Water Resource Element

Introduction

The Water Resource Element (WRE) is a detailed and quantitative analysis of the impact of anticipated growth on water and wastewater resources. The purpose of the WRE is to ensure that the Town contributes to the promotion of smart growth policies and principles by protecting State land and water resources, and the public health, safety and welfare of our citizens. The Town has taken a number of steps to protect its water resources such as well redundancy and the Wellhead Protection and Emergency Response Plans.

The WRE provides a link between the Land Use Plan and plans for the provision of drinking water supplies, wastewater discharge/treatment capacity and stormwater management. This section was developed utilizing supporting documentation already adopted by the Town, which is intended to protect and to detail how these water resources will support the growth in population and housing based on an approved allocation plan and the nearly 400 homes under site plan review.

Poolesville currently relies entirely upon eleven groundwater wells to supply the needs of its 4,883 residents and multiple businesses. The Town, with assistance of the Maryland Department of the Environment (MDE), reviewed and calculated the potential water supply from existing and proposed future well sources. A theoretical water availability assessment utilizing rainfall and acreage within the corporate boundaries was conducted by the MDE. It was determined that the groundwater availability was more than adequate to meet the Town's population projections of approximately 6,500.

The same population projections used to calculate water supply requirements were used to calculate the generation of wastewater and test the initial assimilative capacities of the receiving stream. These capacities were found to be within reasonable limits and the MDE determined that the stream could handle the increased wastewater discharge permit from 625,000 to 750,000 gallons per day. The expansion and upgrade of the wastewater facility, which was part of the permitting approval process, provided the capacity for the planned development to proceed.

Drinking Water

All of Poolesville's wells are equipped with flow regulating valves and have been set to specific pumping rates to ensure that each wells' major water bearings zones are not dewatered. These rates were determined by continuous 30-day pumping of individual wells during drought conditions and do not take into account any interference that may occur between wells if they were pumped simultaneously for 30 days. The overall current peak day capacity is 843 gallons per minute (gpm) or 1,213,920 gallons per day (gpd). The actual annual average Town usage is between 450,000 and 500,000 gallons per day (gpd). Current wells are identified in Table 1.

The MDE has determined that the yearly average water usage shall be 100 gpd/person; and has further determined that the maximum monthly average usage shall be 140 gpd/person. The current peak day capacity suggests that the Town has an adequate water supply for its current residents and most of the planned growth. The Commissioners have evaluated the Town's historical water usage, system vulnerabilities and the absence of alternate water sources and have determined, for the health and safety of the community, that the well field shall be capable of producing 140 gpd/person with the best-producing well not in operation. This results in the adopted policy that wells currently in operation are for existing residents; and for new connections, the system shall have additional capability to produce a peak day demand of 600 gpd/household.

Future Water Demand

In order to meet the MDE's requirements and accomplish the capacity goals established by the Town, owners of large subdivisions are required to permit, construct and deed municipal wells to the Town. Accordingly, in December 2009, two of the developers constructed and deeded two additional municipal wells to the Town. Table 1 identifies specific information on each well.
Table 1.

Well Number	Aquifer	Depth (Feet)	Diameter (Inches)	Sustainable Yield (gpm)	Status
2	New Oxford Formation	453	6	100	Online for existing residents
3		285	6	60	Online for existing residents
4		600	6.5	40	Online for existing residents
5		500	6	100	Online for existing residents
6		500	8	110	Online for existing residents
7		700	8	45	Online for existing residents
8		500	8	65	Online for existing residents
9		800	8	125	Online for existing residents
10		762	8	75	Online for existing residents
11		1,200	8	100	Permitted, not constructed, for redundancy (Rabanales)
12		500	8	72	Online for existing residents and future residents (Stoney Springs)
13		500	8	51	Online for existing residents and future residents (Brightwell Crossing)
14			8	34	Drilled only, for future residents (Jamison-Westerly)
15			8	48	Drilled only, for future residents (Jamison-Cattail)

Watersheds

The Town is divided into four watersheds. Withdrawal permits from each of these watersheds are based on data from a MDE Water Supply Program study completed in 2000. The estimated annual average base flow (effective recharge) in the nearest representative Triassic basin (Monocacy River @ Bridgeport) is 461 gpd/avg/ac (6.2 in/yr), with an estimated drought year (1-in-10) baseflow of 290 gpd/ac (3.9 in/yr). When amounts are deducted for maintenance of a seasonal low stream flow (7 gpd/avg) and a 10% reduction for impervious surfaces is made, the amount of theoretical ground water available in each watershed is calculated.

Wells are strategically located throughout Town to reduce drawdown interference between sites. The total of the four watershed appropriation permits are 650,000 gpd for an annual daily average and 910,000 gpd for the daily average of the month of maximum use. These permit amounts were derived in anticipation of the projected growth detailed in the Land Use Plan. Two additional wells, not yet permitted, will be brought online to supply the additional capacity required by Town policy. Table 2 details watershed withdrawal and capacity information.

Table 2.

Watershed	Area (acres)	"Theoretically" Available groundwater (gpd)	Permitted Average Daily Allocation on a yearly basis (gpd)	Permitted Average Daily Allocation for Max. Month (gpd)	Well Capacity (gpd)	Permittable Average Daily Groundwater Remaining (gpd)
Horsepen Branch (wells 2, 4, 6, 8 & 11)	588	149,000	293,000	388,000	597,600	0
Broad Run (well 12)	551	140,000	47,500	66,600	66,600	92,500
Dry Seneca Creek (wells 3, 5 &13)	973	247,000	194,500	273,400	303,400	52,500
Russell Branch (wells 7, 9 & 10)	450	115,000	115,000	182,000	359,000	0
Totals	2562	651,000	650,000	910,000	1,326,600	145,000

Water Resource Protection

Poolesville's groundwater is generally of high quality. It meets all current drinking water standards and requires minimal treatment before it reaches the tap. In recent years, the Town has developed protective legislation to reduce the threat to groundwater from contamination arising from stationary sources. A threat from mobile sources of contamination will always remain from tank trucks carrying such products as gasoline, home heating fuel and pesticides. Appropriate contingency plans for this occurrence has been developed as part of the Wellhead Protection Plan and Emergency Response Plan. The Town should continue to develop one or more additional well fields as far removed from potential sources of contamination as possible. Further, the

Town should pursue abandonment of In-Town private well and septic systems to limit this as a potential source of groundwater contamination. The Town views their Wellhead Protection Area as all land within the corporate boundaries and, in some cases, extending beyond the corporate limits. The Wellhead Protection Plan ensures a degree of certainty that the present planning process that reviews new development applications and changes in use provides protection for the Town's water supply.

Water System Improvements

The Town, in conjunction with the MDE continuously monitors Poolesville's water quality to ensure it is in compliance with State and Federal regulations. In 2006, the MDE requested quarterly alpha emitters sampling of Wells 7, 9 & 10. At the conclusion of the sampling schedule in 2009, MDE determined that although the analysis indicated elevated levels of uranium in Wells 7 and 10, they were both in compliance with State and Federal regulations. In order to maintain the current level of confidence, the Commissioners decided to take Wells 7 and 10 offline and to embark on the design of a treatment process to reduce uranium levels, with construction to begin in 2011.

Wastewater

The Town of Poolesville owns and operates a 750,000 gallon per day Wastewater Treatment Plant (WWTP). This sequence batch reactor type facility was upgraded in 2010 to a biologically enhanced nutrient removal (ENR) system. In addition, the WWTP utilizes multimedia pressure filters and ultra violet disinfection prior to the discharge into Dry Seneca Creek.
Table 3 details the permitted discharge effluent limitations.

Table 3.

	Loading Rate, lbs/day			**Concentration, mg/l**		
Effluent Characteristics	**Monthly Average**	**Weekly Average**	**Daily Average**	**Monthly Average**	**Weekly Average**	**Daily Average**
BOD:						
(5/1 to 10/31)	63	94	N/A	12	18	N/A
(11/1 to 4/30)	156	235	N/A	30	45	N/A
TSS:	156	235	N/A	30	45	N/A
TKN:						
(5/1 to 10/31)	20.9	31.3	N/A	4.0	6.0	N/A
Total Ammonia as N:						
(5/1 to 10/31)	4.4	N/A	22.5	0.7	N/A	3.6
(11/1 to 4/30)	10.6	N/A	28.2	1.7	N/A	4.5
Total Phosphorus as P:	10.4	15.6	N/A	2.0	3.0	N/A

	Total Monthly Loading Rate Pounds/Month	**Annual Maximum Loading Rate, Pounds/Year**	**Monthly Average Concentration, mg/l**
Total Phosphorus-P	Report	685	Report
Total Nitrogen-N	Report	9,137	Report

A flow of 0.75 million gallons per day was used in determining waste calculations.

During the latest WWTP upgrade and expansion, the MDE required an increased design capacity of 2,000,000 gpd in order to accommodate inflow and infiltration (I&I) peak flows. In conjunction with the expansion, the Town embarked on a comprehensive sewer relining campaign in the Wesmond subdivision which was completed in the later portion of 2007. Flow monitoring results show a significant decrease in flows. However, I & I exists and is developing in aging infrastructure in other parts of Town and these reduction efforts should continue.

Poolesville utilizes a three-year rolling average to determine available wastewater capacity The annual average daily flow was 584,133 gpd in 2008, 678,524 gpd in 2009 and 621,586 gpd in 2010. The current three-year rolling average of 628,081 gpd equates to an available capacity 121,919 gpd. Five thousand gpd of this available capacity is set aside for municipal use.

The majority of the flow received at the WWTP originates from residents and businesses within the corporate boundaries. However a small portion, up to 20,000 gallons per day, is attributable to the Jonesville/Jerusalem Community via an agreement with the Washington Suburban Sanitary Commission.

By January 31st of each year, the Town Manager will develop an annual Municipal Sewage Capacity Report for submission to the Commissioners of Poolesville and the MDE (Attachment A, page 20) to ensure adequate capacity exists.

Stormwater

Introduction

The Town of Poolesville currently has a population of 4,883 and the corporate limits encompass 2,641 acres. There is no intention to annex additional property into the Town limits at this time. It is anticipated that the population may increase to a maximum of 6,500 over the next 15 years.

The anticipated growth is mostly planned in residential zones with a majority of the construction being single family homes. With this development, it is anticipated that there will be an increase of 403 homes as indicated on Table 1 of the Municipal Growth Element. This growth may have a negative effect on the stormwater treatment process due to the addition of impervious surface coverage and the diminishment of vegetative cover. The Town recognizes this and has adopted zoning with higher density at the Town center and lower densities outwards near the surrounding agricultural preserve.

Stormwater Management Program

Montgomery County is the regulatory authority for stormwater management and responsible for monitoring stream conditions. The Town is responsible for providing input on stormwater practices to Montgomery County.

The Town is located in the piedmont geophysical region of the State of Maryland. The topography is relatively flat with no significant steep slopes and drains toward the Dry Seneca Creek basin, Russell Branch of Dry Seneca Creek, Horsepen Branch, and branches of Broad Run. Based upon topography and the storm water management system of the Town, the majority of the storm water flow will enter either the Dry Seneca Creek Basin or the Russell Branch of Dry Seneca Creek with lesser contributions to the Horsepen Branch and branches of Broad Run.

The Town is actively implementing treatment processes for stormwater management such as the pervious concrete parking area at Town Hall and pervious concrete walkways at Poolesville High School.

The Town's drinking water is supplied by a well system. The Town is aware of the need for recharging the aquifer and promotes this through the planning process and the Town's Well Head Protection Plan.

Protection of streams and banks is a major consideration in the Planning Process both by the Planning Commission and the Parks Board.

Approach

The Montgomery County Department of Permitting Services (DPS) is the regulatory authority and is a strong proponent in the use of the 2000 Maryland Stormwater Design Manual, Volume I & II. The Town has an ongoing process of evaluating each proposed development to ensure compliance with DPS approvals.

Non-point Source Loading Analysis

Based upon the Municipal Growth Element, the projected population growth is near 1,289 persons with a consumption of 632.61 acres (Table 2 of the Municipal Growth Element). Attachment B, page 24, depicts the location of the proposed subdivisions.

Currently, the Town has opted not to develop a GIS Infrastructure data base and relies on the existing paper plans or gathers information as needed.

Currently, a total of 24 septic systems remain in operation. The Town is connecting systems existing near new construction and has planned infrastructure expansions where possible. The existing septic systems are over 15 years of age and by Code, no additional septic systems are permitted. All new development must be connected to the waste water treatment plant. The Town's Wastewater Treatment Discharge Permit, effective July 2010, sets Total Nitrogen limits at 9,137 lbs. and Total Phosphorous at 685 lbs. Table 4 indicates the new loads.

Table 4.

	Nitrogen Loading (Lbs/yr)		Phosphorus Loading (Lbs/yr)	
	Current	Proposed	Current	Proposed
Sewer	15,064	9,137	125	685
Septic	304	304	0	0
Stormwater	102,827	112,130	102,828	111,454
Total	**118,159**	**121,571**	**102,953**	**112,139**

All Calculations based upon Maryland Chesapeake and Atlantic Critical Area 10% Rule Guidance Manual. Provided by the State of Maryland

The removal of the septic systems would provide a reduction of less than 1% of the total loading based upon the data in this report.

A summary of the nonpoint source loading analysis indicates that proposed development will increase the Nitrogen Loading by 8.8% and the Phosphorus Loading by 8.2%. The proposed loadings are based upon the completion of the ENR upgrades to the Waste Water Plant.

Based upon the loading analysis Priority Funding Area (PFA), the Town should concentrate on removing septic systems and limiting the increase of impervious areas.

Non-point source loading impacts

The Town is a proponent of improved growth policies, which is evident through subdivision regulations. Poolesville's Planning Commission has coordinated with Montgomery County's policies to achieve responsible and practical policy advancement. Through the coordination of Stormwater Management and the Land Use Elements, the Town continues to act in a responsible manner.

During the Town's development plan review process, the Town mandates that critical and sensitive areas be retained in a natural condition. The Town identifies those areas and places them into a conservation easement so as to limit construction and encourage bio-diversity. Within the Town limits is a parcel of approximately 264 acres that has been placed in a reserve program. Additionally, there are parcels of land that will not be developed in the foreseeable future due to lack of availability of sewer and water taps, which the Town controls.

The Town should encourage the use of drainage swales for quality and quantity control. The Town believes that this configuration encourages the filtration and absorption of surface flows and maintains the rural character of the Town.

The Town establishes and follows subdivision regulations, which are reviewed from time to time. The Town strictly monitors and enforces the regulations. An appeals process is available to petitioners.

The Town maintains a maintenance budget for the stormwater system and allocates funds and resources as required.

The Town of Poolesville has coordinated with Montgomery County Government, and supplied the land cover and other information needed for the County to include the Town within the overall County Nutrient Loading Analysis.

Review Criteria for Stormwater Management

The criteria for stormwater management are established by Montgomery County DPS (MCDPS). By law, Montgomery County must use the 2000 Maryland Stormwater Design Manual Volume I and II. MCDPS may modify these standards only if the modified criteria are greater than the standards of the design manual. The Town acts in concert with MCDPS in the review process. When review questions arise, the County reviewer is contacted and made aware of the Town's concerns.