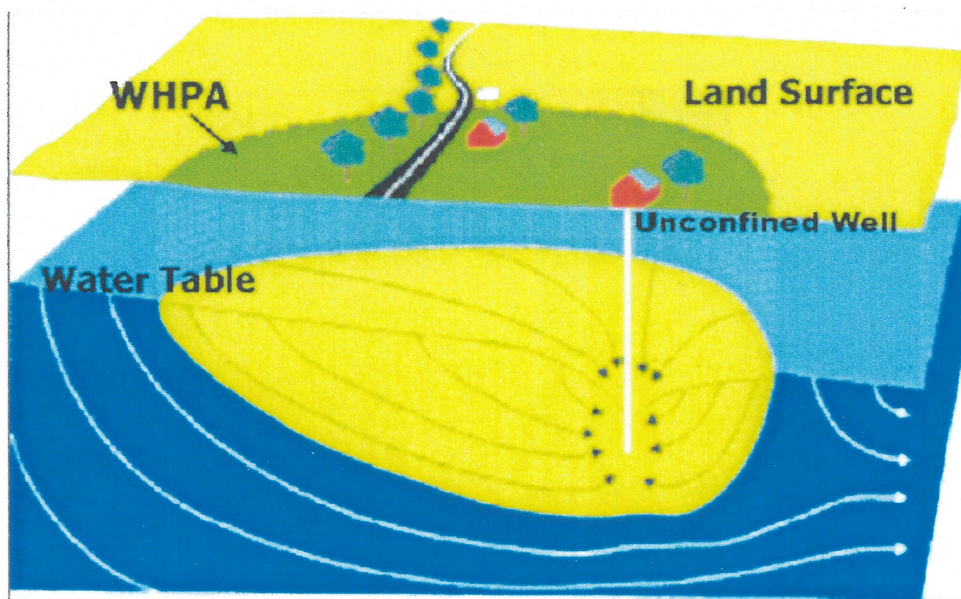


Source Water Assessment

For Transient Water Systems
Wicomico County, Maryland



Prepared By
Maryland Department of the Environment
Water Management Administration
Water Supply Program
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Summary

The Maryland Department of the Environment's Water Supply Program (WSP) has conducted a Source Water Assessment for 53 transient noncommunity water systems in Wicomico County. The required components of this report as described in Maryland's Source Water Assessment Program (SWAP) are: 1) delineation of an area that contributes water to the source; 2) identification of potential sources of contamination; and 3) determination of the susceptibility of the water supply to contamination. Recommendations for protecting the drinking water supply conclude this report.

Confined aquifers protect water supplies from contaminants originating on the land surface. Transient water supply systems in Wicomico County use both confined and unconfined aquifers. Fifty-five wells supply Wicomico County's 53 transient systems. Thirteen of these are completed in confined aquifers and 42 are completed in unconfined aquifers. The Source Water Assessment Areas for all unconfined wells were delineated by the WSP using EPA approved methods specifically designed for each source.

Potential point sources of contamination within the assessment areas were identified from field inspections and contaminant inventory databases. Common potential sources of contamination are on-site septic systems and underground storage tanks. The Maryland Office of Planning's 2000 land use map for Wicomico County was used to determine the distribution of land use present in each assessment area. Cropland, commercial, and forest uses were most commonly identified within the assessment areas. Figures showing well locations, assessment areas and potential contaminant sources overlain on aerial photographs were produced for all of the unconfined sources.

For each system, the WSP reviewed water quality results, along with the presence of potential sources of contamination in the individual assessment areas, the integrity of the system's well, and the inherent vulnerability of the aquifer. It was determined that some of the transient systems are susceptible to contamination by nitrates, volatile organic compounds, and microbiological contaminants. Sources using confined aquifers were determined not to be susceptible to these contaminants. Table 2 highlights those systems with nearby sources of volatile organic compounds, and Table 8 summarizes the susceptibility analysis for nitrates and microbiological contaminants. Most of the supply sources were not found to be susceptible to these contaminants.

INTRODUCTION

The Water Supply Program (WSP) has conducted a Source Water Assessment for 53 transient noncommunity water systems in Wicomico County (Figure 1). As defined in Maryland's Source Water Assessment Plan (SWAP), a transient noncommunity water system is any noncommunity water system that does not regularly serve at least 25 of the same individuals over 6 months per year. Some good examples of transient water systems include hotels, restaurants, parks, fire departments, and churches. Each transient system must sample for two contaminants. The first is coliform, which is an indicator of microbiological contaminants that could be in the water supply. Systems are required to test for coliform regularly. Additional sampling is required for fecal coliform and at other sample taps following positive coliform results. The second contaminant is nitrogen in the form of nitrate and nitrite. This SWAP report will focus on these two contaminants, but will address other obvious potential sources of contamination.

Wicomico County is located on the lower Eastern Shore portion of the State and is part of the Coastal Plain physiographic province. The Coastal Plain, geologically the youngest province in Maryland, covers nearly half of the State and consists entirely of unconsolidated sediments. All of the transient water supplies obtain their water from wells of various size and depth. Some of these wells are completed in confined aquifers, while others are using unconfined aquifers. Depth of well, lithology, and nitrate data were used to determine whether the wells are in confined or unconfined aquifers. An accurate determination of the aquifer type is very important because systems using confined aquifers are generally not vulnerable to contaminants present on the land surface or the shallow aquifer system.

WELL INFORMATION

Well information for each system was obtained from the WSP's database, site visits, well completion reports, sanitary survey inspection reports, and published reports. A total of 55 wells are used by the 53 transient systems assessed in this report. The well tag number, which provides vital well information, was found for 47 of the 55 wells. Table 1 contains a summary of the well information for each system. From the well tag information, ground water appropriation data, and with the nitrate sampling data it was concluded that 13 wells are completed in confined aquifers (Aquifer code "C"). The remaining 42 wells are completed in unconfined aquifers (Aquifer code "U").

The location information in the state's database for the wells used by Wicomico Co. transient systems was good at the start of this project. However, it was decided that more accurate well locational information would have to be obtained. This additional precision would assure that delineated well contribution areas for systems using unconfined aquifers would be accurate. Locations of all the unconfined wells were taken with a GPS and differentially corrected to increase the precision of each location. Along with the GPS point any wellhead deficiencies are noted during the site visit.

An important aspect of the susceptibility of a ground water supply is the integrity of the well. The age, construction details and maintenance of the well affect its integrity, and protection against microbiological contamination. Information was found that at least 43 of the 55 wells were completed after 1973, which is when the state adopted the well completion standards for wells. The well completion standards set construction guidelines for well construction including requiring that all wells be grouted.

A review of the sanitary surveys was done to determine if wellheads could be a source of bacteriological contamination to some water systems. Sanitary surveys showed that a few wellheads needed some type of improvement. Improvements for some systems are as simple as replacing an old one-piece style cap with a new insect-proof two-piece type. Previous testing has shown that insects nesting under well caps fall into wells thereby contaminating the water with coliform organisms. Wellhead improvements should be made at these locations to reduce the risk of positive bacteriological samples.

HYDROGEOLOGY

Wicomico County is located in the lower Eastern Shore of Maryland. The entire county is located in the Coastal Plain physiographic province. All of the wells in Wicomico County draw water from unconsolidated sediments. Ground water flows through pores between gravel, sand, and silt grains in unconsolidated sedimentary aquifers. Confined aquifers are those formations that are overlain by a confining layer consisting of clay or fine silt (Figure 2). This confining layer allows very little water to travel vertically through it. Unconfined aquifers are those formations that do not have a continuous confining layer above them. Unconfined aquifers are also known as water table aquifers. Precipitation that falls on the ground surface infiltrates directly into the unconfined aquifer in a short time. The unconsolidated sediment formations possess a large quantity of ground water. Transient water systems in Wicomico County pump water from one of four aquifers. The first, and the shallowest in Wicomico County, is the Quaternary Aquifer. The Quaternary Aquifer is always considered unconfined in Wicomico County. The second aquifer is the Pocomoke Aquifer. This aquifer can be confined or unconfined depending on where in Wicomico County the well is drilled. The third aquifer is the Manokin Aquifer. All but one transient system is drawing from this aquifer in southern Wicomico County, where it is confined. The deepest aquifer that Wicomico County transient systems draw from is the Frederica. The Frederica Aquifer is always confined in Wicomico County (DNR, 1987).

Quaternary Aquifer (110C)

The Quaternary Formation contains the youngest deposits on the Eastern Shore. Most of this formation is sand and gravel with some layers of silty clay and clay. These clay layers are broken and thin enough that true confining layers are not present. These clay layers do however slow down the percolating water somewhat. The Beaverdam Sand, Pensauken Formation, and the paleochannel all make up the Quaternary Aquifer. The paleochannel lies to the north west side of Salisbury. The paleochannel is a valley of coarse sand, gravel, and cobble deposits within the Manokin Formation hydraulically connected to the Quaternary

Aquifer. It is believed that an ancient river cut into the Manokin Aquifer sediments and deposited the cobble and gravel (Weigle, Mack, Thomas, 1972). A detailed description of the Quaternary Aquifer in the Salisbury area may be obtained in Maryland Geological Survey Report Of Investigations No. 65 (Andreasen and Smith, 1997). The thickness of the Quaternary deposits range from 0 to over 100 feet across Wicomico County. This aquifer sand thickness varies somewhat, but not exclusively on the land topography. The quantity of water available from this aquifer is very high. The water quality of the Quaternary Formation can vary depending on the local soil types and land use. Water quality impacts from farming and high-density development with on site septic systems can lead to elevated nitrate levels and pesticide contamination. Low pH along with high iron could be a concern in some areas where there is more clay and silt. In these areas the percolation rate is slower allowing iron to dissolve in the water (DNR, 1987).

Pocomoke Aquifer (122I)

The Pocomoke Aquifer is sandwiched between the shallow Quaternary Aquifer and the Manokin Aquifer in eastern Wicomico County. The Pocomoke Aquifer thickness ranges from 0 to over 100 feet thick in eastern Wicomico County. The Pocomoke Aquifer extends west to Salisbury where it becomes too thin to be a viable aquifer. Water from this formation could be used without treatment in some areas, but in most areas the water is acidic and contains iron (DNR, 1987).

Manokin Aquifer (122G)

The Manokin Aquifer is confined across most of Wicomico County. In eastern Wicomico County the Manokin Aquifer lies underneath the Pocomoke Aquifer. In the western part of the county the Quaternary Aquifer directly overlies the Manokin Aquifer. In this area wells thought to be drilled in the Manokin Aquifer could be unconfined due to the erosion of the upper confining layer. The water from the Manokin Aquifer more than likely has to be treated for iron and/or acidity (DNR, 1987).

Frederica Aquifer (122F)

The Frederica Aquifer is the deepest aquifer that the Wicomico County transient systems withdraw water from. The Frederica Aquifer is confined everywhere in Wicomico County. The average thickness of this aquifer is 100 feet. Overall the water is a good source of drinking water, but as with most confined aquifers the chemical characteristics can be undesirable in some locations (DNR, 1987).

SOURCE WATER ASSESSMENT AREA DELINEATION

When Maryland's SWAP was written the method for delineating an assessment area for the unconfined transient systems using <10,000 gpd was not yet determined. An ongoing study between the United States Geological Survey and MDE assisted MDE in selecting an appropriate method. One of the objectives of this study was to determine ground water flow paths for systems pumping <10000 gpd in unconfined Coastal Plain

aquifers. The study concluded that small users, pumping <10,000 gpd, have very little effect on the ambient ground water flow in unconfined aquifers. Using this information MDE created a wedge shape delineation area that will be used for all the transient systems using <10,000 gpd from unconfined aquifers, where the general direction of ground water flow is known. The wedge is based on an annual recharge of 1 ft and ground water flow direction. The wedge shape has an angle of 60 degrees that extends against the ground water flow direction for a length of 1000-ft (Figure 3). The wedge was created to compensate for uncertainties in ground water flow direction and to provide sufficient recharge area to balance a withdraw of 10,000 gpd. A circle with a radius of 1000 ft will be used for all systems that pump from unconfined aquifers in locations where there are uncertainties on ground water flow direction. As defined in Maryland's SWAP, no delineation area will be created for the transient systems drawing from confined sources. This is because the monitoring of these wells for their regulated contaminants and geologic protection has established that they are not vulnerable to contamination. The assessment focuses on the integrity of their water supply well(s), see well information section.

POTENTIAL SOURCES OF CONTAMINATION

As stated in the introduction, the focus of this SWAP is on the sources of contamination that could cause a coliform or nitrite/nitrate problem in water supplies using unconfined aquifers. Potential sources of contamination can be broken into two types. The first type is a point source contamination. Some examples of potential point source contaminants would be feed lots, ground water discharge permits, and underground storage tanks. The second type of potential sources of contaminants is non-point sources. Some types of non-point sources can include general row-crop farming; land application of waste, pesticide and herbicide application, and various land uses. On-site septic systems are often referred to as non-point pollution as they are very common in non-sewered residential areas. Over 40,000 households in Wicomico County rely on on-site sewerage disposal for domestic wastes. In this project the location of some septic systems were identified. Therefore they have been included with point sources.

Point Sources

Thirty-two potential point sources of contamination have been identified within the 30 source water assessment areas. The WSP has located and mapped 18 on-site septic absorption fields for the 40 unconfined transient systems in Wicomico Co. Of the 18 mapped septic absorption fields 15 are located inside the zone of contribution for the system's well. The WSP also located and mapped 4 septic tanks near supply wells. Three of the 4 septic tanks are inside the zone of contribution of the supply well. If extensive research and fieldwork were done we would find more systems with on-site septic systems within the zone of contribution for their well. There are 2 hazardous waste generators within the 30 source water assessment areas. Fortunately there are no CERCLA sites within any of the zones of contribution. Four ground water discharge sites were found within the 30 SWAP areas. Two of the 4 are no longer active. Using the WSP's current underground storage tanks (USTs) geographic information there were 2

SWAP areas with active tanks (Table 2 and 3). During the site visits to the unconfined systems, locations of 11 other USTs were taken with a GPS. Of these 11 another 5 were within the zone of contribution. Although the Volatile Organic Compounds (VOC), which are the main contaminants of concern with UST's, are not sampled for under the current Transient System Regulations, UST sites were mapped. All of the potential point sources of contaminants in source water assessment areas for unconfined wells are identified in figures 4a-4z. Figure 1 shows where each individual system is located within the county.

Non-Point Sources

The Maryland Office of Planning's (MOP) 2000 Land Use map for Wicomico County was used to identify predominant types of land use within the SWAP areas (Figure 5). The three largest proportions of land use for the SWAP areas are cropland, commercial, and forest at 23.2, 18.1, and 17.1% respectively. The next land use is low density residential at 15.8%. These four land uses make up 74.2% of the total land area. The next 3 land uses; medium density residential, institutional, and open urban land contribute another 19.5% (Figure 6). These types of land use would be expected since most of the systems are located in small population centers in a rural county. Ground water contamination of unconfined aquifers is possible from a high density of multiple on-site septic systems, or from over fertilization of lawns and cropland.

The Maryland Office of Planning 1996 Wicomico County Sewer map shows that only 4.3 percent of the land area within the county currently has sewer service (Figure 7). Another 0.9 percent is expected to have sewer service in 3 to 5 years. An additional 0.4 percent is scheduled to receive service in 6 to 10 years. At this time there are no plans to provide any new sewer service to the other 94.4 percent of Wicomico County.

WATER QUALITY DATA

Water quality data was reviewed from the Water Supply Program's database for Safe Drinking Water Act (SDWA) contaminants. All data reported is from the water supplied to consumers also known as finished water. 14 out of the 53 Wicomico County Transient Systems are known to have some type of water treatment. Table 3 summarizes the treatment methods and the reason for that treatment. Only 2 of the systems use disinfection. If coliforms in the finished water for the other 51 systems are not present, this data can be used to evaluate ground water or source water quality. A review of the monitoring data, Table 5 and Table 6, indicates that the finished water supplied by the transient systems is also meeting health standards.

Nitrogen compounds

Water quality data indicates that 20 of the 53 systems have had at least one nitrate sample that was >50% of the SDWA maximum contaminate level (MCL) standard of 10 ppm (Table 6). Table 7 shows all of the nitrate samples that were

above 50% of the MCL for the transient systems in Wicomico County. If the result exceeded 10 ppm, which is the MCL for nitrate, it is shown in bold.

None of the systems had nitrite results that exceeded even 50% of the MCL of 1 PPM.

Microbiological Contaminants

All of the transient water suppliers are routinely sampled at least annually for microbiological contamination. If this routine sample is positive the system must then resample within 24 hours of notification of the sample results, or as soon as possible. This bacteriological sampling is required by the SDWA (Table 5). Forty-one of the systems have never had a positive bacteriological sample. 7 systems have had more than 25 percent of their bacteriological samples come back positive since 1996. Surprisingly 3 of the 7 systems are drawing water from confined aquifers. These confined aquifers are free of any living coliform bacteria. This is evidence on how easy it is to contaminate a water supply with total coliform from a fouled ion-exchange unit or during distribution repairs. Only one of the systems has ever had a positive fecal coliform sample. This positive was not confirmed when they resampled seven days later. The excellent bacteriological results are proof that the unconsolidated sediments are very efficient at filtering the percolating water.

SUSCEPTIBILITY ANALYSIS

Wells serving the transient water systems in Wicomico County all draw their water from wells in unconsolidated sedimentary aquifers. Some of these wells are in confined aquifers and others are in unconfined aquifers. Water supplied from confined aquifers is protected, if the well is constructed correctly, and the wells are not susceptible to contamination from surface activity. Water withdrawn from wells in unconfined aquifers are more susceptible to contamination from surface activities. Wicomico County's unconsolidated sediments, and soil, provide protection from microbiological contamination as water percolates through the overlying soil and aquifer sediments. The lack of positive fecal samples proves this efficiency. However, nitrate and other water-soluble contaminants can percolate through the soil and contaminate unconfined wells. This is evident in the elevated nitrate levels in a few unconfined wells (see Table 6).

Inorganic Compounds

Nitrate was found to be 5 ppm or greater in 20 of the 53 systems. TJ's Market has the highest nitrate levels of the transient systems. This high nitrate level looks to be coming from the agricultural activity around this system. Seven Eleven Food Store also has had nitrate levels above the 10ppm MCL. Agriculture looks to be the cause of the high nitrate levels in the ground water in this area too. These two systems may want to consider drilling deeper wells into a confined aquifer. The rest of the systems with elevated nitrate level seem to have a mix of agriculture, residential and commercial land use within their SWAP areas. One or all of the following: farming, multiple on-site septic systems, or some other commercial

activity may be the source of the elevated nitrate in these areas. Some of these systems may want to drill deeper wells to alleviate their nitrate problem.

Microbiological Contaminants

As stated earlier in this report, if there are no well construction problems with a well drawing from a confined aquifer the supply should be safe from microbiological contamination. A review of Table 5 indicates that 3 of the 13 confined systems have had at least one positive total coliform sample in the past five years. These 3 systems most likely have or have had at one time a fouled ion-exchange unit. Storage or a distribution problem or repair can also introduce the coliform into the system. Correctly disinfecting the water system is very important after pulling a well pump or completing improvements to the distribution system. Wells may also be physically damaged from a vehicle hitting the well and providing a route for microbial contaminants to enter a well.

The wells drawing from unconfined aquifers could be contaminated from various sources. However, a source of microbiologic contamination would have to be very close to a well because of the high filtration effectiveness of the unconsolidated soils. Maryland regulations require at least 100 feet between on-site septic systems and unconfined wells. This distance is adequate to prevent microbial (bacteriological) contamination from on-site septic systems unless there is a major construction problem in either the well or on-site septic system. If a well was not grouted or if the casing was damaged, a well would be susceptible to surficial sources of pathogens. Surface water can carry contaminants down a well if these conditions are present. Wells that are subject to flooding or wells finished just above grade may need to be sampled following rain events to ensure their integrity. As with the confined systems positive bacteriological samples are most likely from the storage and/or distribution problems.

SUMMARY AND RECOMMENDATIONS FOR PROTECTING WATER SUPPLIES

Key Findings:

This report identified transient water supplies in Wicomico County as being more likely to be contaminated by nitrate or nitrite nitrogen than microbial contaminants. The source of nitrate contamination in most cases looks to be from agriculture. Agricultural land use was the most common type of land use within the SWAP areas. Sources of microbial contamination, however, are not believed to be related to ground water contamination, but rather the maintenance of the integrity of the individual water supply system. The report also identified specific areas (SWAP areas) immediately surrounding the transient water supply sources as those that have the greatest potential to influence the quality of the water supply. On-site septic systems were the most commonly identified point source threat in these areas. The recommendations that immediately follow are a result of these key findings.

Recommendations for Individual Water System Owners

- The sanitary integrity of the water supply system must be maintained. Sanitary defects noted in MDE's sanitary surveys should be corrected. All work on the water system should be performed in a sanitary manner and followed with a one-time disinfection.
- Coliform testing results are a good indication if the sanitary integrity of the system has been affected. All positive results should be investigated to determine the cause of the positive tests. Corrective action should be taken to eliminate the source of the problem. Any sources with confirmed fecal contamination must be rehabilitated or abandoned.
- Installing new two-piece well caps is a good way to reduce potential contamination from insects. Caulking of the electrical conduit is needed to ensure a sanitary seal.
- Any wells in areas subject to flooding or just above grade should be sampled following significant rain events to demonstrate if they are sensitive to flooding impacts.
- Water systems for seasonal facilities should be disinfected and flushed prior to the opening of a new season.
- Wells identified to be at risk to contamination from underground storage tanks (USTs) should be sampled for Volatile Organic Compounds (VOCs). While not a regulatory requirement, it will help protect the health of regular consumers.
- Wells should be protected from damage by vehicles or other machinery. If a well is or was damaged, it should be repaired. All work on wells should be followed by disinfection to avoid contamination of the water supply.
- Owners should keep track of potential changes in land use that might impact their water supply. Letting neighboring property owners and local officials know their concerns can prevent problems from occurring. The individual maps of Figure 4 should be a useful starting point as these identify the specific areas that have the greatest potential to impact the water quality of each water supply.

Recommendations for County and Enforcement Officials

- Continue regular inspection, oversight and testing of transient noncommunity water systems. Ensure that systems correct the cause of positive bacteriological test results.
- Test results show that some systems have a high percentage of positive results. Priority should be placed on those systems that have not corrected the root causes of past positive results.
- Encourage planting of cover crops for fields upgradient of water supplies, particularly if systems are experiencing nitrate levels greater than 50% of the MCL.
- Consider working with systems to collect VOC samples for systems in the Quaternary Aquifer in proximity to USTs (see Tables 3 and 4). Positive results for petroleum compounds should be alerted to MDE's Oil Control Program and Water Supply Program.
- Wicomico County should consider petitioning the City of Salisbury to extend water service to areas around Salisbury and major road corridors extending

from the City. This report shows that there are many potential sources of contamination near Salisbury, which could contaminate nearby drinking water wells.

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Other Sources of Data

Water Appropriation and Use Permits
Wicomico County Sanitary Survey Inspection Reports
MDE Water Supply Program (PDWIS) Database
MDE Waste Management Sites Database
Department of Natural Resources Digital Orthophoto Quarter Quadrangles
USGS Topographic 7.5 Minute Quadrangles
Maryland Office of Planning 2000 Wicomico County Land Use Map
Maryland Office of Planning 1996 Wicomico County Sewer Map

PWSID	System Name	Source #	Plant #	Use Code	Ground Water Appropriation	Aquifer Code	Aquifer Type	Well Tag #	Casing Depth	Well Depth
1220047	PARK SEVENTH DAY ADVENTIST SCHOOL	2	2	P	WI1984G023	110C	U	WI882960	77	80
1220047	PARK SEVENTH DAY ADVENTIST SCHOOL	1	1	P	WI1984G023	110C	U			
1221007	B & J MARKET	1	1	P		9999	U	WI930284		
1221020	CHEROKEE LANES	1	1	P	WI1989G028	110C	U	WI880948	55	65
1221021	CHRIST UMC	3	1	P	WI1982G002	110C	U	WI944695	83	93
1221023	COUNTRYSIDE MARKET & DELI	1	1	P	WI1988G013	122G	C	WI881998	100	110
1221037	GREEN HILL YACHT & CC [CLUBHOUSE]	1	1	P	WI1963G007	110C	U	WI814701	65	70
1221039	HEBRON MINI MARKET DELI	1	1	P	WI1974G028	110C	U	WI882046	80	90
1221048	HUNAN PALACE	1	1	P	WI1969G005	110C	U	WI690052		
1221049	PHIPPINS 50 WEST RESTAURANT	1	1	P		9999	U			
1221056	MARDELA DASH-IN	1	1	P	WI1983G030	122F	C	WI810832	280	295
1221057	MASSEYS VILLAGE INN	1	1	P	WI1967G027	110C	U	WI670145	44	63
1221072	POWELLVILLE STORE	1	1	P		9999	U			
1221073	POWELLVILLE VOL FIRE CO	5	1	P	WI1977G022	122I	C	WI944118	150	160
1221074	POWER HOUSE CHURCH OF GOD	1	1	P	WI1983G014	122G	C	WI811099	150	160
1221075	RED ROOST	1	1	P	WI1971G019	122G	C	WI710189	100	110
1221076	ROARING POINT WATERFRONT CAMPGROUND	1	1	P	WI1975G010	122G	C	WI731624	90	100
1221079	SANDY HILL FAMILY CAMP	1	1	P		9999	U			
1221085	TJ'S MARKET	1	1	P	WI1982G012	110C	U	WI810146	95	100
1221093	TRAVELER MOTEL	1	1	P	WI1974G009	110C	U	WI730566	60	68
1221097	BOONIE'S RESTAURANT & BAR	1	1	P		9999	U	WI944244		
1221098	NORTH SALISBURY SQUARE	1	1	P		9999	U			
1221099	AMERICAN LEGION # 269	1	1	P	WI1976G004	110C	U	WI810715	70	75
1221101	WOODLAWN FAMILY CAMPING	1	1	P	WI1987G005	110C	U	WI813896	55	75
1221108	JOSEPH HOUSE CENTER	1	1	P		110C	U	WI810834	68	73
1221109	K & J MARKET	1	1	P	WI1983G015	122I	C	WI810473	96	101
1221115	MIDWAY MINI MARKET	1	1	P	WI1979G006	110C	U	WI880299	105	115
1221116	SHORE STOP #225 [HEBRON]	1	1	P	WI1987G020	122G	U	WI881713	142	152
1221117	CROSS ROADS MARKET	1	1	P	WI1975G022	122G	C	WI881288	130	140
1221120	SHORE STOP #44 [SALISBURY]	1	1	P	WI1969G006	122G	C	WI881432	87	97
1221130	DELMARVA INN/ SEAGULL RESTAURANT	1	1	P	WI1959G006	110C	U	WI710165	94	110
1221131	EXPRESS LANE INC	1	1	P	WI1991G008	110C	U	WI882589	75	85
1221133	WALSTON SWITCH EXXON	1	1	P	WI1994G003	110C	U	WI921916	76	81
1221135	JT'S MARKET	1	1	P	WI1990G020	110C	U	WI882127	75	80

Table 1, Well information for Wicomico County Transient Systems

PWSID	System Name	Source #	Plant #	Use Code	Ground Water Appropriation	Aquifer Code	Aquifer Type	Well Tag #	Casing Depth	Well Depth
1221139	LIVING STONES CHURCH	1	1	P	WI1997G040	110C	U	WI941465	72	82
1221141	W. SALISBURY LITTLE LEAGUE	2	1	P		9999	U			
1221143	CLEAR CHANNEL COMMUNICATIONS, INC	1	1	P	WI1996G032	110C	U	WI940695	65	75
1221145	ARTHUR W PERDUE STADIUM	1	1	P		9999	U			
1221150	EAST WICOMICO LITTLE LEAGUE COMPLEX	1	1	P		110C	U			
1221153	NUTTERS CROSSING -CLUBHOUSE	1	1	P	WI1991G003	110C	U	WI882497	93	88
1221154	MARDELA GOOSE CREEK INC	1	1	P	WI1964G003	122F	C	WI920240	265	285
1221158	NORTH LAKE PARK	2	1	S	WI1975G011	110C	U	WI731649	35	40
1221158	NORTH LAKE PARK	1	1	P	WI1968G006	110C	U	WI920538	62	72
1221159	PARSONSBURG QUICK STOP	1	1	P		122I	C	WI940265	90	100
1221161	POP POP'S PRODUCE	2	1	P		110C	U	WI944312	60	70
1221163	SEVEN ELEVEN FOOD STORE	1	1	P	WI1998G032	110C	U	WI942347	96	116
1221164	SHORE STOP #241 [EDEN]	1	1	P	WI1997G050	122G	C	WI941469	81	91
1221172	WINTERPLACE MARKET	1	1	P	WI1996G032	110C	U	WI922328	65	70
1221173	COMMUNITY PARK AT WINTER PLACE	1	1	P		110C	U	WI944127	51	71
1221176	HEBRON PARK & REC AREA	1	1	P	WI1990G052	110C	U	WI920635	60	70
1221177	NUTTERS CROSSING GC- SATELLITE BUILDING	1	1	P	WI1991G003	110C	U	WI882355	65	75
1221178	HEALTHSOUTH MEDICAL CENTER	1	1	P		110C	U	WI922139	60	65
1221179	DELMARVA CONVENTION CENTER	1	1	P	WI1959G006	110C	U	WI735254	88	98
1221181	GREEN HILL YACHT & CC [SATELLITE BLDG]	2	1	P	WI1963G007	122G	C	WI736134	120	130
1221182	FAMILY WORSHIP CENTER/ ALPHA-OMEGA	1	1	P	WI1992G030	110C	U	WI920245	78	88

Table 1 (Continued), Well information for Wicomico County Transient Systems

Type	Within Assessment for	PWSID	Potential Contaminate	Figure Shown
UST*	TJ's Market	1221085	VOC	4i
UST*	B & J Market	1221007	VOC	4a
UST*	Delmarva	Multiple	VOC	4x
UST*	Hebron Mini Market	1221039	VOC	4d
UST*	Express Lane Inc.	1221131	VOC	4y
UST*	Winterplace Parkway	Multiple	VOC	4z
UST*	Winterplace Parkway	Multiple	VOC	4z
UST*	Walston Switch Exxon/ Healthsouth Med. Center	Multiple	VOC	4z
Septic Tank	Hebron Mini Market	1221039	Bacteria, Viruses, Nitrogen	4d
Septic Tank	Delmarva	Multiple	Bacteria, Viruses, Nitrogen	4x
Septic Tank	Boonie's Restaurant and Bar	1221097	Bacteria, Viruses, Nitrogen	4j
Septic Absorption Area	American Legion # 269	1221099	Bacteria, Viruses, Nitrogen	4l
Septic Absorption Area	Phippkins 50 West Restaurant	1221049	Bacteria, Viruses, Nitrogen	4e
Septic Absorption Area	Nutters Crossing (satellite well)	1221177	Bacteria, Viruses, Nitrogen	4y
Septic Absorption Area	Winterplace Parkway	Multiple	Bacteria, Viruses, Nitrogen	4z
Septic Absorption Area	Winterplace Parkway	Multiple	Bacteria, Viruses, Nitrogen	4z
Septic Absorption Area	Winterplace Parkway	Multiple	Bacteria, Viruses, Nitrogen	4z
Septic Absorption Area	Winterplace Parkway	Multiple	Bacteria, Viruses, Nitrogen	4z
Septic Absorption Area	Walston Switch Exxon/ Healthsouth Med. Center	Multiple	Bacteria, Viruses, Nitrogen	4z
Septic Absorption Area	Walston Switch Exxon/ Healthsouth Med. Center	Multiple	Bacteria, Viruses, Nitrogen	4z
Septic Absorption Area	Massey's Village Inn	1221057	Bacteria, Viruses, Nitrogen	4f
Septic Absorption Area	Powellville Store	1221072	Bacteria, Viruses, Nitrogen	4g
Septic Absorption Area	North Salisbury Square	1221098	Bacteria, Viruses, Nitrogen	4k
Septic Absorption Area	Christ UMC	1221021	Bacteria, Viruses, Nitrogen	4b
Septic Absorption Area	Midway Mini Market	1221115	Bacteria, Viruses, Nitrogen	4n
Septic Absorption Area	B & J Market	1221007	Bacteria, Viruses, Nitrogen	4a
Hazardous Waste	Joseph House Center	1221108	Not Active	4m
Hazardous Waste	North Salisbury Square	1221098	Various Chemicals	4k
GW Discharge	Walston Switch Exxon/ Healthsouth Med. Center	Multiple	Bacteria, Viruses, Nitrogen	4z
GW Discharge	Delmarva Combined	Multiple	Not Active	4x
GW Discharge	Delmarva Combined	Multiple	Not Active	4x
GW Discharge	Delmarva Combined	Multiple	VOC	4x

Table 2, Known Potential Contaminant Point Sources Within the Source Water Assessment Areas

*Field visit concluded that USTs were present on site within SWAP area, but current UST locational data showed tank location outside of SWAP.

Location Name	Address	ZIP Code	Tank Status	Substance
DSH 101 (Midway One Stop, Inc.)	NAYLOR MILL RD AT JERSEY RD	21801	Permanently Out of Use	Kerosene
DSH 101 (Midway One Stop, Inc.)	NAYLOR MILL RD AT JERSEY RD	21801	Permanently Out of Use	Gasoline
DSH 101 (Midway One Stop, Inc.)	NAYLOR MILL RD AT JERSEY RD	21801	Permanently Out of Use	Gasoline
Barr Freightliner	9367 OCEAN HWY	21875	Permanently Out of Use	Used Oil
Barr Freightliner	9367 OCEAN HWY	21875	Permanently Out of Use	Used Oil
Barr Freightliner	9367 OCEAN HWY	21875	Permanently Out of Use	Used Oil
Barr Freightliner	9367 OCEAN HWY	21875	Permanently Out of Use	Diesel
Barr Freightliner	9367 OCEAN HWY	21875	Permanently Out of Use	Gasoline
Barr Freightliner	9367 OCEAN HWY	21875	Permanently Out of Use	Used Oil
Christ United Methodist Church	211 PHILLIP MORRIS DR	21804	Permanently Out of Use	Heating Oil
Thirsty's	9534 OCEAN HWY	21875	Currently In Use	Gasoline
Thirsty's	9534 OCEAN HWY	21875	Permanently Out of Use	Gasoline
Thirsty's	9534 OCEAN HWY	21875	Permanently Out of Use	Gasoline
Thirsty's	9534 OCEAN HWY	21875	Permanently Out of Use	Kerosene
Thirsty's	9534 OCEAN HWY	21875	Permanently Out of Use	Diesel
Thirsty's	9534 OCEAN HWY	21875	Currently In Use	Diesel
Thirsty's	9534 OCEAN HWY	21875	Currently In Use	Gasoline
Thirsty's	9534 OCEAN HWY	21875	Permanently Out of Use	Diesel
Walston Switch Exxon	31997 BEAVER RUN DR	21804	Currently In Use	Gasoline
Walston Switch Exxon	31997 BEAVER RUN DR	21804	Currently In Use	Gasoline
Walston Switch Exxon	31997 BEAVER RUN DR	21804	Currently In Use	Diesel
Walston Switch Exxon	31997 BEAVER RUN DR	21804	Currently In Use	Gasoline
Philmore Commons	224 PHILLIP MORRIS DR	21804	Permanently Out of Use	Heating Oil

Table 3, Known underground storage tanks within the source water assessment areas.

PWSID	System Name	Plant ID	Known Treatment Methods	Reason for Treatment
1221099	AMERICAN LEGION # 269	1	No Treatment	None
1221145	ARTHUR W PERDUE STADIUM	1	pH Adjustment	Corrosion Control
1221145	ARTHUR W PERDUE STADIUM	1	Hypochlorination, Pre	Disinfection
1221138	AZAR EYE INSTITUTE	1	No Treatment	None
1221007	B & J MARKET	1	No Treatment	None
1221097	BOONIE'S RESTAURANT & BAR	1	No Treatment	None
1221020	CHEROKEE LANES	1	No Treatment	None
1221021	CHRIST UMC	1	No Treatment	None
1221143	CLEAR CHANNEL COMMUNICATIONS, INC	1	No Treatment	None
1221173	COMMUNITY PARK AT WINTER PLACE	1	No Treatment	None
1221023	COUNTRYSIDE MARKET & DELI	1	Ion Exchange	Iron Removal
1221117	CROSS ROADS MARKET	1	Softening	Hardness Removal
1221117	CROSS ROADS MARKET	1	Hypochlorination, Pre	Taste and Odor
1221179	DELMARVA CONVENTION CENTER	1	No Treatment	None
1221130	DELMARVA INN/ SEAGULL RESTAURANT	1	No Treatment	None
1221150	EAST WICOMICO LITTLE LEAGUE COMPLEX	1	Ion Exchange	Iron Removal
1221131	EXPRESS LANE INC	1	No Treatment	None
1221182	FAMILY WORSHIP CENTER/ ALPHA-OMEGA	1	No Treatment	None
1221037	GREEN HILL YACHT & CC [CLUBHOUSE]	1	Hypochlorination, Pre	Iron Removal
1221181	GREEN HILL YACHT & CC [SATELLITE BLDG]	1	No Treatment	None
1221178	HEALTHSOUTH MEDICAL CENTER	1	No Treatment	None
1221039	HEBRON MINI MARKET DELI	1	Ion Exchange	Softening
1221176	HEBRON PARK & REC AREA	1	No Treatment	None
1221048	HUNAN PALACE	1	No Treatment	None
1221108	JOSEPH HOUSE CENTER	1	No Treatment	None
1221135	JT'S MARKET	1	No Treatment	None
1221109	K & J MARKET	1	Ion Exchange	Iron Removal
1221139	LIVING STONES CHURCH	1	Ion Exchange	Iron Removal
1221056	MARDELA DASH-IN	1	No Treatment	None
1221154	MARDELA GOOSE CREEK INC	1	No Treatment	None
1221057	MASSEYS VILLAGE INN	1	No Treatment	None
1221115	MIDWAY MINI MARKET	1	No Treatment	None
1221158	NORTH LAKE PARK	1	No Treatment	None
1221098	NORTH SALISBURY SQUARE	1	No Treatment	None
1221153	NUTTERS CROSSING -CLUBHOUSE	1	Ion Exchange	Iron Removal
1221177	NUTTERS CROSSING GC- SATELLITE BUILDING	1	No Treatment	None
1220047	PARK SEVENTH DAY ADVENTIST SCHOOL	1	No Treatment	None
1220047	PARK SEVENTH DAY ADVENTIST SCHOOL	2	No Treatment	None
1221159	PARSONSBURG QUICK STOP	1	Ion Exchange	Iron Removal
1221049	PHIPPINS 50 WEST RESTAURANT	1	No Treatment	None
1221161	POP POP'S PRODUCE	1	No Treatment	None
1221072	POWELLVILLE STORE	1	No Treatment	None
1221073	POWELLVILLE VOL FIRE CO	1	No Treatment	None
1221074	POWER HOUSE CHURCH OF GOD	1	No Treatment	None
1221075	RED ROOST	1	No Treatment	None
1221076	ROARING POINT WATERFRONT CAMPGROUND	1	No Treatment	None
1221079	SANDY HILL FAMILY CAMP	1	Hypochlorination, Post	Disinfection
1221079	SANDY HILL FAMILY CAMP	1	Hypochlorination, Pre	Disinfection
1221079	SANDY HILL FAMILY CAMP	1	Ion Exchange	Iron Removal
1221079	SANDY HILL FAMILY CAMP	1	Activated Carbon	Taste and Odor

Table 4, Known treatment methods for Wicomico County Transient Systems.

PWSID	System Name	Plant ID	Known Treatment Methods	Reason for Treatment
1221163	SEVEN ELEVEN FOOD STORE	1	No Treatment	None
1221116	SHORE STOP #225 [HEBRON]	1	No Treatment	None
1221164	SHORE STOP #241 [EDEN]	1	No Treatment	None
1221120	SHORE STOP #44 [SALISBURY]	1	Hypochlorination, Pre	Iron Removal
1221120	SHORE STOP #44 [SALISBURY]	1	Softening	Hardness Removal
1221085	TJ'S MARKET	1	Ion Exchange	Iron Removal
1221093	TRAVELER MOTEL	1	No Treatment	None
1221141	W. SALISBURY LITTLE LEAGUE	1	No Treatment	None
1221133	WALSTON SWITCH EXXON	1	No Treatment	None
1221172	WINTERPLACE MARKET	1	No Treatment	None
1221101	WOODLAWN FAMILY CAMPING	1	No Treatment	None

Table 4 (Continued), Known treatment methods for Wicomico County Transient Systems.

PWSID	PWS_NAME	Total Number of Samples Taken	Number of Positive Bacti. Samples	Percentage of Total Samples Positive	Number of Positive Fecal Samples
1221099	AMERICAN LEGION # 269	14	0	0	0
1221145	ARTHUR W PERDUE STADIUM	15	0	0	0
1221007	B & J MARKET	14	0	0	0
1221097	BOONIE'S RESTAURANT & BAR	11	1	9	0
1221020	CHEROKEE LANES	10	0	0	0
1221021	CHRIST UMC	14	0	0	0
1221143	CLEAR CHANNEL COMMUNICATIONS, INC	8	1	13	0
1221173	COMMUNITY PARK AT WINTER PLACE	2	0	0	0
1221023	COUNTRYSIDE MARKET & DELI	14	0	0	0
1221117	CROSS ROADS MARKET	22	6	27	0
1221179	DELMARVA CONVENTION CENTER	9	0	0	0
1221130	DELMARVA INN/ SEAGULL RESTAURANT	59	5	8	0
1221150	EAST WICOMICO LITTLE LEAGUE COMPLEX	7	4	57	0
1221131	EXPRESS LANE INC	13	0	0	0
1221182	FAMILY WORSHIP CENTER/ ALPHA-OMEGA	2	0	0	0
1221037	GREEN HILL YACHT & CC [CLUBHOUSE]	19	1	5	0
1221181	GREEN HILL YACHT & CC [SATELLITE BLDG]	1	0	0	0
1221178	HEALTHSOUTH MEDICAL CENTER	10	0	0	0
1221039	HEBRON MINI MARKET DELI	12	0	0	0
1221176	HEBRON PARK & REC AREA	2	0	0	0
1221048	HUNAN PALACE	13	0	0	0
1221108	JOSEPH HOUSE CENTER	5	0	0	0
1221135	JT'S MARKET	7	4	57	0
1221109	K & J MARKET	10	0	0	0
1221139	LIVING STONES CHURCH	24	11	46	0
1221056	MARDELA DASH-IN	11	0	0	0
1221154	MARDELA GOOSE CREEK INC	8	0	0	0
1221057	MASSEYS VILLAGE INN	12	0	0	0
1221115	MIDWAY MINI MARKET	12	0	0	0
1221158	NORTH LAKE PARK	2	0	0	0
1221098	NORTH SALISBURY SQUARE	20	0	0	0
1221153	NUTTERS CROSSING -CLUBHOUSE	6	0	0	0
1221177	NUTTERS CROSSING GC- SATELLITE BUILDING	6	0	0	0
1220047	PARK SEVENTH DAY ADVENTIST SCHOOL	50	0	0	0

Table 5, Routine and repeat bacteriological samples for each system since 1996.

PWSID	PWS_NAME	Total Number of Samples Taken	Number of Positive Bacti. Samples	Percentage of Total Samples Positive	Number of Positive Fecal Samples
1221159	PARSONSBURG QUICK STOP	9	0	0	0
1221049	PHIPPINS 50 WEST RESTAURANT	17	0	0	0
1221161	POP POP'S PRODUCE	11	0	0	0
1221072	POWELLVILLE STORE	23	3	13	0
1221073	POWELLVILLE VOL FIRE CO	30	11	37	0
1221074	POWER HOUSE CHURCH OF GOD	25	10	40	0
1221075	RED ROOST	6	0	0	0
1221076	ROARING POINT WATERFRONT CAMPGROUND	6	0	0	0
1221079	SANDY HILL FAMILY CAMP	14	0	0	0
1221163	SEVEN ELEVEN FOOD STORE	22	6	27	1
1221116	SHORE STOP #225 [HEBRON]	48	0	0	0
1221164	SHORE STOP #241 [EDEN]	10	0	0	0
1221120	SHORE STOP #44 [SALISBURY]	12	0	0	0
1221085	TJ'S MARKET	5	0	0	0
1221093	TRAVELER MOTEL	13	0	0	0
1221141	W. SALISBURY LITTLE LEAGUE	2	0	0	0
1221133	WALSTON SWITCH EXXON	14	0	0	0
1221172	WINTERPLACE MARKET	7	0	0	0
1221101	WOODLAWN FAMILY CAMPING	6	0	0	0

Table 5 (Continued), Routine and repeat bacteriological samples for each system since 1996.

PWSID	PWS NAME	Total # of Nitrate Samples	Number of Nitrate Samples		Total # of Nitrite Samples	Number of Nitrite Samples > 50% MCL
			>1 ppm	> 50% MCL		
1221099	AMERICAN LEGION # 269	9	9	9	0	0
1221145	ARTHUR W PERDUE STADIUM	4	2	0	3	0
1221007	B & J MARKET	9	8	0	2	0
1221097	BOONIE'S RESTAURANT & BAR	6	0	0	5	0
1221020	CHEROKEE LANES	3	3	0	2	0
1221021	CHRIST UMC	7	6	0	2	0
1221143	CLEAR CHANNEL COMMUNICATIONS, INC	3	3	0	1	0
1221173	COMMUNITY PARK AT WINTER PLACE	2	2	0	1	0
1221023	COUNTRYSIDE MARKET & DELI	9	0	0	6	0
1221117	CROSS ROADS MARKET	6	2	1	4	0
1221179	DELMARVA CONVENTION CENTER	2	2	1	1	0
1221130	DELMARVA INN/ SEAGULL RESTAURANT	5	5	0	1	0
1221150	EAST WICOMICO LITTLE LEAGUE COMPLEX	2	2	0	1	0
1221131	EXPRESS LANE INC	8	8	8	1	0
1221182	FAMILY WORSHIP CENTER/ ALPHA-OMEGA	1	1	0	1	0
1221037	GREEN HILL YACHT & CC [CLUBHOUSE]	9	0	0	6	0
1221181	GREEN HILL YACHT & CC [SATELLITE BLDG]	1	0	0	1	0
1221178	HEALTHSOUTH MEDICAL CENTER	2	2	2	1	0
1221039	HEBRON MINI MARKET DELI	3	3	0	1	0
1221176	HEBRON PARK & REC AREA	2	2	2	1	0
1221048	HUNAN PALACE	8	8	5	3	0
1221108	JOSEPH HOUSE CENTER	21	20	16	1	0
1221135	JT'S MARKET	2	0	0	1	0
1221109	K & J MARKET	6	0	0	4	0
1221139	LIVING STONES CHURCH	4	1	1	1	0
1221056	MARDELA DASH-IN	4	0	0	3	0
1221154	MARDELA GOOSE CREEK INC	2	0	0	1	0
1221057	MASSEYS VILLAGE INN	7	7	0	3	0
1221115	MIDWAY MINI MARKET	6	6	6	2	0
1221158	NORTH LAKE PARK	2	2	0	1	0
1221098	NORTH SALISBURY SQUARE	5	5	5	2	0
1221153	NUTTERS CROSSING -CLUBHOUSE	3	3	0	1	0
1221177	NUTTERS CROSSING GC- SATELLITE BUILDING	2	2	0	1	0

Table 6, Total IOC water quality samples collected for transient systems

PWSID	PWS NAME	Total # of Nitrate Samples	Number of Nitrate Samples		Total # of Nitrite Samples	Number of Nitrite Samples > 50% MCL
			>1 ppm	> 50% MCL		
1220047	PARK SEVENTH DAY ADVENTIST SCHOOL	12	12	11	3	0
1221159	PARSONSBURG QUICK STOP	4	0	0	2	0
1221049	PHIPPINS 50 WEST RESTAURANT	11	8	8	2	0
1221161	POP POP'S PRODUCE	3	0	0	3	0
1221072	POWELLVILLE STORE	9	1	0	5	0
1221073	POWELLVILLE VOL FIRE CO	8	1	0	4	0
1221074	POWER HOUSE CHURCH OF GOD	5	0	0	1	0
1221075	RED ROOST	4	0	0	4	0
1221076	ROARING POINT WATERFRONT CAMPGROUND	2	0	0	1	0
1221079	SANDY HILL FAMILY CAMP	4	0	0	2	0
1221163	SEVEN ELEVEN FOOD STORE	4	4	4	2	0
1221116	SHORE STOP #225 [HEBRON]	8	8	1	2	0
1221164	SHORE STOP #241 [EDEN]	4	0	0	3	0
1221120	SHORE STOP #44 [SALISBURY]	6	0	0	5	0
1221085	TJ'S MARKET	10	5	5	3	0
1221093	TRAVELER MOTEL	3	3	3	1	0
1221141	W. SALISBURY LITTLE LEAGUE	3	3	3	1	0
1221133	WALSTON SWITCH EXXON	5	5	4	2	0
1221172	WINTERPLACE MARKET	4	3	0	1	0
1221101	WOODLAWN FAMILY CAMPING	4	4	1	1	0

Table 6 (Continued), Total IOC water quality samples collected for transient systems

PWSID	System Name	Plant ID	Contaminant Name	MCL (PPM)	Sample Date	Result (PPM)
1221099	AMERICAN LEGION # 269	1	Nitrate		13-Feb-02	7
1221099	AMERICAN LEGION # 269	1	Nitrate		13-Feb-02	7
1221099	AMERICAN LEGION # 269	1	Nitrate		26-Mar-96	5.9
1221099	AMERICAN LEGION # 269	1	Nitrate		03-Apr-97	5.7
1221099	AMERICAN LEGION # 269	1	Nitrate		03-Apr-97	5.5
1221099	AMERICAN LEGION # 269	1	Nitrate		26-Mar-96	6.01
1221099	AMERICAN LEGION # 269	1	Nitrate		04-May-99	5.3
1221099	AMERICAN LEGION # 269	1	Nitrate		04-May-99	5.7
1221099	AMERICAN LEGION # 269	1	Nitrate		16-Jun-98	5.6
1221117	CROSS ROADS MARKET	1	Nitrate		01-Aug-00	6.7
1221179	DELMARVA CONVENTION CENTER	1	Nitrate		30-Oct-01	5.2
1221131	EXPRESS LANE INC	1	Nitrate		15-Jan-01	6.5
1221131	EXPRESS LANE INC	1	Nitrate		21-Feb-96	6.6
1221131	EXPRESS LANE INC	1	Nitrate		16-Mar-98	6.4
1221131	EXPRESS LANE INC	1	Nitrate		06-Mar-97	6.8
1221131	EXPRESS LANE INC	1	Nitrate		22-Feb-00	7.3
1221131	EXPRESS LANE INC	1	Nitrate		31-Jan-02	7.8
1221131	EXPRESS LANE INC	1	Nitrate		30-Jan-01	6.8
1221131	EXPRESS LANE INC	1	Nitrate		17-Apr-02	6.9
1221178	HEALTHSOUTH MEDICAL CENTER	1	Nitrate		28-Jan-02	7.6
1221178	HEALTHSOUTH MEDICAL CENTER	1	Nitrate		26-Nov-01	7.2
1221176	HEBRON PARK & REC AREA	1	Nitrate		16-Apr-02	8.3
1221176	HEBRON PARK & REC AREA	1	Nitrate		08-May-01	8.4
1221048	HUNAN PALACE	1	Nitrate		19-Mar-01	5.1
1221048	HUNAN PALACE	1	Nitrate		19-Mar-01	5.1
1221048	HUNAN PALACE	1	Nitrate		22-Apr-98	5.3
1221048	HUNAN PALACE	1	Nitrate		10-Feb-97	5.3
1221048	HUNAN PALACE	1	Nitrate		13-Dec-00	5.2
1221108	JOSEPH HOUSE CENTER	1	Nitrate		07-Oct-99	5.2
1221108	JOSEPH HOUSE CENTER	1	Nitrate		12-Oct-00	5.4
1221108	JOSEPH HOUSE CENTER	1	Nitrate		31-Oct-01	6.6
1221108	JOSEPH HOUSE CENTER	1	Nitrate		10-Feb-00	5.2
1221108	JOSEPH HOUSE CENTER	1	Nitrate		23-Jan-96	6.4
1221108	JOSEPH HOUSE CENTER	1	Nitrate		06-Oct-99	5.2

Table 7, Nitrate results greater than 50% of the MCL of 10 PPM.

PWSID	System Name	Plant ID	Contaminant Name	MCL (PPM)	Sample Date	Result (PPM)
1221108	JOSEPH HOUSE CENTER	1	Nitrate		08-Jul-99	5.4
1221108	JOSEPH HOUSE CENTER	1	Nitrate		07-Jan-98	6.5
1221108	JOSEPH HOUSE CENTER	1	Nitrate		06-Aug-97	6
1221108	JOSEPH HOUSE CENTER	1	Nitrate		07-Jan-99	5.3
1221108	JOSEPH HOUSE CENTER	1	Nitrate		19-Nov-96	6
1221108	JOSEPH HOUSE CENTER	1	Nitrate		01-Jul-98	5.6
1221108	JOSEPH HOUSE CENTER	1	Nitrate		05-Apr-99	5
1221108	JOSEPH HOUSE CENTER	1	Nitrate		15-Oct-97	5.7
1221108	JOSEPH HOUSE CENTER	1	Nitrate		29-Aug-01	6.1
1221108	JOSEPH HOUSE CENTER	1	Nitrate		28-Jan-02	6.7
1221139	LIVING STONES CHURCH	1	Nitrate		30-Jan-02	8.5
1221115	MIDWAY MINI MARKET	1	Nitrate		04-Jan-01	6.8
1221115	MIDWAY MINI MARKET	1	Nitrate		30-Jan-96	5.6
1221115	MIDWAY MINI MARKET	1	Nitrate		07-Feb-97	6.5
1221115	MIDWAY MINI MARKET	1	Nitrate		14-Mar-02	6.9
1221115	MIDWAY MINI MARKET	1	Nitrate		02-Feb-00	6.4
1221115	MIDWAY MINI MARKET	1	Nitrate		25-Oct-00	6.9
1221098	NORTH SALISBURY SQUARE	1	Nitrate		28-Jan-02	6.3
1221098	NORTH SALISBURY SQUARE	1	Nitrate		30-Oct-00	6.1
1221098	NORTH SALISBURY SQUARE	1	Nitrate		30-Oct-00	6.1
1221098	NORTH SALISBURY SQUARE	1	Nitrate		30-Oct-00	6.1
1221098	NORTH SALISBURY SQUARE	1	Nitrate		12-Feb-01	5.9
1220047	PARK SEVENTH DAY ADVENTIST SCHOOL	1	Nitrate		05-Jan-00	5.5
1220047	PARK SEVENTH DAY ADVENTIST SCHOOL	1	Nitrate		23-Jan-02	5.8
1220047	PARK SEVENTH DAY ADVENTIST SCHOOL	1	Nitrate		29-Jan-01	5.6
1220047	PARK SEVENTH DAY ADVENTIST SCHOOL	1	Nitrate		14-Jan-98	6
1220047	PARK SEVENTH DAY ADVENTIST SCHOOL	1	Nitrate		05-Apr-99	5.8
1220047	PARK SEVENTH DAY ADVENTIST SCHOOL	1	Nitrate		12-Oct-98	5.6
1220047	PARK SEVENTH DAY ADVENTIST SCHOOL	1	Nitrate		27-Aug-96	5.5
1220047	PARK SEVENTH DAY ADVENTIST SCHOOL	1	Nitrate		21-Jan-97	6.5
1220047	PARK SEVENTH DAY ADVENTIST SCHOOL	1	Nitrate		20-Jul-99	6.6
1220047	PARK SEVENTH DAY ADVENTIST SCHOOL	1	Nitrate		14-Oct-97	5.9
1220047	PARK SEVENTH DAY ADVENTIST SCHOOL	2	Nitrate		08-Apr-98	5.3
1221049	PHIPPINS 50 WEST RESTAURANT	1	Nitrate		04-Jan-01	9

Table 7 (Continued), Nitrate results greater than 50% of the MCL of 10 PPM.

PWSID	System Name	Plant ID	Contaminant Name	MCL (PPM)	Sample Date	Result (PPM)
1221049	PHIPPINS 50 WEST RESTAURANT	1	Nitrate		20-Feb-01	9.2
1221049	PHIPPINS 50 WEST RESTAURANT	1	Nitrate		21-Jun-00	7.8
1221049	PHIPPINS 50 WEST RESTAURANT	1	Nitrate		07-Feb-96	5.7
1221049	PHIPPINS 50 WEST RESTAURANT	1	Nitrate		09-Feb-00	7.8
1221049	PHIPPINS 50 WEST RESTAURANT	1	Nitrate		25-Feb-98	7.5
1221049	PHIPPINS 50 WEST RESTAURANT	1	Nitrate		05-Jun-97	6.7
1221049	PHIPPINS 50 WEST RESTAURANT	1	Nitrate		09-Jan-02	11.5
1221163	SEVEN ELEVEN FOOD STORE	1	Nitrate		02-Jan-02	10
1221163	SEVEN ELEVEN FOOD STORE	1	Nitrate		07-Feb-00	8
1221163	SEVEN ELEVEN FOOD STORE	1	Nitrate		19-Mar-02	9.3
1221163	SEVEN ELEVEN FOOD STORE	1	Nitrate		14-Feb-01	9.3
1221116	SHORE STOP #225 [HEBRON]	1	Nitrate		01-Apr-02	5.3
1221085	TJ'S MARKET	1	Nitrate		26-Feb-97	12.9
1221085	TJ'S MARKET	1	Nitrate		08-Feb-96	12.9
1221085	TJ'S MARKET	1	Nitrate		12-Feb-96	11.8
1221085	TJ'S MARKET	1	Nitrate		03-Mar-97	12
1221085	TJ'S MARKET	1	Nitrate		21-Mar-02	18.2
1221093	TRAVELER MOTEL	1	Nitrate		14-Jan-02	5.6
1221093	TRAVELER MOTEL	1	Nitrate		25-Jan-01	7.1
1221093	TRAVELER MOTEL	1	Nitrate		02-Mar-00	7.1
1221141	W. SALISBURY LITTLE LEAGUE	1	Nitrate		24-Oct-02	6.8
1221141	W. SALISBURY LITTLE LEAGUE	1	Nitrate		11-Apr-02	7.2
1221141	W. SALISBURY LITTLE LEAGUE	1	Nitrate		04-May-01	7.3
1221133	WALSTON SWITCH EXXON	1	Nitrate		28-Jan-02	5.5
1221133	WALSTON SWITCH EXXON	1	Nitrate		19-Feb-97	5
1221133	WALSTON SWITCH EXXON	1	Nitrate		07-Mar-02	6.2
1221133	WALSTON SWITCH EXXON	1	Nitrate		03-Feb-00	5.2
1221101	WOODLAWN FAMILY CAMPING	1	Nitrate		06-May-96	5.8

Table 7 (Continued), Nitrate results greater than 50% of the MCL of 10 PPM.

PWSID	System Name	Source #	Aquifer Type	Nitrate Susceptibility			Microbiological Susceptibility			
				Detected in Signif. Amounts*	Source Present in SWAP	Susceptible	Detected in Signif. Amounts**	Source Present in SWAP	Is Well Integrity a Factor	Susceptible
1220047	PARK SEVENTH DAY ADVENTIST SCHOOL	2	U	YES	YES	YES	NO	YES	NO	NO
1220047	PARK SEVENTH DAY ADVENTIST SCHOOL	1	U	YES	YES	YES	NO	YES	NO	NO
1221007	B & J MARKET	1	U	NO	YES	NO	NO	YES	YES	NO
1221020	CHEROKEE LANES	1	U	NO	NO	NO	NO	YES***	NO	NO
1221021	CHRIST UMC	3	U	NO	YES	NO	NO	YES	NO	NO
1221037	GREEN HILL YACHT & CC [CLUBHOUSE]	1	U	NO	NO	NO	NO	YES***	NO	NO
1221039	HEBRON MINI MARKET DELI	1	U	NO	YES	NO	NO	YES	NO	NO
1221048	HUNAN PALACE	1	U	YES	NO	YES	NO	YES***	NO	NO
1221049	PHIPPINS 50 WEST RESTAURANT	1	U	YES	YES	YES	NO	YES	YES	NO
1221057	MASSEYS VILLAGE INN	1	U	NO	YES	NO	NO	YES	NO	NO
1221072	POWELLVILLE STORE	1	U	NO	YES	NO	NO	YES	YES	NO
1221079	SANDY HILL FAMILY CAMP	1	U	NO	NO	NO	NO	YES***	NO	NO
1221085	TJ'S MARKET	1	U	YES	NO	YES	NO	YES***	NO	NO
1221093	TRAVELER MOTEL	1	U	YES	YES	YES	NO	YES	YES	NO
1221097	BOONIE'S RESTAURANT & BAR	1	U	NO	YES	NO	NO	YES	NO	NO
1221098	NORTH SALISBURY SQUARE	1	U	YES	YES	YES	NO	YES	NO	NO
1221099	AMERICAN LEGION # 269	1	U	YES	YES	YES	NO	YES	NO	NO
1221101	WOODLAWN FAMILY CAMPING	1	U	YES	YES	YES	NO	YES	NO	NO
1221108	JOSEPH HOUSE CENTER	1	U	YES	NO	YES	NO	YES***	NO	NO
1221115	MIDWAY MINI MARKET	1	U	YES	YES	YES	NO	YES	YES	NO
1221116	SHORE STOP #225 [HEBRON]	1	U	YES	NO	YES	YES	YES***	NO	YES
1221130	DELMARVA INN/ SEAGULL RESTAURANT	1	U	NO	YES	NO	NO	YES	NO	NO
1221131	EXPRESS LANE INC	1	U	YES	NO	YES	NO	YES***	NO	NO
1221133	WALSTON SWITCH EXXON	1	U	YES	YES	YES	NO	YES	NO	NO
1221135	JT'S MARKET	1	U	NO	NO	NO	YES	YES***	NO	YES
1221139	LIVING STONES CHURCH	1	U	YES	YES	YES	YES	YES	NO	NO
1221141	W. SALISBURY LITTLE LEAGUE	2	U	YES	NO	YES	NO	NO	NO	NO
1221143	CLEAR CHANNEL COMMUNICATIONS, INC	1	U	NO	YES	NO	NO	YES	NO	NO
1221145	ARTHUR W PERDUE STADIUM	1	U	NO	NO	NO	NO	YES***	NO	NO
1221150	EAST WICOMICO LITTLE LEAGUE COMPLEX	1	U	NO	YES	NO	YES	YES	YES	YES
1221153	NUTTERS CROSSING -CLUBHOUSE	1	U	NO	NO	NO	NO	YES***	NO	NO
1221158	NORTH LAKE PARK	2	U	NO	NO	NO	NO	YES***	YES	NO
1221158	NORTH LAKE PARK	1	U	NO	NO	NO	NO	YES***	YES	NO

Table 8, Summary of Susceptibility of Transient Water Supplies to Nitrate, and Microbiological Organisms.

* Nitrate detected in significant amounts: Any system that had a sample >50% of the MCL, of 10 ppm, in the last 5 years.

** Microbiological organisms detected in significant amounts: Any system whose monitoring results were positive >25% of the time in the last 5 years.

*** The system is in an area where there is no sewer service although no specific sites were mapped.

PWSID	System Name	Source #	Aquifer Type	Nitrate Susceptibility			Microbiological Susceptibility			
				Detected in Signif. Amounts*	Source Present in SWAP	Susceptible	Detected in Signif. Amounts**	Source Present in SWAP	Is Well Integrity a Factor	Susceptible
1221161	POP POP'S PRODUCE	2	U	NO	NO	NO	NO	YES***	NO	NO
1221163	SEVEN ELEVEN FOOD STORE	1	U	YES	NO	YES	YES	YES***	NO	YES
1221172	WINTERPLACE MARKET	1	U	NO	YES	NO	NO	YES	NO	NO
1221173	COMMUNITY PARK AT WINTER PLACE	1	U	NO	YES	NO	NO	YES	NO	NO
1221176	HEBRON PARK & REC AREA	1	U	YES	NO	YES	NO	YES***	NO	NO
1221177	NUTTERS CROSSING GC- SATELLITE BUILDING	1	U	NO	YES	NO	NO	YES	YES	NO
1221178	HEALTHSOUTH MEDICAL CENTER	1	U	YES	YES	YES	NO	YES	NO	NO
1221179	DELMARVA CONVENTION CENTER	1	U	YES	YES	YES	NO	YES	NO	NO
1221182	FAMILY WORSHIP CENTER/ ALPHA-OMEGA	1	U	NO	NO	NO	NO	YES***	NO	NO

Table 8 (Continued), Summary of Susceptibility of Transient Water Supplies to Nitrate, and Microbiological Organisms.

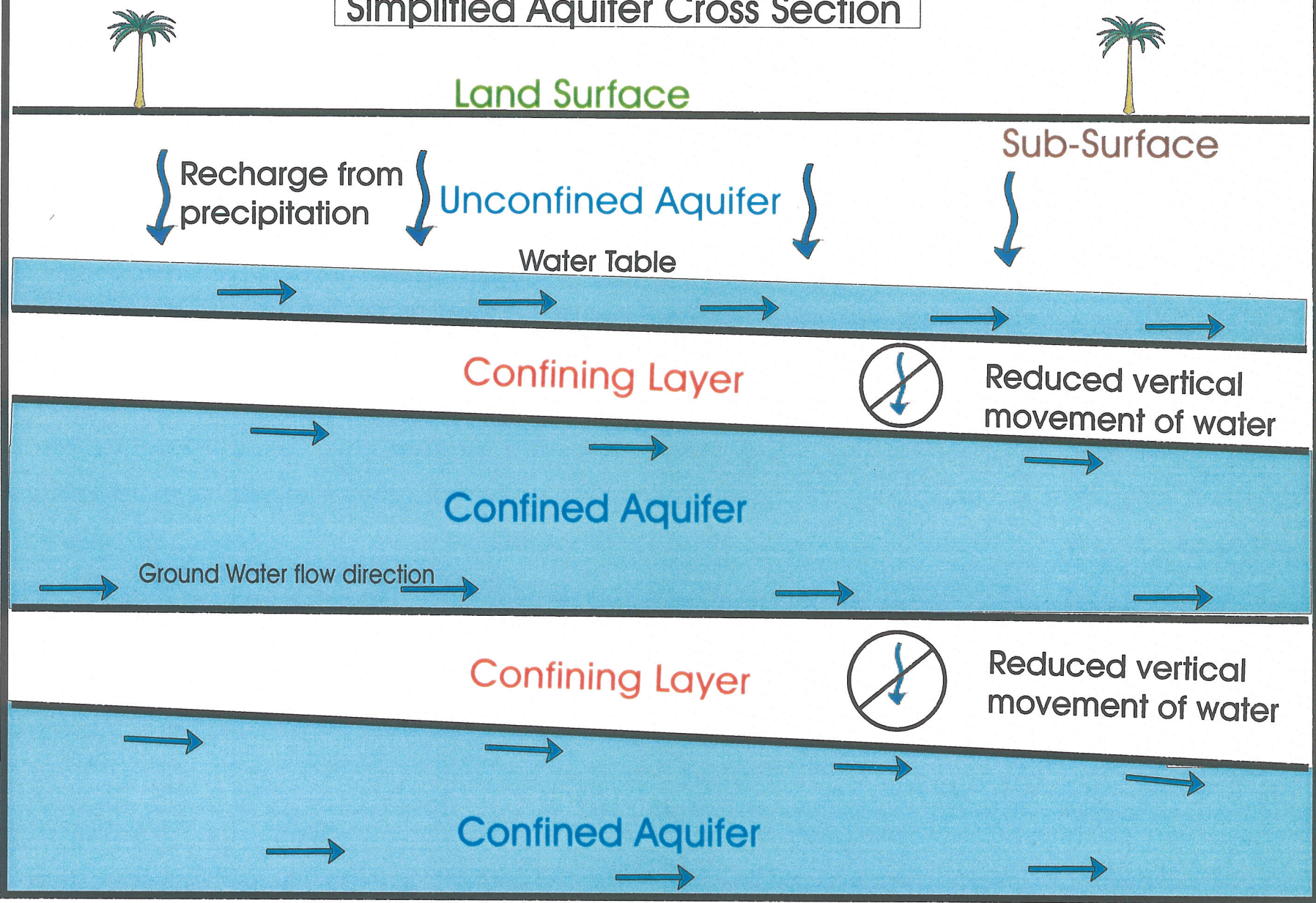
* Nitrate detected in significant amounts: Any system that had a sample >50% of the MCL, of 10 ppm, in the last 5 years.

** Microbiological organisms detected in significant amounts: Any system whose monitoring results were positive >25% of the time in the last 5 years.

*** The system is in an area where there is no sewer service although no specific sites were mapped.

FIGURES

Simplified Aquifer Cross Section



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Figure 2

Circle and Wedge Delineation Areas

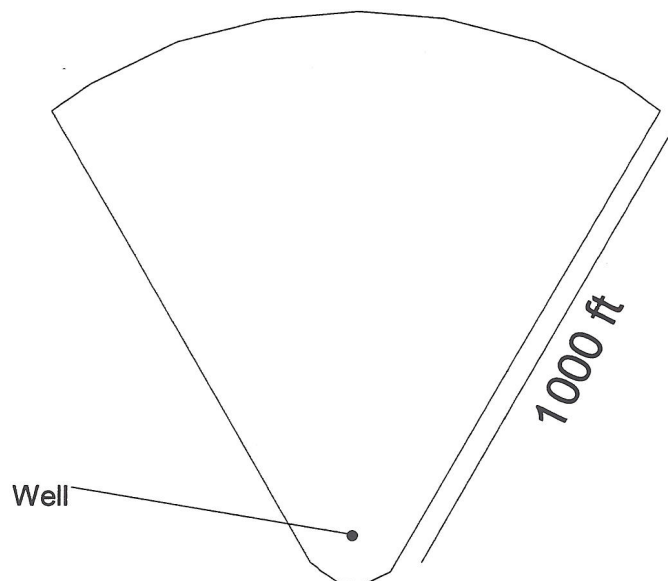
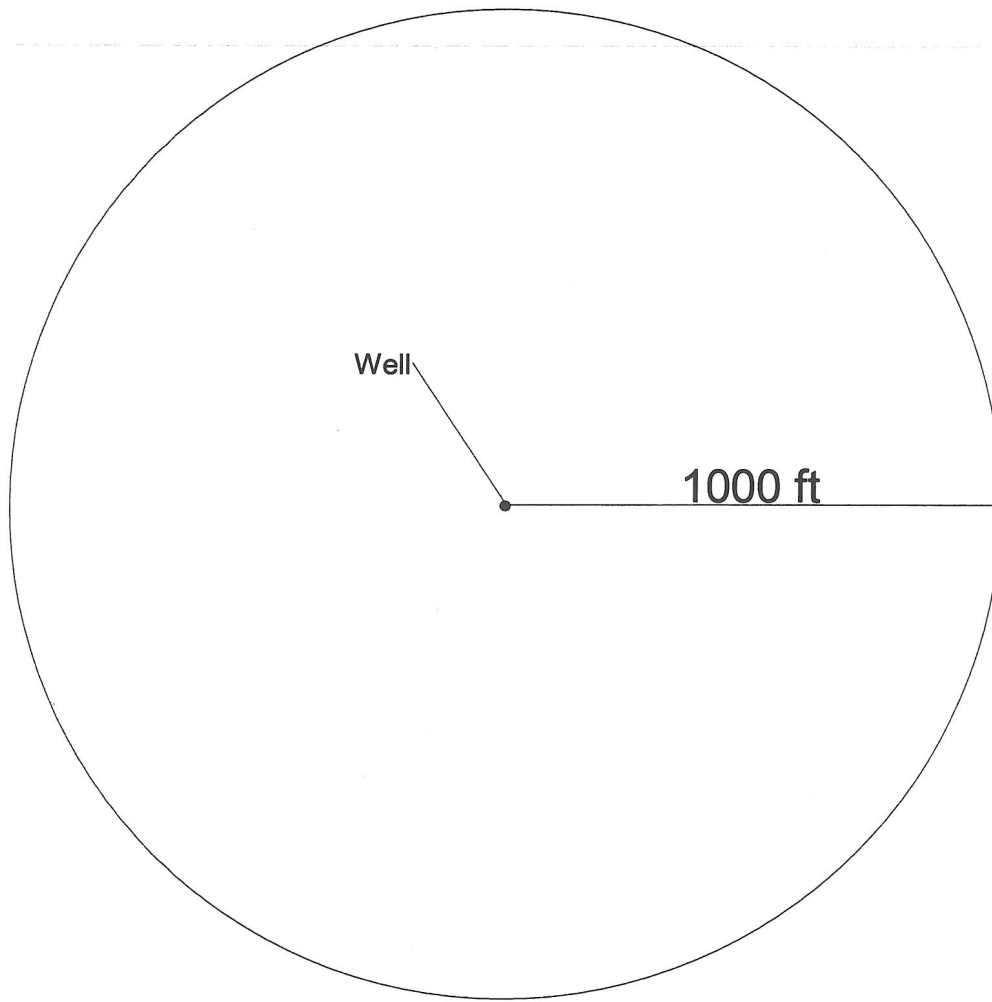
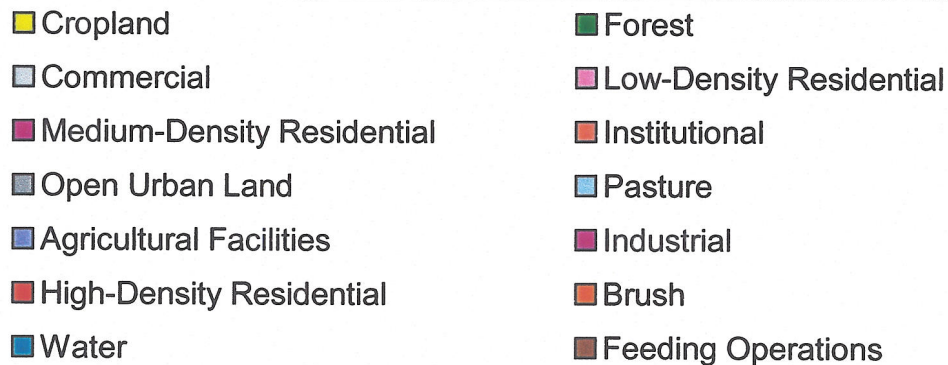
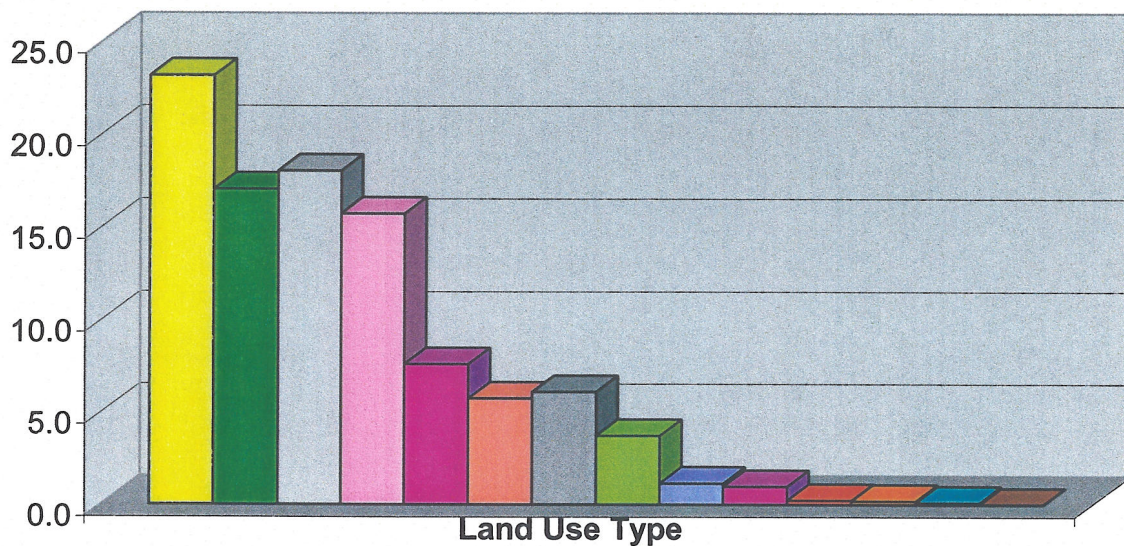


Figure 3








Figure 6 Wicomico County SWAP Land Use Summary

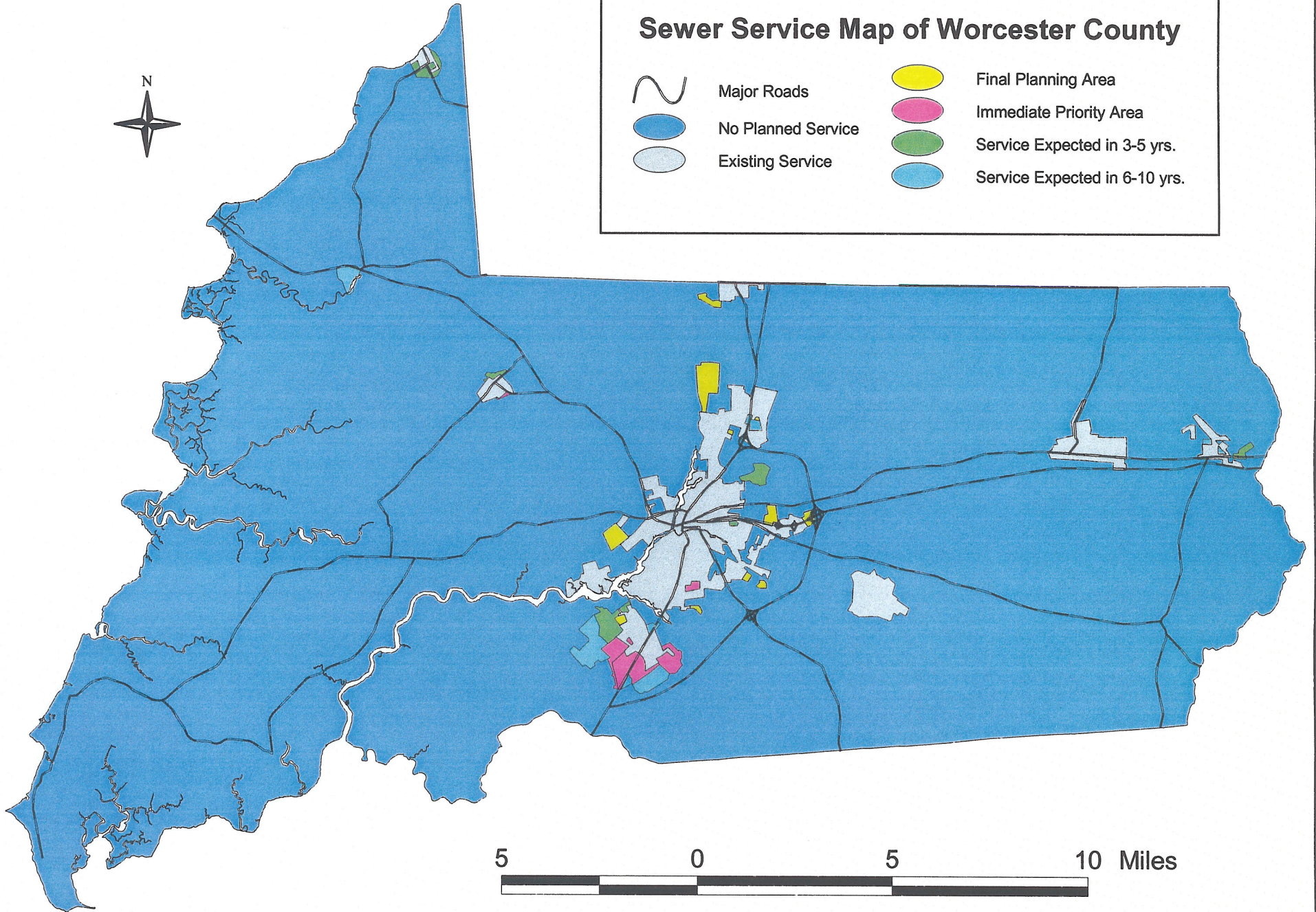
Land Use Type	Land Use Code	Counts in SWAPs	Acres in SWAP	% of Total Area
Cropland	21	22	246.277	23.2
Forest	40	2	181.336	17.1
Commercial	14	20	191.773	18.1
Low-Density Residential	11	22	167.337	15.8
Medium-Density Residential	12	13	81.005	7.6
Institutional	16	9	61.320	5.8
Open Urban Land	18	7	65.083	6.1
Pasture	22	2	39.697	3.7
Agricultural Facilities	242	3	12.300	1.2
Industrial	15	1	10.381	1.0
High-Density Residential	13	1	2.422	0.2
Brush	44	3	2.044	0.2
Water	50	1	1.238	0.1
Feeding Operations	241	1	0.001	0.0
Totals		107	1062.214	100.000

Percentage of Total Land Use



Sewer Service Map of Worcester County

- | | | | |
|---|--------------------|---|-------------------------------|
|  | Major Roads |  | Final Planning Area |
|  | No Planned Service |  | Immediate Priority Area |
|  | Existing Service |  | Service Expected in 3-5 yrs. |
| | |  | Service Expected in 6-10 yrs. |



5 0 5 10 Miles

County Land Use

dential
Residential
dential

rs



3 0 3 6 Miles

