Town of Poolesville Water Supply Evaluation

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Environmental & Water Resource Consultants

Main Conclusions

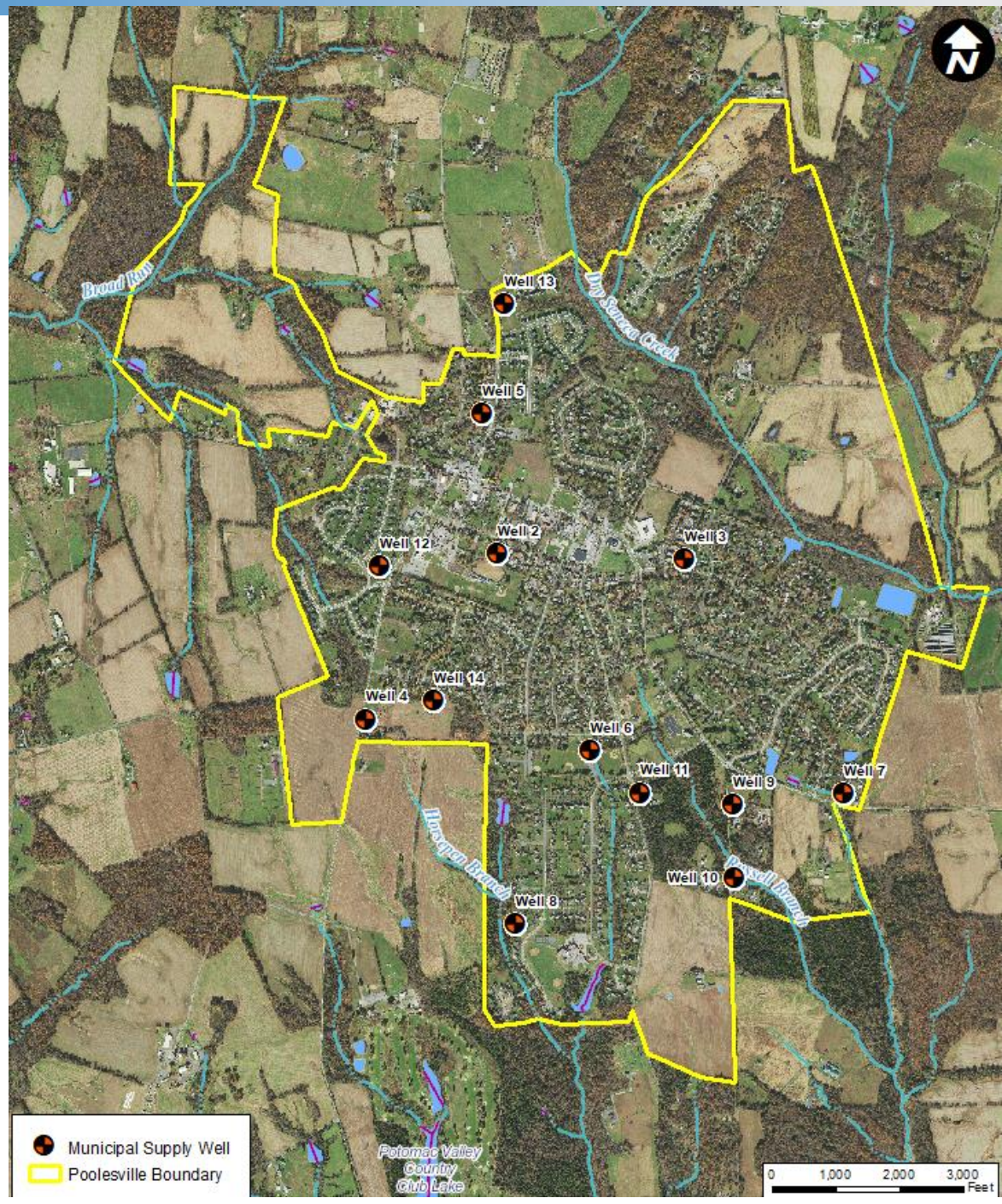
- Comparison of Reports = **water demand** and **well yield** estimates are similar between SSP&A and the MCA/Hammond report
  - » Differences occur when consider climate change impacts
- MDE does not anticipate changes to water management strategy due to climate change
- MDE does not anticipate reductions in Town water allocations
  - » Water Permits will be renewed in early 2026
- Town's Capacity Management Plan approved by MDE - incorporates approved Town development (~ 120 new homes)

Introduction

- Town water supply consists of 13 wells
- Wells are permitted for a maximum use rate use by the Maryland Department of Environment (MDE)
- MDE permits were designed to support a population of 6,500 persons, consistent with Town's Master Plan
- Current population is about 6,000 with about 120 new homes approved for construction
  - » Projected population of about 6,385 persons

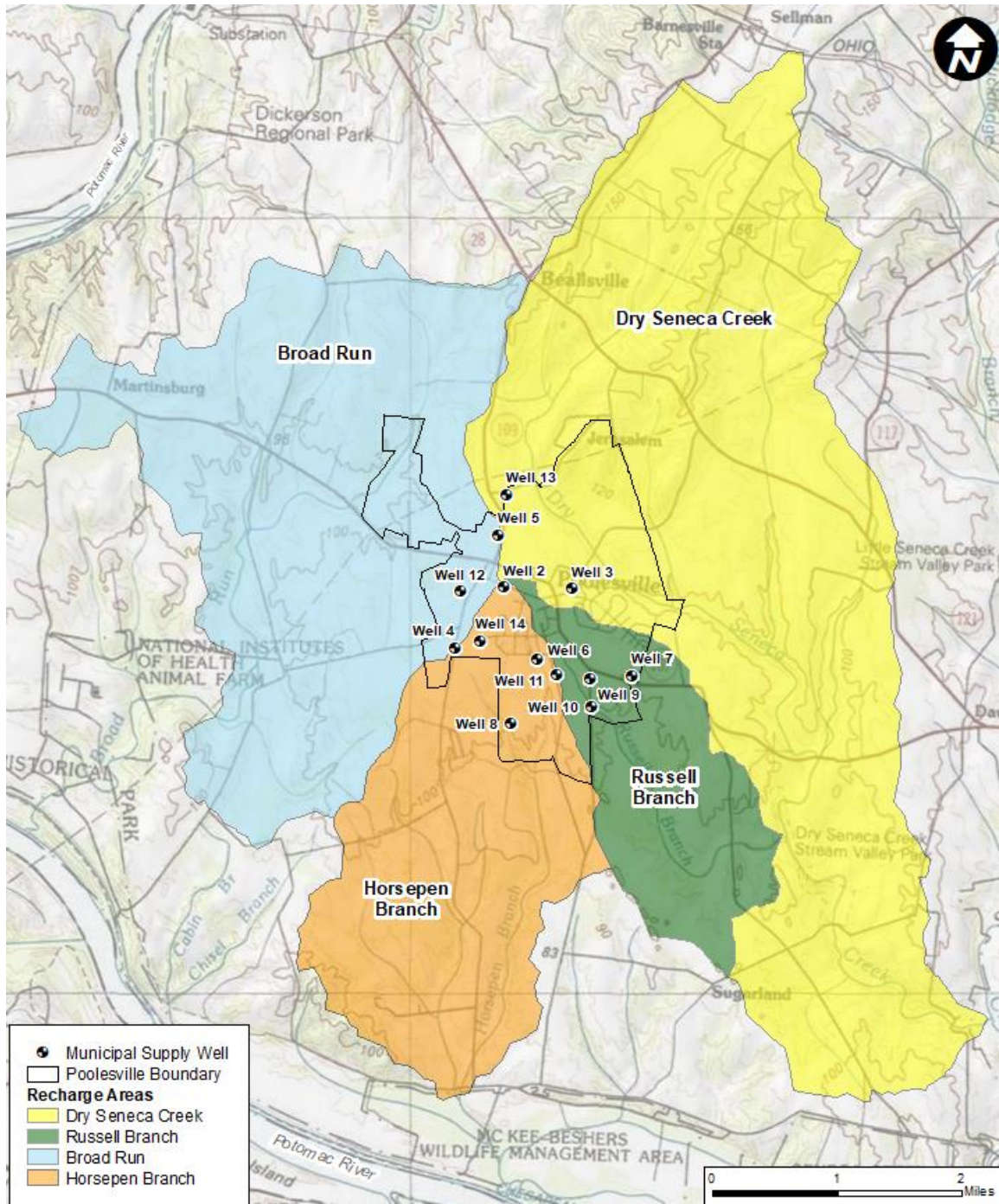
Town Water – 13 Wells

- Each well is permitted for municipal water supply under a Water Appropriation and Use Permit, issued by the MDE
- Currently five MDE Water Appropriation and Use Permits
  - » Permits are issued based on well location within watersheds in Town boundary



Water Allocation and Watersheds

- Four watershed areas in Town boundary
  - » Dry Seneca Creek – wells 3, 5, 13 (2 permits)
  - » Russell Branch – wells 7, 9, 10
  - » Horsepen Branch – wells 4, 6, 8, 10, 11, 14
  - » Broad Run – well 12
- MDE Permits are based on Watershed area and recharge rate
  - » Recharge is the amount of precipitation that makes it way through the ground to the aquifer
  - » Can't take more water out than is recharged naturally to the aquifer
- Each MDE permit has 2 withdrawal rates:
  - » Daily average (gallons) on a yearly basis
  - » Daily average (gallons) for month of maximum use



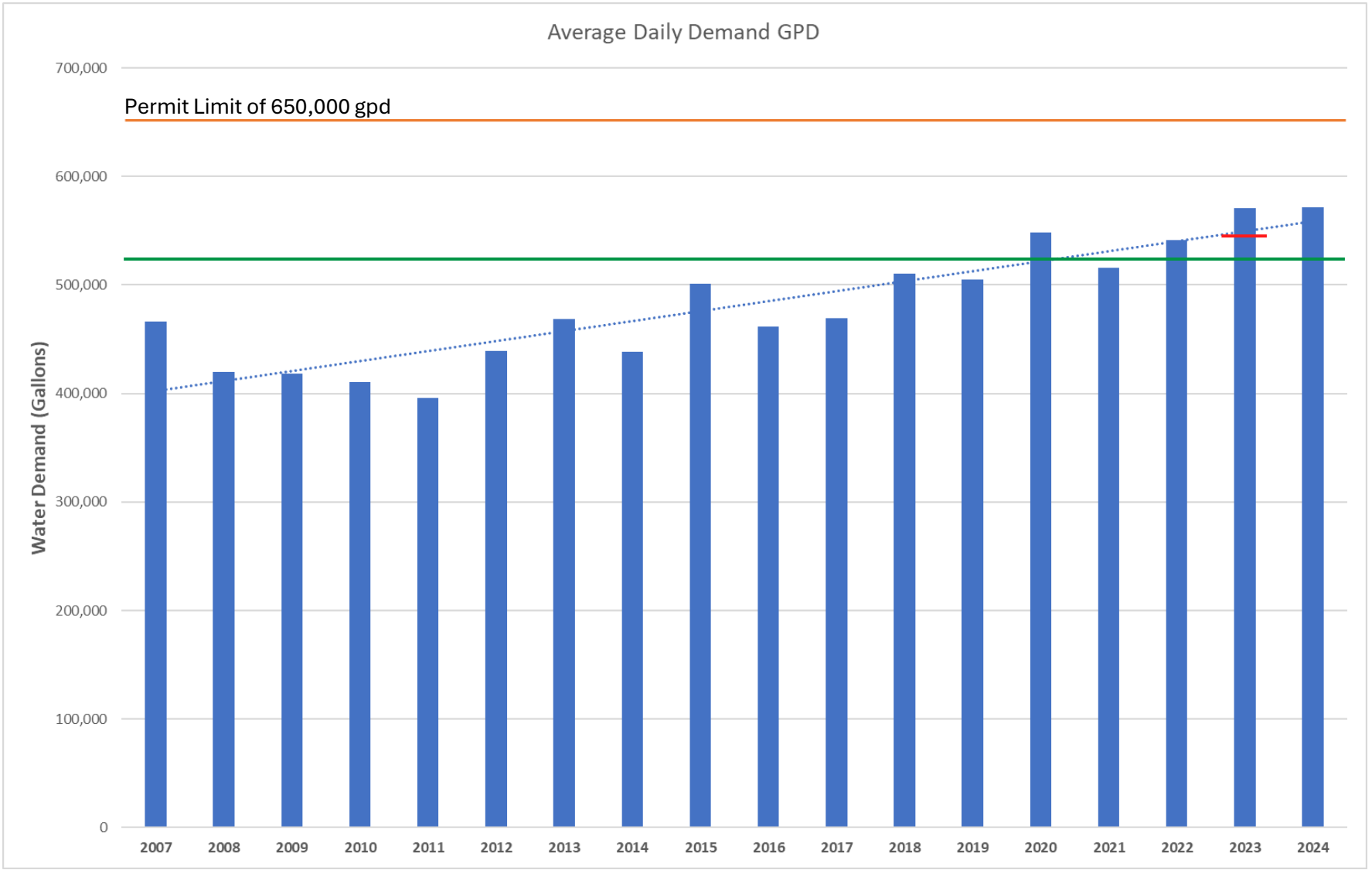
MDE Water Allocations

MDE Permit ID	Wells	Watershed	Permitted Daily Average (GPD)	Permitted Daily Average Month Maximum Use (GPD)	Well Permit Group Name
MO1970G007(13)	2 4 6 8 11 14	Horsepen Branch	293,000	388,000	Horsepen Branch
MO1970G107(02)	3 5	Dry Seneca Creek	142,000	200,000	Dry Seneca 3-5
MO2004G003(03)	Elgin (13)	Dry Seneca Creek	52,500	73,400	Dry Seneca 13
MO1970G207(05)	7 9 10	Russell Branch Watershed	115,000	182,000	Russell Branch
MO2004G006(04)	Schraf (12)	Broad Run	47,500	66,600	Broad Run
		Total	650,000	910,000	

650,000 GPD = daily average

910,000 GPD = month maximum use

Average Daily Demand since 2007 in GPD



Capacity Management Plan - MDE

- Since average daily demand within 80% of permitted rate, MDE requested a Capacity Management Plan (CMP)
  - » CMP evaluates water demand, additional demand of approved developments, water system capacity
  - » CMP submitted to MDE October 2024, including the addition of the approved ~120 new homes
  - » CMP approved by MDE March 2025
- **MDE-Approved CMP supports there is sufficient water capacity to support additional ~120 homes**

SSP&A Water Supply Evaluation in 2021

- Town contracted with S.S. Papadopulos & Associates Inc. to conduct an independent assessment of the Town water supply
- SSP&A analysis included detailed review of data, including historic water use and well operational data
- Concluded Town water supply was sufficient to supply water demand for a population of 6,500
- Noted that additional wells beneficial in event of more severe drought or water-quality impacts

SSP&A Climate Evaluation

- Relied on various climate studies – overall expected to be wetter with more precipitation in winter/spring and temperature expected to increase 2.5 degrees F
- Evaluated relationship between maximum daily air temperature and Town's ground water withdrawals
  - » Predicted additional demand of about 55,000 gpd for each day with temperature above 100 degrees F
  - » Water demand estimate included **very conservative** 30 days in one month with temperature above 100 degrees F

Montgomery Countryside Alliance – Pat Hammond Report

- MCA contracted with Pat Hammond to evaluate Poolesville water supply
- Report released July/August 2024
- Projected population to 6,500 persons - predicted water shortages, especially if climate change predictions are realized
  - » Evaluates a period of higher demand than available for SSP&A in 2021
  - » Relies on more severe drought correction than SSP&A
  - » Relies on climate change predictions that reduce aquifer recharge/well yield
  - » Relies on increased water demand due to climate change

Water Issues are Taken Seriously

- Town has consulted with MDE on the Town water supply and the MCA/Hammond report
- Town met with MDE in August 2024 to discuss issues related to water capacity
  - » MDE suggested renewing all Water Withdraw permits with the MDE – February 2026
  - » **MDE does not anticipate reducing the permitted water allocations**
  - » **MDE does not anticipate changes to permit allocations due to climate change because of the high uncertainty**
- Water Management objective is a balanced water supply system where the infrastructure can supply the demand, and is realistically conservative
  - » Goldilocks Principle – not too little, not too much, but just right

MCA/Hammond and SSP&A Report - Well Yield

- **SSP&A and MCA/Hammond well yield assessments are similar, up to point of climate change**
- About 725-750 gpm well yield under drought conditions
- Equivalent to 1,044,000 gpd to 1,080,000 GPD
  - » Month of maximum use permitted limit is 910,000 gpd
  - » Average daily use permit limit is 650,000 gpd

MCA/Hammond and SSP&A Report – Water Demand

- **Estimates of water demand are similar, up to the point of climate change impacts**
  - » MCA/Hammond report relies on higher peaking factor – for more severe drought (peaking factor of 1.4 versus 1.33)
  - » MCA/Hammond - climate impacts incorporate 16% reduced recharge and elevated water demand

MCA/Hammond and SSP&A Report - Comparison

MDE Permit	SSP&A (2021)	GPD	Hammond (2024) (pages 13 and 57)	GPD
	Average Daily Demand 2018 to 2020	521,000	Average Daily Demand 2018-2023	530,942
	Additional Population Demand to 6500 (700 people @100 gpd)	70,000	Additional Population Demand to 6500 (728 people @100 gpd)	72,800
650,000	Average Daily Demand with Population 6500	591,000	Average Daily Demand with Population 6500	603,742
650,000	Average Annual Daily Drought Demand (10%)	650,100	Average Annual Daily Drought Demand (10%) plus 100 Degree Days	669,550
910,000	**Average Daily Maximum Month Drought Demand - Peaking Factor of 1.33**	**864,633**	**Average Daily Maximum Month Drought Demand - Peaking Factor of 1.4**	**937,370**
910,000	Adding 100 Degree Days Factor to Climate Scenario	919,633	Adding 100 Degree Days Factor	1,003,484

MCA/Hammond climate scenarios estimate water demands that significantly exceed MDE permitted withdrawal rates

MCA/Hammond Estimate for Population 6500 – Without Climate Change

MDE Permit	Hammond (2024) (pages 13 and 57)	Without Climate Change Impacts (GPD)
	Average Daily Demand 2018-2023	530,942
	Additional Population Demand to 6500 (728 people @100 gpd)	72,800
650,000	Average Daily Demand with Population 6500	603,742
650,000	Average Annual Daily Drought Demand (10%)	664,116
910,000	**Average Daily Maximum Month Drought Demand - Peaking Factor of 1.4**	**929,762**

- Conclusion not included in the report but…
- Max. Month Demand is 929,762 gpd
- Wells can produce **1,080,000 gpd (750 gpm)**
- MDE permit limits withdrawal to **910,000 gpd**
- MCA/Hammond calculations indicate that the ***wellfield can support population of 6,500*** but may need permit adjustments

MCA/Hammond – at 6500 Population

"At a population of 6500, water restrictions may be required under average climatic conditions and severe water restrictions may be required during droughts. The water supply system could then be at high risk during severe and extreme droughts. "

- Statement provided on page 57 of the pdf document
- Phrase derived from **climate change discussion** - taken out of context

MCA/Hammond – Impacts of Climate Change Predictions

- Demand estimate likely elevated beyond reasonably conservative – demand of over 1,000,000 gpd
  - » Demand estimates incorporate SSP&A factor of 30 days with air temperatures above 100 degrees
    - Very conservative factor intended by SSP&A to increase demand due to high temperatures in combination with peaking factor of 1.33
    - Used in combination by MCA/H with peaking factor of 1.4, resulting in maximum use demand about 7% above the permitted withdrawal rates
    - End up "double-counting" the impacts of elevated temperature – resulting in an exaggerated estimate of water demand due to climate change
- MCA/Hammond climate scenarios predict water shortages – but uncharted territory and likely overestimates the water demand

Climate Change Predictions - Summary

- Climate change predictions are highly uncertain
  - » Result of climate change may be more water, or less water in the aquifer – we don't know
  - » Likely some increased demand during hot, dry periods due to higher air temperature
  - » Challenging to incorporate into planning due to uncertainty and unknowns
- MDE does not anticipate changing water management procedure for municipalities based on climate predictions – Poolesville is proactive
- MCA/Hammond calculations consider 16% reduction in well yield as a result of climate change
  - » 750 gpm (1,080,000 gpd) reduced by 16% is 630 gpm, or 907,200 gpd
  - » But yields in some wells are limited by the Permits
    - i.e., the wells can yield additional water, but doing so would violate the permitted withdrawals in some watersheds
    - Available yield would then be 838,080 gpd, or about 8% less than permitted withdrawal of 910,000 gpd

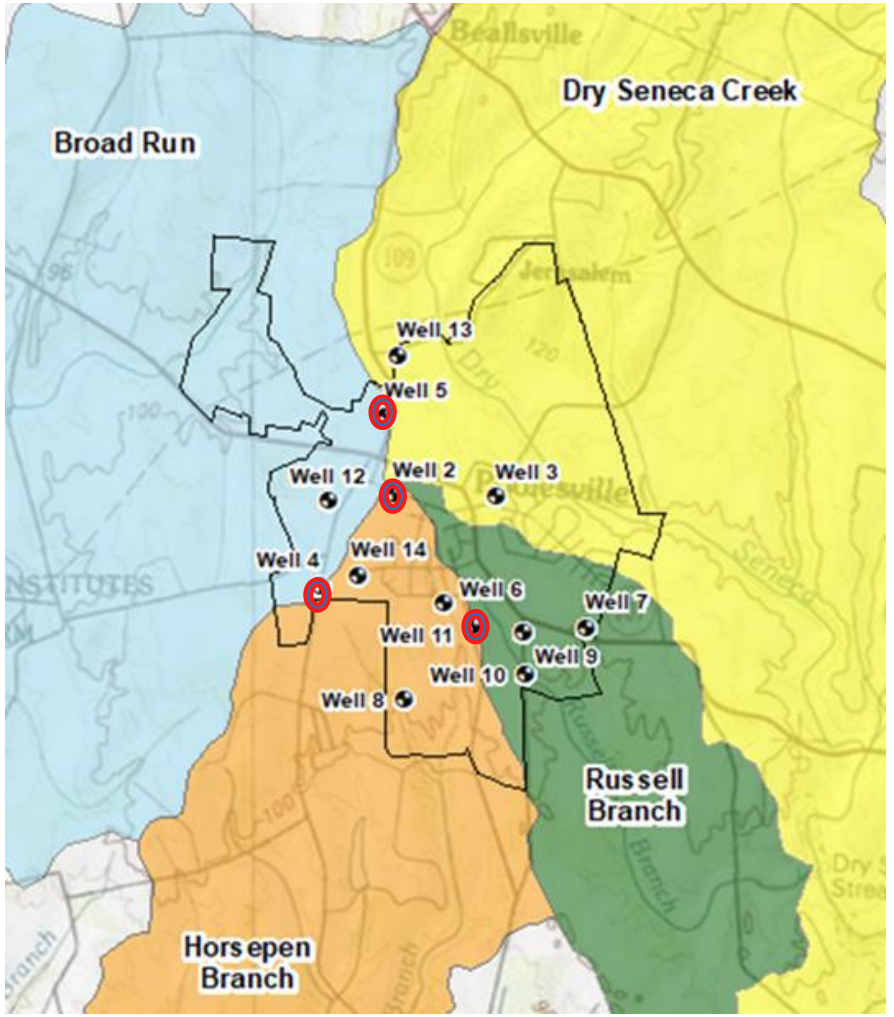
Climate Change and Water Demand/Permits

- If climate change results in significant additional demand and reduced well yield, permit changes may be needed (but MDE not currently addressing)

- Town wells can produce more water to address climate change but limited by Permit restrictions
  - » May need to rely on water easement agreements with adjacent landowners or annex additional properties into the Town boundary to increase total water allocation
  - » Develop additional wells to provide additional yield

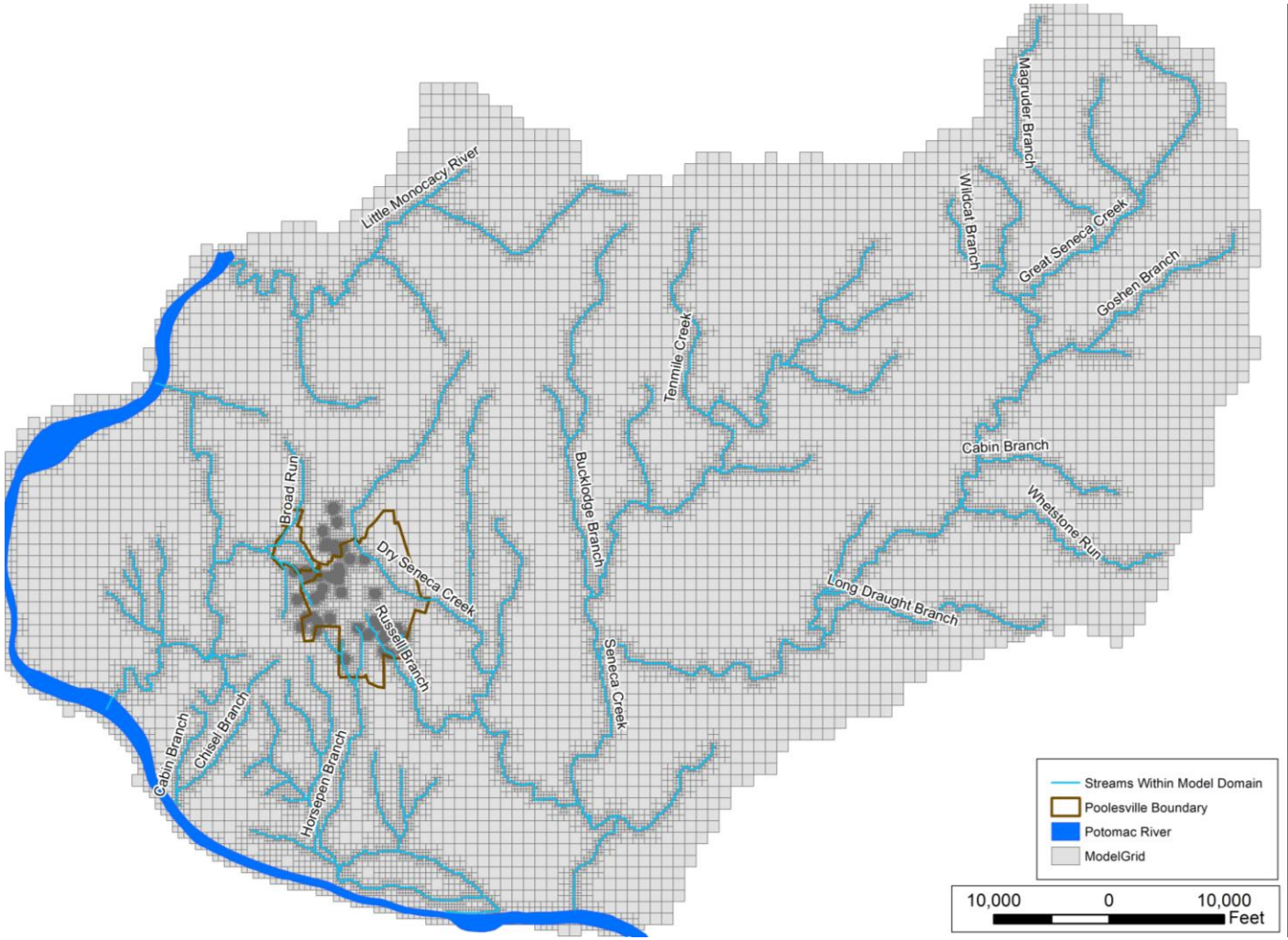
Horsepen Branch Allocation

- Issue will be addressed during permit renewals – by Feb 2026
- Per MDE – reduction in permit allocation is not anticipated
- It's complicated…
  - » Withdrawals from wells in the Horsepen Branch are also derived from adjacent watersheds
  - » Town withdraws significantly less than the Permit allows (~ 63% of allocation was pumped @ 2007-2020)

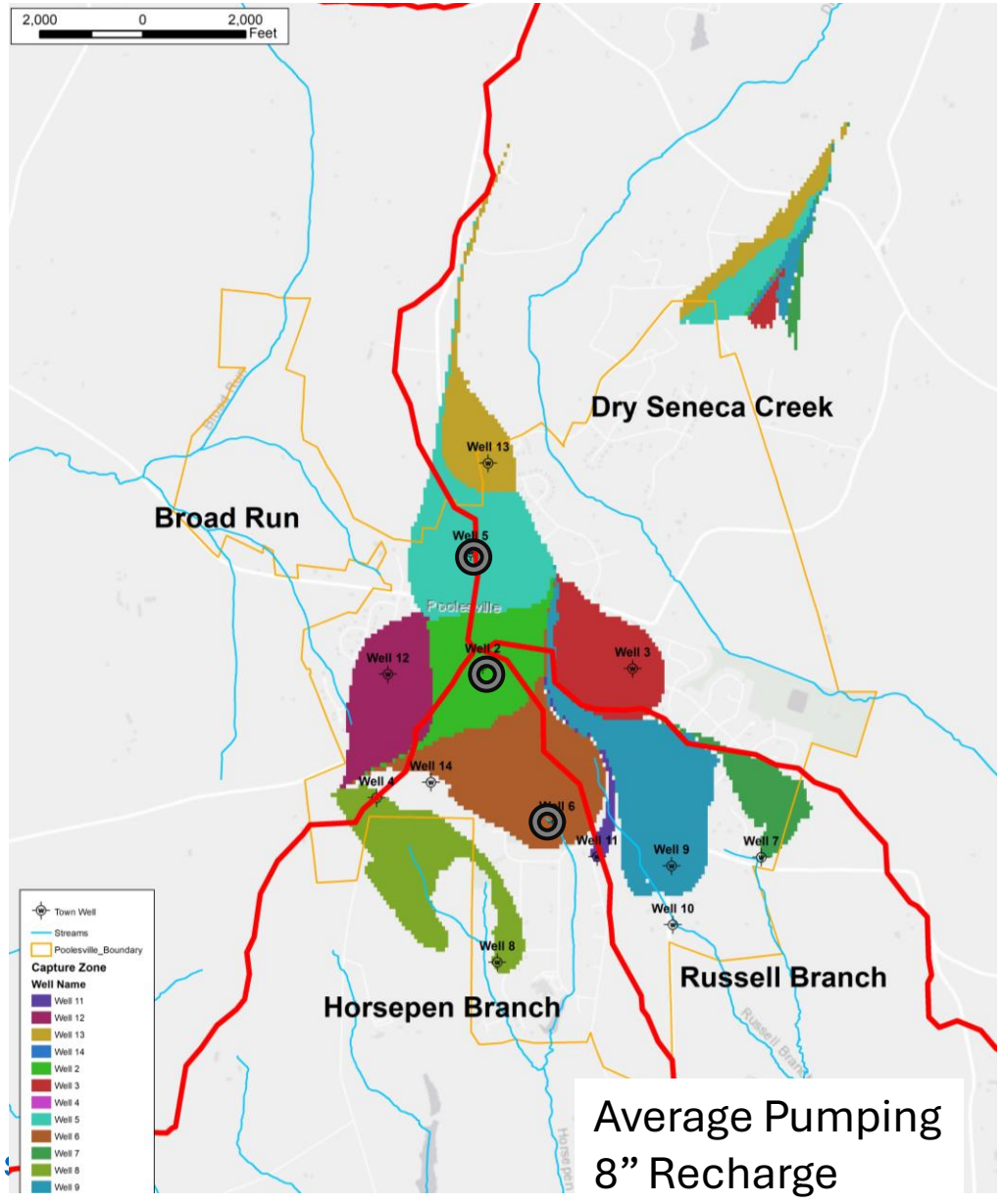


Groundwater Flow Model Results

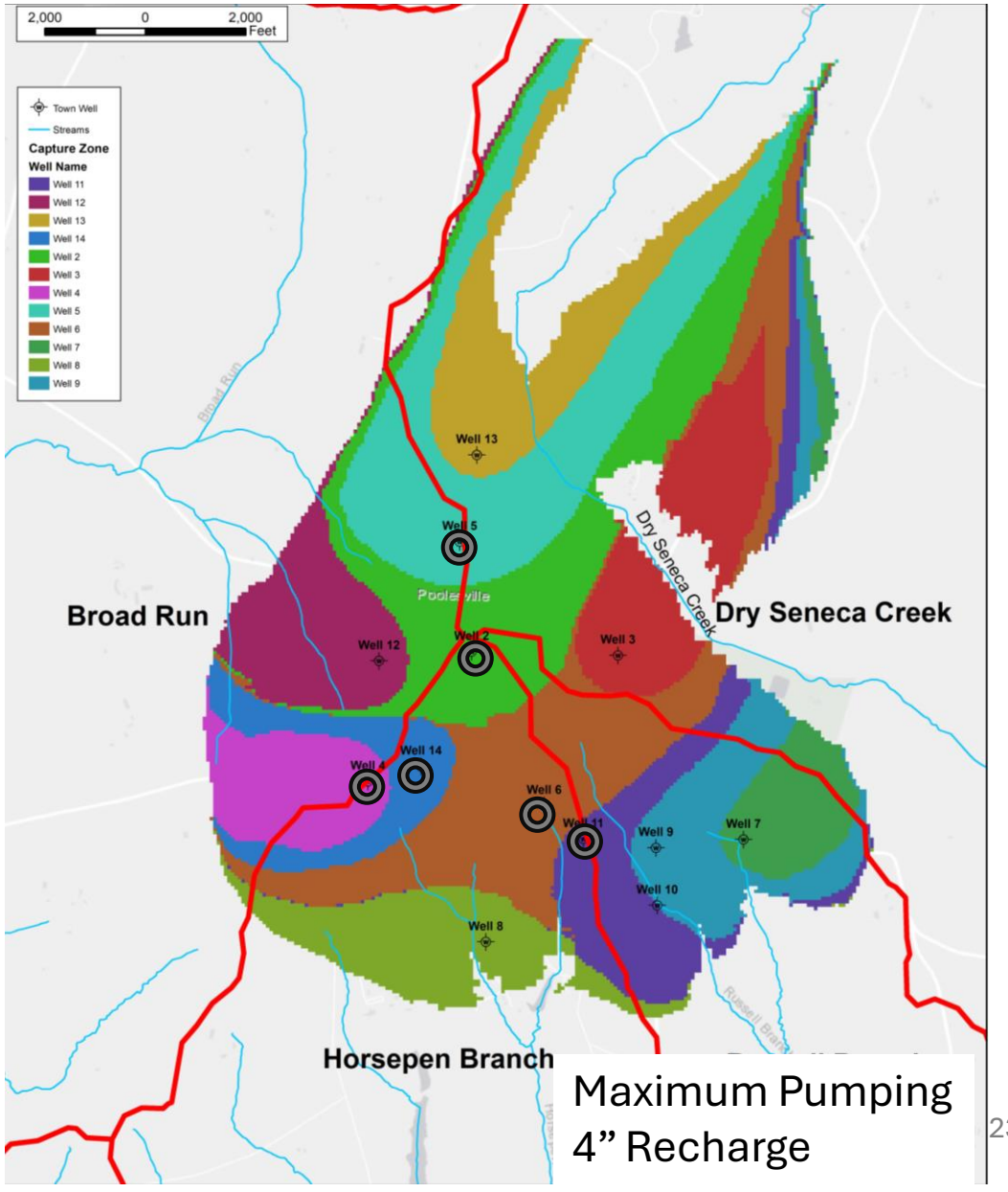
- SSP&A developed steady-state numerical groundwater flow model to evaluate the well field
- Various recharge and pumping rates were applied
- Simulated the capture zone of each well (*i.e*, where the pumped water is derived from in the subsurface)



Model Results – Capture Zones – 2 Pumping Scenarios



Average Pumping
8” Recharge



Maximum Pumping
4” Recharge

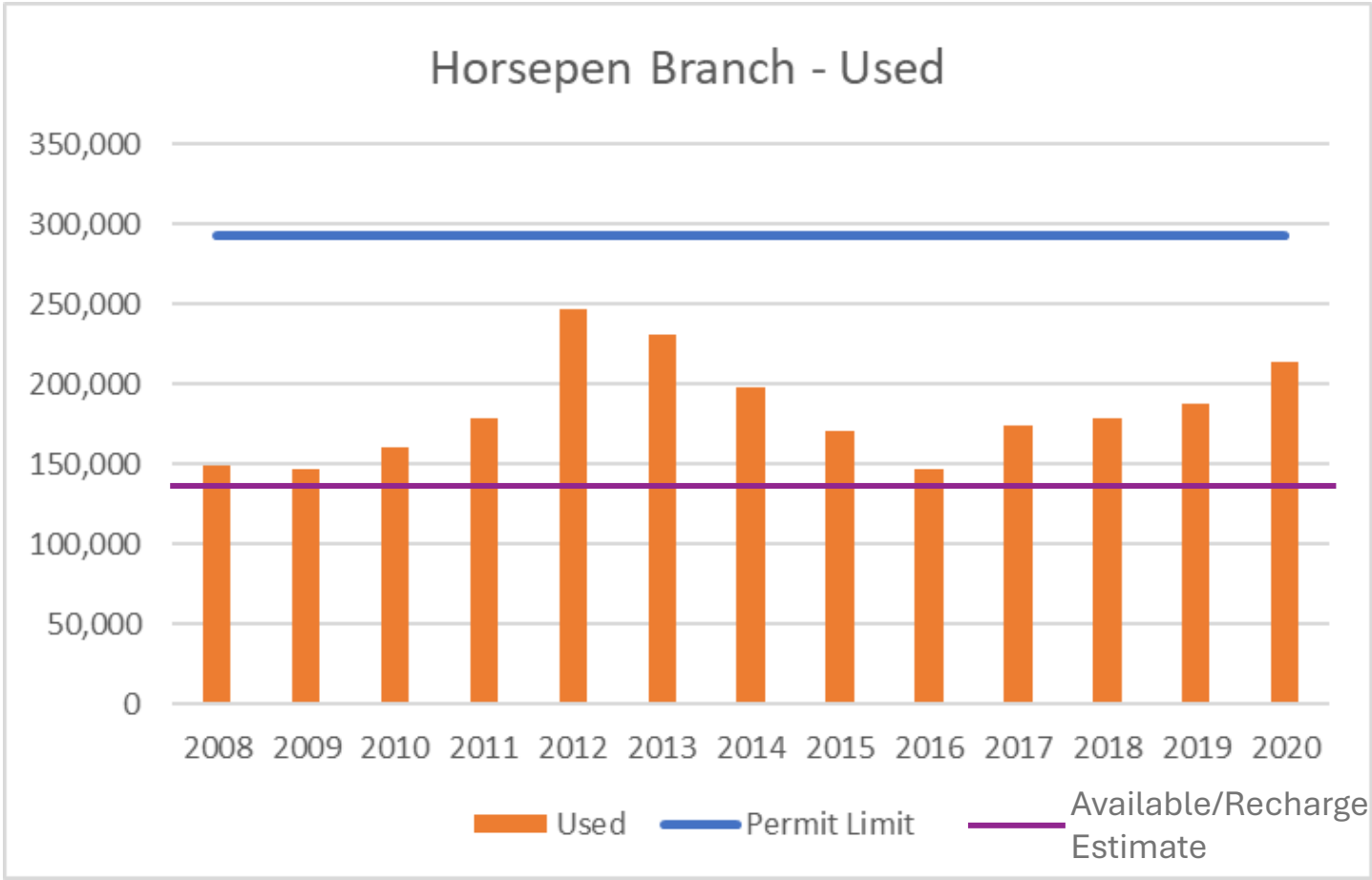
Water Withdrawals Don't Follow Watershed Boundaries

2 Pumping Scenarios

Well	Located in Watershed	8" Recharge Average Pumping				4" Recharge Full On Pumping				Comment on Capture Zone and Watersheds
		Dry Seneca	Russel Branch	Broad Run	Horsepen Branch	Dry Seneca	Russel Branch	Broad Run	Horsepen Branch	
2	Horsepen Branch	33%	10%	17%	40%	59%	4%	28%	9%	Well 8 obtains most water from the Horsepen Branch watershed. Other wells in Horsepen Branch withdraw water from adjacent watersheds, with the majority of the water sometimes from adjacent watersheds, including Broad Run (wells 2, 4 and 14), Dry Seneca (wells 2 and 11), and Russell Branch (wells 6 and 11).
4	Horsepen Branch					0%	0%	80%	20%	
6	Horsepen Branch	1%	16%	2%	82%	45%	13%	2%	40%	
8	Horsepen Branch	0%	0%	5%	95%	0%	3%	2%	95%	
11	Horsepen Branch	8%	73%	0%	20%	29%	47%	0%	24%	
14	Horsepen Branch					0%	0%	51%	49%	
3	Dry Seneca Creek	98%	2%	0%	0%	100%	0%	0%	0%	Most wells in Dry Seneca Watershed withdraw water from this watershed. Wells 3 and 13 almost exclusively from Dry Seneca but well 5 also withdraws water from the Broad Run watershed.
5	Dry Seneca Creek	79%	0%	21%	0%	82%	0%	18%	0%	
13	Dry Seneca Creek	100%	0%	0%	0%	100%	0%	0%	0%	
7	Russell Branch	54%	46%	0%	0%	57%	43%	0%	0%	Wells in this watershed withdraw water about equally from the Dry Seneca and Russell Branch watersheds.
9	Russell Branch	42%	57%	0%	1%	38%	62%	0%	0%	
10	Russell Branch									
12	Broad Run	0%	0%	98%	2%	4%	0%	96%	0%	Well 12 withdraws water almost exclusively from the Broad Run watershed.

Horsepen Branch - Compare Permitted, Used, and "Available/Recharge"

- Town uses less than permitted amount (~63%)
- Recharge estimates of SSP&A and MCA/Hammond are similar (~135,000 gpd)



Potential Stressors on the Well System

- Potential additional demand due to drought, water leaks teleworking, and reduced yield due to drought/climate change
- Water quality impacts – PFAS compounds and the need for treatment systems result in wells offline and ‘wasted water’
  - » Well 3 running in 2023 but water not put into distribution – resulted in elevated demand ~ 20,000 gpd average annually
  - » Wells offline occasionally due to maintenance
- 2023 and 2024 voluntary water restrictions were due to PFAS impacts, not insufficient well yield!

Main Conclusions - Again

- Comparison of Reports = **water demand** and **well yield** estimates are similar between SSP&A and the MCA report
  - » Differences occur when consider climate change impacts
- MDE does not anticipate changes to water management strategy due to climate change
  - » Impacts of climate change are highly uncertain
- MDE does not anticipate reductions in Town water allocations
  - » Water Permits will be renewed in early 2026
  - » Horsenpen Branch allocation will be reviewed by MDE
- Town's Capacity Management Plan approved by MDE - incorporates approved Town development (~ 120 new homes)

Suggested Actions

- Submit application for renewal of all water allocation permits to MDE by February 2026
  - » MDE will assess allocations in the watersheds, including Horsepen Branch
  - » If needed, watershed allocations may be resolved by incorporating additional property to within town boundary or a water easement with adjacent properties
- Plan additional studies/aquifer testing in collaboration with Mr. Hammond
  - » Aquifer testing to evaluate potential well interference for select wells
  - » Water level monitoring for improved drought monitoring
  - » Operational issues
- Pursue an additional well(s); water easements from adjacent properties
- No additional approvals for new development until MDE Permits are evaluated – approved developments will take into 2028
- Continue to rely on conservative yet realistic water management practices
- Improve water conservation and education program for residents

Thank you

PFAS Removal – Well 3

"Official" Poolesville Dowsing Rod

Drought Well Yields from MCA/Hammond

Drought Yield of Wells (gpm)	Yield with Watershed Limits (gpm)	Wells
330	269	2, 4, 6, 8, 11, 15
175	126	7, 9, 10
223	236	3, 5, 12, 13
728	**631**	**Total**
1,048,320	**908,640**	**gpd**

- From page 55 of the pdf

- Additional water is available, but would be violation of Permit
- Temporary permit for emergency appropriation may be available