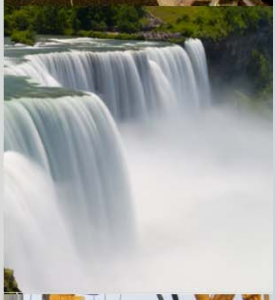
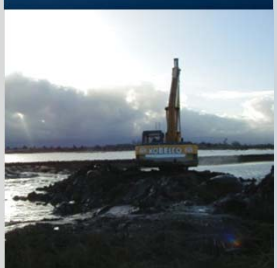
S.S. Papadopulos & Associates, Inc.
Environmental and Water Resource Consultants





Source Water Protection Plan for the Elkton, Maryland Public Water System

October, 2013

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Source Water Protection Plan for the Elkton, Maryland Public Water System

Prepared for:
Maryland Department of the Environment
Water Supply Program
(Purchase Order # P2400301)

Prepared by:

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October, 2013

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List of Acronyms

AGPD	Average Gallons per Day
BMP	Best Management Practices
CEM	Chesapeake Environmental Management
ESD	Environmental Site Design
GIS	Geographic Information System
GPD	Gallons per Day
IOC	Inorganic Compounds
MCL	Maximum Contaminant Level
MDE	Maryland Department of the Environment
MGPD	Maximum Gallons per Day
OCP	Oil Control Program
PCE	Tetrachloroethylene
PCS	Potential Contaminant Source
PWS	Public Water System
PWSID	Public Water System Identification
SMCL	Secondary Maximum Contaminant Level
SOC	Synthetic Organic Compounds
SSP&A	S.S. Papadopulos & Associates
SWAA	Source Water Assessment Area
SWPP	Source Water Protection Plan
TTHM	Total Trihalomethanes
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VOC	Volatile Organic Compounds
WHPA	Wellhead Protection Area
WHPO	Wellhead Protection Ordinance
WWTP	Wastewater Treatment Plant

REPORT

Section 1
Introduction

This Source Water Protection Plan (SWPP) was prepared for the Town of Elkton by S.S. Papadopulos & Associates (SSP&A) and Chesapeake Environmental Management (CEM). The plan was initiated and funded by the Maryland Department of the Environment (MDE) under Purchase Order # P2400301.

In the early 2000s, the MDE completed or contracted out completion of Source Water Assessments (SWAAs) for public water systems (PWS) across the state. These reports were developed in accordance with Maryland's Source Water Assessment Plan (1999). The content of these reports included

- Delineation of Source Water Assessment Areas (SWAAs)
- Identifying Potential Sources of Contamination, and
- Completing a Susceptibility Analysis for each PWS source.

MDE completed Source Water Assessments for Elkton's groundwater and surface water sources in 2001 and 2005, respectively. A significant portion of the current report is an update to the previous SWAA Reports, including an update to the SWAA delineation. Recommendations included within this report, however, go beyond those in the original Source Water Assessment Reports (MDE, 2001 and 2005). To date, the town of Elkton has not adopted an independent Wellhead Protection Ordinance or incorporated a Wellhead Protection Overlay Zone into its zoning, although the latter action has been under discussion with Cecil County (Town of Elkton Planning Commission, 2010). Recommendations in this report address a number of issues associated with Wellhead Protection.

In completing this report, MDE provided assistance through access to files, databases, and GIS data. The report contents were discussed with representatives of Elkton, and public input was solicited to help ensure that recommendations for Source Water Protection were consistent with the Town's needs and resources.

1.1 Community Involvement

Opportunities for public involvement were provided during the course of this project. The goals and scope of the project were presented at a Town Council Meeting on February 1, 2012 (Appendix A). Public notices prior to this meeting included an announcement in the Cecil Whig newspaper and in the meeting's agenda.

Section 2
Background

The Town of Elkton is located in east-central Cecil County, at the head of the Elk River, adjacent to the Delaware Border and approximately 8 miles south of the Pennsylvania Border (Figure 1). According to the 2010 census, the Town's population was 15,443 people. The Elkton Public Water System (PWS) is operated by the Town, and serves approximately 6,578 connections including developments outside the town boundary.

The town of Elkton encompasses approximately 8.7 square miles at an elevation ranging from a few feet above mean sea level in the southern part of the town to about 100 ft MSL in the northern part. Most of the town is situated within the Upper Elk River watershed, with portions of its area also within the watersheds for Big Elk Creek and Little Elk Creek, both of which discharge to the Chesapeake Bay.

Currently the Town obtains its drinking water from two wells (Wells 3 and 1R) and one surface water intake on Big Elk Creek. A third well, Well 4 was installed in 2008, and has recently been permitted, although it is not currently being utilized and is not interconnected with the Town PWS. A Water Appropriation Permit (WAP) application for an additional well, Well 2R, also been submitted to MDE, but has not been approved at this time

2.1 Groundwater and Surface Water Sources; System Operations

Currently the Elkton Public Water System (PWS; PWSID 0070011) is permitted to withdraw 2,600,000 gallons per day (gpd) on average (Table 1). For the two 2 active wells and surface water intake, the total permitted amount is 2,100,000 GPD. The town also purchases water from Artesian Water Company. The purchased water is not evaluated in this report.

Data provided by MDE indicate that since 1979, the Elkton PWS's total water use has been increasing approximately linearly (Figure 2). Surface water has generally been responsible for about two-thirds of the total water supply. In the past ten years (2002 to 2011), the Elkton PWS has appropriated between 294 million gallons and 654 million gallons per year, averaging about 560 million gallons a year, or about 1.53 million gallons per day. This is equivalent to an extraction rate of 1,064 gallons per minute, on average.

2.2 Previous Source Water Assessment and Protection Reports

In 2000, Advanced Land and Water, Inc. (ALWI) developed a draft Wellhead Protection Plan (WHPP) for wells 1 and 3, delineating multi-zone wellhead protection areas for each well and identifying potential sources of contamination (ALWI, 2000). This draft was not finalized. In 2001, MDE completed a susceptibility analysis for these groundwater sources, based on the previous WHPP, which concluded that the town's water supply was susceptible to contamination by volatile organic compounds (MDE, 2001). MDE also completed a Source Water Assessment Plan (SWAP) in 2005 for Elkton's surface water supply source (Big Elk Creek); this report concluded that the major concerns for the town's surface water supply were turbidity, disinfection by product precursors, and pathogenic microorganisms (MDE, 2005).

2.3 Water System Infrastructure

As noted above, the Elkton PWS currently obtains water from up to two wells and a surface water intake. Surface water withdrawal is limited by a number of conditions, including the Town's responsibility to maintain a minimum flowby in Big Elk Creek. The permit also requires a back-up water supply plan, leading to the town's Artesian Water-Elkton water distribution systems Interconnection, completed in July, 2009 (Town of Elkton Planning Commission. 2010). The town currently purchases 250,000 GPD from Artesian Water, with a maximum purchase of 1,500,000 GPD.

The water supply system has a storage capacity of 3.4 million gallons.

Section 3
Source Water Assessment

This section of the report provides the updated Source Water Assessment for the Elkton PWS.

3.1 Hydrogeology and Hydrology

The town of Elkton is located within the Delmarva Peninsula Region of the Coastal Plain Physiographic Province, immediately southeast of the Fall Line (Reger and Cleaves, 2008; Figure 3A). This region consists primarily of unconsolidated sand, silt and clay layers, including both Cretaceous units of the Potomac Group, and overlying Quaternary sediments. Although within the Coastal Plain Province, Elkton is near outcrops of consolidated bedrock including Grays' Hill, an erosional outlier of gabbroic bedrock, immediately north of Elkton's water supply wells.

Water is recharged to the Cretaceous aquifer by infiltration in the outcrop areas to the west and vertically through sands and gravels in unconfined and confined areas. Elkton's water supply wells range in depth from 109 to 271 feet and are completed in the Potomac Group Aquifer. Because of their relative shallow depths, proximity to the Fall Line, and absence of a thick, regional aquitard, these wells are classified as semi-confined by MDE.

Geological and geophysical logs in Otton and Mandle (1984) and Otton et al. (1988) suggest that Elkton is located in the transition zone between unconfined and confined conditions, and that Potomac Group water supply wells to the east and southeast are entirely confined. For the purposes of this study, to be conservative and protective of the groundwater resources, it is assumed that the Elkton wells are under semi-confined conditions.

3.2 Review of Water Quality Data

Maryland's Water Supply Program provided SSP&A with compiled analytical data reported for the Elkton PWS from 1990to 2011. For the purposes of this analysis, ten (10) years' worth of data are reviewed (2001 to 2010). Data discussed here are compared to the US Environmental Protection Agency (USEPA)'s Maximum Contaminant levels (MCLs) and Maryland groundwater cleanup standards (MDE, 2008).

3.2.1 Volatile Organic Compounds (VOCs)

For the period from 2001 through 2010, 840 VOC analyses were reported for the Elkton PWS. During this time period, a number of VOCs were detected (Table 2):

- Tetrachloroethylene (PCE)
- Trihalomethanes
  - Bromodichloromethane
  - Chloroform
  - Dibromochloromethane

Tetrachloroethylene (PCE) is a chlorinated solvent widely used in dry cleaning and other industrial processes.The two detections (Table 2) were both from groundwater supplies, but well below the USEPA's MCL. No PCE was detected for in the 11 samples reported for the Big Elk Creek surface water supply (TP-1).

Trihalomethanes are formed when chlorine or other disinfectants used to control microbial contaminants in drinking water react with naturally occurring organic and inorganic matter in water. These are regulated as a group – the Total Trihalomethanes (TTHM). The USEPA has established a Maximum Contaminant Level (MCL) of 80 ug/l for the TTHMs. Under USEPA's Stage 2 Disinfection Byproducts Rule (DBR), compliance with this standard is based upon an annual average value at each location. As shown in Table 2, for the period from 2001 to 2010, there have been 8 exceedances of the TTHM level in finished (treated) water, in all cases associated with treated surface water from Big Elk Creek. Also, the annual averages have often exceeded 40 ug/l (1/2 the MCL) including in 2002 when the average was 70 ug/l. Since 2001, concentrations of TTHM have averaged just around ½ the MCL on an annual basis (Figure 4).

3.2.2 Synthetic Organic Contaminants (SOCs)

Synthetic organic compounds detected in the Elkton Public Water System are summarized in Table 3. The contaminants detected were:

- Atrazine
- Benzo (a) pyrene
- Dalapon
- Di (2-Ethylhexyl) Adipate
- Di (2-Ethylhexyl) Phthalate
- Dicamba
- Ethylene Dibromide (EDB)
- Metoachlor
- Simazine

All of the SOC detections are associated with TP-01, the treatment plant for Elkton's surface water source. Di (2-Ethylhexyl) adipate and Di (2-Ethylhexyl) phthalate are plasticizers; Di (2-Ethylhexyl) phthalate is also a common laboratory contaminant and may not be indicative of water quality. These two compounds were not detected in excess of relevant groundwater standards. Ethylene dibromide (EDB) was detected a single time at concentrations approaching the MCL, but was not detected again. Consequently, the significance of this result is unclear, but likely reflects a transitory impact from a surface source of contamination.

The remaining compounds (atrazine, dalapon, dicamba, metoachlor, simazine) are all used as herbicides or pesticides and likely reflect the impacts of agricultural and residential land use in the region. None of the detections exceeded relevant drinking water standards. While one detection of simazine did exceed ½ the MCL in 2002, subsequent samples have all been less than one tenth of that concentration.

3.2.3 Inorganic Compounds

Inorganic compounds reported in Elkton's water supply are summarized in Table 4. Many of these compounds can have both natural and man-made (anthropogenic) sources. None of the parameters listed in Table 4 have exceeded the relevant standard (MCL) during the time period from 2001 to 2010. A single exceedance of the secondary MCL (SMCL) by Manganese in 2001 has not been repeated in subsequent sampling. SMCLs are established only as guidelines to assist public water systems in managing their drinking water for aesthetic considerations, such as taste, color and odor. These contaminants are not considered to present a risk to human health at the SMCL.

Nitrate is a naturally-occurring ion that is also a contaminant associated with agricultural fertilizers and septic systems/sewage. None of the nitrate measurements reported for Elkton exceeded the MCL (10 mg/l). One nitrate measurement at TP-01 (Big Elk Creek) exceeded one-half the MCL (5 mg/l); the nitrate concentration was reported to be 5.2 mg/l in 2011. From the period of 1993 to the present there appears to be a very slow increase in nitrate concentration (Figure 4) although on average, the nitrate levels have remained between 2 and 4 mg/l. The concentrations in the wells and surface water supplies are similar, with perhaps somewhat lower concentration on average (2-3 mg/l) in Well 3.

3.2.4 Coliform Bacteria

Total coliforms are a group of closely related, mostly harmless bacteria that live in soil and water as well as the gut of animals. The extent to which total coliforms are present in source water can indicate the general quality of that water and the likelihood that the water is contaminated with fecal matter from animals or humans. Total coliforms are currently controlled in drinking water regulations (Total Coliform Rule) because their presence above the standard indicates problems in treatment or in the distribution system. EPA requires all PWS to monitor for total coliforms in distribution systems. If total coliforms are found, then the public water system must further analyze that total coliform-positive sample to determine which specific types of coliforms (i.e., fecal coliforms or *E. coli*) are present.

Table 5 summarizes the coliform results for the Elkton system for the years 2001 to 2010. During this period, no positive detections for total coliform or fecal coliform were reported.

3.3 Source Water Assessment Areas

The Source Water Assessment Area describes the geographic boundary of areas providing water to public water system sources. As per Maryland's Source Water Assessment Program Guidance (MDE, 1999), the preferred tool for delineating SWAAs in semi-confined aquifers is a three-dimensional groundwater model and particle tracking. For this report, we have developed a MODFLOW model that considers regional hydrogeologic constraints and accounts for available groundwater level data within the Potomac Group aquifer near Elkton

3.3.1 MODFLOW Model

The MODFLOW model (Figure 5) is a finite difference grid composed of one layer of 441 rows and 524 columns in map view. Rows and columns are spaced irregularly with minimum and maximum row size of 20 m and 2400 m respectively. The column minimum and maximum sizes are 14 m and 25 m respectively. The model origin is located at easting 525800 and northing 171300 (NAD1983 Maryland Coordinate System, in meters) with rotation of 50 degrees. The total area covered by model is 2100 km^2.

3.3.1.1 Boundary Conditions

The northwestern boundary of the model, roughly coincident with the Fall Line, is a no-flow boundary. In addition, the outcrops of bedrock associated with the Gray's Hill area are also treated as no-flow boundaries (Figure 5).

Because the Potomac aquifer extends beyond the model edges, water level data from Otton and Mandle (1984) and Otton et al. (1988) were used to generate a regional potentiometric map using kriging mapping methods with a linear trend. The model orientation was chosen in such way that eastern and western boundary follows the flow line and these are treated as no-flow boundaries.

The same regional water level map was used to generate General Head Boundary (GHB) which is present along the southwestern distal edge of the model.

Cross section information and data from Otton and Mandle (1984) and Otton et al. (1988) were also used to roughly delineate the boundary between unconfined and confined conditions in the Potomac aquifer. Northwest of the boundary – in the region of unconfined conditions – recharge is applied to the model. The recharge package was used to simulate the assumption that natural recharge of the Potomac aquifer occurs in the unconfined Potomac outcrop area. The model assumed 45 in of annual precipitation, with 15% apportioned to ground water recharge.

A constant head boundary was chosen to represent surface water features such as Little Creek, Elk Creek and Elk River. The constant head boundary is based on the assumption that ground water is in direct connection with surface water features and doesn't fluctuate significantly over longer periods of time.

Other reports reviewed in developing the model included those by Delaware Division of Water Resources (2003), Dugan et al., (2008), He and Andres (2011), Martin, (1984), and Talley (2005).

3.3.1.2 Model Parameters

The primary parameters for this model are the Transmissivity (T) and storage coefficient (S). The Transmissivity was calculated by applying a steady value of hydraulic conductivity (K) equal to 24ft/day, and increasing the thickness of Model Layer 1 by 40ft/mile to the southeast, parallel to the direction of groundwater flow. This imparts a regional gradient on the T value that ranges from 480 ft^2/day to 5,380 ft^2/day.

The storage coefficient used was1 x 10^{-4}, with an effective porosity value (specific yield) of 0.2.

Pumping rates used for each of the wells were as follows:

1) Elkton Wells - Average Daily Pumping Amount Permitted (Table 1)
2) Delaware Wells (Artesian Water Co.)

a.	Brendan Farms 1	1.296	MGD
b.	Brendan Farms 2	1.08	MGD
c.	Chesapeake City Road 2	0.324	MGD
d.	Chesapeake City Road 3	0.792	MGD
e.	Eastern States 1	0.432	MGD
f.	Eastern States 2	0.864	MGD
g.	Old County Road 1	1	MGD
h.	Old County Road 2	1.5	MGD

3.3.1.3Calibration

After construction of the model, it was tested against available data to ensure that it met the test for reasonableness. ALWI (2009) reported drawdowns associated with the well testing program for new Well 4. These were compared to the observed drawdowns in the model to assist in the calibration process for T and S. A manual calibration was completed. Because of the relatively small amount of data available, a more sophisticated approach was not warranted.

3.3.2 SWAA Results

Modeling Results are illustrated on Figure 6. The general groundwater flow direction in the Potomac Aquifer is toward the south and southeast, with localized depressions associated with the Elkton wells and groundwater supply wells in Delaware. In Particular, wells of the "Old County Road" system, which are permitted to pump > 1 MGD per well have a significant impact on water levels.

As per MDE (1999), particle tracking was implemented on the simulated potentiometric surface to calculate both 1-year and 10-year travel times toward each of the wells. Because there is natural variability in, and some uncertainty associated with the groundwater flow direction, the Source Water Assessment Areas (Figure 6) were calculated by rotating the 10-year particle paths +/- 60 degrees about the well, and then delineating an envelope about all these potential paths. The original particle paths are also shown on the Figure for reference.

The resultant source water assessment areas (10-year, Zone 2) consist of three sub-equal polygons of approximately 910 acres total land area.

For comparison, a polygon is also displayed for each well representing the "Florida Method" approach, as proposed for use in a confined aquifer (MDE, 1999). To be conservative, with respect to the downgradient extent of this polygon, they were developed with no background gradient. As can be seen from Figure 6, the majority of the area of the Florida Method polygons is contained within the envelope developed by particle tracking, with the exception of well 1R, which is located in the area of steepest hydraulic gradient.

3.4 Potential Contaminant Sources

Point sources of contamination may include businesses, chemical storage/transfer facilities or other locations that store or have used chemicals with the potential for impacting groundwater. In August, 2012, staff of Chesapeake Environmental Management (CEM) completed a survey of the Elkton area to identify any Potential Contaminant Sources (PCS) that

might be located within or near the SWAAs. Identification and description of these PCS will assist in understanding current conditions with regard to threats to groundwater quality and contribute to the susceptibility analysis.

Prior to the field survey, SSP&A obtained database and shape file layers from MDE and USEPA to assist in identifying existing and new PCS. These layers include MD Oil Control Program (OCP) sites, registered generators of hazardous waste (CHS), registered pesticide dealers, existing and out-of-service underground storage tanks, and Land Remediation Program sites. These were used to create preliminary maps and tables from which CEM staff worked to identify existing PCS.

Thirty-seven (37) PCS were identified within 500 feet of the SWAAs in the area (Table 6, Figure 7). These include underground storage tanks (USTs) at gas stations, above-ground salt storage, diesel tanks associated with diesel generators and gas stations, a car wash, a cemetery and a dry cleaning establishment. In addition, the Elkton WWTP is located within this area. This list is not meant to be exhaustive or to target specific PCS. It is instead illustrative of the types of PCS that are currently within the area of interest, and may remain so in the future.

3.5 Land Use

Both point sources and non-point sources of contamination may be related to land use. Figure 8 and Table 7 illustrate the land use within the SWAAs for the groundwater sources. Land use in the SWAAs for Wells 1R and 3 differs markedly from that in Well 4. Because the former two wells are located closer to the town center and along Route 40, a major transportation corridor, the land use in these two SWAAs is dominated by commercial/industrial/institutional use, together with low-medium density residential use. In contrast, the SWAA for Well 4 is dominated by agricultural and forested lands. The portions of this SWAA within the town boundaries are, however, also zoned or future residential development (Figure 9). Some areas of likely future residential use within the SWAA of Well 4 are currently outside the town boundaries.

Land use within the Big Elk Creek watershed upstream of Elkton is shown in Figure 10. This area is approximately 60 square miles (38,660 acres) and consists predominantly of forested and agricultural land. Less than 20% of the land is associated with residential or urban use, and most of that is found within the Elkton Town boundaries and along major transportation corridors such as Route 1 in Pennsylvania. Sloto (2002) discussed the quality of groundwater within the Big Elk Creek Basin. While surface water and groundwater within a watershed may show differing characteristics, it is worth noting that water from 10% of the groundwater samples reported by Sloto (2002) exceeded US EPA's MCL for nitrate. All of these samples were obtained from the Wissachickon schist, which underlies most of the watershed in Pennsylvania, and may be open to direct communication with surface water through fractures. The median concentration of nitrate reported by Sloto (3.6 mg/l) is similar to that reported for the Elkton PWS (Figure 4).

Water and Sewer Service areas for Elkton are represented in Figure 11, and largely follow the land use divisions previously discussed. Approximately two-thirds the land area within the SWAAs currently receives water and sewer service from the Town. Within the SWAA for Well 4, there is almost no current water or sewer service as this area is sparsely developed. Future development may alter this extent of services.

3.6 Susceptibility Analysis

As outlined in MDE's Source Water Assessment Program Plan (1999), the goal of a Susceptibility Analysis is to assess the potential for a water supply source to be contaminated at concentrations that would pose a concern or be affected in a way that is detrimental to the operation, health of consumers, or long-term viability of the supply. The methodology relies on existing water quality data, and an evaluation of potential contaminants of concern and their sources. Specifically, if any potential contaminant of concern exceeds ½ the Federal MCL for 10% of the results, a more detailed evaluation is warranted.

Because the Elkton PWS relies on wells open to a semi-confined aquifer and surface water for its water supplies, all of these sources are potentially susceptible to contamination from surface sources. The point sources previously identified in or near the SWAAs include potential sources of gasoline, motor oil, other man-made chemicals, and nitrates. Contaminants detected, including PCE, pesticides, and elevated nitrate are all consistent with a water supply that is susceptible to surface contamination.

Section 4
Existing Provisions to Protect Groundwater

This section addresses existing provisions in place to protect Elkton's water supply, and provides recommendations for additional, improved or revised items.

4.1 Cecil County Water Resources Element (WRE)

The Cecil County Water Resources Element of its Comprehensive Plan was adopted in 2010. The Plan documents the existing resources available for public water supply and goals for developing additional water supply capacity. There are concerns voiced in the plan regarding potential shortages for the 2030 population projection. The Water Resources Element does not discuss specific goals for water supply/quality protections in source water assessment areas.

4.2 Town of Elkton Comprehensive Plan

The Town of Elkton Comprehensive Plan completed in 2010 is consistent with the county established goals stated in the Cecil County Comprehensive Plan. The Elkton Comprehensive Plan also focuses on water supply capacity and goals for meeting water demands for the 2030 growth projection, and redundancy in the water system supplies. The 2010 Elkton Comprehensive Plan refers to a draft Wellhead Protection Overlay Zone which would serve as a regulatory means of protecting both the quantity and quality of Elkton's water supplies. The draft Overlay Zone has not been implemented.

4.3 Town of Elkton Hazard Mitigation Plan

The Town of Elkton maintains a Hazard Mitigation Plan (HMP), most recently updated in 2009 (Town of Elkton Hazard Mitigation Planning Committee, 2009). This plan identifies the emergency facilities available to Elkton, and identifies vulnerable facilities, including environmentally sensitive areas. A stated goal of the HMP's mitigation strategy is to "maintain the flow of safe water to the town of Elkton and surrounding water service area". The specific objectives under this goal harmonize well with this Source Water Protection Plan, and include

- periodic checks for hazardous materials in the subsurface, and
- community education on water conservation and water restriction levels.

Section 5
Recommendations for Source Water Protection

The following recommendations are provided for Protection of Elkton's Source Water.. It is recognized that the Town has limited control on land use or other factors impacting Source Water Protection outside its boundaries, but this issue is addressed through recommendations to work with Cecil County and other interested parties.

5.1 Contingency Planning

The SWAAs for Well 1R and Well 3 coincide with the Elkton business district along Route 40. Consequently a number of current and future point Potential Contaminant Sources are located in or near those SWAAs. The Well 4 SWAA, while currently in a less developed location may in the future be the locus of both point and non-point sources of contamination. Consequently, it is important that the Town of Elkton include the potential for contamination of these water supplies in its contingency planning.

The Town of Elkton maintains a Hazard Mitigation Plan (HMP), most recently updated in 2009 (Town of Elkton Hazard Mitigation Planning Committee, 2009). This plan identifies the emergency facilities available to Elkton, and identifies vulnerable facilities, including environmentally sensitive areas. Sensitive areas cited that are relevant to this report include

- Wellhead Protection Areas
- Areas surrounding Big Elk and Little Elk Creeks
- Watershed upstream of the Big Elk Creek

The HMP also notes that freight rail tracks that may carry hazardous materials run near the Town's water supply, although the Town has experienced relatively few incidents related to hazardous materials in the past. A stated goal of the HMP's mitigation strategy is to "maintain the flow of safe water to the town of Elkton and surrounding water service area". The specific objectives under this goal harmonize well with this Source Water Protection Plan, and include

- periodic checks for hazardous materials in the subsurface, and
- community education on water conservation and water restriction levels.

This HMP forms a solid basis on which to expand on specific responses needed to address potential impairments to water quality and supply. Proposed amendments to the town's HMP are presented below.

5.1.1 Contamination Contingency Plan

In Elkton, emergency response is provided through a partnership between volunteer fire departments and Cecil County Department of Emergency Services (CCDES). CCDES coordinates 911 emergency communications, emergency medical services, emergency management, hazardous material response, electronic support services, and training and education. The Singerly Fire Company provides fire and rescue services in Elkton. This fire company also has reciprocal fire fighting arrangements with surrounding communities.

The Headquarters for the Cecil County Emergency Management and Civil Defense Agency is located in the Upper Chesapeake Corporate Center in Elkton. This agency provides central communications for all emergency services, including fire, rescue, and ambulance service and maintains a 24-hour communication center from which police, fire, ambulance, and other emergency service can be dispatched and coordinated. The agency prepares an Emergency Response Plan for Cecil County.

It is recommended that the Town of Elkton develop a brief addendum to the existing HMP that defines the actions to be taken, in coordination with the County, State and Federal Agencies, in case of a significant emergency or disaster within the Town's corporate limits that impacts water quality. It is recommended that emergency response responsibilities are closely aligned to the day-to-day responsibilities of each responsible entity. The plan should therefore assume, that due to the Town's limited resources, the County will be called upon to assist in responding to significant incidents in the town.

Recommendations for Designated Department for addressing incidents relative to this SWPP are:

Type of Incident	Designated Department
Hazardous Material	Cecil County Dept. of Emergency Services
Pipeline Spill / Fire or Explosion	Cecil County Dept. of Emergency Services
Water distribution / Water Quality	Town of Elkton, Town Manager

Under scenarios that might pose a risk of contamination to groundwater or surface water supplies (spill, explosion, leak) any immediate threat to human health will be most appropriately addressed by the County Dept. of Emergency Services. The longer-term, potential threats to drinking water supplies are appropriately addressed by the Town; these responsibilities would include addressing water and sewer infrastructure, and ensuring the continued supply of potable water.

5.1.2 Emergency Contact Lists

It is recommended that the Town maintain an updated contact list for individuals and office responsible for overseeing any aspect of water contingency response:

- Cecil County Dept. Of Emergency Services (pipeline spill/release, hazardous material release [including gasoline or other substances stored in tanks])
- Elkton Volunteer Fire Department (fire and emergency response)
- Town Manager (responsible for overseeing water supply and water quality)
- Town Manager (responsible for communicating with public)

5.1.3 Known PCS

It is recommended that the HMP be updated to include all PCS identified in or near the SWAAs, as outlined in this report and future updates. Appropriate content includes

- Figure 9 and Table 7 from this report, and similar figures, as updated in future Source Water Protection Plans

5.1.4 Steps for Alerting the Public

Steps necessary to alert the public to water quality or water supply issues will be outlined. These will include existing measures currently used for public notification including

- Town emergency siren, and
- Electronic signs in public areas

In addition, as other measures become available, such as text alert system, these will be implemented and the Contingency Plan will be updated as appropriate.

5.1.5 Alternate Water Supply for Impacted Source(s)

In cases where the water supply to a well or surface water source is threatened, the Town will take steps necessary to replace that water until the problem can be solved. Under the existing infrastructure, the town currently maintains an interconnection with Artesian Water Company supply which can be tapped in case of emergency. In addition, the town's 3.4 million gallons of storage are an additional backup supply.

5.2 Planning

5.2.1 Wellhead Protection Ordinance

It is recommended that the Town of Elkton implement a Wellhead Protection Ordinance (WHPO). The Wellhead Protection Overlay Zone identified in the Elkton Comprehensive Plan should be incorporated in the ordinance to protect water supplies within the SWAAs. The concept of Wellhead Protection Areas as defined by Source Water Protection Areas should be incorporated to protect water supply capture areas, and should include protection for water quality as well as water quantity.

Allowed, prohibited, and conditional land uses within the SWAAs should be incorporated into the WHPO. These land uses may be delineated by Zone, with Zone 1 representing the 1-year travel time polygons, and Zone 2 representing the 10-year travel time polygons, which are equivalent to the Source Water Assessment Area. In addition, the implementation of Best Management Practices (BMPs) are recommended for Zones 1 and 2, as part of the requirements for conditional use. Suggested language for the WHPO is provided in Appendix B to this report. This text was developed from a model WHPO created by the MDE (MDE, 2007), and incorporate the concepts outlined above.

5.2.1.2 Additional Requirements for Petroleum Storage

Per federal and state law (the Clean Water Act of 1990), facilities that store more than 1,320 gallons of oil or petroleum-based liquids aboveground or more than 42,000

gallons of oil underground, and which could impact navigable waters, are required to have a SPCC (Spill Prevention, Control, and Countermeasure Plan). A SPCC Plan identifies practices related to the storage and management of oil and oil tanks, and response procedures in the event of a spill. It is recommended that PCSs within the SWAAs be required to file copies of their SPCCs with the Town and that they be updated in the Town files as the SPCCs are updated and/or ownership or land use changes. This provision has been included in the model WHPO language of Appendix B.

5.2.2 Digital Information/Mapping Resources

It is recommended that the Town continue to support and/or develop mapping and Geographic Information Systems (GIS) resources. This effort will allow local government to maintain and update high-precision geographic information related to SWAAs, water resources, PCS locations, potential effluent sources, and also provide the ability to generate custom maps. It is recommended that the SWAAs (as currently defined and subsequently updated) be permanently incorporated into the zoning and planning process as a required GIS layer.

These maps can be useful in communicating information to the public and decision makers as it regards water policy and emergency response. At a minimum, the Town should maintain hard copy maps that depict the boundaries of the SWAAs, PCS, critical infrastructure, emergency transportation options, and areas of high vulnerability.

5.2.3 Source Water Assessment Areas and Source Water Protection Planning

It is recommended that the Town update the delineation of SWAAs, and complete a new inventory of Potential Contaminant Sources and a new Susceptibility Analysis at regular interval; an interval of every 6 years, coincident with revision to the Water Resources Element of its Comprehensive Plan is recommended. This interval will be sufficient to account for identifying new trends in groundwater monitoring data, zoning and land use. An updated Source Water Protection Plan should be completed and provided to the town council after each review.

Between the completion of each new SWPP, the Department of Public Works and the Department of Planning should work together to implement the recommendations of the most current SWPP, including prohibited and accepted land uses within each SWAA.

Coincident with this review of water supply susceptibility, the Town of Elkton should continue to review the WHPO regulations approximately every five years. This will provide the Town with the opportunity to adjust items such as the prohibited land uses and will help to ensure that the WHPO regulations remain viable to implement.

5.2.4 New Development

It is recommended that the Town of Elkton continue to review and implement zoning and permitting requirements that address the needs for water supply capacity and quality protection. The Town should continue to preserve buffers for existing water supplies and identify opportunities for buffer protection of any new water supplies. The following recommendations address possible changes to zoning and permitting requirements that may improve source water quality.

- Coordinate with regional planning groups/activities – It is recommended that the Town identify opportunities to work with regional planning organizations to participate in efforts such as the development of watershed planning and protection activities, especially as applied to the Big Elk Creek watershed. Additionally, regulations that expand or contract the development envelope in the Elkton service area should be considered as it affects the quantity and quality of the groundwater.

5.3 Transfer On-Site Septic to Regional System

It is recommended that the Town continue to promote the transition of residential lands and businesses from on-site septic disposal to regional wastewater treatment facilities. This transition will help to reduce the potential for contamination of groundwater resources. Any future expansion of the service area should attempt to transition new parcels into the regional wastewater treatment facility.

This should be addressed by focusing on those lands that are within new or existing sewer service areas but are not yet connected, identifying new development adjacent to existing sewer infrastructure, then looking at expansion of the service areas. This will also help the region meet other nutrient reduction goals such as the TMDL regulations. Because most of the SWAAs without current sewer service are outside of town boundaries, this may require cooperation with the County and private developers.

5.4 Public / Governmental Interaction

Public education and participation are essential parts of water resources management, as noted in the town's HMP. It is recommended that the Town Council and/or Administrator appoint an individual or agency to be responsible for communicating the importance of groundwater protection amongst the citizens and business interests of the Town. The Elkton Department of Public Works (DPW) already engages in public outreach in association with its municipal storm sewer permit (MS4 Permit), and thus is already situated to implement public education through the DPW.

The DPW should develop an outreach strategy that is focused on educating residents on how water issues affect each of them and how they can take steps to minimize their impacts. These efforts should include the development of educational materials and their distribution (with, for example, water quality reports and water bills), outreach events (sponsoring Water Day-type events at local schools to educate children), and sponsoring commercial programs designed to highlight local businesses who voluntarily enter into water protection or conservation programs.

5.5 Develop Signage for the Recharge Zones

It is recommended that the Town of Elkton develop signage that indicates what areas are located in the Recharge Zone. These signs should be placed along main roads and within residential developments. The road signs can explain to the public that they are entering a protected drinking water watershed and provide contact info which can help people to identify and report spills.

5.6 Land Acquisition and Easements

5.6.1 Acquisition of Land

The Town of Elkton, in conjunction with Cecil County and/or state agencies, should pursue the acquisition of additional lands within the SWAAs and/or watersheds of concern. The return on investment for these sources should be measured by proximity to the sources, relative size of the parcel, and by the opportunity to create or preserve natural areas on that site.

5.6.2 Creation of Easements

It is recommended that The Town strive to create conservation easements on parcels that offer opportunities to improve water quality. These conservation easements could be offered with terms similar to agricultural easements offered by the Maryland Department of Agriculture in that they have a 25 year life-span and offer tax incentives to the property owner for their creation and maintenance. These easements should prohibit the development of any structures or utilities within the preserved areas. The existing land use should be considered when evaluating potential properties since those with inherent water quality risks, such as Agricultural use with high nutrient and/or bacteria concerns, are not preferred.

5.6.3 Funding Opportunities

It is recommended that the Town pursue means of outside funding water quality improvement and community outreach efforts to offset additional costs incurred by protection measures and recommended actions identified. EPA and MDE provide opportunities for grants and loans through various programs targeted for specific purposes. Table 9 provides information pertaining to each funding opportunity and contact information to pursue funding.

5.7 Implementation Schedule

Table 10 is a matrix summarizing the results of this report. It includes a listing of possible threats to water quality and supply, recommended actions, together with estimated costs, sources of funding, and schedule. Some potential costs and schedules are poorly defined at this time, and dependent upon further Town action. These are noted as “TBD” in the table.

Section 6
Conclusions and Summary

The Source Water Assessment for Elkton's Public Water System has been updated to account for the current permitted water withdrawals, and for the addition of Well 4. New Source Water Assessment Areas (SWAAs) have been delineated using MDE's prescribed method of 3D groundwater modeling and particle tracking. The SWAAs comprise about 911acres associated with3 permitted groundwater sources and 38,660 acres (partly in Pennsylvania) upstream of the Big Elk Creek surface water intake.

The susceptibility analysis for the Elkton PWS finds that all of the groundwater and surface water sources are potentially susceptible to surface contamination, including VOCs, IOCs, and SOCs. Detections of VOCs and SOCs in the past ten years have not been above MCLs, and therefore do not exceed statutory levels, but they do indicate the potential for contamination from both point source and distributed contamination.

Nitrate levels, while below both the MCL of 10 mg/L and MDE's susceptibility flag of 5 mg/L are somewhat elevated and increasing slowly. The source of this nitrate is most likely associated with surface land use such as agricultural activities within the Big Elk watershed and the groundwater SWAAs. The reported concentrations are similar to those observed in both surface water and groundwater of the Big Elk Creek watershed.

Elevated levels of TTHMs - greater than ½ the MCL (or 40 ug/L), have been observed regularly over the past decade, although the maximum values have generally fallen slightly since 2001. These levels are associated with chlorination treatment of sources - primarily the surface water sources - rather than a specific anthropogenic source.

Recommendations to the town of Elkton include the following:

- Update the Towns' Hazard Mitigation Plan (HMP)
  - with a brief addendum that defines the actions to be taken, in coordination with the County, State and Federal Agencies, in case of a significant emergency or disaster within the Town's corporate limits that impacts water quality.
  - maintain an updated contact list for individuals and office responsible for overseeing any aspect of water contingency response
  - include Figures and Tables from this and future Source Water Protection Plans that identify Potential Contaminant Sources
  - Outline the response the Town will take in case of any water related emergency, including a generalized set of actions, public notification, and provisions for alternate water supply
- Implementation of a Wellhead Protection Ordinance (WHPO) that delineates two zones, based upon SWAAs, and defines acceptable, prohibited, and conditional land uses (based upon BMPs) in each zone
- Periodic updating of the Town's Source Water Protection Plan coincident with updates to the Town's Comprehensive Plan and WRE
- Continuing to update and maintain information on source water protection in the Town's GIS, mapping, and planning resources

- Identification of opportunities to work with regional planning organizations to participate in efforts such as the development of watershed planning and protection activities, especially as applied to the Big Elk Creek watershed.
- Continued promotion of transition of residential lands and businesses from on-site septic disposal to regional wastewater treatment facilities
- Taking advantage of existing DPW educational activities, and expanding to include education of the public specifically in regards to Source Water Protection.
- Develop Signage for the Recharge Zones to assist in public awareness and education
- Land Acquisition and Easements – where possible
    - Acquisition of Land in proximity to wellheads and within SWAAs
    - Creation of Easements in proximity to wellheads and within SWAAs
- Take advantage of Federal and State Funding Opportunities to assist in achieving these goals.

Section 7
References

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FIGURES

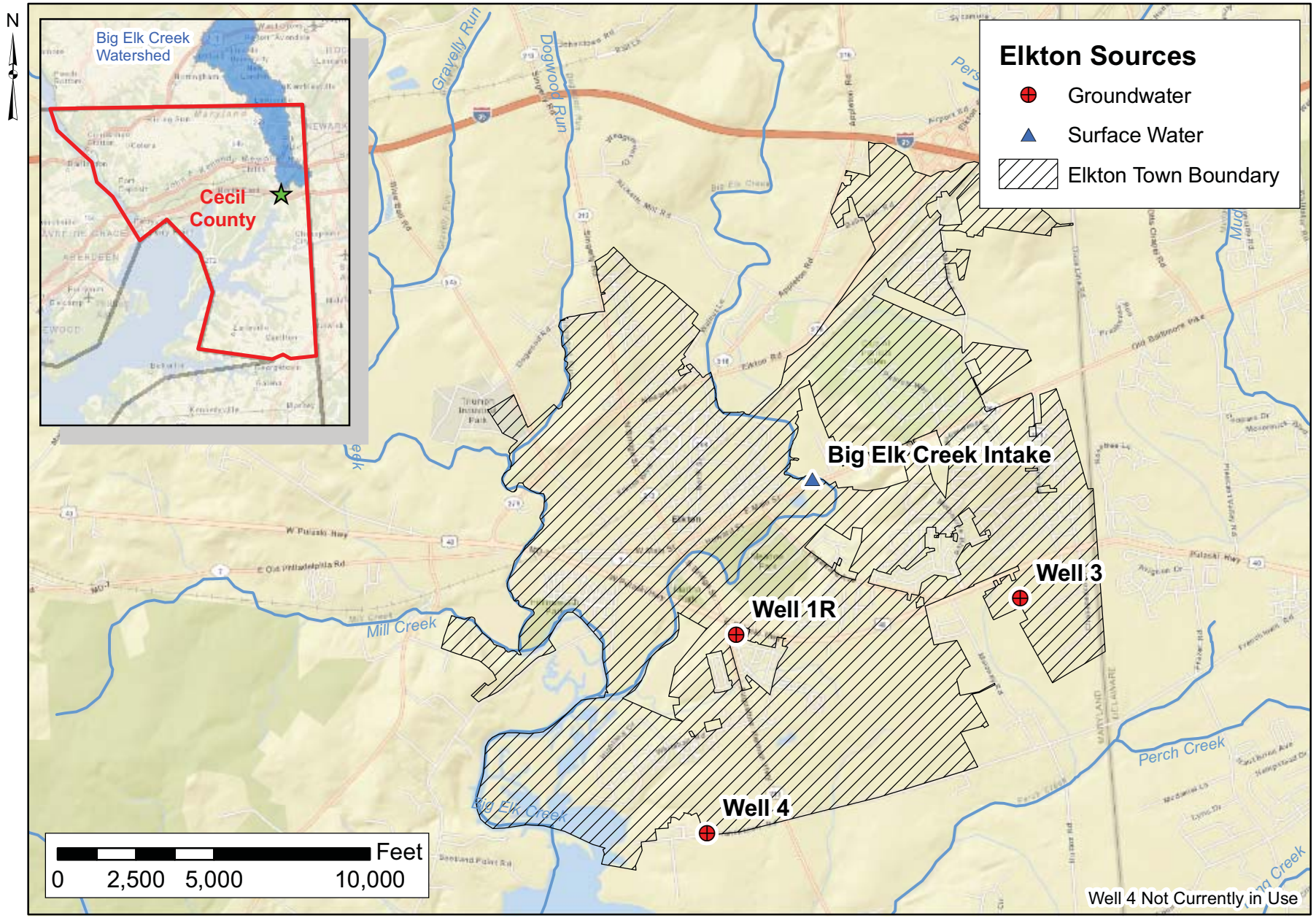

Figure 1 Location of Elkton, Maryland and Sources of the Elkton PWS

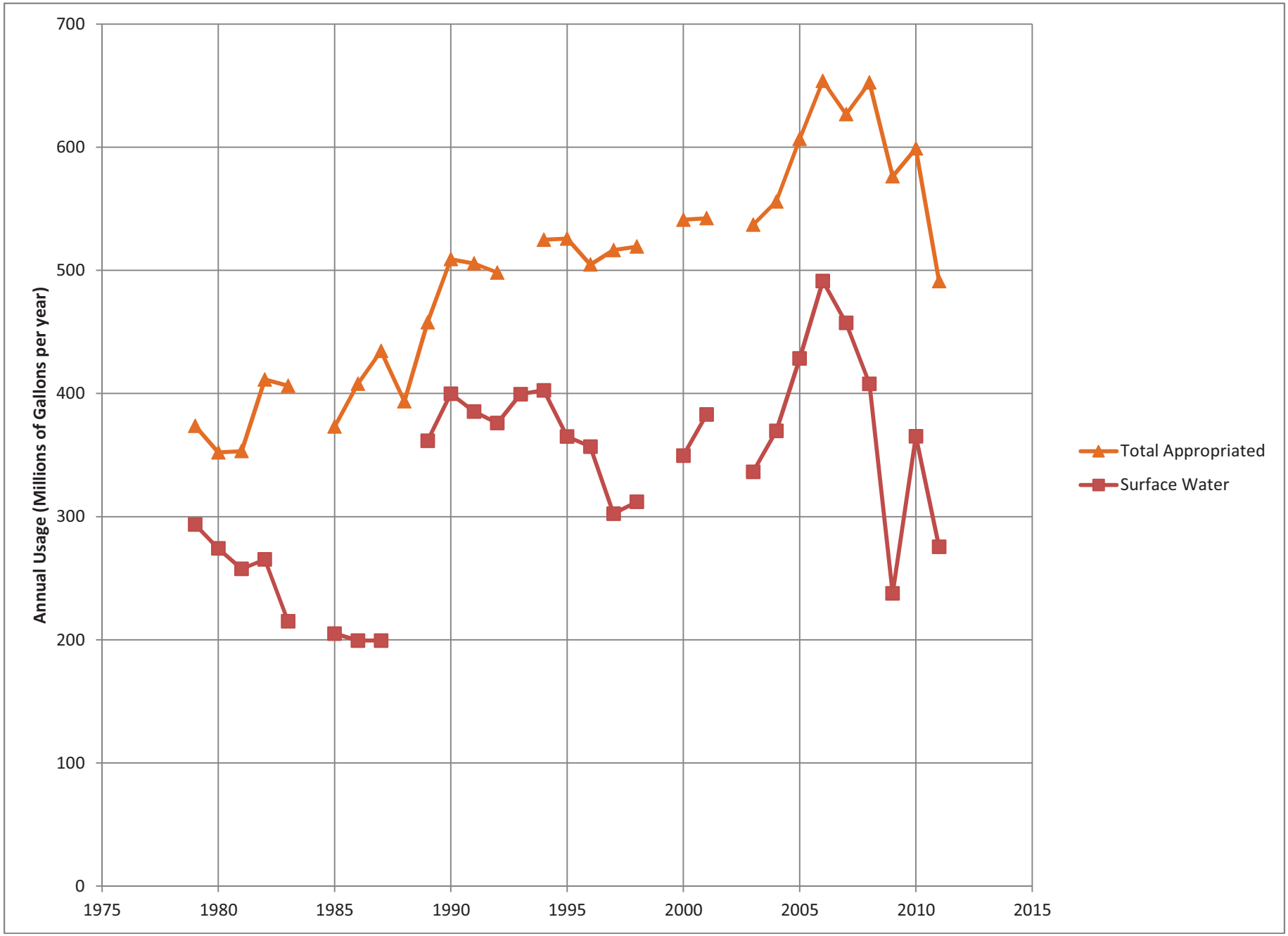

Figure 2 Reported Water Use by the Elkton PWS, 1979 to 2011

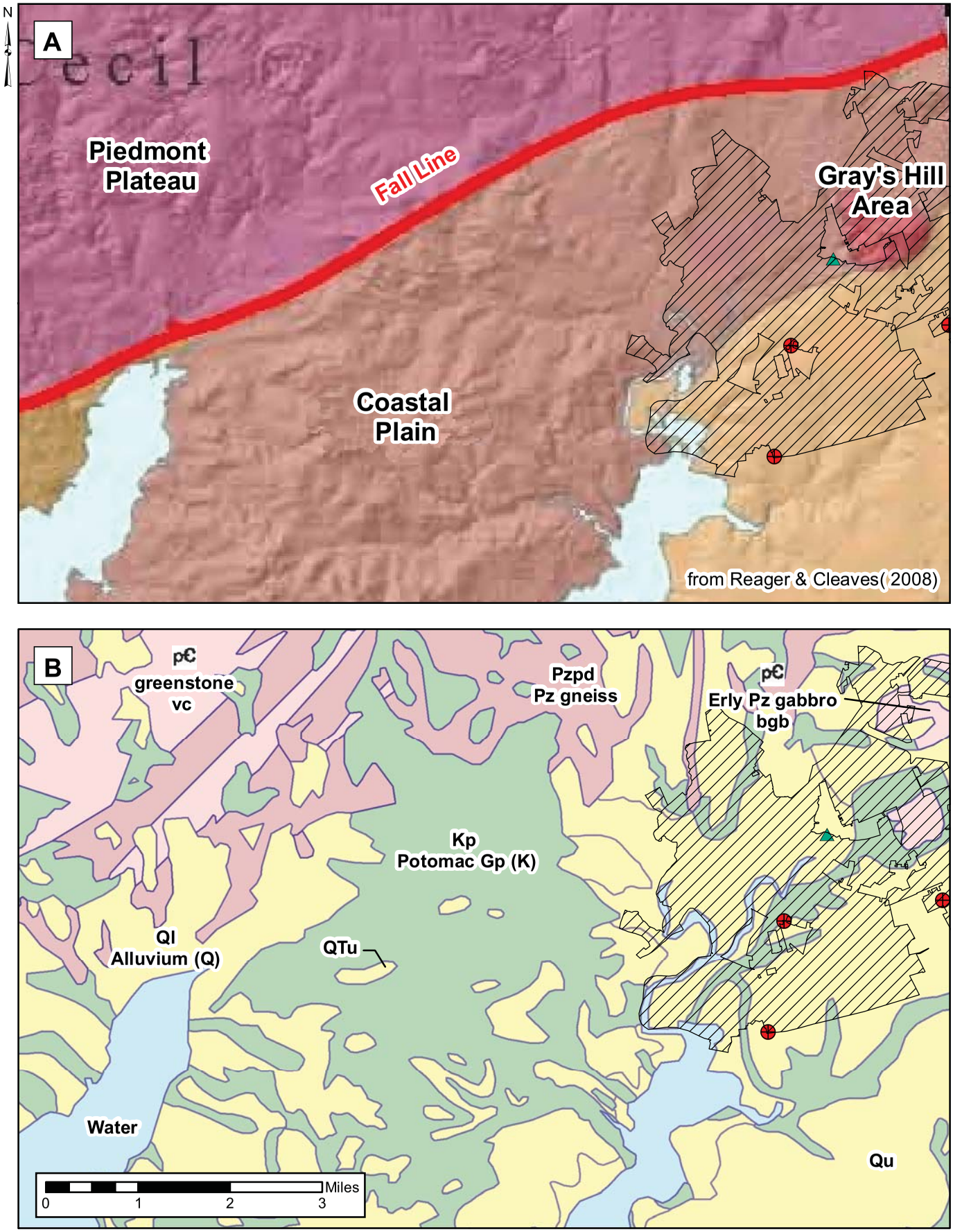

Figure 3 Physiographic Provinces of Maryland (A) and Bedrock Geology (B) in vicinity of Elkton, MD

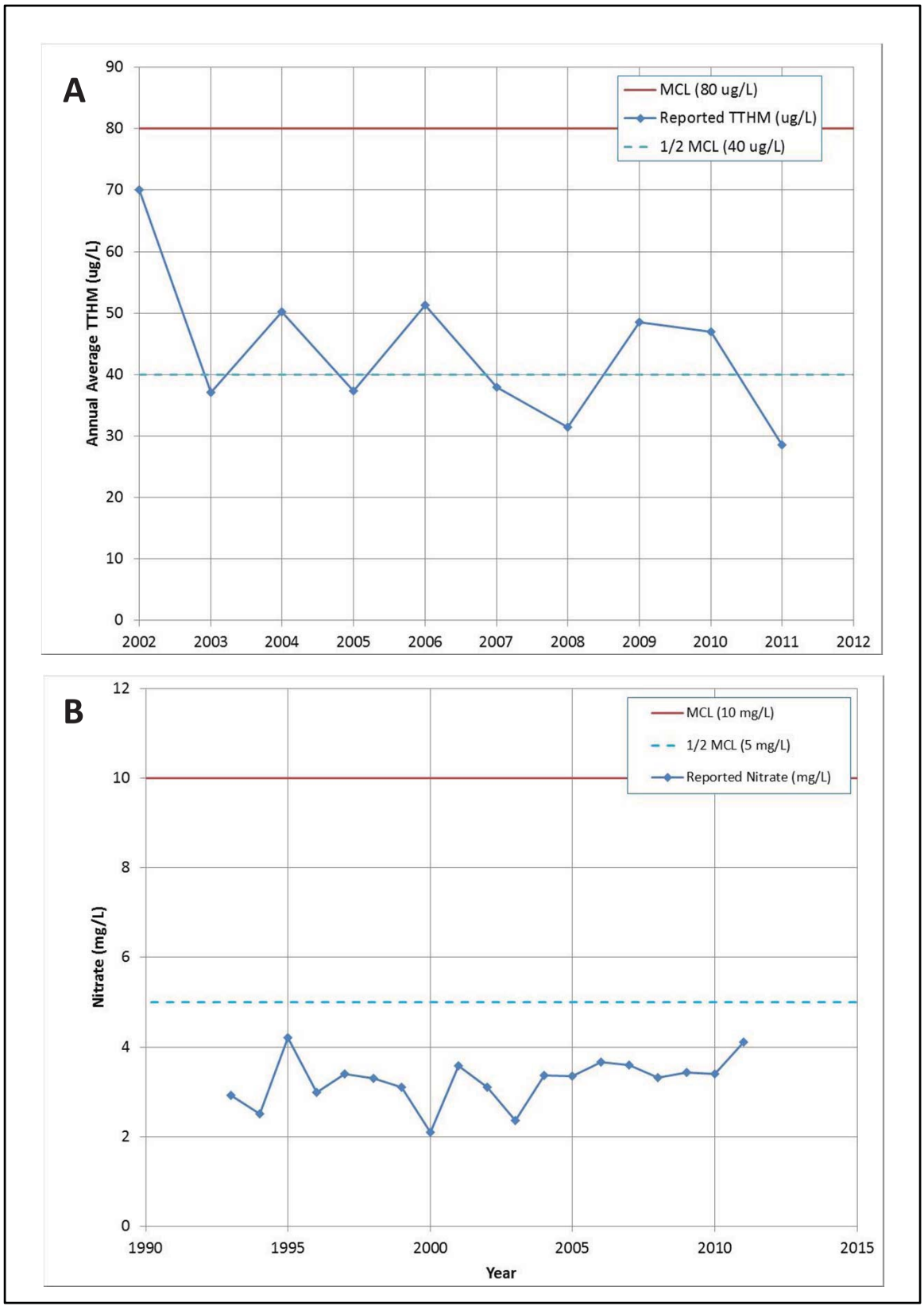

Figure 4 Annual Average TTHM (A) and Nitrate Concentrations (B) Reported for the Elkton Public Water System

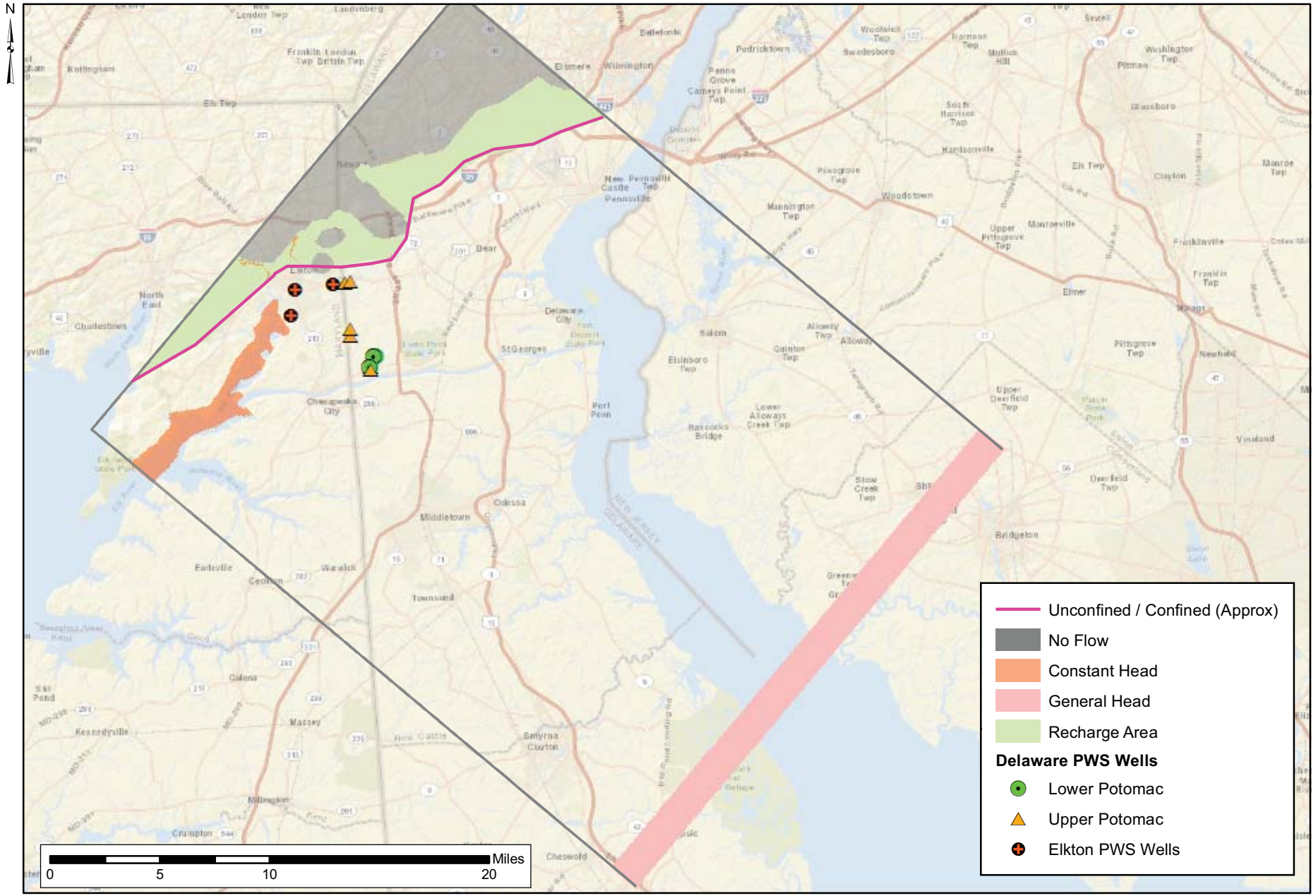

Figure 5 Layout of MODFLOW Model for Evaluating Source Water Assessment Areas

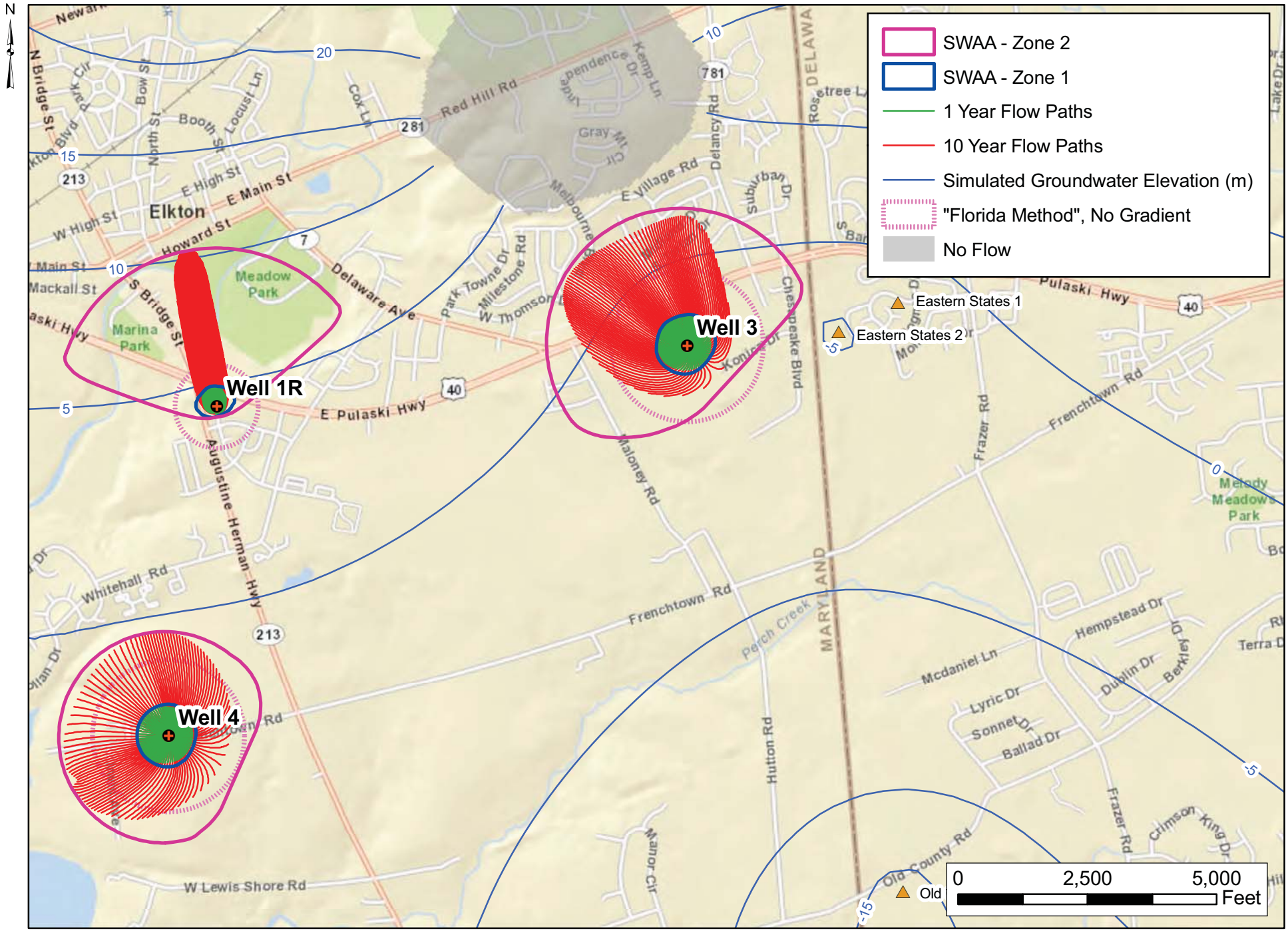

Figure 6 Simulated Potentiometric Surface and Source Water Assessment Areas for Elkton Area

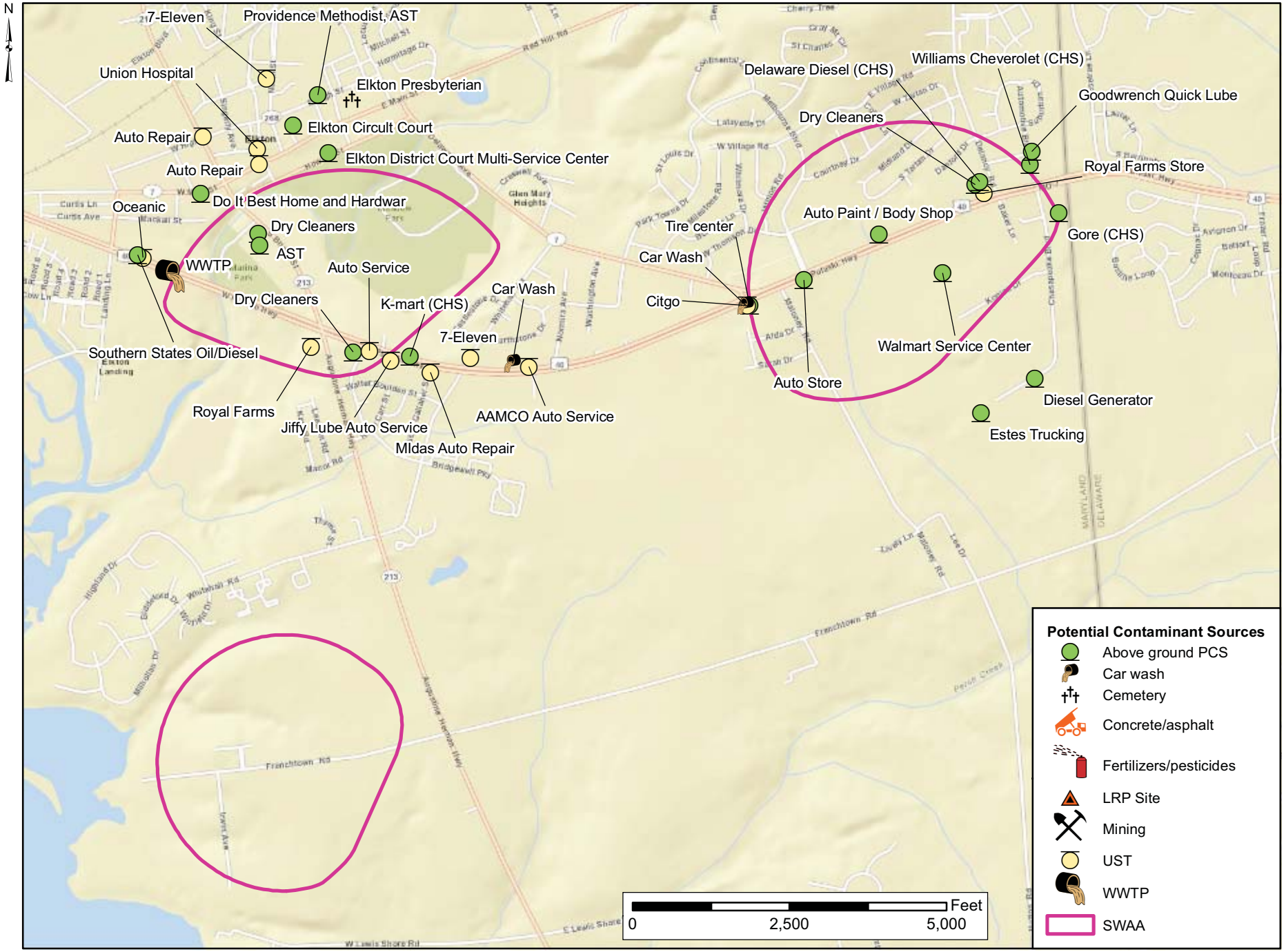

Figure 7 Potential Contaminant Sources in the Elkton Area

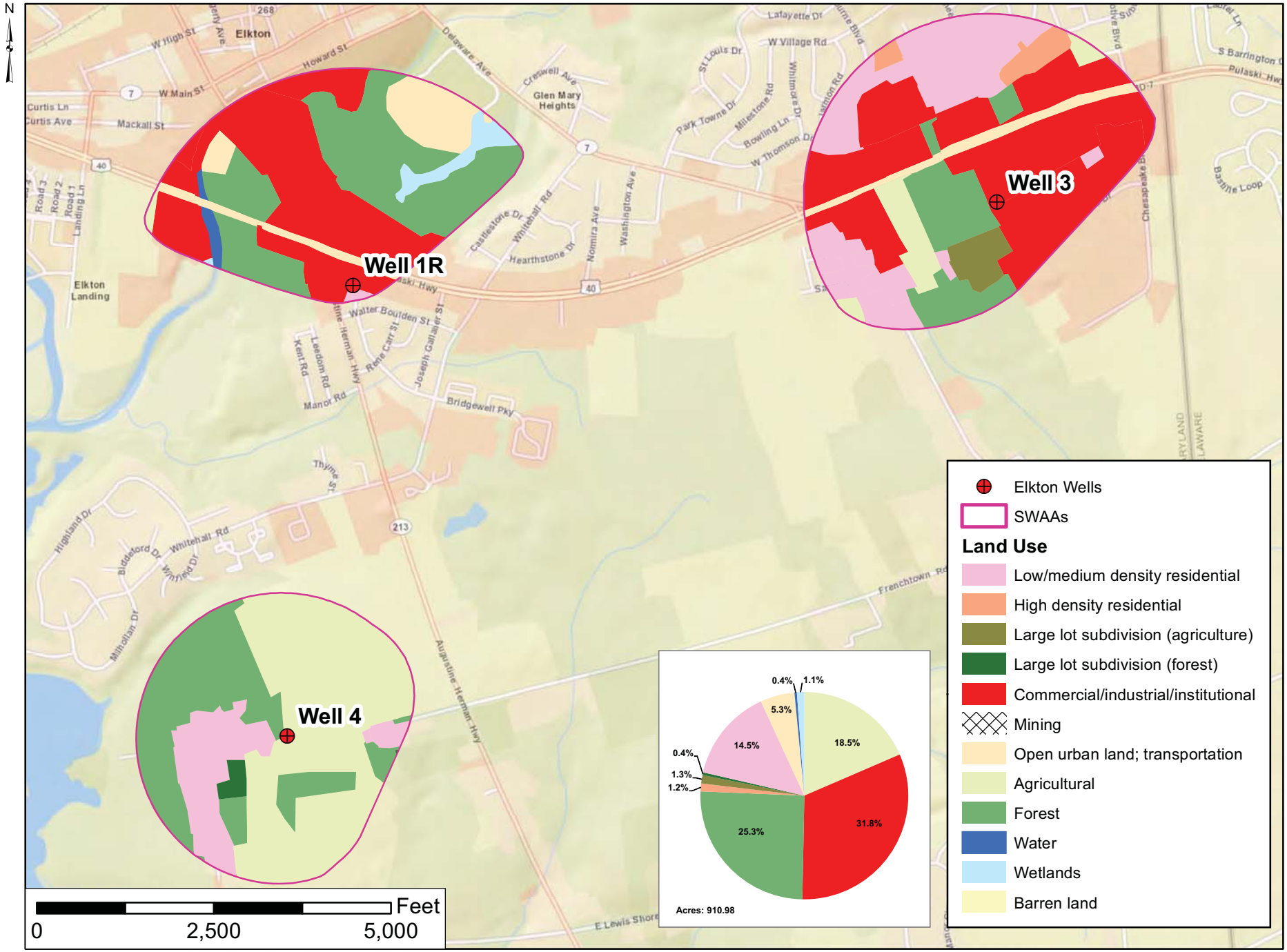

Figure 8 Land Use in the Source Water Assessment Areas for Wells in the Elkton Public Water System

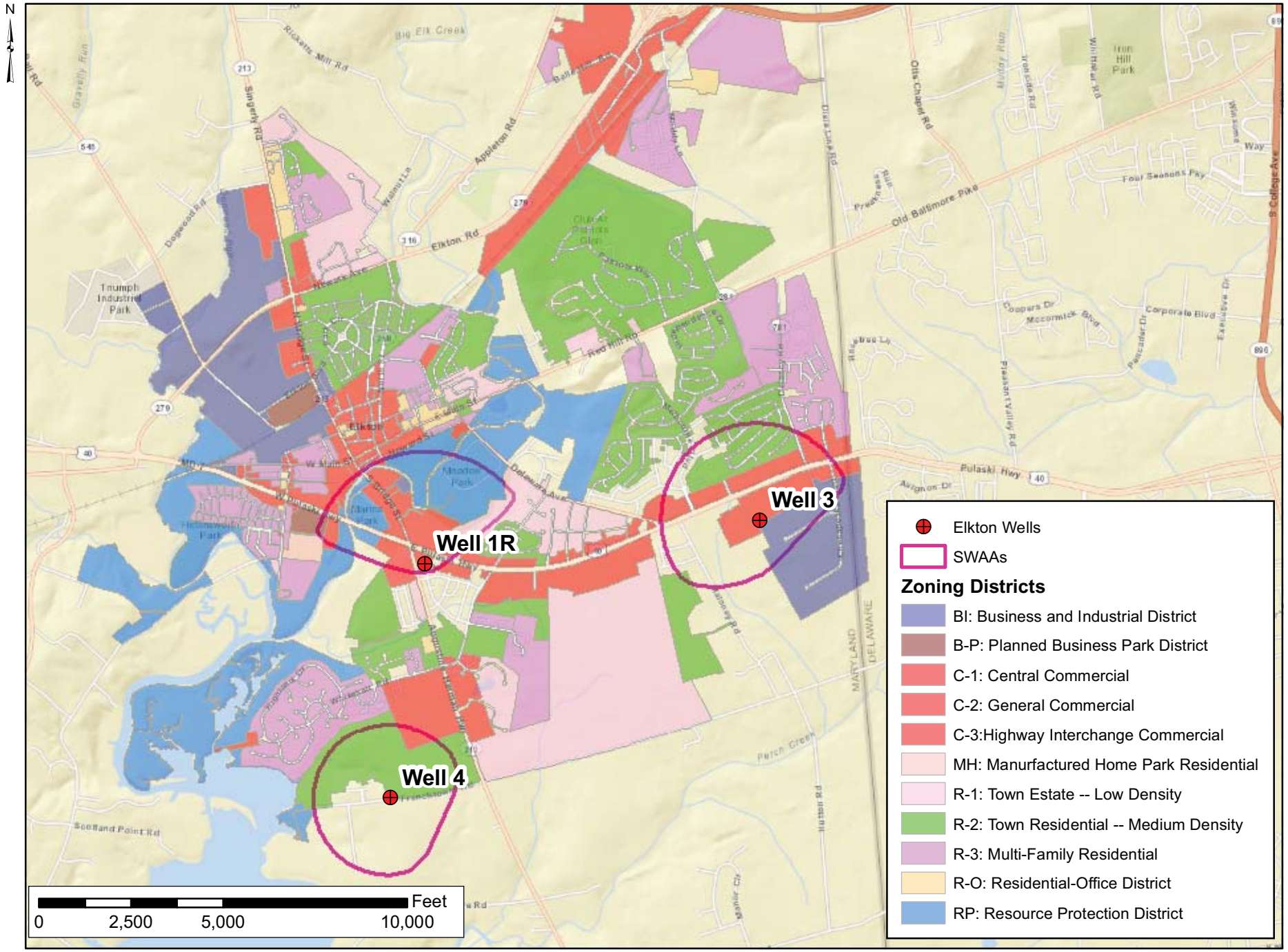

Figure 9 Zoning in the Elkton Area

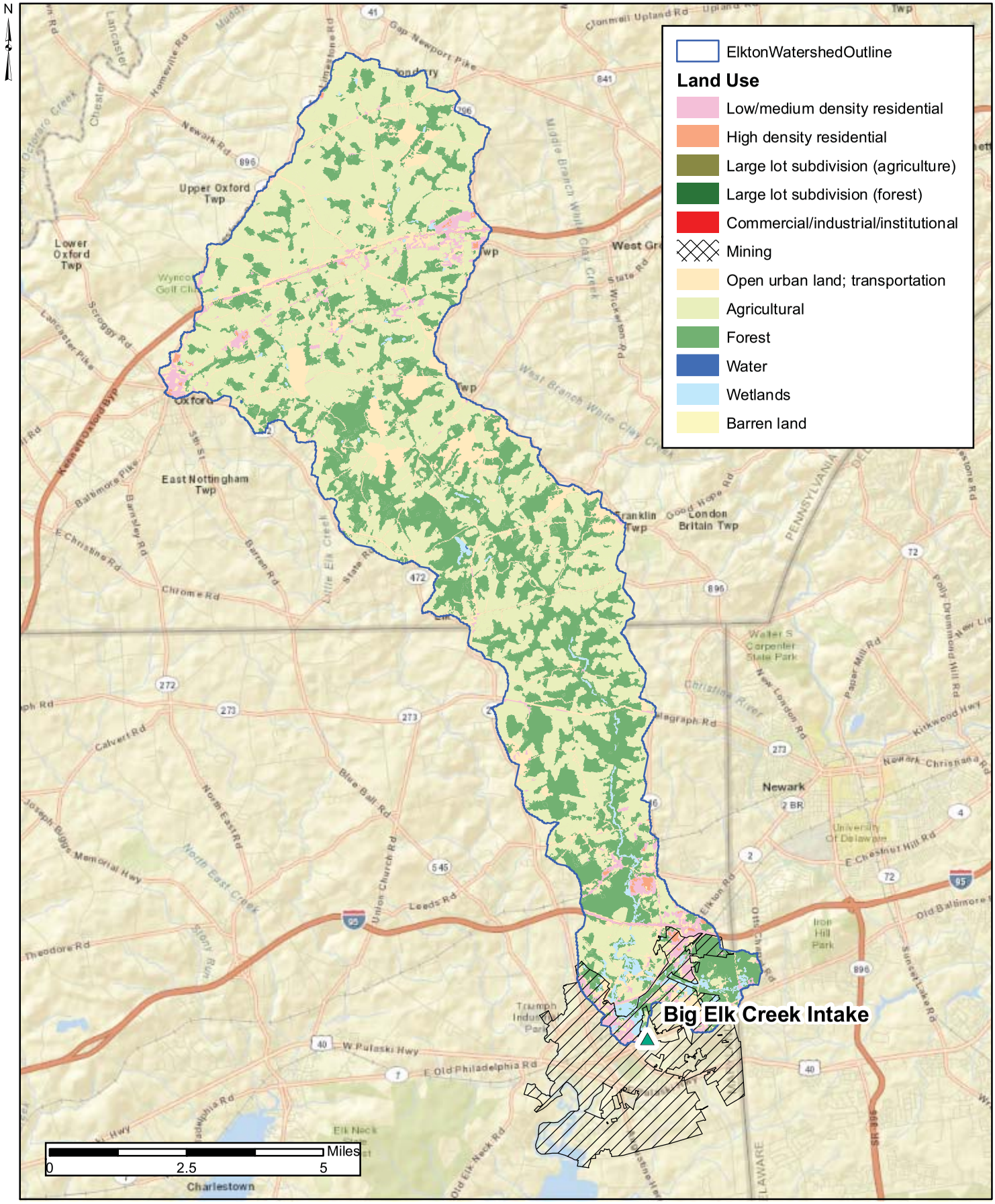

Figure 10 Land Use in the Big Elk Creek Watershed Upstream from Elkton

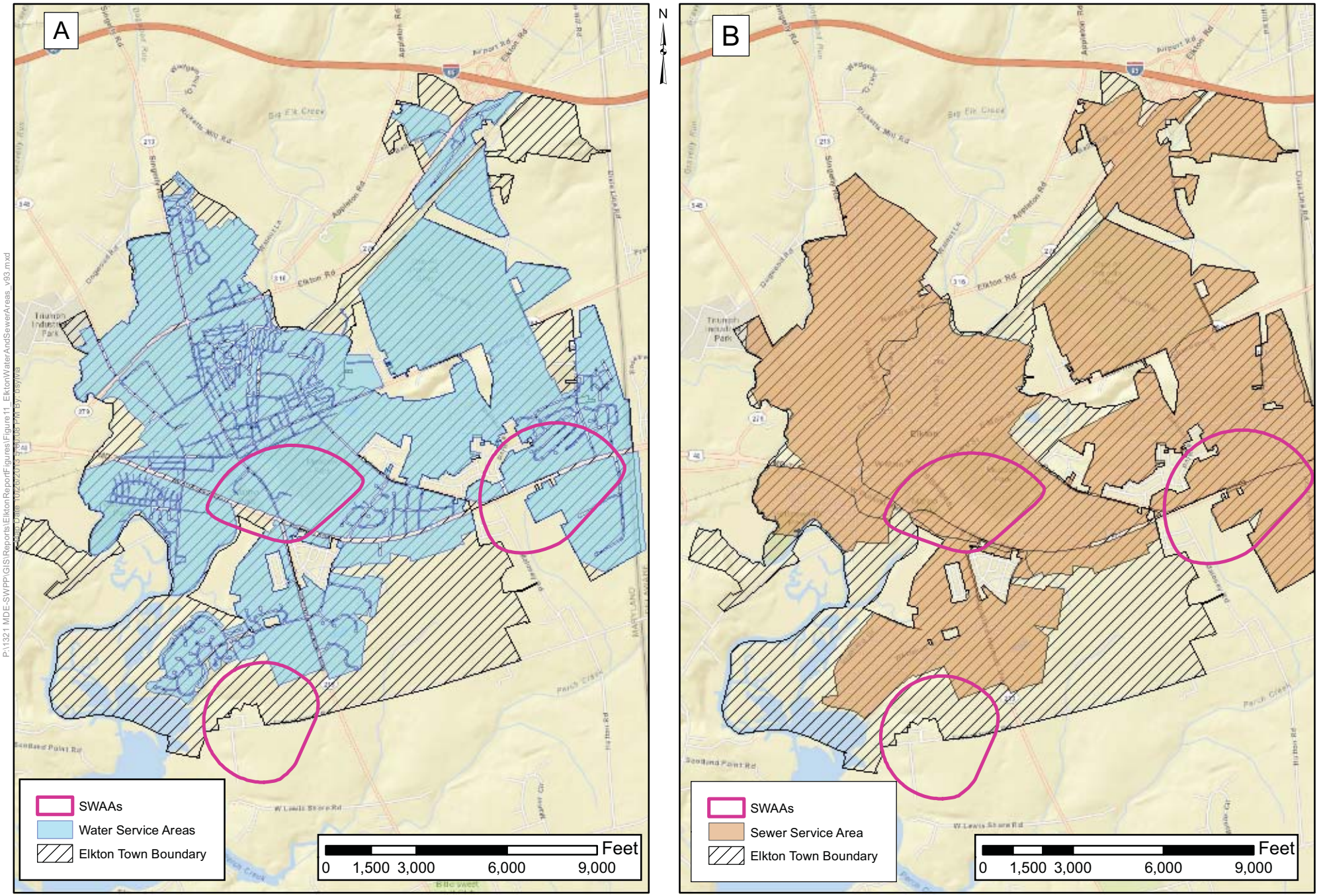

Figure 11 Water Service (A) and Sewer Service Areas (B) in the Vicinity of Elkton

TABLES

TABLE 1 Sources of the Elkton Public Water System

SOURCES ADDRESSED IN THIS REPORT										SOURCES IN PREVIOUS SWAP REPORTS
Source Type	**Source ID**	**Plant ID**	**Source Name**	**Well Permit**	**WAPID**	**Average Withdrawal (Gallons per Day)**	**Total Depth (ft)**	**Casing Depth (ft)**	**Completion Date**	
SW	1	1	Big Elk Creek	n/a	CE1966S005	1,500,000	N/A	N/A	N/A	Yes
GW	2	2	Well 3	CE045556	CE1961G007	500,000	157	126	12/30/1961	Yes
GW	3	3	Well 1R	CE944619	CE2001G026	100,000	109	89	8/1/2001	Yes
GW	n/a	n/a	Well 4 *	CE952488	CE2006G024	500,000	271	195	9/3/2008	

TABLE 2 Volatile Organic Compounds (VOCs) and Total Trihalomethanes (TTHM) Reported for the Elkton PWS

A. Non - Trihalomethanes

Contaminant	Plant ID	Earliest Detect Date	Most Recent Detect Date	Number of Analyses	Count of Detections	Max Concentration (ug/L)
Tetrachloroethylene	2	August-09	August-09	2	1	0.5
Tetrachloroethylene	3	June-08	June-08	1	1	1.2

B. Individual Trihalomethanes

Contaminant	Plant ID	Earliest Detect Date	Most Recent Detect Date	Number of Analyses	Count of Detections	Max Concentration (ug/L)
Bromodichloromethane	1	January-01	November-10	11	10	7.7
Chloroform	1	January-01	November-10	11	10	65.8
Dibromochloromethane	1	March-03	June-08	11	5	1.2

C. Total Trihalomethanes

Contaminant	Plant ID	Number of Samples	Exceedances of One-Half MCL (40 ug/l)	Exceedances of MCL (80 ug/l)
TTHM 2950	0 *	68	6	6
TTHM 2950	1	20	2	2

TABLE 3 Synthetic Organic Compounds (SOCs) Reported for the Elkton PWS

Contaminant	Plant ID	Earliest Detect Date	Most Recent Detect Date	Number of Analyses	Count of Detections	Max Concentration (ug/L)	MCL *
Atrazine	1	May-07	May-07	31	1	0.0004	3
Benzo(a)Pyrene	1	March-06	March-06	32	1	0.02	0.2
Dalapon	1	March-01	March-01	12	1	0.14	200
Di(2-Ethylhexyl) Adipate	1	October-01	October-01	32	1	0.4	400
Di(2-Ethylhexyl) Phthalate	1	April-01	September-10	384	12	4.5	6
Dicamba	1	April-02	April-04	24	2	0.24	
Ethylene Dibromide (EDB)	1	April-07	April-07	13	1	0.04	0.05
Metolachlor	1	May-07	August-09	56	2	0.22	
Simazine	1	April-01	April-10	160	5	3.2	4

* Same as State of Maryland Groundwater Standards for Type I and Type II Aquifers

TABLE 4 Inorganic Compounds (IOCs) Reported for the Elkton PWS

Contaminant	Number of Detections	Earliest Detect Date	Most Recent Detect Date	Min Concentration	Max Concentration	MCL	SMCL	Units
Aluminum	1	January-01	January-01	0.1	0.1		0.2	mg/L
Barium	10	March-04	January-11	0.0271	0.13	2		mg/L
Chromium	3	March-01	February-09	0.0062	0.01	0.1		mg/L
Combined Radium (226 & 228)	3	April-07	September-10	2	3.5	5		pCi/L
Gross Alpha	3	April-07	September-10	1	5.5	15		pCi/L
Gross Beta	5	January-01	September-10	4	4.9	50		pCi/L
Manganese	1	January-01	January-01	0.07	0.07		0.05	mg/L
Mercury	1	March-10	March-10	0.0005	0.0005	0.002		mg/L
Nickel	1	February-09	February-09	0.016	0.016	0.1		mg/L
Nitrate	24	March-01	January-11	2.2	5.2	10		mg/L
Nitrite	1	April-02	April-02	0.006	0.006	1		mg/L
Radium-226	3	April-07	September-10	0.7	1.6			pCi/L
Radium-228	3	April-07	September-10	1.3	1.9			pCi/L
Sodium	13	January-01	January-11	9.96	80.3			mg/L
Sulfate	2	April-01	April-02	25	26.7		250	mg/L

TABLE 5 Total and Fecal Coliform Results Reported for the Elkton PWS

Routine Samples				Repeat Samples			
Number of Samples Collected	**Number Positive for Total Coliform**	**Number Positive for Fecal Coliform**	**Number Indeterminate**	**Number of Samples Collected**	**Number Positive for Total Coliform**	**Number Positive for Fecal Coliform**	**Number Indeterminate**
1150	0	0	0	0	0	0	0

TABLE 6 Potential Contaminant Sources in the Elkton Area

	Potential Contaminant Source	Type
1	WWTP	WWTP
2	Royal Farms	UST
3	Dry Cleaners	Above ground PCS
4	Auto Service	UST
5	Jiffy Lube Auto Service	UST
6	MIdas Auto Repair	UST
7	Tire center	Above ground PCS
8	Citgo	UST
9	Car Wash	Car wash
10	Auto Store	Above ground PCS
11	Walmart Service Center	Above ground PCS
12	Estes Trucking	Above ground PCS
13	Diesel Generator	Above ground PCS
14	Gore (CHS)	Above ground PCS
15	Williams Cheverolet (CHS)	Above ground PCS
16	Goodwrench Quick Lube	Above ground PCS
17	Royal Farms Store	UST
18	Dry Cleaners	Above ground PCS
19	Delaware Diesel (CHS)	Above ground PCS
20	Auto Paint / Body Shop	Above ground PCS
21	AAMCO Auto Service	UST
22	Car Wash	Car wash
23	7-Eleven	UST
24	K-mart (CHS)	Above ground PCS
25	Oceanic	UST
26	Southern States Oil/Diesel	Above ground PCS
27	American Home and Hardware	Above ground PCS
28	Elkton Presbyterian	Cemetery
29	Providence Methodist, AST	Above ground PCS
30	Elkton District Court Multi-Service Center	
31	Elkton Circult Court	Above ground PCS
32	Dry Cleaners	Above ground PCS
33	AST	Above ground PCS
34	Union Hospital	UST
35	7-Eleven	UST
36	Auto Repair	UST
37	Auto Repair	UST

TABLE 7 Land Use in the Source Water Assessment Areas for Wells in the Elkton Public Water System

	Acres				Percentage of SWAA			
Land Use	**Well 1R**	**Well 3**	**Well 4**	**Total**	**Well 1R**	**Well 3**	**Well 4**	**Total**
Agricultural	1.2	19.3	148.1	168.6	0%	5%	53%	18.5%
Commercial / Industrial / Institutional	119.5	170.1		289.7	44%	47%		31.8%
Forested	102.1	44.4	84.4	230.9	37%	12%	30%	25.3%
High-Density Residential		11.3		11.3		3%		1.2%
Large lot subdivision (agriculture)		11.8		11.8		3%		1.3%
Large lot subdivision (forest)			3.9	3.9			1%	0.4%
Low / Medium Density Residential	1.0	88.6	42.7	132.4	0%	25%	15%	14.5%
Open Urban Land / Transportation	35.3	13.4		48.6	13%	4%		5.3%
Water	3.4			3.4	1%			0.4%
Wetlands	10.5			10.5	4%			1.1%
Total	**273.0**	**358.8**	**279.2**	**911.0**	**100%**	**100%**	**100%**	**100.0%**

TABLE 8 Land Use in the Big Elk Creek Watershed Upstream from Elkton

	Big Elk Watershed	
Land Use	**Acres**	**Percentage**
Agricultural	19,258.9	49.8%
Barren Land	8.9	0.023%
Forested	12,119.0	31.3%
High-Density Residential	114.1	0.3%
Low / Medium Density Residential	1,432.8	3.7%
Open Urban Land / Transportation	5,107.3	13.2%
Water	2.7	0.007%
Wetlands	616.8	1.6%
Total	**38,660.4**	**100.0%**

TABLE 9 Source Water Protection Funding Opportunities

S.S. PAPADOPULOS & ASSOCIATES, INC.

Organization/ Funding Opportunity	Contact	Description	Website
MDA			
Maryland Agricultural Water Quality Cos-Share (MACS) Program	Charles Hayes (410) 398-4411 ext. 3	Provides farmers with grants for use of BMPs and cover crops to prevent soil erosion, manage nutrients and protect water quality.	http://mda.maryland.gov/resource_conservation/Pages/macs.aspx
Conservation Reserve Enhancement Program (CREP)	Charles Hayes (410) 398-4411 ext. 3	Offers financial assistance above the rates offered by the traditional Conservation Reserve Program. Program places land in conservation reserve or provides cost-share assistance for BMPs	http://mda.maryland.gov/resource_conservation/Pages/crep.aspx
MDE			
Drinking Water Supply Assistance Program	Deborah Thomas (410)537-3722	Provides financial assistance for the acquisition, construction, rehabilitation and improvement of publicly owned water supply facilities to protect against health problems and meet federal SDWA requirements	http://www.mde.maryland.gov/programs/water/qualityfinancing/saterqualityfinancehome/pages/programs/waterprograms/water_quality_finance/wqfa_ws.aspx
319 Nonpoint Source Program	Eric Ruby (410) 537-3685 (800) 633-6101	Provides financial assistance for the implementation of nonpoint source best management practices and program enhancements as a means of controlling the loads of pollutants entering the State's waterways.	http://www.mde.state.md.us/programs/Water/319NonPointSource/Pages/Programs/WaterPrograms/319nps/index.aspx
Bay Restoration Fund Enhanced Nutrient Removal	Rajiv Chawla (410)537-3770 (800) 633-6101	Provides up to 100 percent grant funding to upgrade wastewater treatment plants to enhanced nutrient removal (ENR) technologies.	http://www.mde.state.md.us/programs/Water/BayRestorationFund/Pages/water/cbwrf/enr.aspx
Maryland's Nitrogen-Reducing Septic Upgrade Program	Shan Abeywickrama 410-537-3921	Onsite Disposal Systems (OSDS) Fund: Provides up to 100 percent in grant funding for upgrades of existing systems to best available technology for nitrogen removal or for the marginal cost of using best available technology instead of conventional technology. Priority given to failing OSDS in Critical Areas	http://www.mde.state.md.us/PROGRAMS/WATER/BAYRESTORATIONFUND/ONSITEDISPOSALSYSTEMS/Pages/Water/cbwrf/index.aspx
Biological Nutrient Removal Cost-Share Program	Ms. Elaine Dietz (410) 537-3908 (800) 633-6101	Provides grants to local municipalities and agencies for upgrading WWTPs with biological nitrification/denitrification facilities to achieve a goal of annual average effluent concentration of 8 mg/l total nitrogen.	http://www.mde.state.md.us/programs/Water/QualityFinancing/SaterQualityFinanceHome/Pages/programs/waterprograms/water_quality_finance/wqfa_bnr.aspx
Linked Deposit Water Quality Revolving Loan Fund (WQRLF) and Drinking Water Revolving Loan Fund (DWRLF)	Mr. Jag Khuman (410) 537-3119 (800) 633-6101	Provides a source of low-interest financing for certain water quality and drinking water capital projects. Below market interest rates are passed on to borrowers by participating commercial lenders with investment agreements with MDE	http://www.mde.state.md.us/programs/Water/QualityFinancing/LinkedDeposit/Pages/programs/waterprograms/water_quality_finance/link_deposit/index.aspx
Sewerage Facilities Supplemental Assistance Program	Ms. Heather Fleming (410) 537-3327 (800) 633-6101	Provides financial assistance to local governmental entities in the form of grants, supplementing the Water Quality Loan funds, where affordability is a problem and to correct public health or water quality problems	http://www.mde.state.md.us/programs/Water/QualityFinancing/SaterQualityFinanceHome/Pages/programs/waterprograms/water_quality_finance/wqfa_supplemental.aspx
State Revolving Loan Fund/ Water Quality Financing	Mr. Jag Khuman (410) 537-3119 (800) 633-6101	Provides a source of low interest financing to encourage private landowners, and water system owners to implement capital improvements that will protect or improve the quality of Maryland's water resources and provide safe drinking water.	http://www.mde.state.md.us/programs/Water/QualityFinancing/Pages/Programs/WaterPrograms/water_quality_finance/index.aspx
Water Supply Program/ Drinking Water Supply Assistance Program	Ms. Debbie Thomas (410) 537-3722 (800) 633-6101	Provides financial assistance to local governments or to water supply systems for wellhead protection projects and direct loans to local governments or to water supply systems for land acquisition for source water protection.	http://www.mde.state.md.us/programs/Water/QualityFinancing/SaterQualityFinanceHome/Pages/programs/waterprograms/water_quality_finance/wqfa_ws.aspx
UST Loan Program/ Linked Deposit WQRLF & DWRLF	Mr. Greg Sonberg (410) 537-3412 (800) 633-6101	A program through the Water Management Administration, known as Linked Deposit, may provide owners of underground oil storage tanks (UST) a way to replace those tanks.	http://www.mde.state.md.us/programs/Water/QualityFinancing/LinkedDeposit/Pages/programs/waterprograms/water_quality_finance/link_deposit/index.aspx
UST Reimbursement Program (Oil Contaminated Site Environmental Cleanup Fund)/ The Oil Control Program	Mr. Christopher Ralston (410) 537-3443 (800) 633-6101	Provides financial assistance to owners or operators of USTs by reimbursing them for costs incurred as a result of an oil contaminated site environmental cleanup project.	http://www.mde.state.md.us/programs/Land/OilControl/OilControlProgram/Pages/programs/landprograms/oil_control/pollution_management/index.aspx
Environmental Benefits Districts	Lisa Nissley (410) 537-3812 (800) 633-6101	Offers financial, technical, and other appropriate resources to benefit targeted communities. This is a new initiative developed by MDE to foster sound environmental practices, healthy and safe communities, and proactive economic development for all Marylanders.	http://www.mde.state.md.us/programs/crossmedia/EnvironmentalJustice/EJImplementationinMaryland/Pages/programs/multimediaprograms/environmental_justice/implementation/details.aspx#ebd
USDA			
Funding for Rural Communities	Stacey Slacum (302) 857-3595	Provides assistance for rural businesses, housing and community facilities, and utilities through direct or guaranteed loans, grants, technical assistance, research and educational materials	http://www.rurdev.usda.gov/RD_Loans.html
Conservation Reserve Program (CRP)	Stacey Slacum (302) 857-3595	Contact specific for Cecil and Harford Counties	http://www.fsa.usda.gov/FSA/webapp?area=home&subject=copr&topic=crp-sp
Conservation Innovation Grant (CIG) Program	Gregorio Cruz (703) 235-8065	Provides grants for the development and adoption of innovative conservation approaches and technologies. Provides more options for environmental enhancement and compliance with agricultural regulations	http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1044413.pdf
USEPA			
Assessment and Watershed Protection Program Grants (CFDA 66.480)	Federal Service Desk (866) 606-8220	Provides financial assistance for studies relating to water pollution, specifically for watershed management actions and policies.	https://www.cfda.gov/index?s=program&mode=form&tab=step1&id=8f560648f1725cee11f88ee3c25452ea
Environmental Education Regional Grants	Federal Service Desk (866) 606-8220	Provides financial assistance for environmental education projects that increase public awareness.	http://www.epa.gov/education/grants/index.html
Pollution Prevention Grants Program (CFDA 66.708)	Federal Service Desk (866) 606-8220	Provides financial assistance for pollution prevention technical assistance and projects for businesses.	https://cfda.symplicity.com/index?s=program&mode=form&tab=step1&id=15438a8058b068197cc298e0234f8695

TABLE 10 Elkton SWPP - Implementation Matrix

Threat	Recommended Action	Estimated Cost *	Funding Sources	Schedule
Releases of Contaminants	Contingency Planning	---	General Revenues	within 1 year
	Transfer on-Site Septic to Regional System	---	General Revenues	ongoing
Inappropriate Land Use	Wellhead Protection Ordinance (WHPO)	TBD	General Revenues or Tax/fee dedicated to WHP	within 1 year
	Digital Information/Mapping Resources	---	General Revenues	within 30 days
	Periodic Updates of SWPP	$15,000 - $30,000	General Revenues	every 6 years
	Land Acquisition and/or Easement	site-specific	General Revenues Grants/Loans - see Table 9	As opportunities arise
Need for Public Education and Interaction	Public Education through DPW	<$10,000	General Revenues	ongoing
	Signage for Recharge Zone	<$5,000	General Revenues	within 1 year

* Cost Estimates are based upon current implementation, and do not account for changes in costs over time

APPENDIX A

Elkton PWS – Minutes of Public Meeting

Elkton Town Offices (100 Railroad St.), Wednesday February 1, 2012

- Attending
  - Harvey Cohen, SSP&A
  - Nick Walls, CEM
  - Town Commissioners, Mayor and Admin Staff
  - ~10 audience members in attendance
- Harvey and Nick presented scope of project
- Relevant comments from Severn Trent Env. Services Presentation
  - Well #150 is pumping well at 150 gpm
  - Screen has been televiewed – in good shape
  - Started renovation work on well house #1
    - Replacing water lines on well house
    - Cut out old pneumatic tank
    - Upgrading chemical feed system
  - Well #3 upgrade almost complete
  - No odors (odor control system working)
- Questions from audience/commissioners
  - Will this study include the Knights of Columbus well? (which apparently had some previous contamination)?
    - Answer: no, only addresses permitted wells
  - What are the 20 PWS selected by MDE
    - Answer: Sent file to Commissioner Jablonski on 2/2/12
  - Will the work include an SWAA delineation?
    - Answer: Yes
  - How is this different than existing wellhead protection plans?
    - Answer: More detailed and includes new well

APPENDIX B

Example
Wellhead Protection Ordinance[1]

For the Town of Elkton,
October, 2013

Based on the
Maryland Model Wellhead Protection Ordinance
February 1997,
Revised August 2005
Revised August 2007

Maryland Department of the Environment
Water Management Administration
Water Supply Program

[1] This text has not been reviewed, approved, or otherwise endorsed by attorneys, planners or other parties responsible for enacting legislation for the Town of Elkton. It is provided as a framework and suggestion, only.

Table of Contents

Section 1.0 PURPOSE AND INTENT

WHEREAS, the ground water underlying the community water supply wellhead protection areas is a major source of the Town of Elkton's existing and future water supply; and

WHEREAS, a safe and adequate source of drinking water is of great benefit to the health and well being of the Town of Elkton; and

WHEREAS, the aquifer systems supplying the community water supply wellhead protection areas, with its ground water supply, is integrally connected with numerous surface waters and streams; and

WHEREAS, accidental spills and discharges of toxic and hazardous materials can threaten the quality of such water supplies, posing public health and safety hazards; and

WHEREAS, unless preventive measures are adopted to control the discharge and storage of toxic and hazardous materials within the community water supply wellhead protection areas, further spills and discharges of such materials will predictably occur, and with greater frequency and degree of hazard by reason of increasing land development, population, and vehicular traffic within the wellhead protection areas; and

WHEREAS, agricultural and residential development can result in increased nitrogen loading to the ground water from septic systems, fertilizer application and livestock wastes; and

WHEREAS, proper siting, installation, operation, and maintenance of septic systems, agricultural operations, feedlots and animal wastes areas are necessary to prevent contamination of the ground water from excessive nitrogen and pathogenic organisms; and

WHEREAS, the purpose of this ordinance is to protect the public health, safety, and welfare through the preservation of the ground water resources of community public water supplies to ensure a future supply of safe and healthful drinking water. The designation of the wellhead protection districts, and careful regulation of development activities within these districts, can reduce the potential for ground and surface water contamination.

Section 2.0 DEFINITIONS

A. **AQUIFER** means any formation of soil, sand, rock, gravel, limestone, sandstone, or other material, or any crevice from which underground water is or may be produced.

B. **BEST MANAGEMENT PRACTICES (BMPs)** means a conservation or pollution control practice that manages wastes, agricultural chemicals, or hazardous materials so as to minimize movement into surface or ground waters of the State.

C. **CONTAINMENT DEVICE** shall be defined as a device that is designed to contain an unauthorized release, retain it for cleanup, and prevent released materials from penetrating into the ground.

D. **EPA** refers to the United States Environmental Protection Agency.

E. **EPA STORMWATER NPDES PERMIT** shall be defined as a permit meeting the requirements of the National Pollutant Discharge Elimination System Permit Application Regulations for Storm Water Discharges issued by EPA on November 16, 1990.

F. **HAZARDOUS MATERIALS** means any substance that: (1) conveys toxic, lethal, or other injurious effects or which causes sublethal alterations to plant, animal, or aquatic life; or (2) may be injurious to human beings. Hazardous materials include any matter identified as a "hazardous waste" by the Environmental Protection Agency or a "controlled hazardous substance" by the Maryland Department of the Environment.

G. **MDE** refers to the Maryland Department of the Environment.

H. **NUTRIENT/MANURE MANAGEMENT PLAN** shall be defined as a plan prepared by a certified nutrient management consultant to manage the amount, placement, timing, and application of animal waste, fertilizer, sewage sludge, and other plant nutrients in order to prevent pollution and to maintain productivity of the soil.

I. **ON-SITE FLOOR DRAINS** shall be defined as drains which are not connected to municipal sewer or stormwater systems and which discharge directly to the ground or septic system.

J. **OWNER** shall be defined as a property owner or his duly authorized agent or attorney, a purchaser, devisee, fiduciary, and any other person having vested or contingent interest in the property of question.

K. **PERSON** shall be defined as any natural person, individual, public or private corporation, firm, association, joint venture, partnership, municipality, government agency, political subdivision, public officer, owner, lessee, tenant, or any other entity whatsoever or any combination of such, jointly or severally.

L. **PESTICIDE** shall be defined as any substance or mixture of substances intended for: (1) preventing, destroying, repelling, or mitigating any pest; (2) use as a plant regulator, defoliant, or desiccant; or (3) use as a spray adjuvant such as a wetting agent or adhesive.

M. **RULES AND REGULATIONS OF MDE** shall be defined as official publications of MDE with standards and requirements for protection of ground water resources.

N. **UNDERGROUND INJECTION WELL** shall be defined as a bored, drilled, driven or dug well whose depth is greater than the largest surface dimension, through which fluids enter the subsurface; or, an improved sinkhole; or, a subsurface fluid distribution system.

O. **UNDERGROUND STORAGE TANK** means an underground storage tank, connected piping, underground ancillary equipment, and containment system, if any.

P. **WELLHEAD PROTECTION DISTRICT** means that land area overlying the aquifer which contributes water to a public water supply well under the permitted withdrawal rate (average annual) and average annual recharge conditions that can be anticipated based on historical data. It is bounded and may be influenced by the ground water divides which result from pumping the well and by the contact of the aquifer with less permeable geologic boundaries. In all cases, the Wellhead Protection District shall extend upgradient to its point of intersection with prevailing hydrogeologic boundaries (a ground water flow divide, a contact with geologic formations, or a recharge boundary), or be limited by time-of-travel. The Wellhead Protection District shall be reviewed and approved by MDE.

The Wellhead Protection District may include two (2) zones of protection, with Zone 1 being the most restrictive. Zone 1 is based on a 1-year time of travel, as consistent with MDE's guidance on definition of Source Water Assessment Areas in Coastal Plain aquifers. Zone 2 is based on a 10-year time of travel as consistent with MDE's guidance on definition of Source Water Assessment Areas in Coastal Plain aquifers.

Q. **YARDING AREAS** shall be defined as a pen or other outdoor area used for the feeding and care of livestock or poultry.

Section 3.0 AUTHORITY

Section 3.1 Enabling Statute

WHEREAS, the Town of Elkton has duly adopted within the Comprehensive Plan, after public notice and hearing, a Sensitive Areas Plan element in accordance with §3.05 of Article 66B of the Annotated Code of Maryland; and

WHEREAS, § 3.05 of Article 66B requires protection of streams and their buffers, 100-year floodplains, habitats of threatened and endangered species (habitat), and steep slopes; and

WHEREAS, § 3.05 (a)(2) of Article 66B authorizes protection of additional types of sensitive areas; and

WHEREAS, the Town of Elkton the has determined through the Sensitive Areas element of the Comprehensive Plan that, in addition to streams and their buffers, 100-year floodplains, habitats of threatened and endangered species, and steep slopes, wellhead protection areas are in need of special protection; and

WHEREAS, § 4.01 of Article 66B empowers the Town of Elkton with the authority to regulate and restrict land use for the purpose of promoting the health, safety and general welfare of the community; and

WHEREAS, Section 1428 of the Federal Safe Drinking Water Act Amendments of 1986 requires that each state develop a wellhead protection program to protect public water supplies from contamination from contamination; and

WHEREAS, the Maryland Department of the Environment (MDE) has developed a wellhead protection program, approved by EPA, which identifies that local governments have

responsibility for developing programs, including regulations and management controls, to protect public water supplies from contamination.

Section 4.0 APPLICABILITY

A. This Ordinance applies to all land uses and activities located or proposed within the area delineated as the Wellhead Protection District in the Town of Elkton on a map available for inspection at the office of the Town of Elkton and as defined in the definitions section of the ordinance. The Wellhead Protection District consists of Zone 1, and Zone 2 as described in 5.0 below.

B. This Ordinance is supplementary to other laws and regulations. Where this Ordinance or any portion thereof imposes a greater restriction than is imposed by other regulations, the provisions of this Ordinance shall control.

Section 5.0 EXTENT AND DESIGNATIONS

A. The Wellhead Protection District includes differing zones of protection as recommended by MDE.

1. Zone 1 represents the area bounded by a ground water travel time of 1 year to (name of supply source and location) as determined by methods consistent with MDE's Source Water Assessment Program, as applied to Coastal Plain aquifers. Delineation of Zone 1 is documented in the Source Water Protection Plan for the Town of Elkton (2013, and subsequent updates). MDE has indicated its approval of this area as being consistent with the requirements of Section 1428 of the Safe Drinking Water Act by letter dated _____.

2. Zone 2 represents an area bounded by a ground water travel time of 10 years to name of supply source and location as determined as determined by methods consistent with MDE's Source Water Assessment Program, as applied to Coastal Plain aquifers. Delineation of Zone 1 is documented in the Source Water Protection Plan for the Town of Elkton (2013, and subsequent updates). MDE has indicated its approval of this area as being consistent with the requirements of Section 1428 of the Safe Drinking Water Act by letter dated _____.

B. The maps delineating the Wellhead Protection District and Zone(s) (1&2) are entitled (title and date) and are incorporated herein and made a part of this Ordinance. The maps shall be on file and maintained by . Accurate copies of these maps shall be made available for review by the public.

C. In determining how properties within the Wellhead Protection District depicted on the (title and date of map) are affected by the requirements of this ordinance the following rules shall apply:

1. Properties located wholly within one zone as reflected on (title and date of map) shall be governed by the restrictions applicable to that Zone.

2. Properties having parts lying within more than one zone as reflected on the (title and date of map) shall be governed by the restrictions applicable in each zone.

3. Where the boundary line between two zones passes through a building, the entire building shall be considered to be in that zone in which more than fifty (50) percent of the floor space of the building is situated.

D. The boundary of the Wellhead Protection District or individual zones within the District may be modified should additional information or analysis be provided that shows that the current boundary lines no longer appropriately reflects the criterion which they purport to represent. Such evaluations will be made at a minimum every six years, coincident with preparation of the Town's Comprehensive Plan and Water Resources Element.

Procedures for modification of such boundaries shall be as follows:

1. The applicant wishing a change in boundary shall provide the evidence to the Zoning Commissioner. The applicant shall petition the Zoning Commissioner for a special hearing/District Reclassification and be required to present detailed hydrogeologic and hydrologic information to the Board of Appeals indicating where in fact the new boundary line should be drawn. The applicant shall provide (No. of copies) copies of all reports and maps to the Zoning Commissioner for a technical review of geologic and hydrologic, and any other relevant information. Maps shall be submitted on the same scale or more detailed as the official Wellhead Protection District Maps.

2. The Zoning Commissioner shall seek competent technical advice of such a change request. The (name of community) wellhead protection planning team shall be given a copy of the information given to the zoning commissioner and be granted adequate time to comment on the proposed change.

3. The burden of proof shall be on the applicant to show that the current boundaries do not represent the criterion which they purport to represent.

4. If after receiving written advice from the Town of Elkton planning team and/or other technical advisors, and the Zoning Commissioner believes that the proposed change has merit, all property owners potentially affected by the changes shall be sent notices indicating the proposed change. An opportunity for public comment of sixty (60) days after notices are sent shall be provided.

5. After close of the comment period the Zoning Commissioner shall make his decision.

6. Any maps so revised shall be incorporated and made part of this Ordinance and kept on file and available to the public for review by (name of appropriate agency).

Section 6.0 USE REGULATIONS

Section 6.1 Permitted Uses

The following uses shall be permitted:

A. Conservation of soil, water, plants, and wildlife;

B. Outdoor recreation, nature study, boating, fishing, and hunting where otherwise legally permitted;

C. Foot, bicycle, and/or horse paths, and bridges;

D. Normal operation and maintenance of existing water bodies and dams, splash boards, and other water control, supply and conservation devices;

E. Maintenance, repair, and enlargement of any existing structure, subject to Section 6.2 prohibited uses;

F. Residential development, subject to Section 6.2 prohibited uses;

G. Farming, gardening, nursery, conservation, forestry, harvesting, and grazing, subject to Section 6.2 prohibited uses; and

H. Construction, maintenance, repair, and enlargement of drinking water supply related facilities such as, but not limited to, wells, pipelines, aqueducts, and tunnels. Underground storage tanks related to these activities are not categorically permitted.

Section 6.2 Prohibited Uses

The following uses are prohibited or conditional within the designated protection zone(s):

			Zone 1	Zone 2
A.		Bulk Storage of Hazardous Materials, except the following[2]	X	Cu
	1.	Materials needing for normal household use, outdoor maintenance, and heating of a structure;		
	2.	Waste oil retention facilities required by statute, rule, or regulation;		
	3.	Materials needed for emergency generators; or		
	4.	Materials used in Water Treatment Plants.		
B.		Dry Cleaning Establishments, Coin or Commercial Laundries	X	Cu
C.		Garage, Service Station	X	Cu
D.		Heavy Manufacturing Uses	X	X
E.		Junk Yard	X	X
F.		Yarding Area	X	Cu[3]
G.		Manure Piles, Animals Waste Pits, Lagoons, and Sewage Sludge Storage Facilities	X	Cu
H.		Metal Plating Establishments	X	X
I.		On-site Wastewater Disposal	X	Cu[4]
J.		Open Burning Sites and Dumps	X	X

K.		Quarries and Mining Operations	X	X
L.		Storage of Deicing Chemicals	X	Cu
M.		Disposal of Fuels or Hazardous Materials	X	X
N.		Sanitary Landfills and Rubble Fills	X	X
O.		Bulk Storage and Mixing of Pesticides and Fertilizers[5]	X	Cu
P.		Underground Injection Wells	X	Cu[6]
Q.		Underground Storage Tanks	X	Cu
R.		Uses which involve, as a principal activity, the manufacture, storage, use, transport, or disposal of hazardous materials	X	X
S.		Uses which involve hazardous materials in quantities greater than those associated with normal household use [8]	X[7]	Cu
T.		Underground pipelines [9] carrying hazardous materials	X	Cu
U.		Development with greater than 50% impervious surfaces	Cu	Cu

Key: X = Not Allowed, Cu = Conditional Use

[2]Secondary containment and release detection standards for in-ground tanks and above ground tanks found later in this manual apply to the exceptions permitted in Zone 1 of the wellhead protection district.

[3]Counties/municipalities may require nutrient management plans through local regulation or other non-zoning by law/ordinance. Local requirements must be consistent with MDA/SCD standards.

[4] Counties/municipalities should consider requiring commercial and residential developments within this Zone to be serviced by public sewer. For all lots subdivided which propose on-site wastewater disposal, the intention is to ensure that the nitrate-levels do not exceed 10 mg/l. In some instances on-site systems that maximize nitrogen removal may required. Process wastewater that contain hazardous materials above drinking water standards or otherwise to harm to the water supply should be prohibited from on-site disposal.

[5]New standards and guidelines adopted by Maryland Department of Agriculture should be referenced as a condition for special exception.

[6]Process wastewater that contain hazardous materials above drinking water standards or otherwise cause harm to the water supply should be prohibited from on-site disposal.

[7]This prohibition does not apply to uses permitted in Section 6.2.A.

[8]Normal household use does not imply that it is acceptable to dispose of hazardous material through the home's plumbing system.

[9] Counties and local governments may be pre-empted from regulating the location of pipelines used in interstate commerce.

Section 6.3 Conditional Uses

Activities that are defined as conditional uses will not be allowed within the Wellhead Protection District unless the property owner can show the use will not harm the ground water and is able to meet the conditions described in 6.3.B and 6.7 of this ordinance.

A. The landowner or representative shall submit to the Town of Elkton an application for a Conditional Use. The application shall include:

1. A list of all hazardous materials which are to be stored, handled, used, or produced in the activity being proposed.

2. A description of the quantities and containers for the storage, handling, use, or production of hazardous materials by the proposed activity.

3. A site plan illustrating the location of all operations involving hazardous materials, spill containment structures and showing all points of potential discharge to ground water including dry wells, infiltration ponds, septic tanks and drainfields.

4. Documentation of approval by MDE of any industrial waste treatment or disposal system or any wastewater treatment system over 5,000 gallons per day (gpd) capacity.

5. Documentation of MDE permit or approval for any discharge via an underground injection well.

6. A description and estimate of the average and maximum number of poultry livestock animals that will be yarded within the Wellhead Protection District. Evidence that a nutrient management plan for nitrogen has been completed for all livestock or poultry wastes to be generated by the activity. This plan must incorporate adequate waste holding facilities and show any application sites within the wellhead protection district.

7. Plans showing secondary containment, for all underground and above ground tanks and lines containing hazardous material.

8. A description of the best management practices which will be followed during the construction of the facility to ensure that hazardous materials are not released to the ground water.

9. An emergency plan indicating the procedures which will be followed in the event of a spill of a hazardous material to control and collect the spilled material to prevent the substance from reaching the ground water.

10. A hydrologic assessment for properties with greater than 50% planned impervious surfaces (building footprints, sidewalks, and transportation surfaces) to determine the ground water recharge rate after site development is completed. The assessment will also estimate the ground water recharge rate prior to development.

B. The Town of Elkton shall obtain advice from all appropriate local agencies to assess whether the wellhead protection area will be protected from contaminants which pose an adverse effect on the health or comfort of persons. In making their determination, the Town of Elkton shall give consideration to the simplicity, reliability, and feasibility of the control measures proposed and the degree of threat to drinking water quality which would result if the control measures failed. Town of Elkton shall then issue a written decision. In order for the area to be approved, it must be shown that the use:

1. Will protect the water supply from contaminants used on the property which pose an adverse effect on the health or comfort of persons;

2. Will not cause the average ground water quality on the property to violate drinking water standards promulgated by MDE and the EPA; or

3. Will maintain recharge of water to the water supply aquifer consistent with rates prior to development. A request may not be approved until all comments provided by local agencies have been addressed by the applicant to the satisfaction of the Town of Elkton.

C. The Town of Elkton may deny the Conditional Use if it is determined that the Conditional Use would not meet the requirements outlined in 6.3.B. above. The Town of Elkton's decision shall be made in writing to the applicant.

Section 6.4 Nonconforming Uses

Non-conforming uses lawfully in existence within the Wellhead Protection District may continue to exist in the form in which they existed at the time on this Ordinance is adopted. Changes in title or right to possession shall not effect continuation of an existing use.

In the event a non-conforming use poses a direct hazard to the public water supply, the Town of Elkton may take any action permitted by law to abate the hazard.

Section 6.5 Variances

Variances to the provisions of this ordinance may be granted by the Town of Elkton, following a public hearing, provided that a strict interpretation of the Ordinance deprives such property of privileges or safety enjoyed by other similarly situated property within the Wellhead Protection District. Applications for Variances must be presented to the Town of Elkton.

Section 6.6 Exemptions

The following activities are exempt from regulation under this ordinance:

1. Transportation of Hazardous Material- The transportation of any Hazardous Material through the Wellhead Protection District shall be exempt from the provisions of this ordinance.

2. Application of Pesticides- The application of pesticides in recreation, agriculture, pest control, and aquatic weed control activities shall be exempt from the provisions of this ordinance provided that:

a. The application is in strict conformity with the use requirement as set forth in the substances EPA registries. A pesticide can only be used according to its labeling and according to pertinent federal and state laws.

b. The application of pesticides shall be noted in the records of an applicator certified by the Maryland Department of Agriculture. Records shall be kept of the date and amount of these substances applied at each location and said records shall be available for inspection.

3. Underground Storage of Oil(s)- The underground storage of oil(s) used for heating fuel shall be exempt from the provisions of this ordinance if the tank used for storage is located within an enclosed structure (i.e., secondary containment or any currently approvable containment technology) sufficient to contain leakage of oil from the environment and to

provide routine access for visual inspection (e.g., cement-floored basement), and sheltered to prevent the intrusion of precipitation. Any tank used for the underground storage of oil that is out of service for more than one year shall be removed. Liquid residue shall be removed and all connecting piping securely capped or plugged.

4. Aboveground Storage of Oil(s)- The aboveground storage of oil(s) used for heating fuel shall be exempt from the provisions of this ordinance provided that the tank used for storage is: 1) located on an impervious pad or container of sufficient volume to capture and contain spills and leakage of oil from entering the environment, 2) sheltered to prevent the intrusion of precipitation and, 3) located in a manner that allows for routine visual inspection. Aboveground storage of oil shall be located as far away from the public water supply wells as possible.

Section 6.7 Performance Plan Standards

All activities that are designated conditional uses shall meet the following design and operation guidelines. The intent of this section is to encourage the use of Best Management Practices (BMPs) for all potentially hazardous activities in Zones 1 and 2.

A. Containment of hazardous materials. Leak-proof trays under containers, floor curbing, or other containment systems to provide secondary liquid containment shall be installed. The containment shall be of adequate size to handle all spills, leaks, overflows, and precipitation until appropriate action can be taken. The specific design and selection of materials shall be sufficient to contain any hazardous material at the location and prevent escape to the environment. These requirements shall apply to all areas of use, production, and handling, to all storage areas, to loading and off-loading areas, and to aboveground and underground storage areas. Because State and federal governments already regulate hazardous materials nothing in this ordinance shall be applied in a way to prevent a person from complying with State and federal requirements.

B. All underground tanks(s) and piping systems shall meet the requirements of COMAR 26.10.05.03.C 1-4 for secondary containment, double wall tanks, liners, vaults and underground piping.

C. Dry cleaning establishments shall not discharge to the ground or subsurface any wastewater that was in contact with the organic solvents used in dry cleaning process. As specified in A. above, secondary containment is required for areas when dry cleaning solvent is stored, used and transferred.

D. Infiltration of stormwater runoff that has come in contact with the pavement surfaces shall not be permitted at gasoline service stations. Waste from service stations' work areas is not permitted to be discharged to the ground or subsurface.

E. All sewage sludge and animal waste holding facilities shall be constructed so as not to allow the waste material to leach into the ground water. All in-ground facilities shall use low permeability liners constructed to meet one of the standards specified below:

a. one foot of clay with a permeability less than 10^{-7} cm/sec, or

b. two feet of clay with a permeability less than 10^{-6} cm/sec or

c. two feet of compacted soil with a permeability less than 10^{-5} cm/sec, and a manmade liner, 30 mil thick, and permeability less than 10^{-7} cm/sec.

F. Agricultural operations with yarding areas shall follow nutrient management plans for nitrogen. Waste application rates for all sites within the wellhead protection district are to be designed to not exceed not exceed crop requirements and therefore minimize nitrate discharge to ground water.

G. All facilities with wastewater disposal greater than 5,000 gpd shall have a State discharge permit. All developments with on-site disposal shall be designed so that the average NO_3-N concentration of the water recharging the surficial ground water aquifer under the property shall not exceed 10 milligrams per liter.

H. All de-icing chemicals (salt piles and sand/salt mixes) must be stored under roof and protected from precipitation by a permanent cover. Runoff from mixing and loading areas may not be discharged to the subsurface.

I. All facilities with bulk storage of pesticides must show evidence of compliance with Maryland Department of Agriculture requirements.

J. All tanks of liquid fertilizers must have secondary containment of at least 110% of the largest tank within the contained area. All dry fertilizer storage must be under a permanent cover and protected from rainfall.

K. All facilities with underground injection wells must show evidence of compliance with all applicable MDE permits, consent orders, or other State actions, regarding the underground disposal of wastes.

L. All underground pipelines carrying hazardous materials shall be equipped with operable secondary release detection equipment and be protected against corrosion.

M. All excess hazardous materials from the construction of any facility shall not be released to the environment and shall be removed from the property, unless such materials are incorporated into a contained hazardous materials storage area.

N. At all facilities practicing stormwater infiltration the following design standards shall apply:

1. Stormwater management facilities including drainage swales, detention ponds, and retention ponds shall be designed in a manner to provide optimal protection of the ground water resources. Uses of grass swales, open shoulder roads and grass filter strips shall be considered as first options in plan development.

2. At least four feet of soil material is required between the top of bedrock surface or high water table (whichever is higher) and the bottom of any stormwater infiltration pond or system.

3. Stormwater infiltration shall be prohibited in areas receiving runoff from handling and mixing areas of hazardous materials.

4. At least 80% of the predevelopment recharge rate shall be preserved following development. The design shall be made to ensure that this rate can be maintained over the life of the facility.

O. Reporting of Spills. Any spill of a hazardous material shall be reported by the facility owner by telephone to the water supplier, within two (2) hours of discovery of the spill. Clean-up shall commence immediately upon discovery of the spill. A written report detailing the steps taken to contain and clean up the spill and preventing a recurrence shall be submitted to the water supplier within five (5) working days of the spill.

P. Monitoring for Hazardous Materials in Ground Water. If required by the Town of Elkton, ground water monitoring well(s) shall be installed at the expense of the facility owner or operator in accordance with an approved ground water monitoring plan. The permittee shall be responsible for developing an approved ground water monitoring system. Samples shall be analyzed by a State-certified laboratory and the results reported to the Town of Elkton

Q. Alterations and Expansion. The Town of Elkton shall be notified in writing prior to the expansion, alteration, or modification of any activity that is subject to a Conditional Use. Approval by the Town of Elkton is required before the activity subject to a Conditional Use can begin. The landowner or representative shall submit an explanation of the change in activity and the information as required by this ordinance above.

R. Facilities required by Federal and/or State Law to maintain a Spill Prevention, Control, and Countermeasure Plan (SPCC; e.g. those facilities storing more than 1,320 gallons of oil or petroleum-based liquid above ground, or 42,000 gallons of oil underground, per the Clean Water Act of 1990) will be required to provide copies of these plans with the Town of Elkton, and to provide updates to the Town when any substantive changes are made, when land use changes, or when the property changes ownership.

Section 7.0 ADMINISTRATION REQUIREMENTS

Section 7.1 Subdivision and Land Development Review

All subdivision proposals and other proposed new development plans within the Wellhead Protection District shall be reviewed by for compliance with the provisions of this ordinance. It shall be the responsibility of the Town of Elkton to recommend approval, disapproval, or approval with modifications of the proposed subdivision or development plan.

Section 7.2 Notice of Violation

Whenever it is determined that there is a violation of this ordinance, A Notice of Violation shall be issued. The Notice of Violation shall:

1. Specify the violation or violations in writing.
2. Specify the length of time available to correct the violation.
3. Clearly state any penalties associated with the subject violation.
4. Provide a description of any rights of appeal.

Section 7.3 Stop Work Orders

The Town of Elkton is authorized to issue cease and desist orders whenever it becomes aware of violations of this ordinance.

Section 7.4 Penalties

All costs incurred by the Town of Elkton, including engineering and attorney's fees for enforcing this ordinance shall be paid by the owner who violated the provisions of this ordinance.
A penalty of up to $1,000 may be levied for any violation of this ordinance.

Section 8.0 FEES

All fees for review of Subdivision and Land Development Plans shall be established by resolution of the appropriate local governing body. Fees established shall be reviewed annually and adjusted as required. The fees shall include reasonable costs involved with the implementation of this ordinance and may include Administrative and professional staff review costs.