Final

Source Water Assessment

for the

Woodlawn Mobile Home Park - New Water System

Cecil County, Maryland

Prepared for:

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

Prepared by:

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May 2003

Project No. 61726.01

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LIST OF ACRONYMS AND ABBREVIATIONS

AST	Aboveground Storage Tank
BMP	Best Management Practice
CCL	Contaminant Candidate List
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CHS	Controlled Hazardous Substances
COMAR	Code of Maryland Regulations
CREP	Conservation Reserve Program
DWEL	Drinking Water Equivalent Level
ft	Foot/Feet
gal	Gallon(s)
gpd	Gallon(s) Per Day
gpm	Gallon(s) Per Minute
GPS	Global Positioning System
GWUDI	Ground Water Under Direct Influence
IOC	Inorganic Compound
L	Liter(s)
LUST	Leaking Underground Storage Tank
MCL	Maximum Contaminant Level
MDE	Maryland Department of the Environment
mg	Milligram(s)
MGS	Maryland Geological Survey
MHP	Mobile Home Park
mrem	Millirem(s)
MTBE	Methyl-Tert-Butyl-Ether
PCB	Polychlorinated Biphenyls
pCi	Picocurie(s)
PWSID	Public Water System Identification
SDWA	Safe Drinking Water Act
SDWR	Secondary Drinking Water Regulations
SOC	Synthetic Organic Compound
SWAP	Source Water Assessment Plan
SWPA	Source Water Protection Area

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

µg	Microgram(s)
USEPA	U.S. Environmental Protection Agency
UST	Underground Storage Tank
VOC	Volatile Organic Compound
WHPA	Wellhead Protection Area

EXECUTIVE SUMMARY

EA Engineering, Science, and Technology was tasked to perform a Source Water Assessment Plan (SWAP) for the Woodlawn-New Mobile Home Park (MHP) water system in Cecil County, Maryland. This water system is identified as Public Water System Identification (PWSID) 0070239 by the Maryland Department of the Environment (MDE). EA has performed this study under Purchase Order No. U00P3200205, as authorized by MDE.

The required components of this report as described in Maryland's SWAP are:

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

The source of the Woodlawn-New MHP's water supply is the Port Deposit Gneiss, which is an unconfined crystalline rock aquifer. The Source Water Protection Area (SWPA) for the four ground-water supply wells was delineated using the watershed delineation method for fractured bedrock wells. The area of the SWPA is based on land topography and a calculation of the total ground-water contributing area during a drought. The SWPA is approximately 177 acres.

Potential point and non-point sources of contamination within the assessment area were identified based on site visits, a review of MDE's databases, and a review of sewer service area and land use maps. Above ground fuel oil storage tanks, potential polychlorinated biphenyl (PCB) containing transformers, septic systems, and a Leaking Underground Storage Tank site were observed within or near the SWPA. Croplands and residential areas account for a majority of the SWPA and can be considered non-point sources of contamination. Well information and water quality data were also reviewed.

The susceptibility analysis for the Woodlawn-New MHP water supply is based on a review of the water quality data, potential sources of contamination, aquifer characteristics, and well integrity. It was determined that the Woodlawn-New MHP water supply is highly susceptible to radon-222, moderately susceptible to volatile organic compounds and total coliform bacteria, and has a low susceptibility to synthetic organic compounds, other radionuclides, and inorganic compounds.

Recommendations to protect the ground-water supply include creating a SWPA protection team, resident awareness, and communication with county officials about future planning and land use.

1. INTRODUCTION

EA Engineering, Science, and Technology was tasked to perform a Source Water Assessment Plan (SWAP) for the Woodlawn Mobile Home Park (MHP) - New water system in Cecil County, Maryland. EA has performed this study under Purchase Order No. U00P3200205, as authorized by the Maryland Department of the Environment (MDE).

The Woodlawn MHP - New water system serves the communities of Woodlawn (new and old) MHPs in Cecil County. The water treatment plant and the supply wells for the system are located within the developments. The Woodlawn MHP - New water system serves a population of 200 with 130 connections. The Woodlawn – New water system is supplied by four wells (Figure 1).

1.1 GROUND-WATER SUPPLY SYSTEM INFORMATION

A review of the well data and sanitary surveys of the system indicates that well numbers 3 and 4 were drilled in 1981 and 1980, respectively, in accordance with the State's current well construction standards, which were implemented in 1973. Well 5 was drilled in 1967 and it is unknown whether it was constructed according to current standards. Each of the wells was completed outdoors and above grade. Each well was observed to have a small concrete pad around the wellhead. Each well was observed to be secure and in good repair.

The wells have a total average yield of 25,000 gallons per day (gpd). According to the MDE Public Water Supply Inspection Report, the system is interconnected to the Woodlawn – Old water system. Also, the system contains an additional back-up well used for washing cars. The location and permit number of this well is unknown and therefore was not surveyed during the site visit. Table 1 contains a summary of the well construction data.

TABLE 1. WELL INFORMATION

Source ID	Source Name	Permit No.	Total Depth (ft)	Casing Depth (ft)	Aquifer
01	Woodlawn 5	CE670286	113	68	Port Deposit Gneiss
02	Woodlawn 4	CE732988	137	63	Port Deposit Gneiss
03	Woodlawn 3	CE733840	300	66	Port Deposit Gneiss
04	Woodlawn 6	Unknown	Unknown	Unknown	Port Deposit Gneiss

According to the MDE Public Water Supply Inspection Report for the water system dated February 2002, the operator of the water system is Donna A Costango.

Currently, the raw ground water is pressure filtrated through sand to remove excess iron. The finished water is stored in 25 bladder tanks (approximately 75 gal each) and four 1,700-gal above ground storage tanks prior to distribution.

1.2 HYDROGEOLOGY

Cecil County has two distinct physiographic provinces, the Piedmont and the Atlantic Coastal Plain, divided by the Fall Line. In the northern third of the county, Precambrian to early Paleozoic crystalline igneous and metamorphic rock of the Piedmont province are exposed at the surface. In the southern two-thirds of the county, the crystalline rocks are overlain by Coastal Plain deposits consisting largely of unconsolidated pebbly sand, sand, sandy clay, and clay. The deposits form a wedge-shaped mass of materials that range in thickness from inches along the Fall Line to as much as 1,600 ft in the southeastern corner of the County (Overbeck et al. 1958).

The ground water used by the Woodlawn MHP - New is from production wells drilled into the Port Deposit Gneiss formation. The Port Deposit Gneiss Formation is described as a "moderately to strongly deformed intrusive complex composed of gneissic biotite quartz diorite, hornblende-biotite quartz diorite, and biotite granodiorite, with all rocks foliated and some strongly sheared" [Maryland Geological Survey (MGS) 1968].

The source of the ground water in Cecil County is from precipitation in the form of rainfall or snow melt. The water table in the aquifer generally mimics the surface topography. The availability of ground water in the crystalline rock of the area depends on the nature and distribution of secondary openings resulting from fracturing and weathering. The yield of a well in crystalline rock depends primarily on the amount of fracture openings penetrated by the well. The well yield range of 43 wells in the Port Deposit Gneiss ranges from 2 to 100 gallons per minute (gpm) with 35 percent of the wells having well yields greater than 10 gpm. The range of specific capacity, which relates well yield to drawdown, of 43 wells in the Port Deposit Gneiss range from less than 0.1 to 4.0 gallons per minute per foot of drawdown (Otton et al. 1988).

2. DELINEATION OF THE AREA CONTRIBUTING WATER TO SOURCE

For ground-water systems, a Wellhead Protection Area (WHPA) is considered to be the source water assessment and protection area for the system. Consistent with the recommended delineation in the Maryland SWAP (MDE 1999), the watershed drainage area that contributes ground water to the supply wells methodology was used.

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

For Woodlawn MHP- New, the current Water Appropriation Permit issued by the MDE Water Rights Division is for an average of 25,000 gpd for the total of the four wells. To determine the total ground-water contribution area during a drought, the following equation was used:

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

From the equation above, the total ground-water contributing area during a drought is approximately 63 acres. The delineated WHPA is approximately 177 acres (Figure 2), and is therefore adequate to meet the average daily ground-water usage during a drought.

3. INVENTORY OF POTENTIAL CONTAMINANTS WITHIN THE DELINEATED AREA

A field survey was performed on 7 November 2002 to confirm potential sources of contamination identified in MDE databases around the ground-water wells. These databases include the Comprehensive Environmental Response, Compensation, and Liability Act Information System (CERCLIS) which includes National Priority List (Superfund) sites, Maryland Registered Underground Storage Tank (UST) sites, Maryland Leaking Underground Storage Tank (LUST) sites, landfills, pesticide dealers, ground-water discharge permits, Colonial Tanks, and Controlled Hazard Substances (CHS) generator sites.

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

3.1 POINT SOURCES

Septic system drain fields were observed on-site and a wastewater lagoon exists north of the development across Camp Meeting Ground Road. Septic system discharge could contain contaminants if there is insufficient treatment of biological contaminants such as coliforms and/or inorganic compounds such as nitrogen. Septic system discharge could also contain contaminants that the systems were not designed to treat, such as solvents and fuels.

Several pole-mounted electrical transformers were identified within the Woodlawn- Old development, the adjacent property to the south of Woodlawn-New across Jackson Park Road. Prior to 1977, many transformers contained polychlorinated biphenyls (PCB) fluid as an insulator. It is possible that the transformers onsite contain PCBs. If the transformer leaks, the PCB oil could eventually leach through the soil overburden into the ground-water aquifer.

Several 275-gal above ground residential heating oil tanks (ASTs) were observed throughout the development. Failure of an AST could impact the ground water with petroleum hydrocarbons.

The Water Witch Fire Company maintains above ground fuel oil tanks at their facility west of the SWPA. Failure of an AST could impact the ground water with petroleum hydrocarbons.

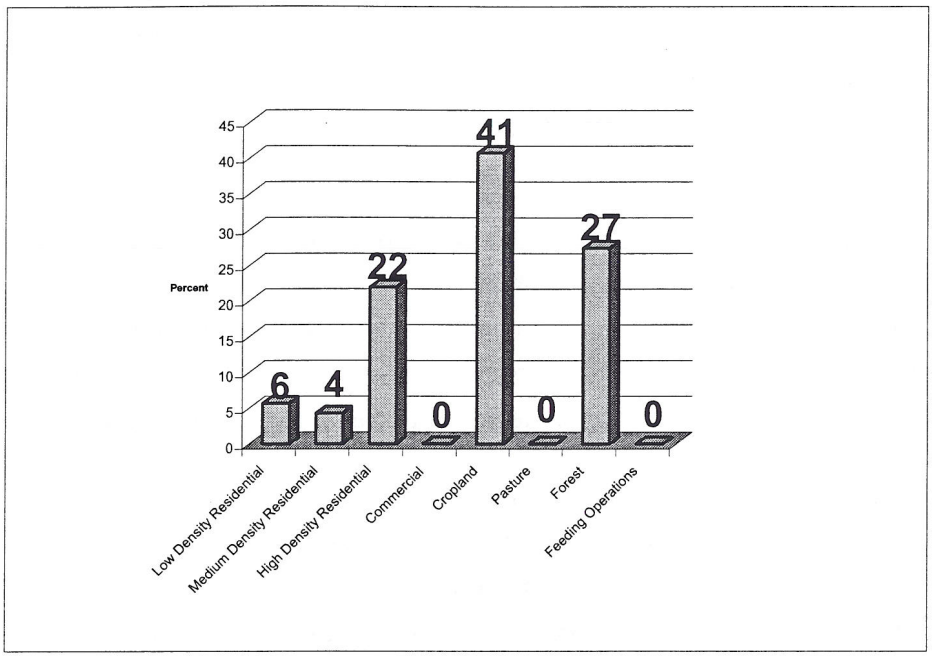
Landhope Farms, a listed leaking underground storage tank site, exists northwest of the SWPA. Dependent on the nature and extent of release at this property, the ground water could become impacted by petroleum hydrocarbons.

3.2 NON-POINT SOURCES

In addition to the above point-sources, non-point source agricultural lands and an orchard were observed north of the delineation area.

Using the Maryland Office of Planning's 2000 Land Use/Land Cover map for Cecil County, potential non-point sources within the SWPA area were also evaluated by land use designation (Figure 3). A summary of the percent and acreage of each type of land use is presented in the graphs below;

PERCENTAGE OF EACH LAND USE TYPE



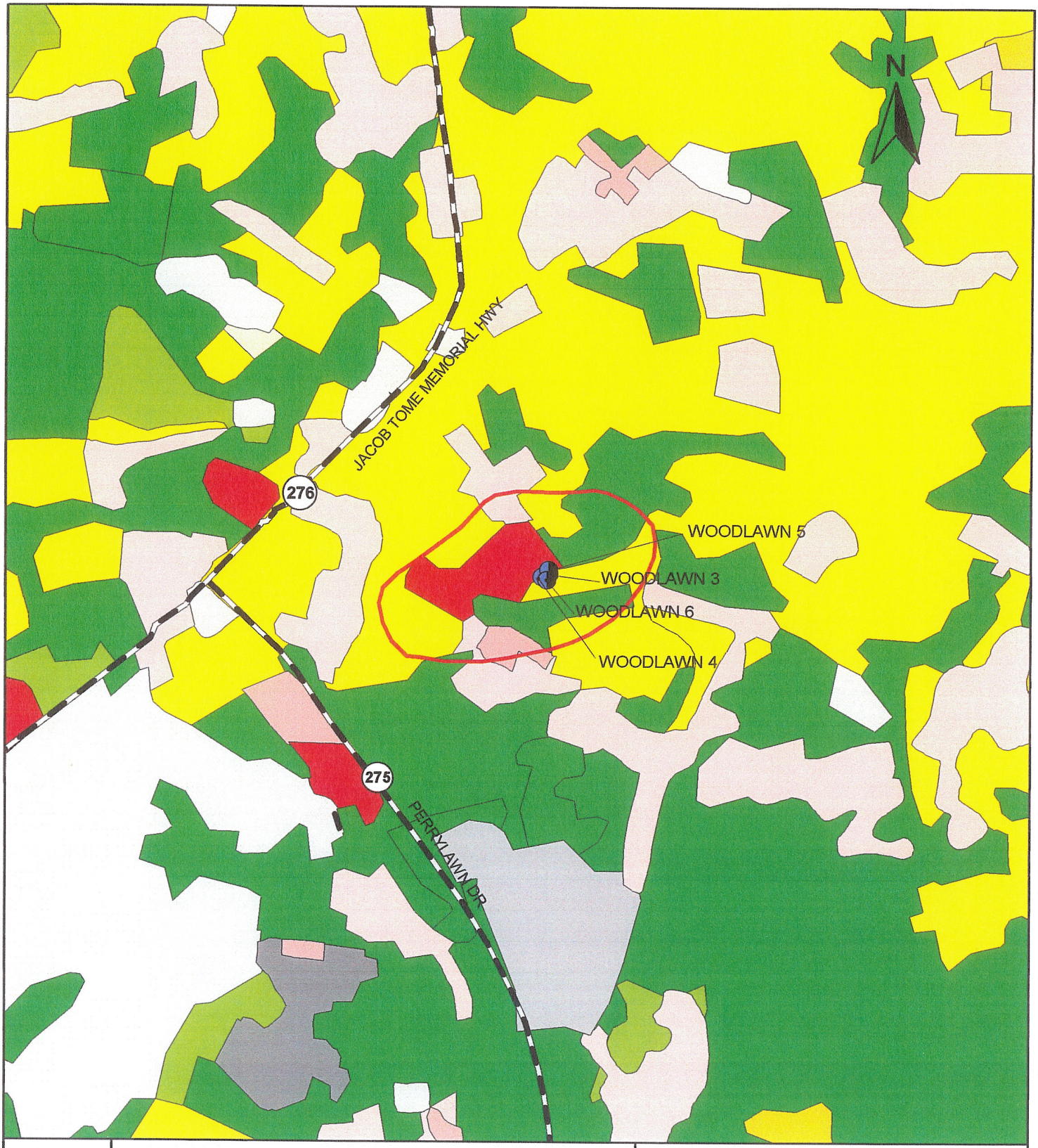


Figure 3. Woodlawn New MHP Land Use Map of the Source Water Protection Area

Source Water Assessment Program
2003

Scale: 1000 0 1000 2000 Feet

Legend:

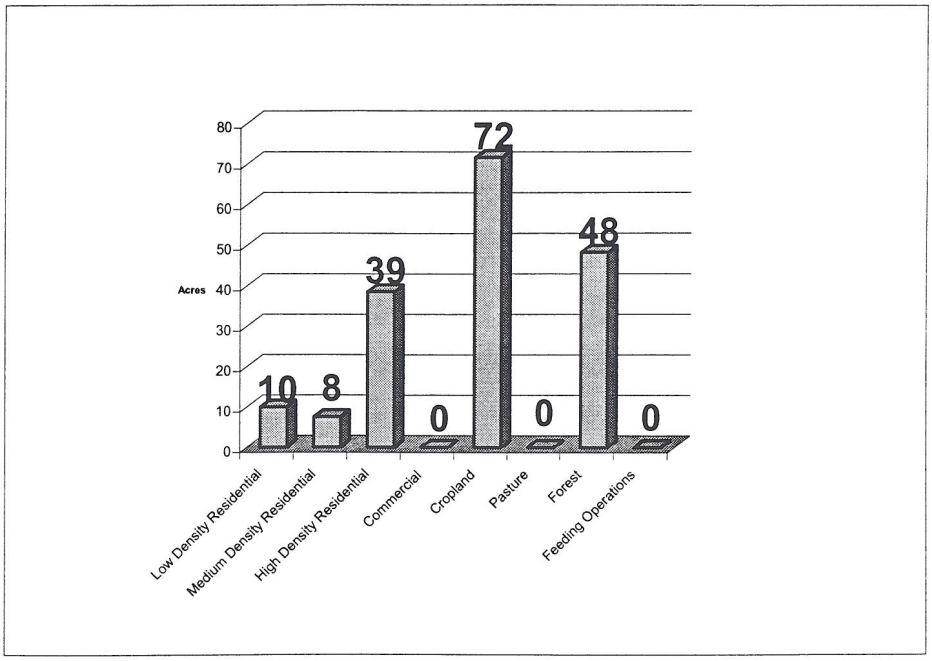
- MHP Wells
- SWPA Boundary
- Major Roads

Land Use

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial
- Extractive
- Open Urban Land
- Cropland
- Pasture
- Orchards
- Forest

Source: Maryland Office of Planning, 2000.

ACREAGE OF EACH LAND USE TYPE



From an interpretation of the graphs above, cropland (72 acres) and residential areas (57 acres) account for almost all of the SWPA (177 acres). The use of fertilizers and pesticides (SOCs) in croplands and on residential area lawns is common. Therefore, there is potential for the migration of potential contaminants into the ground water from these land uses.

Using the 1993 Maryland Office of Planning's Cecil County sewerage coverage, potential non-point sources from other septic system users in the SWPA were assessed (Figure 4). By overlaying the SWPA on the sewerage coverage layer in ArcView GIS, it was determined that approximately 93 percent of the SWPA does not have public sewer service and approximately 7 percent is either on public sewer service or is under construction.

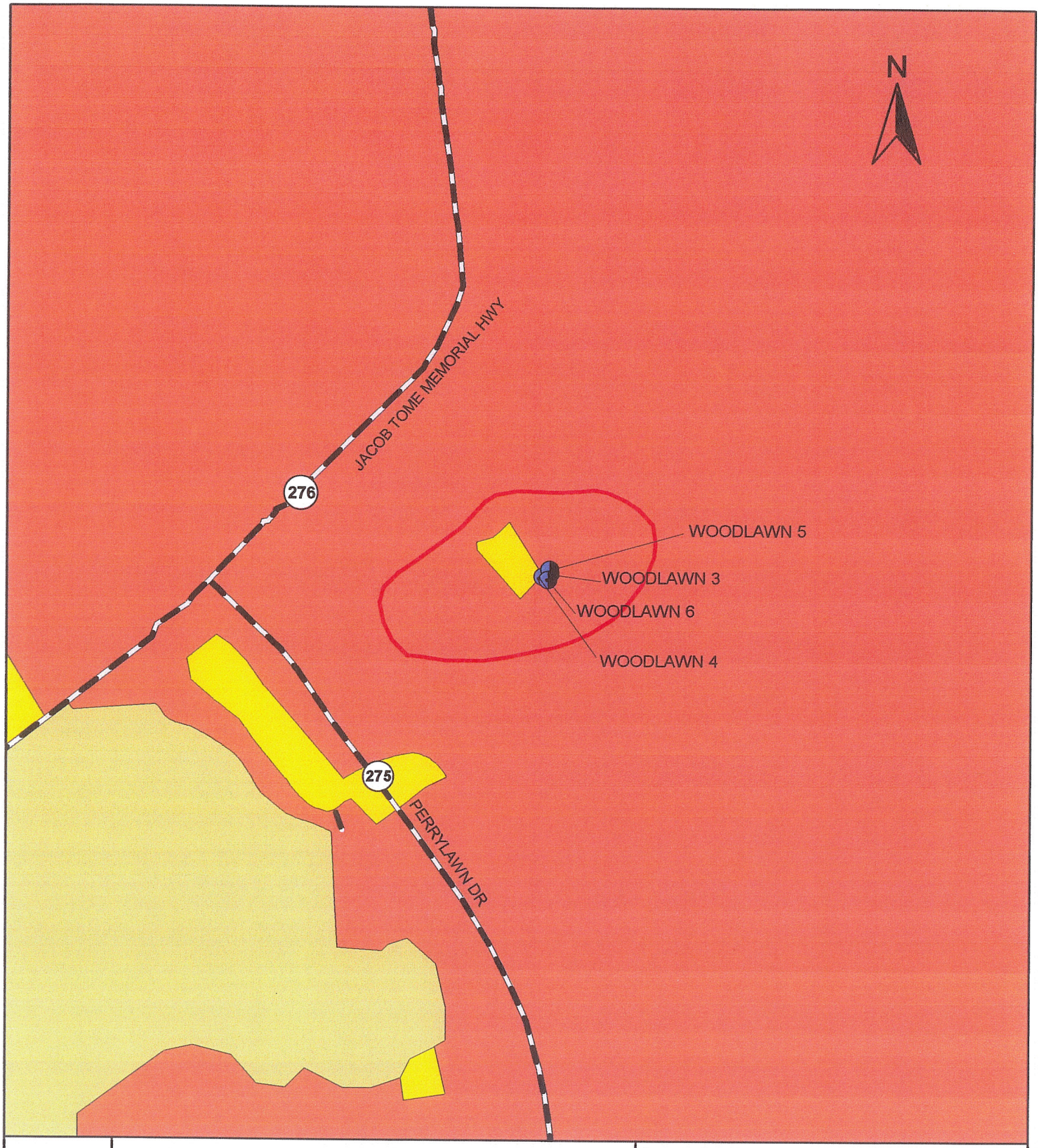


Figure 4. Woodlawn New MHP Sewer Service Map of the Source Water Protection Area

Source Water Assessment Program
2003

Legend:

- MHP Wells
- SWPA Boundary
- Major Roads

Sewer

- No planned service area
- Existing service area
- Area programmed for service within 5 years

Source: Maryland Office of Planning, 1993.

Scale: 1000 0 1000 2000 Feet

4. REVIEW OF WATER QUALITY DATA

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

A review of the water quality data from 1990 to 2002 has been performed for Woodlawn-New MHP's finished water samples. All detected compounds from ground-water samples collected are shown in Appendix A.

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

4.1 GENERAL WATER QUALITY PARAMETERS

No general water quality parameters were reported in the ground-water samples above 50 percent of the USEPA MCL.

4.2 VOLATILE ORGANIC COMPOUNDS

No volatile organic compounds (VOCs) were reported in the ground-water samples above 50 percent of the USEPA MCL.

Methyl-tert-butyl-ether (MTBE) is presently on the USEPA Contaminant Candidate List (CCL) for evaluation of whether placement on the Primary Drinking Water Standards list is warranted. Due to its presence on the CCL, MTBE currently has no MCL; however the USEPA has an advisory level of 20 to 40 µg/L for the compound. MTBE was detected in ground-water samples at concentrations ranging from 0.7 to 1.4 µg/L and is used as an additive to gasoline. The presence of MTBE in the ground-water aquifer is likely a result of a gasoline release into the subsurface.

4.3 SYNTHETIC ORGANIC COMPOUNDS

No synthetic organic compounds (SOC) were reported in the ground-water samples above 50 percent of the USEPA MCL.

Low levels of di(2-ethylhexyl) phthalate were reported in ground-water samples ranging from 0.58 to 1.04 µg/L. Di(2-ethylhexyl)phthalate is a common laboratory cross-contaminant and has a current MCL of 6 µg/L.

4.4 INORGANIC COMPOUNDS

No inorganic compounds (IOCs) were reported in the ground-water samples above 50 percent of the USEPA MCL.

However, low levels of nitrate were reported in ground-water samples, which ranged from 0.5 to 3.6 mg/L. Low levels of nitrite were also reported in ground-water samples, which ranged from 0.002 to 0.17 mg/L. Nitrate and nitrite are USEPA primary drinking water standard parameters with a USEPA MCL of 10 and 1 mg/L, respectively. Elevated levels may occur due to the influx of agricultural animal waste, agricultural chemicals or fertilizers, and/or septic system effluent into the ground water.

Also, low levels of sulfate were reported in ground-water samples collected in July 1996 at 4.9 mg/L but below the SDWR standard of 250 mg/L. SDWR parameters are non-enforceable federal guidelines regarding cosmetic effects, such as tooth or skin discoloration, or aesthetic effects, such as taste, odor, or color.

4.5 MICROBIOLOGICAL CONTAMINANTS

Monthly ground-water sampling and analysis is performed for total and fecal coliform bacteria. Total coliform is a parameter under the National Primary Drinking Water Regulations.

One routine water sample submitted for analysis in June 2000 and one of five routine water samples collected in October 2000 were reported to contain total coliform bacteria. Neither sample was reported to contain fecal coliform bacteria. However, no repeat ground-water samples were collected and analyzed to confirm or deny the presence of total coliform.

Another routine water sample submitted for analysis in September 2000 was also reported to contain total coliform bacteria. No fecal coliform was reported in this sample. Two of the four repeat samples collected and submitted for analysis were reported to contain total coliform bacteria.

No other samples collected monthly since January 1997 thorough August 2002 were reported to contain coliform bacteria.

To assess the potential of Ground Water Under the Direct Influence (GWUDI) of surface water, ground-water sampling records (during dry and storm conditions) in MDE databases were assessed and information from Public Water Supply Inspection Reports were reviewed.

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

From an assessment of the GWUDI ground-water results by MDE, the ground-water supply for Woodlawn-New MHP is not under the direct influence of surface water.

4.6 RADIONUCLIDES

Gross alpha particles were reported in a water sample collected in July 2001 (2 piC/L). The MCL for gross alpha particles is 15 piC/L. Gross beta particles were also reported in two water samples collected in February 1997 (2 piC/L) and July 2001 (3 piC/L). The MCL for gross beta particles is 50 piC/L. No data for radon-222 analysis is available for review to date.

5. SUSCEPTIBILITY ANALYSIS

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

1. available water quality data
2. presence of potential contaminant sources in the SWPA
3. aquifer characteristics
4. well integrity
5. the likelihood of change to the natural conditions

The aquifer that supplies Woodlawn-New MHP's drinking water is an unconfined aquifer.

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

5.1 VOLATILE ORGANIC COMPOUNDS

No VOCs were reported above 50 percent of the MCL.

The only VOC reported in any of the water samples analyzed was MTBE. MTBE is presently on the CCL for evaluation of whether placement on the Primary Drinking Water Standards list is warranted. Due to its presence on the CCL, MTBE currently has no MCL; however, USEPA has an advisory level of 20 to 40 µg/L for the compound. The low levels of MTBE reported (less than 2 µg/L) are most likely the result of a gasoline release into the subsurface. Because of the chemical properties of MTBE, it moves faster and farther than other gasoline constituents such as benzene or xylenes.

The reported concentrations could be the lead edge of the dissolved phase plume of gasoline constituents. A known LUST site (Land Hope Farms Gas Station) has been reported and observed near the SWPA. However, the LUST site is over one-half of a mile away of the supply wells and releases at the site may not be cause of the MTBE in the ground water. The MTBE concentrations reported could also be the result of an unreported spill of gasoline within the SWPA.

Based on the water quality data reviewed and the presence of a known LUST site that may cause VOC contamination near the SWPA, the water supply at Woodlawn-New MHP is moderately susceptible to VOCs.

5.2 SYNTHETIC ORGANIC COMPOUNDS

No SOCs were reported in the ground-water samples above 50 percent of the USEPA MCL.

Only the SOC di(2-ethylhexyl)phthalate was reported in the three water samples at a level well below the MCL, and is most likely the result of laboratory cross-contamination.

The only point sources that could impact the ground water with SOCs within the SWPA are from heating oil tanks observed onsite. The possible use of herbicides and pesticides on croplands and residential areas, which accounts for approximately 73 percent, within the SWPA can be considered a potential non-point source for SOCs. However, No SOCs common to pesticides and herbicides have been reported in any of the water samples submitted for analysis. SOCs also have a high affinity to sorb to soil particles and are not likely to infiltrate into the ground-water aquifer.

Based on the water quality data reviewed and the absence of point sources of SOCs, the water supply at Woodlawn-New MHP has a low susceptibility to SOCs.

5.3 INORGANIC COMPOUNDS

No IOC concentrations were reported above 50 percent of the MCL in any of the water samples analyzed.

Approximately 93 percent of the SWPA does not use public sanitary sewer systems. Residential and commercial areas use on-site septic systems, which can cause nitrate pollution in ground water. However, no concentrations of nitrate have been reported above 4 mg/L and no upward trend in the reported nitrate concentrations in the water samples have been observed over time.

Based on the water quality data reviewed and the lack of observed point sources of IOCs, the water supply at Woodlawn-New MHP has a low susceptibility to IOCs.

5.4 RADIONUCLIDES

No concentrations of radionuclides were reported above 50 percent of the MCL in any of the water samples analyzed. No radon-222 data was available for review to date.

However, from a review of he results of ground water samples submitted for radon-222 analysis from Woodlawn-Old MHP (PWSID 007041), the water supply at the adjacent MHP was highly susceptible. The radon-222 concentrations ranged from 635 to 3,650 pCi/L.

Based on these results from the adjacent MHP and the lack of radon-222 data, the water supply at Woodlawn-New MHP has a high susceptibility to radon-222 and has a low susceptibility to other radionuclides.

5.5 MICROBIOLOGICAL CONTAMINANTS

Total coliform bacteria were reported in the water samples during the routine and repeat water sampling event in June and August 2000.

Total coliforms are a group of closely related bacteria that are generally harmless. They are natural and common inhabitants of soil and surface water bodies. However, they are not generally found in ground water that is free of surface water or fecal contaminants (USEPA 2001). Therefore, if total coliforms are reported in water samples, there may be a direct pathway between surface water and the ground water.

Fecal coliforms are a subset of total coliforms and are a good indicator of surface water contamination, and of the potential presence of waterborne pathogens associated with fecal contamination (USEPA 2001). No fecal coliform bacteria were reported in any of the water samples.

From an assessment of GWUDI ground-water results by MDE, the ground-water supply for Woodlawn-New MHP is not under the direct influence of surface water.

From documentation reviewed, two of the four supply wells were constructed after 1973, the year that current well construction standards were required. All the wellheads were observed to be in good repair.

Based primarily on the water quality review (the reported detections of total coliform) and the construction of the supply wells of the two older wells within the SWPA, the water supply at Woodlawn-New MHP is moderately susceptible to total coliform bacteria.

6.3 PLANNING/NEW DEVELOPMENT

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

6.4 MONITORING

The management of the MHP should continue to monitor the ground water for all SWDA contaminants as required by MDE.

A ground-water sample should be submitted for laboratory analysis of radon-222.

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

The management of the MHP should also contact the MDE Oil Control Program for the status of the LUST site, Land Hope Farms, which is within the SWPA.

6.5 CONTINGENCY PLAN

As required by the Code of Maryland Regulations (COMAR) 26.04.01.22, all water system owners are required to prepare and submit for approval a plan to provide safe drinking water under emergency conditions.

6.6 CHANGES IN USES

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

6.7 CONTAMINANT SOURCE INVENTORY UPDATES/INSPECTIONS

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

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

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

6.8 COOPERATIVE EFFORTS WITH OTHER AGENCIES

The management of the mobile home park may request the assistance of the University of Maryland Agricultural Extension Service, Soil Conservation Service to work with the nearby farmers to adopt Best Management Practices (BMPs) for cropland located within the SWPA.

The nearby farmers can also participate in the New Conservation Reserve Program (CREP) applicable to the cropland located within the SWPA. Government funding is available to qualified farmers equal to the cost and financial benefit of farming the area. The Natural Resources Conservation Service is responsible for determining the relative environmental benefits of each acre offered for participation.

7. REFERENCES

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

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7. United States Environmental Protection Agency (USEPA). 2001. *A Small Systems Guide to the Total Coliform Rule.* Office of Water. EPA 816-R-01-017A. June.

SOURCES OF DATA

Water Appropriation and Use Database
Public Water Supply Inspection Reports
Monitoring Reports
MDE Water Supply Program Oracle Database
MDE Waste Management Sites Database
Maryland Office of Planning 2000 Cecil County Land Use Map
Maryland Office of Planning 1993 Cecil County Land Use Map
USGS Topographic 7.5 minute Quadrangle Map – 1992 Rising Sun, Maryland Quad
USGS Topographic 7.5 minute Quadrangle Map – 1992 Havre de Grace, Maryland Quad

Appendix A

Detected Compounds in Ground-Water Samples

SUMMARY OF DETECTED COMPOUNDS IN WOODLAWN MHP (NEW) WATER SAMPLES				
Plant ID	**Sample Date**	**Contaminant Name**	**Result**	**Unit**
Volatile Organic Compounds				
01	22-Feb-00	METHYL-TERT-BUTYL-ETHER	0.7	ug/L
01	02-Jul-01	METHYL-TERT-BUTYL-ETHER	1.4	ug/L
01	04-Jun-02	METHYL-TERT-BUTYL-ETHER	1.4	ug/L
Synthetic Organic Compounds				
01	29-Dec-95	DI(2-ETHYLHEXYL) PHTHALATE	1.04	ug/L
01	29-Dec-95	DI(2-ETHYLHEXYL) PHTHALATE	1	ug/L
01	16-Jul-96	DI(2-ETHYLHEXYL) PHTHALATE	0.58	ug/L
Inorganic Compounds				
01	10-Mar-96	BARIUM	0.012	mg/L
01	10-Mar-96	FLUORIDE	0.075	mg/L
01	22-Feb-00	FLUORIDE	0.11	mg/L
01	13-Dec-93	NITRATE	3.6	mg/L
01	15-Dec-94	NITRATE	1.6	mg/L
01	03-Dec-95	NITRATE	2.1	mg/L
01	16-Jul-96	NITRATE	1.4	mg/L
01	12-Dec-96	NITRATE	1.4	mg/L
01	18-Dec-97	NITRATE	0.65	mg/L
01	08-Dec-98	NITRATE	0.833	mg/L
01	22-Nov-99	NITRATE	1.21	mg/L
01	23-Nov-99	NITRATE	1.21	mg/L
01	22-Feb-00	NITRATE	0.5	mg/L
01	18-Dec-00	NITRATE	1.24	mg/L
01	25-Jun-01	NITRATE	1.05	mg/L
01	24-Jun-02	NITRATE	1.73	mg/L
01	16-Jul-96	NITRITE	0.002	mg/L
01	12-Dec-96	NITRITE	0.17	mg/L
01	22-Feb-00	NITRITE	0.005	mg/L
01	16-Jul-96	SODIUM	7.2	mg/L
01	22-Feb-00	SODIUM	7.44	mg/L
01	16-Jul-96	SULFATE	4.9	mg/L
General Water Quality Parameters				
01	16-Jul-96	pH	6.6	s.u.
Radionuclides				
01	02-Jul-01	GROSS ALPHA	2	pCi/L
00	13-Feb-97	GROSS BETA	2	pCi/L
01	02-Jul-01	GROSS BETA	3	pCi/L
Microbiological Contaminants				
NA	1-Jul-00	TOTAL COLIFORM (ROUTINE)	Positive	
NA	1-Sep-00	TOTAL COLIFORM (ROUTINE)	Positive	
NA	1-Sep-00	TOTAL COLIFORM (REPEAT)	Positive	
NA	1-Sep-00	TOTAL COLIFORM (REPEAT)	Positive	
NA	1-Oct-00	TOTAL COLIFORM (ROUTINE)	Positive	

s.u. – standard units. NA – not applicable