

SAMPLE

WELLHEAD PROTECTION PLAN

For

Town of Water Customers, VA

Adopted: 08/17/04



Mission Statement: to protect ground water which serves, or may serve in the future, as a source of public water supply. To protect it from the threat of contamination as a result of accidents or unwise practices from nearby residential, industrial, commercial, agricultural, waste management, or transportation activities. To cooperate with the Department of Health in carrying out the Safe Drinking Water Act purposes and provisions.

August 16, 2004

TABLE OF CONTENTS

<u>Title</u>	<u>Page Number</u>
STATEMENT OF ADOPTION.....	1
EXECUTIVE SUMMARY	2
ACKNOWLEDGEMENTS	4
1.0 INTRODUCTION.....	5
1.1 Background	6
1.2 Objectives.....	6
2.0 SOURCE WATER PROTECTION AREA	8
2.1 Delineation of Source Water Protection Area	8
2.2 General Information	10
2.2.1 Geology.....	10
2.2.2 Soils.....	11
2.2.3 Water Sources.....	13
2.3. Characteristics of the Source Water Protection Area.....	13
2.4 Water Quality.....	14
3.0 INVENTORY OF POTENTIAL SOURCES OF CONTAMINATION.....	16
3.1 Potential Sources of Contamination	16
3.2 Chemical Spill Inventory.....	17
3.3 Identifying New Potential Sources of Contamination.....	17
4.0 SUSCEPTIBILITY ANALYSIS.....	18
5.0 SOURCE WATER PROTECTION PLAN.....	20
5.1 Measures in Place.....	20
5.2 Public Education	20
5.3 Actions	21
REFERENCES.....	25

LIST OF FIGURES

Figure 1 – Map of Source Water Protection Areas for the ten wells supplying the water system.....	9
Figure 2 – Geologic Map of the Town of Water Customers’ Area.....	12
Figure 3 – Town of Water Customers, Well No. 1.....	15
Figure 4 – Town of Water Customers, Well No. 5.....	15

LIST OF TABLES

Table 1.1 – Well Information	14
Table 1.2 – Well Information	14
Table 1.3 – Well Information	14
Table 2: Summary of Potential Sources of Contamination to the Town of Water Customers’ Public Supply Potable Water Wells	16
Table 3 – Susceptibility Analysis Results	18

LIST OF APPENDICES

Appendix A	Available Well Logs
Appendix B	Potential Sources of Contamination for the Town of Water Customers' Wellhead Protection Areas
Appendix C	Various Potential Sources of Contamination
Appendix D	Sample Emergency Response Plan

STATEMENT OF ADOPTION

The Town of Water Customers adopted the Town Source Water Assessment and Protection Plan and has filed a copy of the plan with the Virginia Department of Health.

Copies of the plan can be obtained from:

Town of Water Customers
123 Main Street
Town of Water Customers, VA

This service and assistance of the members of the Source Water Protection Planning Committee in preparation of the plan is acknowledged and greatly appreciated.

Water Operator Town Council Member
Home Owner Business Owner
Concerned Citizen

By our signatures, we acknowledge the above statements to be true, and that we are authorized by the Town of Water Customers to make such representation.

Name, Title

Date

Name, Secretary of Board or other Witness

Date

EXECUTIVE SUMMARY

Preventing the contamination of, and maintaining good quality drinking water supplies is the primary goal of source water protection efforts under the Safe Drinking Water Act. The 1986 Amendments to the Safe Drinking Water Act established the Wellhead Protection Program. Wellhead protection is a process of

- identifying the area's public water supply wells;
- assessing the potential risks to ground water in areas around these wells; and
- implementing measures to manage these risks and prevent ground water problems.

For the Town of Water Customers, the first two steps of this process were completed under the Source Water Assessment Program of the Virginia Department of Health and are described in the Source Water Assessment Report. The third step in the process – development and implementation of a protection plan – is the focus of this report.

The Town of Water Customers water system is supplied by ten different wells. Groundwater mainly flows through fractures and joints in bedrock to the town's wells. Flow velocities and gradients can be high and storage is limited in fractured aquifers (Nelms et. al, 2003). Key concerns as potential sources of contamination in the recharge zone (the Wellhead Protection Area) include: on-site waste-water systems, residential fertilizer use and chemical releases from underground and aboveground storage tanks.

The Local Advisory Committee (LAC) for this source water protection plan developed the following recommended actions for helping to ensure the availability and quality of the water supply for the Town of Water Customers for the future.

- Develop a brochure describing Source Water Protection specifically for the town and promote the general education of the community on Source Water Protection.
- Mail the Town of Water Customers SWP brochure to each residence in the SWPA and to each water customer coincident with the distribution of the Consumer Confidence Report.

- Install signs along the roadway in high visibility locations near to the designated boundary of the wellhead protection area that state “Entering a Source Water Protection Area.”
- Assess the concerns of the local gas station as a potential source of contamination.
- Annually review with pertinent emergency response personnel (town and county) the designated WHPA zone and appropriate response procedures.
- Develop with the County the option of designating a Source Water Protection Overlay District for public water systems in the county.
- Begin a routine maintenance and inspection schedule of septic systems within the source water protection area.
- Annually review and update the SWPP.

ACKNOWLEDGEMENTS

Ground water protection needs to be a community effort; it is in everyone's interest to protect ground water and each can play an important role. It is in everyone's interest to protect ground water, and each can play an important role. The Source Water Assessment requirements are delineation of the protection area, an inventory of the potential contaminant sources, and a susceptibility analysis to determine the risk of contamination to the water source. The Town of Water Customers has developed and provided this information to the public in the following manner:

A Local Advisory Committee (LAC) was formed to develop and implement this Source Water Protection Plan for the Town of Water Customers. A series of public meetings and work sessions were held to gather input to develop this plan. The members included:

Water Operator

Town Council Member

Home Owner

Town Mayor

Business Owner

Concerned Citizen

The contribution and dedication of these LAC members is acknowledged by the Virginia Department of Health and Olver Incorporated.

The Wellhead Protection Plan Efforts was funded by the Virginia Department of Health and the Town of Water Customers.

SECTION 1.0

INTRODUCTION

Protection of ground water which supports public water supplies is of vital importance to Town of Water Customers. These public water supplies represent a substantial investment that would be expensive to replace if their source of water were to become polluted. Once contaminated, a groundwater reservoir may be permanently degraded or require costly augmented remediation. Reducing or preventing chemical and microbiological contamination of source waters could ideally allow public water systems to avoid costly treatments and minimize monitoring requirements. When drinking water is contaminated, costs for drinking water contamination include the following:

- Providing emergency replacement water;
- Treatment and/or remediation expenses;
- Finding and developing new supplies;
- Paying for consulting services and staff time;
- Litigating against responsible parties;
- Conducting public information campaigns when incidents occur;
- Failure to meet the regulations of the Safe Drinking Water Act, such as the Disinfection Byproduct and monitoring requirements;
- Loss of property value or tax revenue;
- Health related costs from exposure to contaminated water;
- Lost production of individuals and businesses, loss of economic development opportunities; and
- Lack of community acceptance of treated drinking water.
- Providing emergency replacement water.

There are many normal day-to-day activities that could have the unintended consequence of compromising the community's drinking water supply. Underground storage tanks, commercial, industrial, and agricultural activities, septic systems providing on-site wastewater treatment, and hazardous materials passing along transportation corridors all have the potential of being sources of contamination when they are in the recharge areas of the public water supply.

Groundwater is vulnerable to contamination by several pathways: infiltration from the surface, leachate from onsite wastewater (septic) systems, injection of contaminants through

improperly constructed or defective well, direct contamination of groundwater through sinkholes or other geologic features, or by naturally occurring substances in the soil or rock. The properties of the aquifer and overlying soils affect contaminant movement. Preventing contamination is the key to keeping groundwater supplies safe.

1.1 Background

This Wellhead Protection Plan builds on previous work completed under the Source Water Assessment Program of the Virginia Department of Health described in the source water assessment report (Date of Report). The wellhead protection area (WHPA) and potential sources of contamination defined in that study serve as the basis for this report which focuses on developing and implementing a plan to provide high quality water to the Town for the present and future.

The land within the wellhead protection area is predominately agricultural (pasture and crops). Within the city limits (132 acres) the land use is predominately residential. The Town of Water Customers has a population of approximately 1720 people. A business route passes through the center of town. Sewage is disposed of using a sewer system which is treated at the treatment plant located on the edge of the corporate limits northeast of town. The Town of Water Customers has a number of small business including small scale retail and professional services.

1.2 Objectives

The objectives of the Town of Water Customers' Wellhead Protection Plan are:

- To promote public health, economic development and community infrastructure by maintaining an adequate drinking water supply for all residents of the community and region, both now and into the future.
- To preserve and protect the quality of groundwater resources to assure continued safe and useable water supply.

Specific Objectives of the Wellhead Protection Plan are:

- To protect ground water which serves, or may serve in the future, as a source of public water supply;

- To protect ground water from the threat of contamination as a result of accidents or unwise practices from nearby residential, industrial, commercial, agricultural, waste management, or transportation activities; and
- To cooperate with the Virginia Department of Health in carrying out the Safe Drinking Water Act purposes and provisions.

SECTION 2.0

SOURCE WATER PROTECTION AREA

2.1 Delineation of Source Water Protection Area

The Source Water Protection Area (also referred to as the Wellhead Protection Area) is the area that will be managed by the Town in order to protect groundwater resources. The Wellhead Protection Area (WHPA) is defined as the surface or subsurface area surrounding a water well through which contaminants are reasonably likely to move toward and reach the water well. The Source Water Protection Area was delineated by VDH as part of the source water assessment program based on a fixed radius around each of the wells supplying Water Customers' water. The VDH assessment considered two different zones:

- Zone 1 is a 1000 foot radius around the well and is a priority zone for managing potential sources of contamination; and
- Zone 2 is a one-mile (5,280 feet) radius which represents an estimate of the total recharge zone for the well.

A map of the Source Water Protection Areas for Water Customers' Wells may be found in Figure 1.

The fixed radius approach to delineating the recharge zone was used as a reasonable first approximation. More specific delineation of the recharge zone can be developed through a more extensive evaluation of factors such as the hydrogeology in the vicinity of the well, daily withdrawal rate of the well, watershed boundaries, topography, bedrock and surficial geology, permeability and hydraulic conductivity of the bedrock structural geology, flow boundaries such as ridges, rivers, canals and lakes, fracture traces and lineaments, and dissolution features such as sinkholes. These evaluations may include groundwater basin boundary determination, Tiered Zone boundary delineations, and/or groundwater discharge modeling.

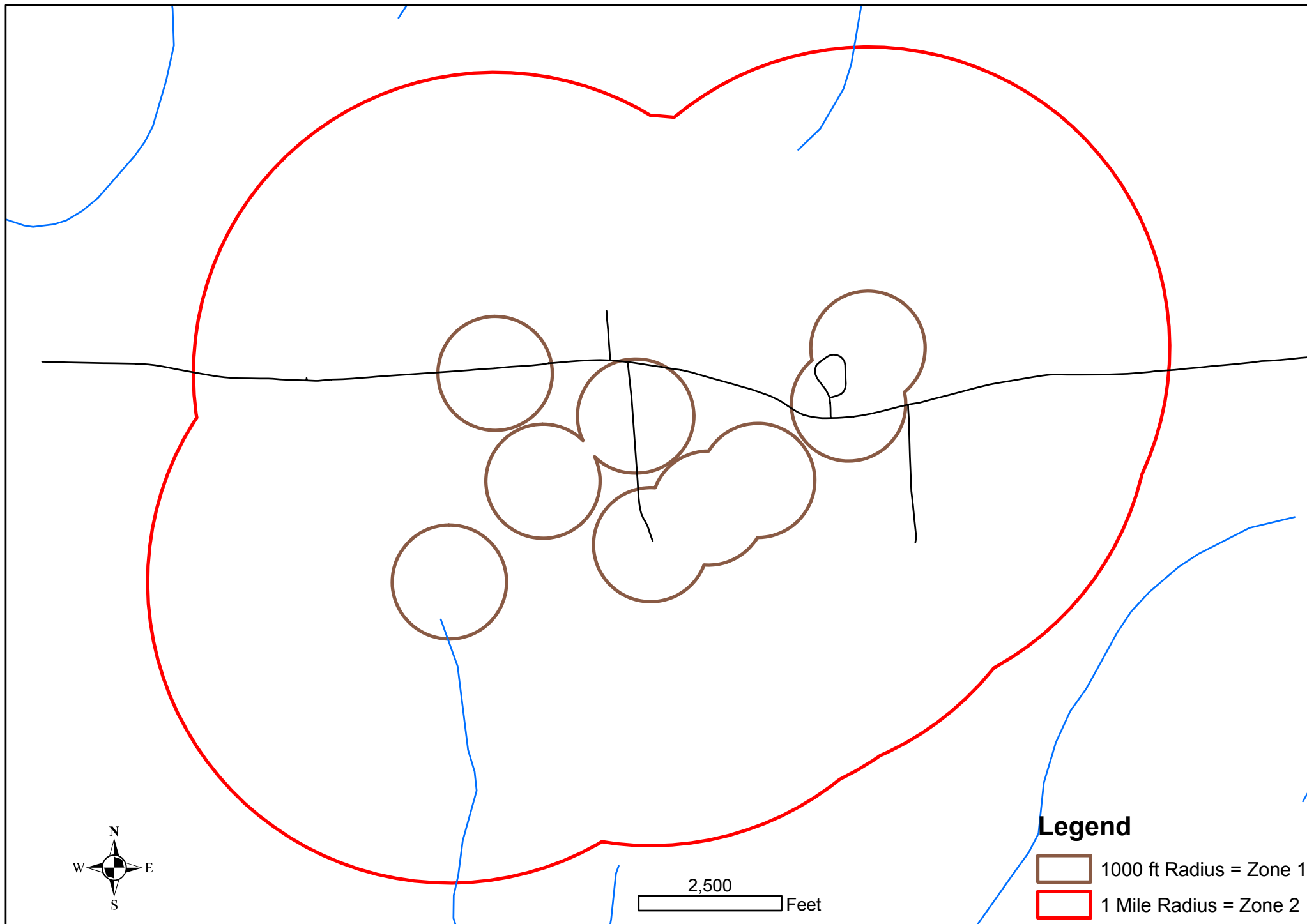


Figure 1:
Map of Source Water Protection Areas
for the Ten Wells Supplying
the Water Customers Water System

The groundwater basin boundary position is determined by the hydrologic, geologic and climatic characteristics of the hydrogeologic setting and fluctuates seasonally. The boundary marks the furthest locations from which groundwater will flow to the source as a hydraulically connected stream. The common assumption that the position of the surface watershed boundary approximates the position of the groundwater basin boundary is not universally true. Use of this approximation may introduce significant error into the estimate of the position of the outermost boundary of groundwater flow to a stream.

Examples of Tiered Zone protection area delineation methods include the following:

Example 1:

- Zone 1 – protective zone around a well as determined by the pumping rate
- Zone 2 – zone of contribution or contributory area of the aquifer based on a 10-year time of travel
- Zone 3 – the watershed drainage area that potentially contributes to the water supply

Example 2:

- Zone 1 – 200 ft assumed essentially immediate travel to well
- Zone 2 – zone of groundwater that would travel to and be pumped up by the well in a 5 year period (expected life time to replace a well)
- Zone 3 – 40-year time of travel zone (likely service life of the well)

Groundwater discharge models may be used to assess the potential impact of individual contaminant sources and to identify watershed areas with the greatest potential impact on source water quality. Modeling can be used in conjunction with source water assessments to enhance source water quality protection efforts.

2.2 General Information

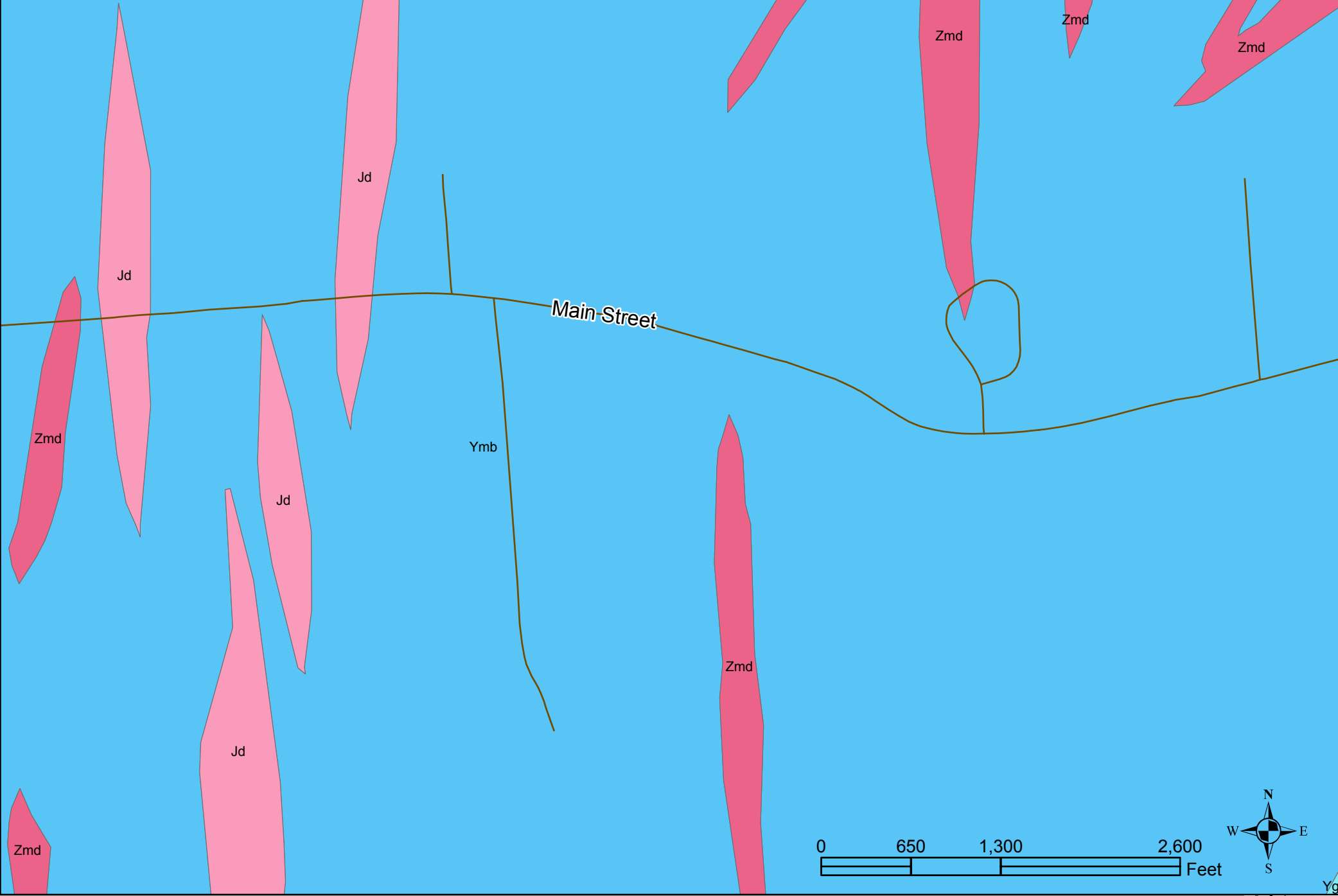
2.2.1. Geology

The Town of Water Customers is located in the Uplands of the Blue Ridge physiographic province of Virginia. The rock types in the area are primarily metamorphic rocks (gneiss) of Proterozoic Age. These metamorphic rocks were originally volcanic or sedimentary rocks. They

were deposited when rifting was occurring similar to the Atlantic Ocean today. The rocks were folded and faulted during the geologic period coincident with the formation of the present day Appalachian Mountains. In general, ground waters produced in the region are from shallow saprolite aquifers or deeper fractures in the bedrock. The gneiss bedrock has very low permeability, so the groundwater can usually only flow through joints, fractures, and faults. In a recent report on groundwater susceptibility in Virginia, this region was characterized as being of high risk for contamination (Nelms et al, 2003). A geologic map of the Town of Water Customers area is included in Figure 2.

2.2.2 Soils

According to the 1991 STATSGO Soil Survey, the primary soil in the area of Water Customers' wells is "Hayseville-Parker-Peaks." This soil is described as a loam and is found on 2-7% slopes. It is included in the "B" hydrologic group of soils, which is characterized by moderate infiltration rates (2-6 in/hr). The soil rarely floods and is considered a well-drained soil. The pH of the soil ranges from 3.6 to 6.5 and the density is between 1.35 and 1.6 g/cm³. The depth to the water table is at least 6 feet below land surface, and the depth to bedrock is at least 60 ft below land surface. Soils types can be important because the rate the groundwater infiltrates through the soil and type of plants that grown in the soil control the amount of precipitation that reaches the groundwater.



Legend

- Jd: Diabase
- Zmd: Metadiabase
- Ymb: Biotitic metagranite

Figure 2: Geologic Map of Water Customer, VA

Map Source:
U.S. Geological Survey
Open-File Report 99-150



2.2.3. Water Resources

Water Customers is located in the Little Stream watershed. There are several creeks with year round flow and a few ponds. None of the current surface water resources are suitable for potable water supplies. The town uses emergency storage tanks to allow for enough water for fire emergency situations.

Each of the surface water resources could act as a potential conduit to groundwater. The water from the ponds and streams could infiltrate into the saprolite and directly into the groundwater.

2.3 Characteristics of the Source Water Protection Area.

The Town of Water Customers (PWSID # 1234567) has 10 wells located within 2 miles of each other. The following Tables 1.1 – 1.3 summarize information about each well.

Table 1.1: Well Information

Well ID#	#1	#2	#3	#4
County	County in VA	County in VA	County in VA	County in VA
Well Depth (ft)	307	423	400	267
Capacity (gpm)	24	33	42	28
Well and Pump Installer	Wells Inc	Wells Inc	Wells Inc	Wells Inc
Status (in use/ not in use/in development)	In use	In Use	In Use	In Use

Table 1.2: Well Information

Well ID#	#5	#6	#7	#8
County	County in VA	County in VA	County in VA	County in VA
Well Depth (ft)	392	386	725	400
Capacity (gpm)	22	15	19	24
Well and Pump Installer	Wells Inc	Wells Inc	Wells Inc	Wells Inc
Status (in use/ not in use/in development)	In use	In Use	In Use	In Use

Table 1.3: Well Information

Well ID#	#9	#10
County	County in VA	County in VA
Well Depth (ft)	835	
Capacity (gpm)	45	
Well and Pump Installer	Wells Inc	Wells Inc
Status (in use/ not in use/in development)	In use	In Development

Figures 3-4 are pictures taken at the well site. The available well logs at the time of this report may be found in Appendix A of this document.

2.4 Water Quality

Water Customers' water is treated for iron and manganese using sand filters and carbon filtration. The water is also chlorinated for disinfection. From 2000-2002, the Town of Water Customers' was in compliance with all water quality, and reporting requirements. The Town is sampling its water on a routine basis to meet all state and federal requirements administered by the VDH and provides Annual Drinking Water Quality Reports to the public.



FIGURE 3: Town of Water Customers Well No. 1



FIGURE 4: Town of Water Customers Well 5

SECTION 3.0

INVENTORY OF POTENTIAL SOURCES OF CONTAMINATION

3.1 Potential Sources of Contamination

The Source Water Assessment Report for Wells 1 -10, dated Month Date, Year was developed by the Virginia Department of Health. Surveys of the 1000-foot and 1-mile protection areas were completed for Wells 1-10 during Month Year.

The following Table 2 summarizes the Potential Sources of Contamination and Land Use Activities within one mile of each well that pose a potential threat to the quality of the source water of the Town of Water Customers. In Appendix B, the Potential Sources of Contamination for each well is included in more detail, listing the distance of the source away from the well. The locations of all of the Potential Sources of Contamination are also included in a map in Appendix B.

Table 2: Summary of Potential Sources of Contamination within One Mile of the Water Customers Public Supply Water Wells

Potential Sources of Contaminants	Number of Instances								
	Well #1	Well #2	Well # 3	Well #4	Well #5	Well #6	Well #7	Well #8	Well #9
On-Site Sewage Systems	15	14	18	22	35	36	25	36	2
Aboveground Storage Tank/ Underground Storage Tank	1	1		1				1	
Offset printing & computer typesetting	1	1	1	1	1	1	1	1	
Primary Roadways	1	1	1	1	1	1	1	1	1
Parking Lots	1		1						
Cemetery	1								
Wastewater Treatment Plant	1	1	1	1	1	1	1	1	
Feed Milling	1	1							
Machine Shops			1						
Water Treatment Plant			1	1	1	1	1	1	1
Waste Water Pump Station				1					

3.2 Chemical Spill Inventory

In 1998 and 1999, Benzene was Well 10. While the amount did not exceed MCL for Benzene the well was monitored according to state regulations during that time. The most probable source of the benzene in the groundwater is a leaky underground storage tank for gasoline and/or a gasoline spill.

3.3 Identifying New Potential Sources of Contamination

Identification of existing contamination sources may address immediate concerns about protection of the local water supply. To ensure that the supply remains uncontaminated, continual review of land use activities and identification of potential sources of contamination is necessary. A summary listing of various sources of contamination that are commonly considered is included in Appendix C.

SECTION 4.0

SUSCEPTIBILITY ANALYSIS

The susceptibility analysis is a procedure for determining how the potential pollutant sources identified in the inventory pose a risk to the quality of the source water. The results of the Source Water Assessment Report are summarized in the following Table 3.

Table 3 : Susceptibility Analysis Results

Source Name	Susceptibility to Contamination	Explanation
Well 1	High	Groundwater source constructed in an area that tends to promote migration of contaminants with land use activities of concern in the Zone 1 Assessment area and potential sources of contamination in the Zone 1 or Zone 2 assessment areas.
Well 2	High	Groundwater source constructed in an area that tends to promote migration of contaminants with land use activities of concern and potential conduits to groundwater in the Zone 1 Assessment area and potential sources of contamination in the Zone 1 or Zone 2 assessment areas.
Well 3	High	Groundwater source constructed in an area that tends to promote migration of contaminants with land use activities of concern in the Zone 1 Assessment area and potential sources of contamination in the Zone 1 or Zone 2 assessment areas.
Well 4	High	Groundwater source constructed in an area that tends to promote migration of contaminants with land use activities of concern and potential conduits to groundwater in the Zone 1 Assessment area and potential sources of contamination in the Zone 1 or Zone 2 assessment areas.
Well 5	High	Groundwater source constructed in an area that tends to promote migration of contaminants with land use activities of concern in the Zone 1 Assessment area and potential sources of contamination in the Zone 1 or Zone 2 assessment areas.
Well 6	High	Groundwater source constructed in an area that tends to promote migration of contaminants with land use activities of concern in the Zone 1 Assessment area and potential sources of contamination in the Zone 1 or Zone 2 assessment areas.
Well 7	High	Groundwater source constructed in an area that tends to promote migration of contaminants with land use activities of concern and potential conduits to groundwater in the Zone 1 Assessment area and potential sources of contamination in the Zone 1 or Zone 2 assessment areas.
Well 8	High	Groundwater source constructed in an area that tends to promote migration of contaminants with land use activities of concern in the Zone 1 Assessment area and potential sources of contamination in the Zone 1 or Zone 2 assessment areas.

Source Name	Susceptibility to Contamination	Explanation
Well 9	High	Groundwater source constructed in an area that tends to promote migration of contaminants with land use activities of concern and potential conduits to groundwater in the Zone 1 Assessment area and potential sources of contamination in the Zone 1 or Zone 2 assessment areas.
Well 10	High	Groundwater source constructed in an area that tends to promotes migration of contaminants with land use activities of concern and potential conduits to groundwater in the Zone 1 assessment area and potential sources of contamination in the Zone 1 or Zone 2 assessment areas.

SECTION 5.0

SOURCE WATER PROTECTION PLAN

The Source Water Protection Plan describes the actions necessary to minimize the risk to the quality of the source water utilized by the Town of Water Customers. The goal of the plan is to reduce or eliminate the potential threat to drinking water supplies within Wellhead Protection Areas either through existing regulatory or statutory controls, or by using non-regulatory (and often voluntary) measures centered around an involved public.

5.1 Measures in Place

The Town of Water Customers has identified general measures that are in place to assure protection of the quality of the utilities' source of water. These Water Quality Protection Measures are a cross connection control plan and an effort to improve public sewer availability within the town limits. In addition, best management practices were put in place to reduce the potential of contamination reaching the source water as a result of land use. Some of the best management practices within the wellhead protection area are a permanent vegetative cover on cropland, small grain cover crop for nutrient management, and a sod waterway.

5.2 Public Education

In order for citizens to appreciate the benefits of source water/wellhead protection, they must first understand what the problems are in providing safe drinking water, and how they can become involved in the process. Examples of public education are brochures, pamphlets, field days, mall displays, town meetings, and other mass-exposure opportunities to present wellhead protection problems and protection efforts to the public in a straightforward, understandable fashion. Public education is the greatest promoter of voluntary action and public support for a community's wellhead protection program.

A number of specific actions directed at public education are included in the recommendations in the next section. These should be considered as a starting point. Other

activities and opportunities should be sought that will increase public awareness that ground water protection is a local issue and that each citizen plays a part.

5.3 Recommended Actions

After reviewing the physical characteristics land uses and potential sources of contamination within the designated Source Water Protection Area the Town decided that the following actions are recommended as initial step towards source water protection for the Town of Water Customers.

1. Develop a brochure describing Source Water Protection specifically for the town.

Develop a brochure for the general public that addresses the following topics: general overview of the importance of SWP; the local nature of groundwater recharge – what you do matters; concerns with local geology; particular concerns with septic systems, wells, sinkholes; and a list of general dos and don'ts.
2. Promote general education of the community on source water protection.
 - Make educational materials on SWP available to the public
 - Have pertinent brochures available for free distribution at the Town office, public library, and other appropriate display/distribution locations. Such materials should include at least:
 - Water Customers' SWP brochure
 - Brochures on septic system function and maintenance (available from EPA, Va. DEQ, www.nsfci.wvu.edu etc.) that highlight the potential impact on groundwater and the importance of regular pumping (3-5 years) to maintain performance and life.
 - Add SWP information to the town web page (e.g. pdf or html of the brochure, links to other resources).

3. Mail the Water Customers' SWP brochure to each residence in the SWPA and to each water customer coincident with the distribution of the Consumer Confidence Report. This mailing will occur every year beginning in 2005.
4. To increase local visibility and awareness of the SWPA, install signs along roads in high-visibility locations near to the designated boundary of the wellhead protection area that state "Entering Source Water Protection Area". (Note that signs on road right-of-way require approval of VDOT.)
5. Assess concerns of the local gas station as a potential source of contamination (PSC). Because this site is physically up-slope of well 10, any contamination at this site would move towards the well under sustained pumping.
 - Review status of the past environmental site assessment and remediation with DEQ.
 - Assess the potential risk of contamination from the site
 - Depending on the findings, take appropriate action which may include remediation or implementing a monitoring program to sample existing or new wells down-gradient of the site.
6. Annually review with pertinent emergency response personnel (town and county) the designated WHPA zone and appropriate response procedures. Provide an emergency information sheet that shows the WHPA, roads, and emergency contact information. An annual meeting/training/review with emergency response personnel (added as a component to regular training programs) to highlight the significance of the WHPA and review appropriate response procedures for incidents in the WHPA. Such actions should include the following in the event of a spill or potential source of contamination:

- Immediate notification of the waterworks operator
 - Use of best available cleanup procedures
 - Minimize potential for movement to groundwater
7. Develop with the County the option of designating a Source Water Protection Overlay District for public water systems in the county that would:
- a) specify minimum restriction for WHPAs (i.e. provide a generic SWP Overlay), and/or
 - b) allow the designation of a specific Overlay District proposed by the town
- Concerns that could be addressed include: restriction of certain type of businesses and activities, regular inspection and maintenance of septic systems, guidelines on approval and abandonment of private wells.
- A reference guide with model language can be found in: "Implementing Wellhead Protection: Model Components for Local Governments in Virginia" by the Virginia Groundwater Protection Steering Committee (1998).
8. Provide a schedule for inspection and maintenance of septic systems within wellhead protection area.

Each of the septic systems within the wellhead protection zone will be required to be inspected annually and maintained (i.e. pumped out) every 3 years. The town will begin this process by enacting the appropriate ordinance at the Town Council Meeting. Then, the town will launch a public education campaign notifying those owners of septic systems about inspections and maintenance and importance to source water protection. Finally an inspection and maintenance schedule will be implemented to ensure that the ordinance is followed through to compliance.

9. Annually review and update the SWPP
 - Identify and update list of PSCs
 - Review educational program
 - Assess progress on achieving the SWPP goals

REFERENCES

- VDH, 2003. *Source Water Assessment Report – Town of Water Customers*. (Month Year).
Prepared by the Virginia Department of Health.
- Nelms, D.L., Harlow, Jr., G.E., Plummer L.N., and Busenberg, E., 2003. *Aquifer Susceptibility in Virginia, 1998-2000*. USGS Water Resources Investigation Report 03-4278. 67pp
- USDA. 1991. *State Soil Geographic (STATSGO) Database for Virginia*. U.S. Department of Agriculture, Natural Resources Conservation Service.
- Virginia Groundwater Protection Steering Committee, (1998). "Implementing Wellhead Protection: Model Components for Local Governments in Virginia"

APPENDIX A

Available Well Logs
Town of Water Customers, VA



COMMONWEALTH OF VIRGINIA
STATE WATER CONTROL BOARD
P. O. Box 11143, 2111 North Hamilton Street
Richmond, Virginia 23230
Phone (804) 770-1411

WATER WELL COMPLETION REPORT

PERMIT NUMBER 1-10
BWCM WELL NO. 11-19 (Certification of Completion)
(For use in all groundwater areas)

DATE REC'D 20-25
TRUCK TAG NO.

LOCATION (Card 1)

COUNTY: Loudon

WELL IS LOCATED APPROX. .5 ~~xxx~~ miles
South (direction) of Rt. 7 and
57 feet ~~xxx~~ east (direction) of
Rt. 710 S.

WELL IS NEWLY CONSTRUCTED X 26 OR IS AN
ALTERATION, REHABILITATION, OR EXTENSION
OF AN EXISTING WELL 27. NUMBER OF
CERTIFICATE OF GROUNDWATER RIGHT OF EXIST-
ING WELL, IF APPLICABLE .

28-37

FOR OFFICE USE:

VA. PLANE COORDINATES: N E
38-43 44-50

TOPOGRAPHIC MAP NUMBER:
51-55

OWNER (Card 2)

NAME: 11-40
STREET: 41-55
CITY: 56-72
STATE: Va. ZIP: 22068
73-74 75-79

DRILLER (Card 3)

NAME: Sylvester Kyger 11-40
STREET: 2111 Magnolia Street 41-55
CITY: Richmond, 56-72
STATE: Va. ZIP: 23223
73-74 75-79

CONTRACTOR (Card 4)

SIGNATURE: C.C. Norris
NAME (type): Sydnor Hydrodynamics, Inc 11-40
STREET: P.O. Box 27186 41-55
CITY: Richmond, 56-72
STATE: Va. ZIP: 23261
73-74 75-79

BASIC DATA (Card 5)

DATE STARTED: 2/2/76 DATE COMPLETED: 3/23/76 DEPTH DRILLED: 725
11-16 17-22 23-26

DEPTH OF COMPLETED WELL: 725 STATIC WATER LEVEL: +2 feet ~~xxx~~ above land surface.
27-30 31-33

YIELD TEST: pump Method; Drawdown 243' 10 1/2" feet; Yield 25 gpm; Duration 48 hours.
34-35 36-38 39-42 43-44

WAS THE WELL LOGGED? Yes/No; if Yes, BY WHOM? ; TYPE OF LOG(S): .
45 46-55 56-58

WAS THE WATER ANALYZED? Yes Yes; if Yes, BY WHOM? Froehling & Robert TYPE OF RIG: Rotary
59 60-68 69-71

WELL TO SUPPLY: ~~xxxxxxx~~ Municipality/School/xxxxxxx/xxxxxxx/xxxxxxx/Other
(circle which) 72 73 74 75 76 77 78

WERE WELL DRILLINGS SAVED? Yes Yes (Well cuttings should be collected at 10-foot inter-
vals and shipped express collect to this office in a shipping container. Sample bags
are furnished free of charge upon request).

PUMP DATA (Card 6)

BRAND NAME: 11-30
TYPE: 31-45
MODEL NUMBER: 46-60
RATED CAPACITY: gpm at
61-65 66-68 feet of head.
DEPTH OF INTAKE: 69-71
RATED HORSEPOWER: 72-74

CONSTRUCTION DATA (Card 7)

HOLE SIZE: 12 inches from 0 to 85 feet 11-12 13-20
6 inches from 85 to 503 feet 21-22 23-30
5 7/8 inches from 503 to 725 feet 31-32 33-40
CASE SIZE: 6 inches from +2 to 85 feet 41-42 43-50
 inches from to feet 51-52 53-60
 inches from to feet 61-62 63-70

GROUTING? Yes No; from surface to
71 85 feet.
72-74

SCREEN DATA (Card 8)

DOES THE WELL HAVE SCREENS? ~~Yes~~¹¹/No; OR
DOES THE WELL HAVE SLOTTED OR PERFORATED PIPE? ~~Yes~~¹²/No

LOCATION OF SCREENS: Give the diameter and depth of all screens or sections of slotted or perforated pipe.

<u>13-14</u> inches from <u>15-18</u> to <u>19-22</u> feet	<u>43-44</u> inches from <u>45-48</u> to <u>49-52</u> feet
<u>23-24</u> inches from <u>25-28</u> to <u>29-32</u> feet	<u>53-54</u> inches from <u>55-58</u> to <u>59-62</u> feet
<u>33-34</u> inches from <u>35-38</u> to <u>39-42</u> feet	<u>63-64</u> inches from <u>65-68</u> to <u>69-72</u> feet

QUALITY DATA (Card 9)

DID ANY STRATUM CONTAIN WATER WHICH WAS UNUSUABLE? ~~Yes~~¹¹/No; TYPE OF WATER 12-22

DEPTH OF STRATUM: from 89 to 90 feet; from 365 to 370 feet. WATER TEMPERATURE: 39-40 °F

If a permit was not issued for this well and a USGS topographic map is not available, a written description and sketch map of well location will suffice.

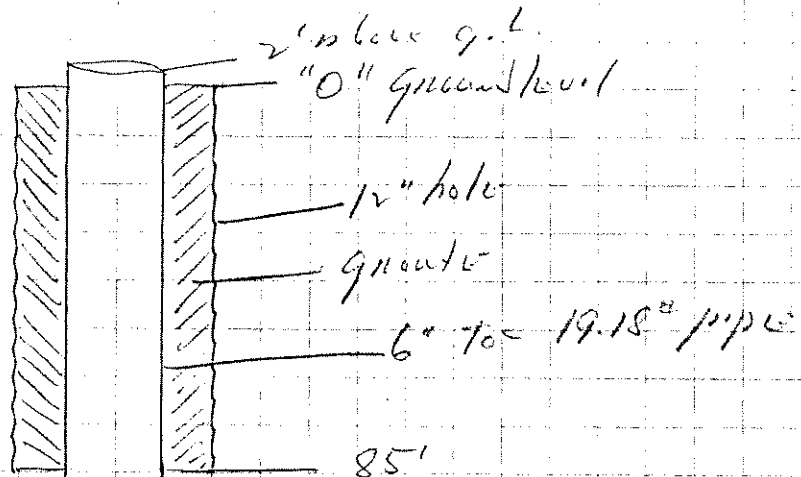
Well #10

DRILLER'S LOG

DEPTH (feet)		TYPE OF ROCK OR SOIL PENETRATED (gravel, clay, etc.; hardness, color, etc.)	REMARKS (water, caving, shot, screen, samples, etc.)
From	To		
0	20	Brown Clay	
20	30	Soft Granite	
30	89	Gray Granite	
89	90	Soft Granite and Water (est. 6 gpm)	
90	250	Gray Granite - Some soft streaks	
250	265	Green Stone	
265	365	Mixture of Granite	
365	370	Soft Greenstone and Water (est. 12 gpm plus)	
370	392	Gray Granite	
392	402	Hard Greenstone	
402	410	Gray Granite	
410	450	Mixture of Granite	
450	503	Gran and Green Rock	
503	550	Gray Granite	
550	625	Gray Granite with quartz mixed	
625	645	Gray Granite	
645	680	Greenstone	
680	685	Soft Gray Granite	
685	705	Greenstone and Granite	
705	725	Hard Gray Granite	

3-23-76
Reg 67

Well #10 1
Job # 42284-7



Drilled by

Sydme Hydrodynamics, Inc.
P.O. Box 27186
Richmond, Va 23261

Drilled

Sylvester Kyger

6" hole

No Scale - New 2/73

SYDNOR HYDRODYNAMICS, INC.

WELL TEST INFORMATION SHEET

CUSTOMER: Town of Hamilton DATE STARTED: 2/10/77

DATE COMPLETED: 2/12/77

LOCATION: _____ WELL TEST NO.: 1

Hamilton, Va. Well #11 JOB NUMBER: 44210-7

WELL DESCRIPTION: Sand or Screened Well () Rock Well (xx)

Total Depth 400 Ft. Size 6 1/2 " to 330 ' and 6 1/4 to 400 ,

Casing Depth 66 Ft. Screens _____

Construction: Domestic () Class 11-B (xx) 11-A () 1 ()

Static Water Level 26'5" Ft. Measured 2/10/77 Date

Description of Formations: Broken Greenstone and Quartz

TEST PUMP: Turbine () Sumo (xx) Piston () Air () Bailer ()

Pump Intake 215 Ft. Below Ground; Air Line M-Scope Ft. Below Ground

Size Pump Discharge 2" ~~XX~~. Metering Device Flow Meter

Description of Pump 15 HP submersible portable generator

TEST DATA: Static Level Before Installing Pump 26'5" ~~XXXX~~

Air Line _____ PSI Before Starting Pump; Time of Measurement 2/10/77

Time Test Pump Started 1:00 p.m.; Time Test Pump Stopped 1:00 p.m.

Total Hours Pumped 48 Final Capacity 100 GPM @ 95'9" Ft.

Static Level Ft. 37'1" ~~XX~~. , 4 Hr. _____ Min. After Pump Stopped.

INSTRUCTIONS: For the first hour of pumping, take readings at least every 5 minutes and thereafter at least every 15 minutes. Obtain two 1-gallon representative samples of water near the end of the test. If possible, measure recovery for time equal to 1/3 length of the test. Sample to Froehling & Robertson and State Lab 2/14/77

READINGS 3' ABOVE GROUND LEVEL

TIME OF READING HR. MIN.	ORIFICE READING INCHES	TIME TO FILL CONT. MIN. SEC.	AIR LINE PSI	TAPE READING FEET	PUMP DISCHARGE GPM	PUMPING LEVEL FEET	REMARKS - (e. g., water clear, cloudy, taking air, etc.)
1:00				26'5"	100	Same as Reading Feet	Clear
1:05				55'11 3/4"	"	"	"
1:10				58'5 3/4"	"	"	"
1:15				61'8 1/2"	"	"	"
1:20				63'1 1/2"	"	"	"
1:25				64'2 1/2"	"	"	"
1:30				65'2 1/4"	"	"	"
1:35				66'1 3/4"	"	"	"
1:40				66'11"	"	"	"
1:45				67'8 1/2"	"	"	"
1:50				68'5 1/2"	"	"	"
1:55				69'	"	"	"
2:00				69'7 3/4"	"	"	"
2:05				70'2 1/4"	"	"	"
2:10				70'8 1/4"	"	"	"
2:15				71'2 3/4"	"	"	"
2:20				71'8 1/2"	"	"	"
2:25				72'2"	"	"	"
2:30				72'6 1/2"	"	"	"
2:35				73'	"	"	"
2:40				73'5"	"	"	"
2:45				73'9 1/4"	"	"	"
2:50				74'1 1/4"	"	"	"
2:55				74'5 1/2"	"	"	"
3:00				74'10"	"	"	"
3:05				75'1 1/2"	"	"	"
3:10				75'5 3/4"	"	"	"

DATE: 2/10/77

DATA BY: Cox & Turner

DATA SHEET NO. 1

TIME OF READING HR. MIN.	ORIFICE READING INCHES	TIME TO FILL CONT. MIN. SEC.	AIR LINE PSI	TAPE READING FEET	PUMP DISCHARGE GPM	PUMPING LEVEL FEET	REMARKS - (e. g., water clear, cloudy, taking air, etc.)
3:15				75'10 1/4"	"	"	"
3:20				76'11"	"	"	"
3:25				76'14 1/4"	"	"	"
3:30				76'18"	"	"	"
3:35				76'10"	"	"	"
3:40				77'2"	"	"	"
3:45				77'5 1/4"	"	"	"
3:50				77'8 1/4"	"	"	"
3:55				77'11"	"	"	"
4:00				78'2 1/2"	"	"	"
4:05				78'3 1/2"	"	"	"
4:10				78'7 1/2"	"	"	"
4:15				78'11"	"	"	"
4:20				79'1 1/4"	"	"	"
4:25				79'4 1/2"	"	"	"
4:30				79'6 1/2"	"	"	"
4:40				79'11 3/4"	"	"	"
4:50				80'3 1/4"	"	"	"
5:00				80'7 1/4"	"	"	"
5:10				80'11 1/4"	"	"	"
5:20				81'2 1/4"	"	"	"
5:30				81'6"	"	"	"
5:40				81'9 1/2"	"	"	"
5:50				82'1 1/2"	"	"	"
6:00				82'3 1/2"	"	"	"
6:15				82'7"	"	"	"
6:30				83'	"	"	"

DATE: 2/10/77

DATA BY: Cox and Turner

DATA SHEET NO. 2

TIME OF READING HR. MIN.	ORIFICE READING INCHES	TIME TO FILL CONT. MIN. SEC.	AIR LINE PSI	TAPE READING FEET	PUMP DISCHARGE GPM	PUMPING LEVEL FEET	REMARKS - (e. g., water clear, cloudy, taking air, etc.)
6:45				83'5 1/4"	"	"	"
7:00				83'9"	"	"	"
7:15				84'2 1/2"	"	"	"
7:30				84'6"	"	"	"
7:45				84'9"	"	"	"
8:00				85'	"	"	"
8:15				85'4"	"	"	"
8:30				85'7 1/2"	"	"	"
8:45				85'10 1/2"	"	"	"
9:00				86'1 1/2"	"	"	"
9:15				86'3 1/4"	"	"	"
9:30				86'6 1/2"	"	"	"
9:45				86'9"	"	"	"
10:00				86'11"	"	"	"
10:15				87'2"	"	"	"
10:30				87'4 1/2"	"	"	"
10:45				87'7"	"	"	"
11:00				87'8 3/4"	"	"	"
11:15				87'11"	"	"	"
11:30				88'1"	"	"	"
11:45				88'3"	"	"	"
12:00				88'4 1/2"	"	"	"
12:15				88'6"	"	"	"
12:30				88'7 1/4"	"	"	"
12:45				88'10"	"	"	"
1:00				88'11"	"	"	"
1:15				89'	"	"	"

2/10/77

Cox and Turner

3

DATE:

DATA BY:

DATA SHEET NO.

TIME OF READING HR. MIN.	ORIFICE READING INCHES	TIME TO FILL CONT. MIN. SEC.	AIR LINE PSI	TAPE READING FEET	PUMP DISCHARGE GPM	PUMPING LEVEL FEET	REMARKS - (e. g., water clear, cloudy, taking air, etc.)
1:30				89'1 3/4"	"	"	"
1:45				89'2 1/2"	"	"	"
2:00				89'3"	"	"	"
2:15				89'8"	"	"	"
2:30				89'9"	"	"	"
2:45				89'10 1/4"	"	"	"
3:00				89'11 1/2"	"	"	"
3:15				90'1"	"	"	"
3:30				90'1 1/2"	"	"	"
3:45				90'2"	"	"	"
4:00				90'3"	"	"	"
4:15				90'4"	"	"	"
4:30				90'4 1/2"	"	"	"
4:45				90'6"	"	"	"
5:00				90'7"	"	"	"
5:15				90'8 1/2"	"	"	"
5:30				90'9 3/4"	"	"	"
5:45				90'11"	"	"	"
6:00				90'11 3/4"	"	"	"
6:15				91'1/2"	"	"	"
6:30				91'2"	"	"	"
6:45				91'2 1/2"	"	"	"
7:00				91'2 3/4"	"	"	"
7:15				91'3 1/2"	"	"	"
7:30				91'4 1/2"	"	"	"
7:45				91'5 1/2"	"	"	"
8:00				91'5 3/4"	"	"	"

TIME OF READING HR. MIN.	ORIFICE READING INCHES	TIME TO FILL CONT. MIN. SEC.	AIR LINE PSI	TAPE READING FEET	PUMP DISCHARGE GPM	PUMPING LEVEL FEET	REMARKS - (e. g., water clear, cloudy, taking air, etc.)
8:15				91'6 3/4"	"	"	"
8:30				91'8"	"	"	"
8:45				91'9"	"	"	"
9:00				91'9 1/2"	"	"	"
9:15				91'10"	"	"	"
9:30				91'11 1/4"	"	"	"
9:45				92'	"	"	"
10:00				92'1 1/2"	"	"	"
10:15				92'3"	"	"	"
10:30				92'4 1/2"	"	"	"
10:45				92'5 1/4"	"	"	"
11:00				92'6"	"	"	"
11:15	Adjust valve			93'9 1/2"	"	"	"
11:30				93'11 1/2"	"	"	"
12:00				94'2 1/2"	"	"	"
12:30				94'4"	"	"	"
1:00				94'5 1/2"	"	"	"
1:30				94'7 1/2"	"	"	"
2:00				94'9 1/2"	"	"	"
2:30				94'10 1/2"	"	"	"
3:00				95'	"	"	"
3:30				95'1 3/4"	"	"	"
4:00				95'2 3/4"	"	"	"
4:30				95'3 1/2"	"	"	"
5:00				95'4"	"	"	"
5:30				95'5 1/4"	"	"	"
6:00				95'6 1/2"	"	"	"

DATE: 2/11/77

DATA BY: Cox and Turner

DATA SHEET NO. 5

TIME OF READING HR. MIN.	ORIFICE READING INCHES	TIME TO FILL CONT. MIN. SEC.	AIR LINE PSI	TAPE READING FEET	PUMP DISCHARGE GPM	PUMPING LEVEL FEET	REMARKS - (e. g., water clear, cloudy, taking air, etc.)
6:30				95'6 3/4"	"	"	"
7:00				95'6 1/2"	"	"	"
7:30				95'5 1/2"	"	"	"
8:00				95'6"	"	"	"
8:30				95'7"	"	"	"
9:00				95'6 1/2"	"	"	"
9:30				95'8"	"	"	"
10:00				95'8 1/4"	"	"	"
10:30				95'8 1/2"	"	"	"
11:00				95'9"	"	"	"
11:30				95'9 1/2"	"	"	"
12:00				95'9"	"	"	"
12:30				95'8"	"	"	"
1:00				95'8 1/2"	"	"	"
1:30				95'7"	"	"	"
2:00				95'7 1/2"	"	"	"
2:30				95'9"	"	"	"
3:00				95'8 1/2"	"	"	"
3:30				95'9"	"	"	"
4:00				95'9"	"	"	"
4:30				95'8 1/2"	"	"	"
5:00				95'8 3/4"	"	"	"
5:30				95'9"	"	"	"
6:00				95'8 3/4"	"	"	"
6:30				95'8 1/2"	"	"	"
7:00				95'9"	"	"	"
7:30				95'9 1/4"	"	"	"

DATE: 2/11 & 12/77

DATA BY: Cox and Turner

DATA SHEET NO. 6

TIME OF READING HR. MIN.	ORIFICE READING INCHES	TIME TO FILL CONT. MIN. SEC.	AIR LINE PSI	TAPE READING FEET	PUMP DISCHARGE GPM	PUMPING LEVEL FEET	REMARKS - (e. g., water clear, cloudy, taking air, etc.)
8:00				95'9 3/4"	"	"	"
8:30				95'10 3/4"	"	"	"
9:00				95'10 3/4"	"	"	"
9:30				95'10 1/2"	"	"	"
10:00				95'10 3/4"	"	"	"
10:30				95'2 1/2"	"	"	"
11:00				94'11"	"	"	"
11:30				95'4 1/4"	"	"	"
12:00				95'7 1/4"	"	"	"
12:30				95'9 1/2"	"	"	"
1:00				95'9"	"	"	"
	NOTE:	Well #7	(Francis Well)	was pumped continuous during the #11 Test			
	<u>RECOVERY</u>	<u>TEST</u>					
1:05				63'4 1/2"			
1:10				60'5"			
1:15				58'9 1/2"			
1:20				56'9 1/2"			
1:25				55'8"			
1:30				54'7 1/2"			
1:35				53'4"			
1:40				52'9"			
1:45				52'2 1/4"			
1:50				51'5 3/4"			
1:55				50'10 3/4"			

TIME OF READING HR. MIN.	ORIFICE READING INCHES	TIME TO FILL CONT. MIN. SEC.	AIR LINE PSI	TAPE READING FEET	PUMP DISCHARGE GPM	PUMPING LEVEL FEET	REMARKS
2:00				50'2"		TIME	TAPE READING FEET
						4:15	39'7 1/2"
2:05				49'6"		4:20	39'3 1/2"
2:10				49'1 1/2"		4:25	39'
2:15				48'7 1/2"		4:30	38'8 3/4"
2:20				48'1"		4:40	38'2 1/2"
2:25				47'8 1/4"		4:50	37'7 1/2"
2:30				47'1"		5:00	37'2 1/4"
2:35				46'6 1/4"			
2:40				46'			
2:45				45'4 3/4"			
2:50				44'11"			
2:55				44'5"			
3:00				44'			
3:05				43'6"			
3:10				43'1"			
3:15				42'8"			
3:20				42'3 1/4"			
3:25				42'1 1/2"			
3:30				41'9"			
3:35				41'6 1/2"			
3:40				41'4"			
3:45				41'1 1/4"			
3:50				40'10 1/2"			
3:55				40'8 1/2"			
4:00				40'5 3/4"			
4:05				40'2 1/2"			
4:10				39'10 1/2"			

COMMONWEALTH OF VIRGINIA
WATER WELL COMPLETION REPORT

• BWCM No. _____

(Certification of Completion/County Permit)

State Water Control Board
P. Box 11143
2111 North Hamilton St.
Richmond, Va. 23230

County/City Loudon County

County/City Stamp

• Virginia Plane Coordinates

N
E
Latitude & Longitude
N
W

- Topo. Map No. _____
- Elevation _____ ft.
- Formation _____
- Lithology _____
- River Basin _____
- Province _____
- Type Logs _____
- Cuttings _____
- Water Analysis _____
- Aquifer Test _____

• Owner Town of Hamilton

• Well Designation or Number 4A

Address P.O. Box 130

Hamilton, Virginia 22068

Phone 703-338-2811

• Drilling Contractor Sydnor Hydrodynamics, Inc.

Address P.O. Box 27186

Richmond, Virginia 23261-7186

Phone 804-643-2725

WELL LOCATION: 1100 (feet/miles North direction) of Rt. 7
and 50 feet/miles W (direction) of Applewood Court (Loudon County)
(If possible please include map showing location marked) (Same Well Lot as Well #4)

Date started 05/11/83 • Date completed 06/06/83 Type rig Rotary

SWCB Permit _____

County Permit _____

Certification of inspecting official:

This well does _____ does not
meet code/low requirements.

S. _____

Date _____

For Office Use

Tax Map I.D. No. _____

Subdivision _____

Section _____

Block _____

Lot _____

Class Well I _____ IIA _____

IIB _____ IIIA _____ IIIB _____

IIIC _____ IIID _____ IIIE _____

1. WELL DATA: New * Reworked _____ Deepened _____

• Total depth 423 ft.
Depth to bedrock 10 ft.

• Hole size (Also include reamed zones)

- 12 inches from 0 to 135 ft.
- 6 inches from 135 to 423 ft.
- _____ inches from _____ to _____ ft.

• Casing size (I.D.) and material

- 8 inches from +2 to 135 ft.

Material Steel

Wt. per foot 28.55 or wall thickness _____ in.

- _____ inches from _____ to _____ ft.

Material _____

Wt. per foot _____ or wall thickness _____ in.

- _____ inches from _____ to _____ ft.

Material _____

Wt. per foot _____ or wall thickness _____ in.

• Screen size and mesh for each zone (where applicable).

- _____ inches from _____ to _____ ft.
- Mesh size _____ Type _____
- _____ inches from _____ to _____ ft.
- Mesh size _____ Type _____
- _____ inches from _____ to _____ ft.
- Mesh size _____ Type _____
- _____ inches from _____ to _____ ft.
- Mesh size _____ Type _____

• Gravel pack

- From _____ to _____ ft.
- From _____ to _____ ft.

• Grout

- From 0 to 135 ft., Type Cement
- From _____ to _____ ft., Type _____

2. WATER DATA • Water temperature _____ of

- Static water level (unpumped level-measured) 33' 8" ft.
- Stabilized measured pumping water level 144' 10 1/2" ft.
- Stabilized yield 60 gpm after 48 hour
- Natural Flow: Yes _____ No * _____, flow rate: _____ gpm
- Comment on quality Samples to State Lab.

3. WATER ZONES: From 190 To 206

From 208 To 212 From 222 To 226
From 229 To 233 From 352 To _____

4. USE DATA:

Type of use: Drinking * _____, Livestock Watering _____
Irrigation _____, Food processing _____, Household _____
Manufacturing _____, Fire safety _____, Cleaning _____
Recreation _____, Aesthetic _____, Cooling or heating _____
Injection _____, Other _____

• Type of facility: Domestic _____, Public water supply * _____
Public institution _____, Farm _____, Industry _____
Commercial _____, Other _____

5. PUMP DATA: Type _____ • Rated H.P. _____

• Intake depth _____ • Capacity _____ at _____ head

6. WELLHEAD: Type well seal _____

Pressure tank _____ gal., Loc. _____
Sample tap _____, Measurement port _____
Well vent _____, Pressure relief valve _____
Gate valve _____, Check valve (when required) _____
Electrical disconnect switch on power supply _____

7. DISINFECTION: Well disinfected _____ yes _____ no _____

Date _____, Disinfectant used _____
Amount _____, Hours used _____

8. ABANDONMENT (where applicable) • yes _____ no _____

Casing pulled yes _____ no _____ not applicable _____
Plugging grout From _____ to _____ material _____

9. State law requires submitting to the Virginia State Water Control Board information about groundwater and wells for every well made in the State intended for water, or any other non-exempt well. This information must be submitted whether the well is completed, on standby, or abandoned. Information required includes: an accurately and completely prepared water well completion report, full data from any aquifer pumping tests, drill cuttings taken at ten foot intervals (unless exemption is secured), the results of any chemical analyses, and copies of any geophysical logs. Quarterly pumpage and use reports are required from owners of public supply and industrial wells. County or State permits to drill may be required in some parts of the state. Some counties require submission of a water well completion report. The Virginia State Health Department requires a water well completion report for public supply wells.

10. DRILLERS LOG (use additional Sheets if necessary)			11. Drilling Time (Min.)	12. DIAGRAM OF WELL CONSTRUCTION (with dimensions)
DEPTH (feet) From	To	TYPE OF ROCK OR SOIL (color, material, fossils, hardness, etc.)		
0	10	Red clay		
10	30	Decomposed rock and clay		
30	80	Decomposed rock		
80	100	Gray granite with streaks of soft rock		
100	110	Soft gray granite		
110	121	Hard gray granite		
121	135	Soft gray granite with hard streaks		
135	175	Gray granite with streaks of soft granite		(Water zones) 190-206 12 gpm
175	190	Gray granite		208-212 5
190	206	Soft gray granite with streaks of brown weathered rock		222-226 5
206	227	Gray granite with soft streaks		229-233 5
227	423	Gray granite		352- 5

13. Well lot dedicated? _____; Size _____ ft. X _____ ft., Well house? _____
 Distance to nearest pollutant source _____ ft., Type _____
 Distance to nearest property line _____ ft., Building _____ ft.

State Water Control Board Regional Offices

Valley Reg. Off.
 116 North Main Street
 P. O. Box 268
 Bridgewater, Va. 22812
 703-828-2595

Southwest Reg. Off.
 408 East Main Street
 P. O. Box 476
 Abingdon, Va. 24210
 703-628-5183

West Central Reg. Off.
 Executive Park
 5312 Peters Creek Road
 Roanoke, Va. 24019
 703-982-7432

Piedmont Reg. Off.
 4010 West Broad Street
 P. O. Box 6616
 Richmond, Va. 23230
 804-257-1006

Tidewater Reg. Off.
 287 Pembroke Office Park
 Suite 310 Pembroke No. 2
 Va. Beach, Va. 23462
 804-499-8742

Northern Virginia Reg. Off.
 5515 Cherokee Avenue
 Suite 404
 Alexandria, Va. 22312
 703-750-9111

14. WATER SERVICE PIPE: Checked under _____ p.s.i. for _____ minutes. Pipe size _____ inches, Material _____
 Installer _____
 Date _____

15. I certify that the information contained herein is true and correct and that this well and/or system has been installed and constructed in accordance with the requirements for well construction as specified in compliance with appropriate county or independent city ordinances and the laws and rules of the Commonwealth of Virginia.

Signature *Charles Chan* (Seal), Date 6/22/83
 (Well driller or authorized person)
 License No. _____

Town of Hamilton
Hamilton, Va
Well # 4A
Job # 55419-7

6-6-83
Reg 69

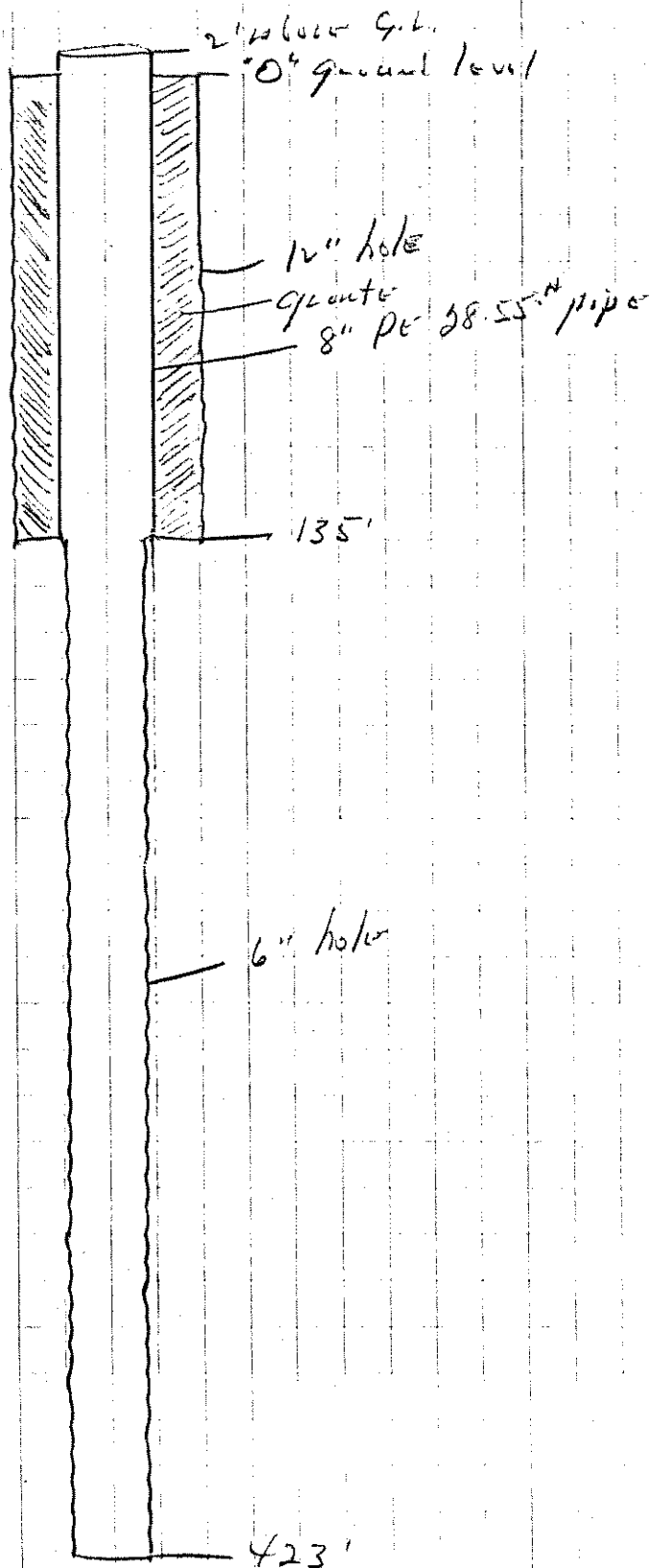
Drilled by

Sylvan Hydrodynamics, Inc.
P.O. Box 27166
Richmond, VA 23261-7166

Driller

Lynn M. Cox

No Scale - Meters



COMMONWEALTH OF VIRGINIA
WATER WELL COMPLETION REPORT

• BWCM No. _____

S. Water Control Board
P. O. Box 11143
2111 North Hamilton St.
Richmond, Va. 23230

(Certification of Completion/County Permit)

County/City LOUDON

County/City Stamp

• Virginia Plane Coordinates
N _____
E _____
Latitude & Longitude
N _____
W _____
• Topo. Map No. _____
• Elevation _____ ft.
• Formation _____
• Lithology _____
• River Basin _____
• Province _____
• Type Logs _____
• Cuttings _____
• Water Analysis _____
• Aquifer Test _____

• Owner Town of Hamilton
• Well Designation or Number #8
Address P.O. Box 130
Hamilton, Virginia 22068
Phone 703-338-4011
• Drilling Contractor Sydnor Hydrodynamics, Inc.
Address P.O. Box 27186
Richmond, Virginia 23261
Phone 804-643-2725

SWCB Permit _____
County Permit _____
Certification of inspecting official:
This well does _____ does not _____
meet code/low requirements.
S. _____
Date _____
For Office Use

Tax Map I.D. No. _____
Subdivision _____
Section _____
Block _____
Lot _____
Class Well I _____, IIA _____
IIB _____, IIIA _____, IIIB _____
IIIC _____, IIID _____, IIIE _____

WELL LOCATION: 50 (feet/miles East direction) of Bates Drive
and 50 feet/miles Sou. (direction) of Downs Court
(If possible please include map showing location marked)

Date started 06/17/83 • Date completed 07/08/83 Type rig Rotary

WELL DATA: New * Reworked _____ Deepened _____
Total depth 392 ft.

Depth to bedrock 7 ft.

• Hole size (Also include reamed zones)
• 12 inches from 0 to 50 ft.
• 6 inches from 50 to 392 ft.
• _____ inches from _____ to _____ ft.

• Casing size (I.D.) and material
• 8 inches from +1 to 50 ft.
Material Steel

Wt. per foot 28.55 or wall thickness _____ in.
• _____ inches from _____ to _____ ft.
Material _____

Wt. per foot _____ or wall thickness _____ in.
• _____ inches from _____ to _____ ft.
Material _____

Wt. per foot _____ or wall thickness _____ in.
• _____ inches from _____ to _____ ft.
Material _____

• Screen size and mesh for each zone (where applicable)

• _____ inches from _____ to _____ ft.
• Mesh size _____ Type _____

• _____ inches from _____ to _____ ft.
• Mesh size _____ Type _____

• _____ inches from _____ to _____ ft.
• Mesh size _____ Type _____

• _____ inches from _____ to _____ ft.
• Mesh size _____ Type _____

• Gravel pack
• From _____ to _____ ft.
• From _____ to _____ ft.

Grout
• From 0 to 50 ft., Type Cement

• From _____ to _____ ft., Type _____

2. WATER DATA • Water temperature 57 °F

• Static water level (unpumped level-measured) 62'6" ft

• Stabilized measured pumping water level 176'11" ft

• Stabilized yield 35 gpm after 48 hours

Natural Flow: Yes _____ No * _____, flow rate _____ gpm

Comment on quality Attach Analysis

3. WATER ZONES: From 244 To 247

From _____ To _____ From _____ To _____

From _____ To _____ From _____ To _____

4. USE DATA:

Type of use: Drinking * _____, Livestock Watering _____

Irrigation _____, Food processing _____, Household _____

Manufacturing _____, Fire safety _____, Cleaning _____

Recreation _____, Aesthetic _____, Cooling or heating _____

Injection _____, Other _____

• Type of facility: Domestic _____, Public water supply * _____

Public institution _____, Farm _____, Industry _____

Commercial _____, Other _____

5. PUMP DATA: Type _____ • Rated H.P. _____

• Intake depth _____ • Capacity _____ at _____ head

6. WELLHEAD: Type well seal _____

Pressure tank _____ gal., Loc. _____

Sample tap _____, Measurement port _____

Well vent _____, Pressure relief valve _____

Gate valve _____, Check valve (when required) _____

Electrical disconnect switch on power supply _____

7. DISINFECTION: Well disinfected _____ yes _____ no _____

Date _____, Disinfectant used _____

Amount _____, Hours used _____

8. ABANDONMENT (where applicable) • yes _____ no _____

Casing pulled yes _____ no _____ not applicable _____

Plugging grout From _____ to _____ material _____

Owner Town of Hamilton

BWCM No. _____

9. State law requires submitting to the Virginia State Water Control Board information about groundwater and wells for every well made in the State intended for water, or any other non-exempt well. This information must be submitted whether the well is completed, on standby, or abandoned. Information required includes: an accurately and completely prepared water well completion report, full data from any aquifer pumping tests, drill cuttings taken at ten foot intervals (unless exemption is secured), the results of any chemical analyses, and copies of any geophysical logs. Quarterly pumpage and use reports are required from owners of public supply and industrial wells. County or State permits to drill may be required in some parts of the state. Some counties require submission of a water well completion report. The Virginia State Health Department requires a water well completion report for public supply wells.

10. DRILLERS LOG (use additional Sheets if necessary)

10. DRILLERS LOG (use additional Sheets if necessary)				11.	12. DIAGRAM OF WELL CONSTRUCTION (with dimensions)
DEPTH (feet)		TYPE OF ROCK OR SOIL	REMARKS	Drilling Time (Min.)	
From	To	(color, material, fossils, hardness, etc.)	(water, caving, cavities, broken, core, shot, (etc.))		
0	1	Top soil			
1	7	Brown clay, shale			
7	18	Decomposed rock with streaks of granite			
18	22	Soft and hard streaks of gray granite			
22	55	Hard dark gray granite			
55	70	Light gray granite			
70	90	Hard dark gray granite			
90	187	Light gray granite with streaks of red			
187	190	Light gray granite			
190	230	Dark gray granite			
230	260	Light gray granite with streaks of red			(Water 244-247)
260	300	Hard dark gray granite			(35 gpm)
300	392	Light gray granite			

13. Well lot dedicated? _____; Size _____ ft. X _____ ft.; Well house? _____
 Distance to nearest pollutant source _____ ft., Type _____
 Distance to nearest property line _____ ft., Building _____ ft.

14. WATER SERVICE PIPE: Checked under _____ p.s.i. for _____ minutes. Pipe size _____ inches, Material _____
 Installer _____
 Date _____

15. I certify that the information contained herein is true and correct and that this well and/or system has been installed and constructed in accordance with the requirements for well construction as specified in compliance with appropriate county or independent city ordinances and the laws and rules of the Commonwealth of Virginia.

State Water Control Board Regional Offices

Valley Reg. Off.
 116 North Main Street
 P. O. Box 268
 Bridgewater, Va. 22812
 703-828-2595

Southwest Reg. Off.
 408 East Main Street
 P. O. Box 476
 Abingdon, Va. 24210
 703-628-5183

West Central Reg. Off.
 Executive Park
 5312 Peters Creek Road
 Roanoke, Va. 24019
 703-982-7432

Piedmont Reg. Off.
 4010 West Broad Street
 P. O. Box 6616
 Richmond, Va. 23230
 804-257-1006

Tidewater Reg. Off.
 287 Pembroke Office Park
 Suite 310 Pembroke No. 2
 Va. Beach, Va. 23462
 804-499-8742

Northern Virginia Reg. Off.
 5515 Cherokee Avenue
 Suite 404
 Alexandria, Va. 22312
 703-750-9111

Signature Chas Chas (Seal), Date 7/20/82
 (Well driller or authorized person)
 License No. _____

Town of Hamilton
London County
Hamilton Ont
Well # 8
Job # 554697

7/8/38
Rig 69

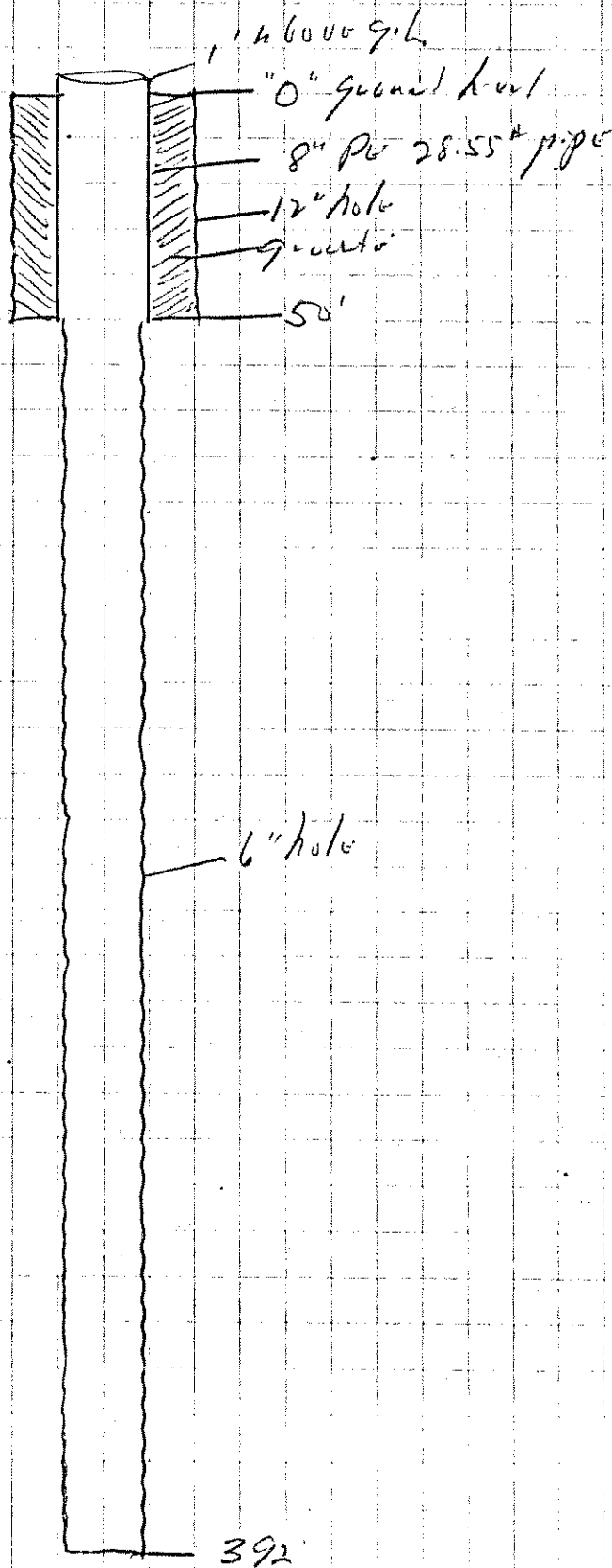
Drilled by

Squadron Hydrodynamic, Inc.
P.O. Box 27186
Richmond, Va 23261-7186

Driller

Lennie Cox

No Scale - Morris



APPENDIX B

Potential Sources of Contamination for Water Customer's Wellhead Protection Areas

Table B.1: Potential Sources of Contamination – Well #1

Classification of Contaminant Source	Distance from Water Source	Ranking
On-Site Sewage System	200 ft	Medium
On-Site Sewage System	230 ft	Medium
On-Site Sewage System	260 ft	Medium
On-Site Sewage System	275 ft	Medium
On-Site Sewage System	380 ft	Medium
On-Site Sewage System	450 ft	Medium
On-Site Sewage System	500 ft	Medium
On-Site Sewage System	600 ft	Medium
On-Site Sewage System	640 ft	Medium
On-Site Sewage System	640 ft	Medium
On-Site Sewage System	675 ft	Medium
On-Site Sewage System	690 ft	Medium
On-Site Sewage System	700 ft	Medium
On-Site Sewage System	880 ft	Medium
On-Site Sewage System	970 ft	Medium
Above ground storage tank	975 ft	Medium
Offset printing & computer typesetting	1570 ft	Medium
Primary Roadways	275 ft	Low
Parking Lots	840 ft	Low
Cemetery	940 ft	Low
Wastewater Treatment Plant	2100 ft	Low
Feed Milling	4080 ft	Low

Table B.2 : Potential Sources of Contamination – Well #2

Classification of Contaminant Source	Distance from Water Source	Ranking
Above ground storage tank	80 ft	Medium
On-site sewage system	580 ft	Medium
On-site sewage system	630 ft	Medium
On-site sewage system	630 ft	Medium
On-site sewage system	680 ft	Medium
On-site sewage system	685 ft	Medium
On-site sewage system	705 ft	Medium
On-site sewage system	820 ft	Medium
On-site sewage system	840 ft	Medium
On-site sewage system	880 ft	Medium
On-site sewage system	910 ft	Medium
On-site sewage system	925 ft	Medium
On-site sewage system	925 ft	Medium
On-site sewage system	925 ft	Medium
On-site sewage system	965 ft	Medium
Offset printing & computer typesetting	2085 ft	Medium
Wastewater treatment plant	1810 ft	Low
Feed Milling	3060 ft	Low

Table B.3 : Potential Sources of Contamination – Well #3

Classification of Contaminant Source	Distance from Water Source	Ranking
On-site sewage systems	160 ft	Medium
On-site sewage systems	230 ft	Medium
On-site sewage systems	365 ft	Medium
On-site sewage systems	405 ft	Medium
On-site sewage systems	460 ft	Medium
On-site sewage systems	540 ft	Medium
On-site sewage systems	545 ft	Medium
On-site sewage systems	610 ft	Medium
On-site sewage systems	660 ft	Medium
On-site sewage systems	660 ft	Medium
On-site sewage systems	730 ft	Medium
On-site sewage systems	760 ft	Medium
On-site sewage systems	770 ft	Medium
On-site sewage systems	775 ft	Medium
On-site sewage systems	870 ft	Medium
Machine Shops	875 ft	Medium
On-site sewage systems	905 ft	Medium
On-site sewage systems	925 ft	Medium
On-site sewage systems	975 ft	Medium
Offset printing & computer typesetting	4640 ft	Medium
Parking Lots	830 ft	Low

Classification of Contaminant Source	Distance from Water Source	Ranking
Water Treatment Plant	2475 ft	Low
Wastewater Treatment Plant	5000 ft	Low

Table B.4 : Potential Sources of Contamination – Well #4

Classification of Contaminant Source	Distance from Water Source	Ranking
On-site sewage system	130 ft	Medium
On-site sewage system	170 ft	Medium
On-site sewage system	215 ft	Medium
On-site sewage system	270 ft	Medium
On-site sewage system	335 ft	Medium
On-site sewage system	360 ft	Medium
On-site sewage system	400 ft	Medium
On-site sewage system	435 ft	Medium
On-site sewage system	460 ft	Medium
On-site sewage system	460 ft	Medium
On-site sewage system	510 ft	Medium
On-site sewage system	515 ft	Medium
On-site sewage system	560 ft	Medium
On-site sewage system	595 ft	Medium
On-site sewage system	630 ft	Medium
On-site sewage system	635 ft	Medium
On-site sewage system	670 ft	Medium

Classification of Contaminant Source	Distance from Water Source	Ranking
On-site sewage system	700 ft	Medium
On-site sewage system	710 ft	Medium
On-site sewage system	710 ft	Medium
On-site sewage system	770 ft	Medium
Above ground storage tank	780 ft	Medium
On-site sewage system	910 ft	Medium
Offset printing & computer typesetting	1550 ft	Medium
Wastewater pump station	530 ft	Low
Wastewater treatment plant	3055 ft	Low
Water treatment plant	4225 ft	Low

Table B.5 : Potential Sources of Contamination – Well #5

Classification of Contaminant Source	Distance from Water Source	Ranking
(5) On-site sewage system	250 ft	Medium
On-site sewage system	260 ft	Medium
On-site sewage system	270 ft	Medium
On-site sewage system	270 ft	Medium
(13) On-site sewage system	290 ft	Medium
On-site sewage system	365 ft	Medium
On-site sewage system	375 ft	Medium
On-site sewage system	425 ft	Medium

Classification of Contaminant Source	Distance from Water Source	Ranking
On-site sewage system	525 ft	Medium
On-site sewage system	540 ft	Medium
On-site sewage system	575 ft	Medium
On-site sewage system	630 ft	Medium
On-site sewage system	690 ft	Medium
On-site sewage system	710 ft	Medium
On-site sewage system	740 ft	Medium
On-site sewage system	790 ft	Medium
On-site sewage system	790 ft	Medium
On-site sewage system	810 ft	Medium
On-site sewage system	845 ft	Medium
Offset printing & computer typesetting	4070 ft	Medium
Water treatment plant	670 ft	Low
Wastewater treatment plant	5060 ft	Low

Table B.6 : Potential Sources of Contamination – Well #6

Classification of Contaminant Source	Distance from Water Source	Ranking
(12) On-site sewage system	120 ft	Medium
On-site sewage system	290 ft	Medium
(5) On-site sewage system	295 ft	Medium
On-site sewage system	390 ft	Medium

Classification of Contaminant Source	Distance from Water Source	Ranking
(4) On-site sewage system	400 ft	Medium
On-site sewage system	455 ft	Medium
On-site sewage system	490 ft	Medium
(4) On-site sewage system	555 ft	Medium
On-site sewage system	560 ft	Medium
On-site sewage system	675 ft	Medium
On-site sewage system	715 ft	Medium
On-site sewage system	720 ft	Medium
On-site sewage system	730 ft	Medium
On-site sewage system	740 ft	Medium
On-site sewage system	865 ft	Medium
Offset printing & computer typesetting	2230 ft	Medium
Water treatment plant	2600 ft	Low
Wastewater treatment plant	3100 ft	Low

Table B.7 : Potential Sources of Contamination – Well #7

Classification of Contaminant Source	Distance from Water Source	Ranking
(11) On-site sewage system	65 ft	Medium
(6) On-site sewage system	260 ft	Medium
On-site sewage system	415 ft	Medium

Classification of Contaminant Source	Distance from Water Source	Ranking
On-site sewage system	480 ft	Medium
On-site sewage system	545 ft	Medium
On-site sewage system	550 ft	Medium
On-site sewage system	700 ft	Medium
On-site sewage system	805 ft	Medium
On-site sewage system	820 ft	Medium
On-site sewage system	840 ft	Medium
Offset printing & computer typesetting	3275 ft	Medium
Water treatment plant	2190 ft	Low
Wastewater treatment plant	4690 ft	Low

Table B.8 : Potential Sources of Contamination – Well #8

Classification of Contaminant Source	Distance from Water Source	Ranking
(12) On-site sewage system	160 ft	Medium
On-site sewage system	260 ft	Medium
(5) On-site sewage system	260 ft	Medium
(4) On-site sewage system	380 ft	Medium
On-site sewage system	380 ft	Medium
On-site sewage system	480 ft	Medium
On-site sewage system	500 ft	Medium
(4) On-site sewage system	570 ft	Medium

Classification of Contaminant Source	Distance from Water Source	Ranking
On-site sewage system	580 ft	Medium
On-site sewage system	720 ft	Medium
On-site sewage system	720 ft	Medium
On-site sewage system	730 ft	Medium
On-site sewage system	765 ft	Medium
On-site sewage system	770 ft	Medium
On-site sewage system	880 ft	Medium
Offset printing & computer typesetting	2200 ft	Medium
Water treatment plant	2650 ft	Low
Wastewater treatment plant	3060 ft	Low

Table B.9: Potential Sources of Contamination – Well #9

Classification of Contaminant Source	Distance from Water Source	Ranking
On-site sewage system	220 ft	Medium
(11) On-site sewage system	230 ft	Medium
On-site sewage system	285 ft	Medium
On-site sewage system	380 ft	Medium
On-site sewage system	475 ft	Medium
On-site sewage system	535 ft	Medium
On-site sewage system	545 ft	Medium
On-site sewage system	555 ft	Medium

Classification of Contaminant Source	Distance from Water Source	Ranking
On-site sewage system	555 ft	Medium
Fuel Storage System	565 ft	Medium
On-site sewage system	665 ft	Medium
On-site sewage system	670 ft	Medium
(4) On-site sewage system	690 ft	Medium
On-site sewage system	695 ft	Medium
On-site sewage system	700 ft	Medium
On-site sewage system	760 ft	Medium
On-site sewage system	785 ft	Medium
On-site sewage system	795 ft	Medium
(4) On-site sewage system	830 ft	Medium
On-site sewage system	965 ft	Medium
On-site sewage system	995 ft	Medium
Offset printing & computer typesetting	2200 ft	Medium
Water treatment plant	3300 ft	Low
Wastewater treatment plant	3700 ft	Low

Table B.10 : Potential Sources of Contamination – Well #10

Classification of Contaminant Source	Distance from Water Source	Ranking
On-site sewage system	430 ft	Medium
On-site sewage system	955 ft	Medium
Water treatment plant	1750 ft	Low

Aerial Photography (C) 2002
Commonwealth of Virginia



Legend

1 Mile Radius = WHPA

Potential Sources of Contamination

- Other
- Above ground storage tank (> 660 gallons)
- Cemetery
- Fuel Storage Systems
- Machine Shops
- On-site sewage system
- Parking Lots
- Primary Roadways
- Wastewater Pump Station
- Wastewater Treatment Facility

Figure B.1
Potential Sources Of Contamination

APPENDIX C

Various Potential Sources of Contamination



According to the Virginia Ground Water Protection Steering Committee, the following land uses can pose threats to ground water. This is provided to demonstrate potential sources the Town should be aware of and plan for. Many of the following sources of pollution are not currently present in the Town of Water Customer's source water protection areas, but citizens should be aware of their potential impact and keep them in mind for future plans for the area.

Residential

Threats to ground water from residential uses are normally less acute on a case-by-case basis than those from other, more intensive, land uses. The cumulative effect from many residents in an area can prove to be a serious problem, however, especially if owners are unaware of the numerous potential contaminants that can be found in the home and yard and the proper methods for their use and disposal. Examples of potential residential sources include:

- On-site septic systems (e.g. nitrates, bacteria and viruses, household cleaners)
- Sewer lines
- Fuel storage
- Lawn chemicals (e.g. pesticides, fertilizers)
- Automotive and pool chemicals
- Storm water
- Abandoned wells
- Road deicing operations (e.g. road salt)
- Household activities chemicals (e.g. solvents, paints, household cleaners)

Industrial

Industrial operations commonly use toxic substance as part of manufacturing, warehousing, and/or distribution. Materials such as chemicals, petroleum, cleaning supplies, machinery, metals, electronic products, asphalt, and others pose a potential threat unless carefully managed. Activities representing the greatest concern include the following.

- Mining, quarrying
- Pipelines
- Storage tanks (above and underground)
- Operating and abandoned wells (e.g., gas, oil, water, monitoring and exploration)
- Septage and sludge lagoons
- Land application of sludge

Even small quantities of toxic and hazardous waste chemicals can contaminate water resources. These chemicals should never be put directly into the ground and their containers should not be discarded on the ground, or in the trash.

Underground storage of hazardous materials has historically been a significant source of groundwater contamination. Even a small leak can contaminate a substantial amount of water.

Commercial

Many commercial operations use toxic and hazardous materials in their processes. The storage, use and disposal of chemicals required by these operations can pose a potential threat to ground water, since even small amounts of the hazardous materials can contaminate large amounts of ground water. Specific examples of land uses of concern include:

- Auto repair shops, gas stations (e.g. oils, greases, solvents, antifreeze, gasoline)
- Road maintenance depots, de-icing operations
- Boat yards, railroad tracks and yards, airports
- Construction areas
- Dry cleaners, Laundromats
- Medical institutions, research laboratories
- Photography establishments, printers
- Golf courses (chemical application)

Agricultural

Chemical usage associated with farming activities can present a contamination threat to underlying ground water. Pesticides, fungicides, and fertilizers can leach through the soil to the water below when applied improperly in the field. They also have the potential to leak from any storage containers into the ground. Animal feedlots and livestock operations can create excessive nitrate/nitrite and bacteriological problems if animal waste loads, whether dry or liquid, are high and ground water is shallow or the soil is permeable. Specific concerns for farming include:

- Pesticides, fungicides
- Fertilizers
- Feedlots, confined animal feeding operations

Waste Management

Disposal of wastes must be handled carefully to prevent contamination of ground water. Older landfills in particular can threaten ground water. In lined landfills, reliance is placed on the liner not failing after a number of years. Landfills are known sources of contamination and typically result in pollutants including nutrients, metals and hydrocarbons. The need to manage “waste” stormwater is created by most development – residential, commercial and industrial – since impervious surface prevent rain from soaking into the soil. Sites of greatest concern can include:

- Landfills
- Impervious surfaces
- Basins, lagoons

Transportation

Facilities moving potentially contaminating liquids or materials through an area can result in spills and accidents in locations near public water supplies. Preventing escape of such materials is crucial as is rapid response. Specific sources of concern may include:

- Pipelines
- Highways
- Airports
- Rail lines

APPENDIX D
Sample Emergency Response Plan

SAMPLE EMERGENCY CONTINGENCY PLAN

Contingency planning is the development and implementation of both long and short-term drinking water supply replacement strategies for supplying safe drinking water to the customer in the event of contamination or physical disruption. The Source Water Emergency Contingency Plan included below describes steps to follow in the event that a natural or man-made disaster makes the water source unusable. This plan is not designed to cover all occurrences, rather it contains essential information that would be needed if the source water supply were directly affected.

Emergency Response Personnel

The Town of Water Customers has designated an **Emergency Response Leader and Alternates** that will be responsible for responding to emergency situations concerning the source water. The following emergency response personnel should be contacted immediately in the event of an emergency.

Emergency Response Personnel and Critical Water Users

	Emergency Response Leader	1 st Alternate
Name	Water Operator	Town Mayor
Title	Water Supervisor	
Day Phone		
Cell		
Pager		
Day Address		
Night Phone		
Night Address		

It is important that the public agencies and the political subdivisions within the Commonwealth of Virginia cooperate and work together to address emergencies quickly and effectively. The Emergency Response Leader (or Alternate) has the responsibility for the

following duties in preventing, mitigating and responding to situations which potentially threaten public water supplies based on ground water sources:

- participate in preparation of the emergency operations plan;
- provide information about the location, physical characteristics and equipment at each ground water based public water supply;
- identify a 24 hour- 7 day contact person and phone number for each public water supply system based on ground water sources;
- provide maps indicating the location of each public water supply well and any are zoned or designated as a Wellhead Protection Area;
- assist the owners of a public water supply system and emergency response personnel in notifying customers of the existence of potential risks; and
- assist water supply owners in arranging for alternate water sources if this should prove necessary.

A complete list of emergency contact phone numbers is provided in Figure D.1.

EMERGENCY TELEPHONE NUMBERS

<u>List of Emergency Telephone Numbers</u>	Day Phone	Cell Phone	Night Phone
Water Utility			
Water Utility Officer			
Water Utility Manager			
Water Utility Field Employee			
Water Utility Field Employee			
RWD Board Chairman, or Mayor			
Local Government			
City Hall			
Mayor			
Fire Department			
Police Department			
Sheriff Department			
County Emergency Preparedness			
Clerk/Administrator			
School Superintendent			
Hospital Administrator			
State Government			
VDH District Office			
VDH Bureau of Water			
Division of Emergency Management			
Department of Transportation			
Red Cross Disaster Chairman			
Federal Government			
National Response Center			

EPA (Spills)			
Media			
Radio			
Television			
Newspaper			
Critical Water Users On System			
Utilities			
Electric Utility			
Gas Company			
Virginia Rural Water Assoc. Rep.			
Well Driller			
Pump Installer			
Emergency Water Hauler			
Emergency Water Supplier			
System Information			
Industries serviced by the system			
Average summer use (gal/day)			
Winter Use (gal/day)			
Peak System Use (gal/day)			
Well locations			
Treatment			
Storage tanks			
Other Information			

Emergency Due To Source Water Contamination

It is important that emergency personnel know of all source waters that contribute to the water supply system. Time of travel to ground water sources is long compared to surface waters, however, in groundwater there may be less dilution and contaminants could remain in the soil for years unless quick response prevents infiltration.

The following actions should be taken by the water system's designated emergency response leader and alternates:

1. If accidental chemical spill occurs near or up-gradient of the water source, contact local **fire department** (*phone number*), **county emergency preparedness coordinator** (*phone number*), and appropriate law enforcement agency (**sheriff's department**) (*phone number*).
2. Notify **VDH District Office** of possible contamination emergency (*phone number*).
3. Stop pumping water from at risk or suspected contaminated water source and isolate the suspected source from the water system. See map at end of plan.
4. Fill all water storage tanks utilizing uncontaminated water sources.
5. If there is any risk that contaminated water was introduced into the system, which poses an immediate health risk, notify the public through use of media.
 - a. Notify users if emergency disinfection of drinking water is recommended.
 - b. Advise public as to the expected duration of the emergency.
 - c. Ask for conservation, if necessary.
 - d. Advise, if necessary, that potable water is available at (*location*) with limits for drinking and cooking.
 - e. Advise public when water is available for sanitation.
 - f. Advise public when conditions are normal.
6. Notify all critical water users (hospitals, industries...etc.) of water emergency.
7. Implement emergency water conservation measures.
8. Begin most appropriate contingency action for providing short-term or long-term supply of drinking water to public.
9. In co-operation with VDH and other appropriate state and federal agencies, begin cleanup/remediation of contaminated water source (and distribution system if also affected.)

Emergency Due to Source Water Shortage

In the event of a drought or power/equipment failure, the actions to be taken by water system's designated emergency response leader and alternates are as follows:

1. Notify **VDH District Office of Source Water Shortage** (*phone number*).
2. Implement emergency water conservation measures.
3. Begin most appropriate contingency action for providing short-term or long-term supply of drinking water to public.

Water System Map

Attached as Figure D.2 is a copy of the current map showing locations of valves, lines, etc., with sufficient detail to allow others to locate valve(s) needed to isolate water source(s) from system.