27/1998	p-CHLOROTOLUENE	--	
01	3/9/2000	p-CHLOROTOLUENE	--	
01	12/14/1990	p-DICHLOROBENZENE	--	
01	1/17/1995	p-DICHLOROBENZENE	--	
01	4/17/1996	p-DICHLOROBENZENE	--	
01	2/11/1997	p-DICHLOROBENZENE	--	
01	3/27/1998	p-DICHLOROBENZENE	--	
01	3/9/2000	p-DICHLOROBENZENE	--	
01	1/17/1995	P-ISOPROPYLTOLUENE	--	
01	4/17/1996	P-ISOPROPYLTOLUENE	--	
01	2/11/1997	P-ISOPROPYLTOLUENE	--	
01	3/27/1998	P-ISOPROPYLTOLUENE	--	
01	3/9/2000	P-ISOPROPYLTOLUENE	--	
01	1/17/1995	p-XYLENE	--	
01	4/17/1996	p-XYLENE	--	
01	2/11/1997	p-XYLENE	--	
01	3/27/1998	p-XYLENE	--	
01	3/9/2000	p-XYLENE	--	
01	1/17/1995	SEC-BUTYLBENZENE	--	
01	4/17/1996	SEC-BUTYLBENZENE	--	
01	2/11/1997	SEC-BUTYLBENZENE	--	
01	3/27/1998	SEC-BUTYLBENZENE	--	
01	3/9/2000	SEC-BUTYLBENZENE	--	
01	12/14/1990	STYRENE	--	
01	1/17/1995	STYRENE	--	
01	4/17/1996	STYRENE	--	
01	2/11/1997	STYRENE	--	
01	3/27/1998	STYRENE	--	
01	3/9/2000	STYRENE	--	

--=Not Detected
*=Secondary Drinking Water Regulation
^=Drinking Water Equivalence Level
+=Drinking Water Advisory Level
#=Total Trihalomethane

RESULTS OF GROUND-WATER SAMPLE ANALYSIS FOR NORTHERN HIGH SCHOOL

Plant ID	Sample Date	Contaminant Name	Result	MCL
Volatile Organic Compounds			µg/L	µg/L
01	1/17/1995	TERT-BUTYLBENZENE	--	
01	4/17/1996	TERT-BUTYLBENZENE	--	
01	2/11/1997	TERT-BUTYLBENZENE	--	
01	3/27/1998	TERT-BUTYLBENZENE	--	
01	3/9/2000	TERT-BUTYLBENZENE	--	
01	12/14/1990	TETRACHLOROETHYLENE	--	
01	1/17/1995	TETRACHLOROETHYLENE	--	
01	4/17/1996	TETRACHLOROETHYLENE	--	
01	2/11/1997	TETRACHLOROETHYLENE	--	
01	3/27/1998	TETRACHLOROETHYLENE	--	
01	3/9/2000	TETRACHLOROETHYLENE	--	
01	12/14/1990	TOLUENE	--	
01	1/17/1995	TOLUENE	--	
01	4/17/1996	TOLUENE	--	
01	2/11/1997	TOLUENE	--	
01	3/27/1998	TOLUENE	--	
01	3/9/2000	TOLUENE	--	
01	12/14/1990	trans-1,2-DICHLOROETHYLENE	--	
01	1/17/1995	trans-1,2-DICHLOROETHYLENE	--	
01	4/17/1996	trans-1,2-DICHLOROETHYLENE	--	
01	2/11/1997	trans-1,2-DICHLOROETHYLENE	--	
01	3/27/1998	trans-1,2-DICHLOROETHYLENE	--	
01	3/9/2000	trans-1,2-DICHLOROETHYLENE	--	
01	12/14/1990	TRICHLOROETHYLENE	--	
01	1/17/1995	TRICHLOROETHYLENE	--	
01	4/17/1996	TRICHLOROETHYLENE	--	
01	2/11/1997	TRICHLOROETHYLENE	--	
01	3/27/1998	TRICHLOROETHYLENE	--	
01	3/9/2000	TRICHLOROETHYLENE	--	
01	12/14/1990	TRICHLOROFLUOROMETHANE	--	
01	1/17/1995	TRICHLOROFLUOROMETHANE	--	
01	4/17/1996	TRICHLOROFLUOROMETHANE	--	
01	2/11/1997	TRICHLOROFLUOROMETHANE	--	
01	3/27/1998	TRICHLOROFLUOROMETHANE	--	
01	3/9/2000	TRICHLOROFLUOROMETHANE	--	
01	12/14/1990	VINYL CHLORIDE	--	
01	1/17/1995	VINYL CHLORIDE	--	
01	4/17/1996	VINYL CHLORIDE	--	
01	2/11/1997	VINYL CHLORIDE	--	
01	3/27/1998	VINYL CHLORIDE	--	
01	3/9/2000	VINYL CHLORIDE	--	
01	12/14/1990	XYLENES, TOTAL	--	
01	1/17/1995	XYLENES, TOTAL	--	
01	4/17/1996	XYLENES, TOTAL	--	
01	2/11/1997	XYLENES, TOTAL	--	
01	3/27/1998	XYLENES, TOTAL	--	
01	3/9/2000	XYLENES, TOTAL	--	

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RESULTS OF GROUND-WATER SAMPLE ANALYSIS FOR NORTHERN HIGH SCHOOL

Plant ID	Sample Date	Contaminant Name	Result	MCL
Synthetic Organic Compounds			µg/L	µg/L
01	1/17/1995	1,2-DIBROMO-3-CHLOROPROPANE	--	
01	10/19/1995	1,2-DIBROMO-3-CHLOROPROPANE	--	
01	4/17/1996	1,2-DIBROMO-3-CHLOROPROPANE	--	
01	2/11/1997	1,2-DIBROMO-3-CHLOROPROPANE	--	
01	3/27/1998	1,2-DIBROMO-3-CHLOROPROPANE	--	
01	3/4/2000	1,2-DIBROMO-3-CHLOROPROPANE	--	
01	10/19/1995	2,4,5-T	--	
01	3/4/2000	2,4,5-T	--	
01	10/19/1995	2,4,5-TP (SILVEX)	--	
01	3/4/2000	2,4,5-TP (SILVEX)	--	
01	10/19/1995	2,4-D	--	
01	3/4/2000	2,4-D	--	
01	3/4/2000	3-HYDROXYCARBOFURAN	--	
01	10/19/1995	ALACHLOR (LASSO)	--	
01	3/4/2000	ALACHLOR (LASSO)	--	
01	11/29/2000	ALACHLOR (LASSO)	--	
01	3/4/2000	ALDICARB	--	
01	3/4/2000	ALDICARB SULFONE	--	
01	3/4/2000	ALDICARB SULFOXIDE	--	
01	10/19/1995	ALDRIN	--	
01	3/4/2000	ALDRIN	--	
01	11/29/2000	ALDRIN	--	
01	10/19/1995	ATRAZINE	--	
01	3/4/2000	ATRAZINE	--	
01	11/29/2000	ATRAZINE	--	
01	10/19/1995	BENZO(a)PYRENE	--	
01	3/4/2000	BENZO(a)PYRENE	--	
01	11/29/2000	BENZO(a)PYRENE	--	
01	10/19/1995	BHC-GAMMA(LINDANE)	--	
01	3/4/2000	BHC-GAMMA(LINDANE)	--	
01	11/29/2000	BHC-GAMMA(LINDANE)	--	
01	10/19/1995	BUTACHLOR (MACHETE)	--	
01	3/4/2000	BUTACHLOR (MACHETE)	--	
01	11/29/2000	BUTACHLOR (MACHETE)	--	
01	3/4/2000	CARBARYL	--	
01	3/4/2000	CARBOFURAN	--	
01	10/19/1995	CHLORDANE	--	
01	3/4/2000	CHLORDANE	--	
01	11/29/2000	CHLORDANE	--	
01	10/19/1995	DALAPON	--	
01	3/4/2000	DALAPON	--	
01	10/19/1995	DECACHLOROBIPHENYL	--	
01	10/19/1995	DI(2-ETHYLHEXYL) ADIPATE	--	
01	3/4/2000	DI(2-ETHYLHEXYL) ADIPATE	--	
01	11/29/2000	DI(2-ETHYLHEXYL) ADIPATE	--	
01	10/19/1995	DI(2-ETHYLHEXYL) PHTHALATE	7.4	6
01	3/4/2000	DI(2-ETHYLHEXYL) PHTHALATE	1.1	6

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RESULTS OF GROUND-WATER SAMPLE ANALYSIS FOR NORTHERN HIGH SCHOOL

Plant ID	Sample Date	Contaminant Name	Result	MCL
Synthetic Organic Compounds			µg/L	µg/L
01	11/29/2000	DI(2-ETHYLHEXYL) PHTHALATE	1.2	6
01	10/19/1995	DIAZINON (SPECTRACIDE)	--	
01	10/19/1995	DICAMBA	--	
01	3/4/2000	DICAMBA	--	
01	10/19/1995	DIELDRIN	--	
01	3/4/2000	DIELDRIN	--	
01	11/29/2000	DIELDRIN	--	
01	10/19/1995	DINOSEB	--	
01	3/4/2000	DINOSEB	--	
01	10/19/1995	DURSBAN	--	
01	10/19/1995	ENDRIN	--	
01	3/4/2000	ENDRIN	--	
01	11/29/2000	ENDRIN	--	
01	1/17/1995	ETHYLENE DIBROMIDE (EDB)	--	
01	10/19/1995	ETHYLENE DIBROMIDE (EDB)	--	
01	4/17/1996	ETHYLENE DIBROMIDE (EDB)	--	
01	2/11/1997	ETHYLENE DIBROMIDE (EDB)	--	
01	3/27/1998	ETHYLENE DIBROMIDE (EDB)	--	
01	3/4/2000	ETHYLENE DIBROMIDE (EDB)	--	
01	10/19/1995	HEPTACHLOR	--	
01	3/4/2000	HEPTACHLOR	--	
01	11/29/2000	HEPTACHLOR	--	
01	10/19/1995	HEPTACHLOR EPOXIDE	--	
01	3/4/2000	HEPTACHLOR EPOXIDE	--	
01	11/29/2000	HEPTACHLOR EPOXIDE	--	
01	10/19/1995	HEXACHLOROBENZENE (HCB)	--	
01	3/4/2000	HEXACHLOROBENZENE (HCB)	--	
01	11/29/2000	HEXACHLOROBENZENE (HCB)	--	
01	10/19/1995	HEXACHLOROCYCLOPENTADIENE	--	
01	3/4/2000	HEXACHLOROCYCLOPENTADIENE	--	
01	11/29/2000	HEXACHLOROCYCLOPENTADIENE	--	
01	3/4/2000	METHOMYL	--	
01	10/19/1995	METHOXYCHLOR	--	
01	3/4/2000	METHOXYCHLOR	--	
01	11/29/2000	METHOXYCHLOR	--	
01	10/19/1995	METOLACHLOR	--	
01	3/4/2000	METOLACHLOR	--	
01	11/29/2000	METOLACHLOR	--	
01	10/19/1995	METRIBUZIN (SENCOR)	--	
01	3/4/2000	METRIBUZIN (SENCOR)	--	
01	11/29/2000	METRIBUZIN (SENCOR)	--	
01	3/4/2000	OXAMYL (VYDATE)	--	
01	10/19/1995	PENTACHLOROPHENOL	--	
01	3/4/2000	PENTACHLOROPHENOL	--	
01	10/19/1995	PICLORAM	--	
01	3/4/2000	PICLORAM	--	
01	10/19/1995	PROPACHLOR (RAMROD)	--	

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RESULTS OF GROUND-WATER SAMPLE ANALYSIS FOR NORTHERN HIGH SCHOOL

Plant ID	Sample Date	Contaminant Name	Result	MCL
Synthetic Organic Compounds			µg/L	µg/L
01	3/4/2000	PROPACHLOR (RAMROD)	--	
01	11/29/2000	PROPACHLOR (RAMROD)	--	
01	10/19/1995	SIMAZINE	--	
01	3/4/2000	SIMAZINE	--	
01	11/29/2000	SIMAZINE	--	
01	10/19/1995	TOXAPHENE	--	
Inorganic Compounds			mg/L	mg/L
01	10/19/1995	ANTIMONY	--	
01	10/22/1998	ANTIMONY	--	
01	3/9/2000	ANTIMONY	--	
01	10/19/1995	ARSENIC	--	
01	10/22/1998	ARSENIC	--	
01	3/9/2000	ARSENIC	--	
01	2/9/1993	BARIUM	--	
01	10/19/1995	BARIUM	0.22	2
01	10/22/1998	BARIUM	0.17	2
01	3/9/2000	BARIUM	0.15	2
01	10/19/1995	BERYLLIUM	--	
01	10/22/1998	BERYLLIUM	--	
01	3/9/2000	BERYLLIUM	--	
01	2/9/1993	CADMIUM	--	
01	10/19/1995	CADMIUM	--	
01	10/22/1998	CADMIUM	--	
01	3/9/2000	CADMIUM	--	
01	1/16/2002	CHLORIDE	15	250*
01	2/9/1993	CHROMIUM	--	
01	10/19/1995	CHROMIUM	--	
01	10/22/1998	CHROMIUM	--	
01	3/9/2000	CHROMIUM	--	
01	2/9/1993	MERCURY	--	
01	10/19/1995	MERCURY	--	
01	10/22/1998	MERCURY	--	
01	3/9/2000	MERCURY	--	
01	10/19/1995	NICKEL	--	
01	10/22/1998	NICKEL	0.013	0.7 ^
01	3/9/2000	NICKEL	--	
01	2/8/1993	NITRATE	0.89	10
01	12/19/1994	NITRATE	2	10
01	5/16/1995	NITRATE	--	
01	10/19/1995	NITRATE	0.4	10
01	12/1/1995	NITRATE	1.1	10
01	1/23/1996	NITRATE	1.3	10
01	1/28/1997	NITRATE	1.2	10
01	7/30/1997	NITRATE	0.4	10
01	10/22/1998	NITRATE	3.9	10
01	10/28/1998	NITRATE	--	
01	3/3/1999	NITRATE	1.2	10

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RESULTS OF GROUND-WATER SAMPLE ANALYSIS FOR NORTHERN HIGH SCHOOL

Plant ID	Sample Date	Contaminant Name	Result	MCL
Inorganic Compounds			mg/L	mg/L
01	1/5/2000	NITRATE	1.3	10
01	3/9/2000	NITRATE	1.2	10
01	2/27/2001	NITRATE	2.1	10
01	1/16/2002	NITRATE	1.7	10
01	2/8/1993	NITRITE	--	
01	10/19/1995	NITRITE	0.002	1
01	2/9/1993	SELENIUM	--	
01	10/19/1995	SELENIUM	--	
01	10/22/1998	SELENIUM	--	
01	3/9/2000	SELENIUM	--	
01	10/19/1995	SILVER	--	
01	10/22/1998	SODIUM	8.2	60 +
01	3/9/2000	SODIUM	5.69	60 +
01	10/19/1995	SULFATE	10.3	250 *
01	10/19/1995	THALLIUM	--	
01	10/22/1998	THALLIUM	--	
01	3/9/2000	THALLIUM	--	
General Water Quality Parameters				
01	10/19/1995	pH	7.8	6.5-8.5 *

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SUMMARY OF MICROBIOLOGICAL CONTAMINANT ANALYSIS FOR NORTHERN HIGH SCHOOL WATER SAMPLES

Sample Date	Samples Taken	Total Coliform	Total Fecal	Total Indeterminate	Sample Repeats	Repeat Coliforms	Repeat Fecal	Repeat Indeterminate
12/1/96	1	0	0	0	--	--	--	--
3/1/97	1	0	0	0	--	--	--	--
5/1/97	1	0	0	0	--	--	--	--
9/1/97	1	0	0	0	--	--	--	--
10/1/97	1	0	0	0	--	--	--	--
11/1/97	1	0	0	0	--	--	--	--
12/1/97	1	0	0	0	--	--	--	--
2/1/98	1	0	0	0	--	--	--	--
4/1/98	1	0	0	0	--	--	--	--
7/1/98	1	0	0	0	--	--	--	--
10/1/98	1	0	0	0	--	--	--	--
12/1/98	1	0	0	0	--	--	--	--
2/1/99	1	0	0	0	--	--	--	--
6/1/99	1	0	0	0	--	--	--	--
9/1/99	1	0	0	0	--	--	--	--
10/1/99	1	0	0	0	--	--	--	--
1/1/00	1	0	0	0	--	--	--	--
6/1/00	1	0	0	0	--	--	--	--
7/1/00	1	0	0	0	--	--	--	--
10/1/00	1	0	0	0	--	--	--	--
1/1/01	1	0	0	0	--	--	--	--
4/1/01	1	0	0	0	--	--	--	--
7/1/01	1	0	0	0	--	--	--	--
10/1/01	1	0	0	0	--	--	--	--
1/1/02	1	0	0	0	--	--	--	--
4/1/02	1	0	0	0	--	--	--	--

-- = not applicable