PATUXENT RIVER PCB TMDL

PHASE I - SUBWATERSHED PCB SCREENING

SAMPLING AND ANALYSIS PLAN

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS

ANNE ARUNDEL, MARYLAND

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Table of Contents

List of Tables

List of Figures

Acronyms

CB	Chlorinated Biphenyl
DOC	Dissolved Organic Carbon
EPA	Environmental Protection Agency
HRGC	High Resolution Gas Chromatography
HRMS	High Resolution Mass Spectrometry
LDPE	Low Density Polyethylene
MDE	Maryland Department of The Environment
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
PAXTF	Patuxent River Tidal Fresh
PCB	Polychlorinated Biphenyl
POC	Particulate Organic Carbon
PRC	Performance Reference Compounds
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance and Quality Control
SAP	Sampling and Analysis Plan
SOPs	Standard Operating Procedures
SW-WLA	Stormwater Wasteload Allocation
TMDL	Total Maximum Daily Load
WIP	Watershed Implementation Plan

1 Background and Introduction

Following MDE's guidance (MDE, 2022a and 2022b), Anne Arundel County has updated a polychlorinated biphenyl (PCB) Total Maximum Daily Load (TMDL) implementation plan for PCB impairments in the Patuxent River that focuses on identifying potential PCB sources through desktop analysis and monitoring (Anne Arundel County, 2024). The method uses a PCB Source Trackdown which is comprised of multiple parts: Source Assessment (desktop), Subwatershed Prioritization (subwatershed risk assessment), development of a monitoring plan, and subsequent multi-phase monitoring (Phase I, Phase II, Phase III). KCI Technologies, Inc. (KCI) completed both the Desktop Source Assessment and Subwatershed Risk Assessment for the County in 2024 and provided detailed summaries of the results to the County in a Technical Memorandum sent on March 20, 2024.

The first phase of monitoring, Phase I Sampling, is conducted following completion of the Desktop Source Assessment and Subwatershed Risk Assessment. A Sampling and Analysis Plan (SAP) is required for Phase I Sampling, which is defined by MDE as PCB Subwatershed Screening. The County's MS4 permit also requires development of a PCB source tracking monitoring plan for all applicable TMDL WLAs where watershed reductions are required to meet water quality standards under Part IV.G.3., Assessment of Controls, PCB Source Tracking. This SAP satisfies the requirements for both the PCB TMDL implementation plan and MS4 PCB Source Tracking for the Patuxent River watershed.

The County's Phase I SAP is presented in this document and describes the following:

Section 1 Provides introduction to the PCB SAP and TMDL watersheds.

Section 2 Describes the sampling framework, which includes sampling locations in each subwatershed with the highest risk score and/or targeted near PCB sources identified from the Desktop Source Assessment. Reference sites to establish background PCB concentrations are also described in this section.

Section 3 Presents the data analysis and statistical approach used for data collected from the sampling.

Section 4 Presents the quality control activities including field blanks, field quality controls, and data review procedures.

Section 5 Describes documentation, forms, and data management procedures used.

1.1 Patuxent River PCB Local TMDL

The Patuxent River is a tidal tributary of the Chesapeake Bay that drains portions of Anne Arundel, Calvert, Charles, Frederick, Howard, Montgomery, Prince George's, and St. Mary's counties (Watershed Counties). The Patuxent River Mesohaline, Oligohaline, and Tidal Fresh Chesapeake Bay Segments (Figure 1-1), hereafter referred to simply as the Patuxent River watershed, have several impaired waters listings in *Maryland's DRAFT 2024 Integrated Report of Surface Water Quality* (303(d) list and 305(b) Report; MDE, 2024). These impairments, which include bacteria, sediment, nutrients, and toxics, apply to all the Watershed Counties.

The County's PCB implementation plan and this SAP specifically addresses the Patuxent River watershed PCB TMDL (MDE, 2017) approved by the Environmental Protection Agency (EPA) on September 19, 2017. The TMDL for Anne Arundel County applies to the freshwater portion of the Patuxent River, the Patuxent River Tidal Fresh (PAXTF), hereafter referred to simply as the Patuxent River watershed. Within Anne Arundel County's portion of the Patuxent River watershed, there are three major 8-digit watersheds and 20 12-digit subwatersheds, shown in Figure 1-2.

The 12-digit subwatersheds within the Patuxent River watershed do not have unique tributary/branch names and are labeled using the 12-digit values, all of which differ by two or three digits within each 8-digit watershed. For efficiency and ease of communication, the County instead refers to the 12-digit subwatersheds by their 8-digit watershed name and the last two digits of their 12-digit subwatershed number (Table 1-1). For example, subwatershed "021311020908" located within the Middle Patuxent will be referred to as "Middle Patuxent 8" herein.

Table 1-1: Subwatershed Names

8-Digit Watershed Name	12-Digit Subwatershed Number	Unique Subwatershed Identifiers
Middle Patuxent River	021311020908	Middle Patuxent 8
Middle Patuxent River	021311020909	Middle Patuxent 9
Middle Patuxent River	021311020910	Middle Patuxent 10
Middle Patuxent River	021311020914	Middle Patuxent 14
Middle Patuxent River	021311020915	Middle Patuxent 15
Middle Patuxent River	021311020916	Middle Patuxent 16
Middle Patuxent River	021311020917	Middle Patuxent 17
Upper Patuxent River	021311040930	Upper Patuxent 30
Upper Patuxent River	021311040932	Upper Patuxent 32
Upper Patuxent River	021311040934	Upper Patuxent 34
Upper Patuxent River	021311040935	Upper Patuxent 35
Upper Patuxent River	021311040936	Upper Patuxent 36
Upper Patuxent River	021311040937	Upper Patuxent 37
Upper Patuxent River	021311040938	Upper Patuxent 38
Upper Patuxent River	021311040940	Upper Patuxent 40
Little Patuxent River	021311050946	Little Patuxent 46
Little Patuxent River	021311050947	Little Patuxent 47
Little Patuxent River	021311050948	Little Patuxent 48
Little Patuxent River	021311050949	Little Patuxent 49
Little Patuxent River	021311050952	Little Patuxent 52

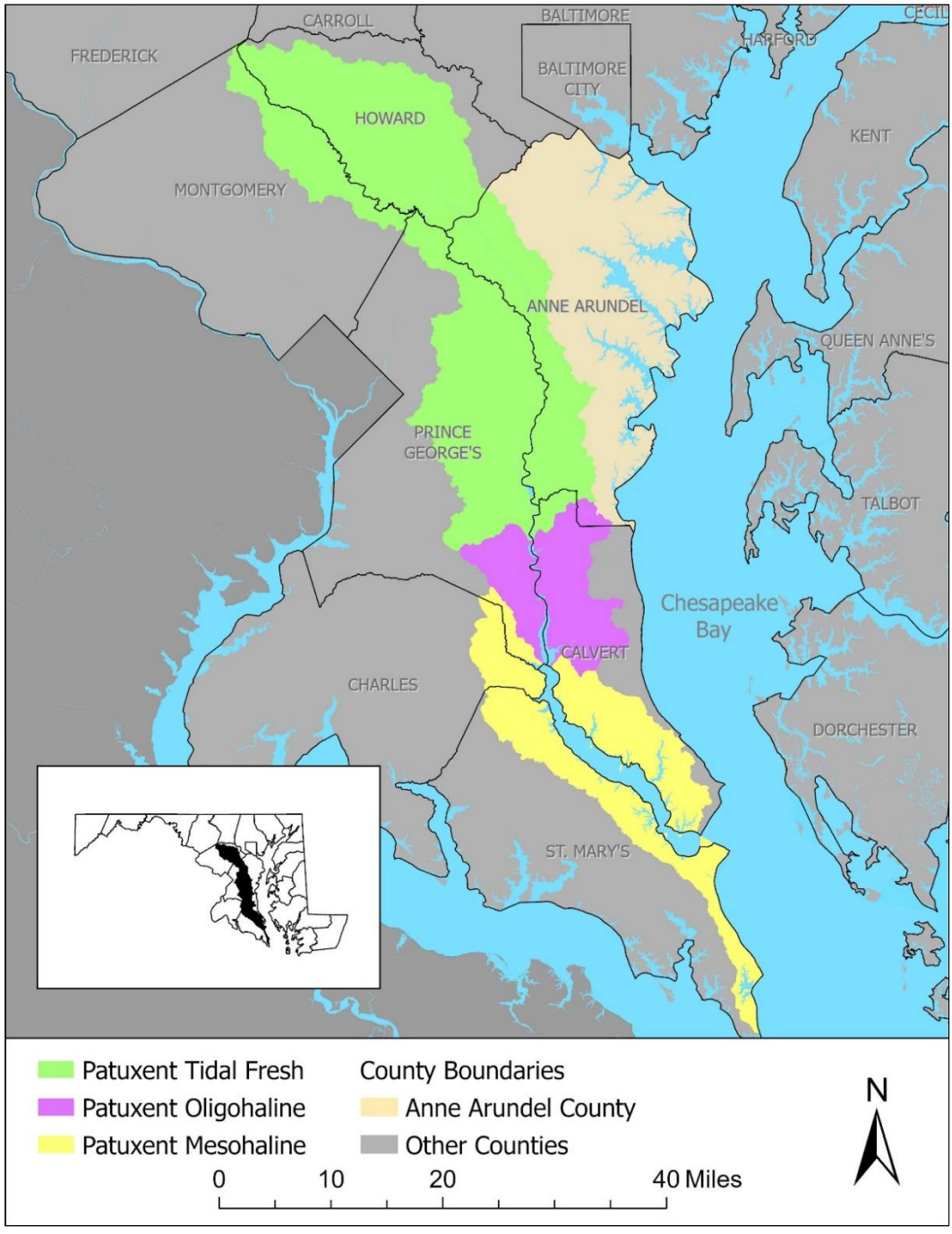

Figure 1-1: Patuxent River Mesohaline, Oligohaline, and Tidal Fresh Chesapeake Bay Segments

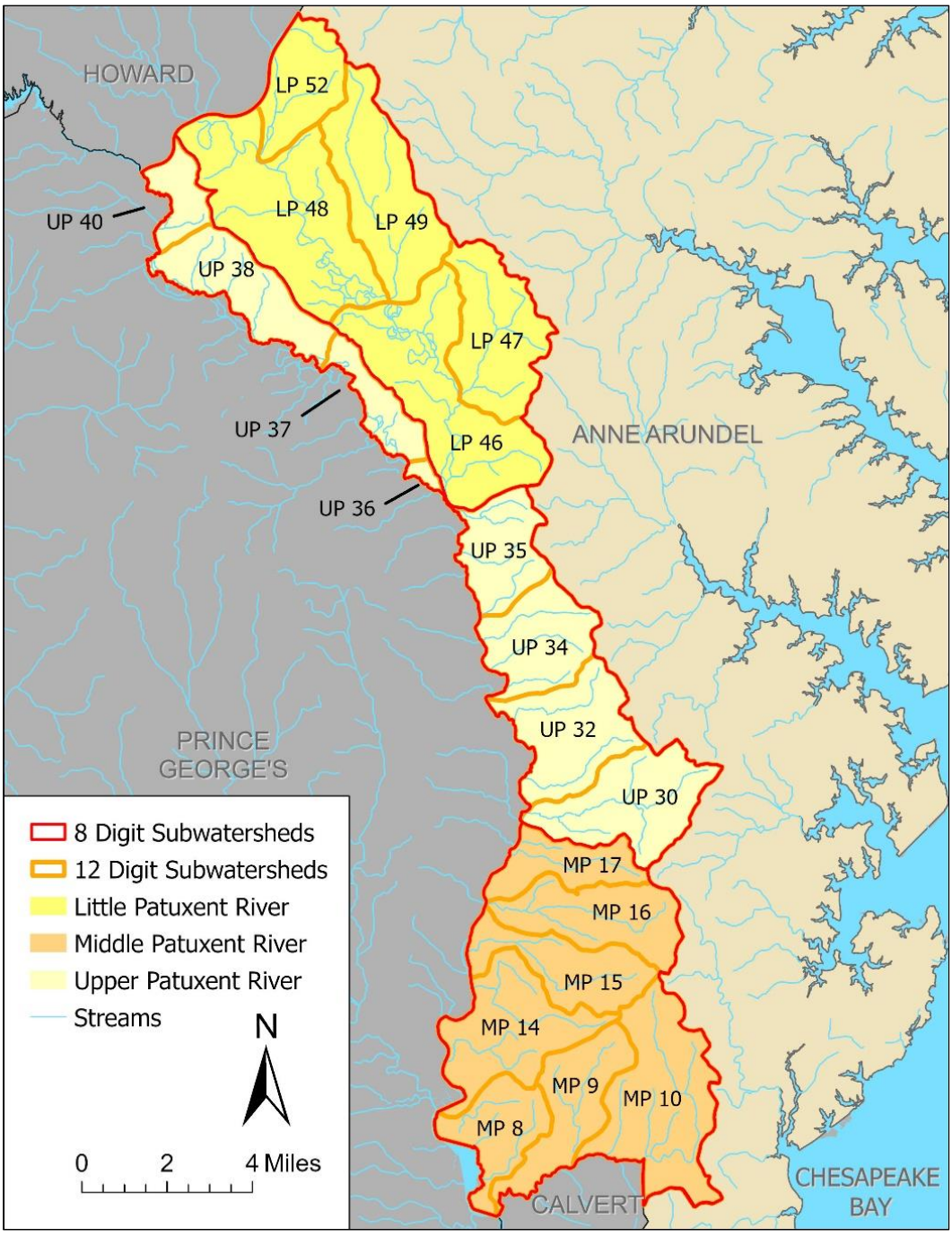

Figure 1-2: Anne Arundel County Patuxent River Subwatersheds and Hydrology

2 Monitoring Approach and Sample Design

This section details the Anne Arundel County PCB monitoring design approach for Phase I Sampling in the Patuxent River watershed. As noted in MDE's PCB Implementation Plan Guidance, Phase I Sampling investigations require jurisdictions to conduct subwatershed PCB screenings to confirm the presence of PCBs at levels of concern within individual subwatersheds. Reference site data (see Section 2.3.1) will be used to inform the County of background levels of PCBs within each TMDL watershed. Results of Phase I Sampling will inform the need for further investigation (i.e., Phase II Sampling) to identify more specifically the discrete sources of PCBs in those subwatersheds.

Anne Arundel County shares responsibility for the Patuxent PCB TMDL with several MS4 jurisdictions and is therefore collaborating with Howard and Montgomery Counties and the Maryland State Highway Administration on development of sampling plans, forthcoming Quality Assurance Project Plans (QAPPs), field sampling, and laboratory analysis. The jurisdictions will share resources and data where appropriate to reduce the overall burden of the source trackdown and allow for more complete decision making.

2.1 Sampling Phases

There are multiple phases for overall PCB monitoring following the completion of the desktop PCB source assessment and subwatershed prioritization. Sampling phases for PCB monitoring are defined below, per MDE's PCB Implementation Plan Guidance (MDE, 2022a):

- Phase I Source Trackdown – Subwatershed PCB Screening: Conduct a subwatershed PCB screening data assessment with at least one monitoring site in each subwatershed to determine which subwatersheds will and will not require further source trackdown investigations.
- Phase II Source Trackdown – In-stream Subwatershed PCB Characterization: Complete a comprehensive in-stream PCB characterization using a bracketed sample design within the subwatersheds identified through Phase I efforts to isolate areas of concern within the stream network that contain upland sources of PCBs.
- Phase III Source Trackdown – MS4 PCB Characterization: Characterize PCBs within the MS4 using outfall and stormwater BMP monitoring and sewer backtrack monitoring to identify sources of PCBs within the storm sewershed where Phase II source trackdown investigations identified sources of PCBs transported to the stream through the MS4.

This SAP addresses the requirements associated with Phase I Source Trackdown (also referred to as PCB Subwatershed Screening) in the Patuxent River watershed. Separate SAPs will be developed for Phase II and Phase III Source Trackdowns following the completion of Phase I.

The County followed MDE's PCB Implementation Plan Guidance to select the subwatersheds for Phase I PCB subwatershed screening. Due to budgetary limitations and the high number of 12-digit subwatersheds located in Anne Arundel County's portion of the watershed (20), the County will focus Phase I subwatershed screening within the 13 12-digit subwatersheds exhibiting PCB risk as identified in the Subwatershed Risk Assessment. In the PCB Implementation Plan Guidance, MDE categorized each source of PCBs (as well as the angler access sites) into three different tiers (i.e., high, medium, low), which correspond to a risk value per record that is used to generate a total risk score for each subwatershed. The risk scores of these subwatersheds indicate the potential for PCB sources based on MDE's guidance,

but it must be noted that the ranking system results in subwatershed rankings relative to the other subwatersheds in the Patuxent River watershed. Therefore, the highest ranked subwatershed does not necessarily indicate significant PCB sources. Full risk score derivations and results are included in Appendix A of the implementation plan (Anne Arundel County, 2024).

Table 2-1 summarizes the land area and risk score for each subwatershed in the Patuxent River watershed and notes the subwatersheds selected for Phase I subwatershed screening. Figure 2-1 presents the subwatersheds selected for PCB screening, outlined in yellow, which received total risk scores ranging from five to eighty. The remaining seven of the County's 12-digit subwatersheds received total risk scores of zero and will be excluded from Phase I PCB subwatershed screening.

Table 2-1: Anne Arundel County Patuxent River 12-Digit Subwatershed Area and Risk Score

Subwatershed Name	Area (mi^2)	Risk Score	Selected for Phase I Sampling
Lower Patuxent 46	11.4	80	Phase I Sampling
Lower Patuxent 47	7.0	55	Phase I Sampling
Lower Patuxent 48	12.6	45	Phase I Sampling
Lower Patuxent 49	8.5	25	Phase I Sampling
Lower Patuxent 52	4.5	26	Phase I Sampling
Middle Patuxent 8	4.2	0	
Middle Patuxent 9	5.4	0	
Middle Patuxent 10	9.6	0	
Middle Patuxent 14	7.3	16	Phase I Sampling
Middle Patuxent 15	5.1	10	Phase I Sampling
Middle Patuxent 16	6.0	5	Phase I Sampling
Middle Patuxent 17	3.6	11	Phase I Sampling
Upper Patuxent 30	7.0	5	Phase I Sampling
Upper Patuxent 32	6.6	0	
Upper Patuxent 34	5.4	11	Phase I Sampling
Upper Patuxent 35	4.5	10	Phase I Sampling
Upper Patuxent 36	0.4	0	
Upper Patuxent 37	2.6	0	
Upper Patuxent 38	5.6	0	
Upper Patuxent 40	2.2	22	Phase I Sampling

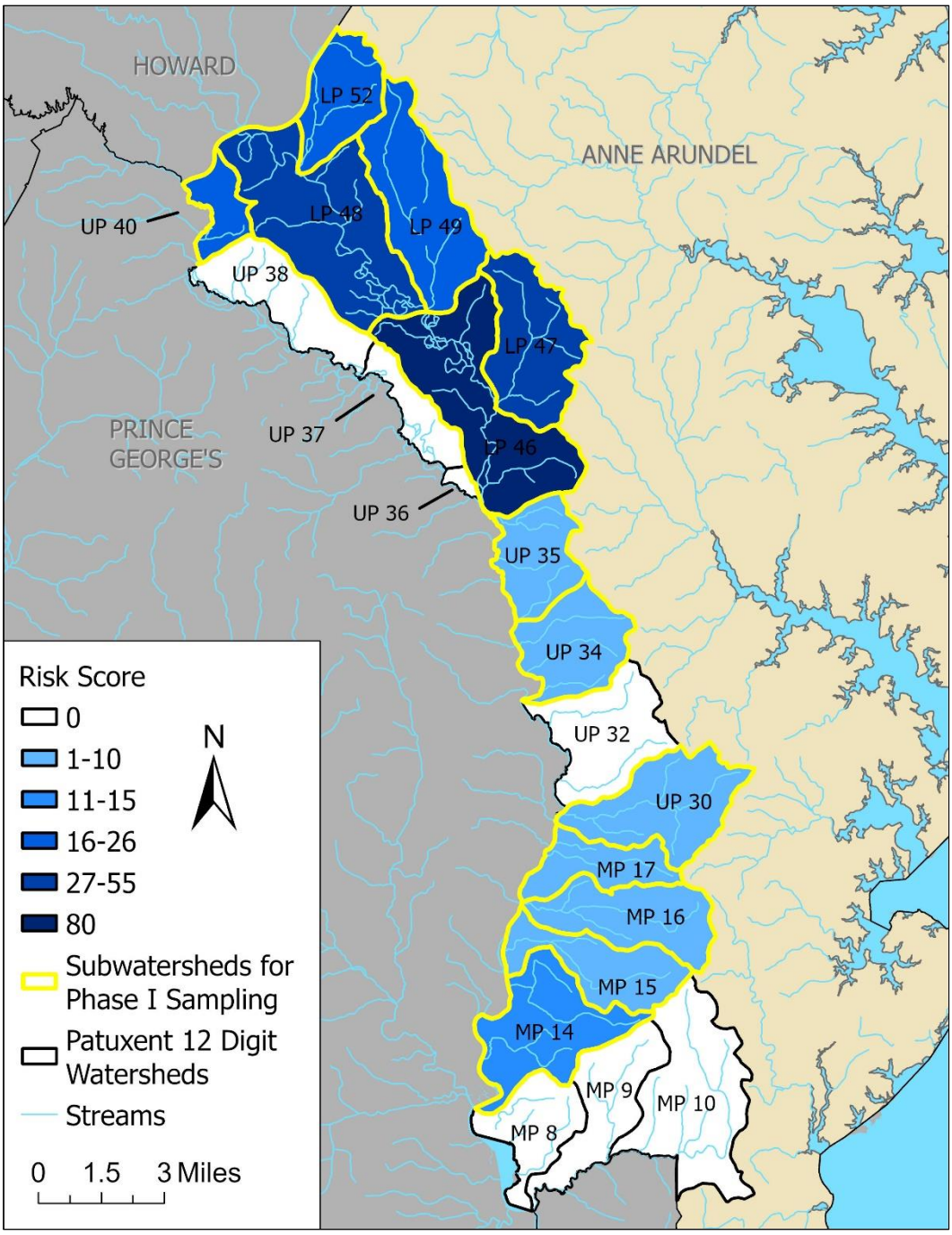

Figure 2-1: Subwatersheds Selected for PCB Subwatershed Screening

2.2 Sampling Methods

The County's screening approach will adhere to MDE's PCB Implementation Plan Guidance whereby a single sampling location will be situated at the outlet of each selected subwatershed, where feasible. Results from subwatershed sampling will be compared with a reference threshold and TMDL water column endpoint to determine whether subwatersheds will or will not require further source trackdown investigations. Reference site selection is described in detail below in Section 2.3.1. Data analysis is described in Section 3.

This SAP will become a part of the overall QAPP for the project. Standard operating procedures (SOPs), quality assurance objectives, monitoring equipment, sampling protocols, and analytical methods will be discussed in detail in the QAPP. A brief description of the Phase I methods is provided below.

2.2.1 Passive Sampling

A single time-integrative passive sampler, using low density polyethylene (LDPE) material, will be deployed in the water column at each Phase I sampling location simultaneously for a minimum 3-month period. The goal of the deployment is to maintain an elevation of the sampler high enough above the substrate with minimal risk of being covered by sediment deposition but low enough to ensure the sampler is not dewatered during deployment. Specifics of the deployment will depend on the characteristics of each site including water depth, the type and mobility of the substrate, and discharge regime. Elements including a concrete block to affix the support plate, buoy, and marker line will be used as needed to maintain the correct position in the water column.

This passive sampling method provides a comprehensive and reliable way to collect samples over an extended period of time and requires a minimum of two visits, one for installation and one for retrieval, minimizing the need to target and capture unpredictable storm events. Additional visits to ensure everything is functioning as it should during the 3-month sampling period will occur as needed depending on site conditions and discharge characteristics such as periods of high flow due to intense rainfall. Two follow-up visits prior to retrieval (after one month and after two months) are planned in addition to post high flow event visits as needed. If the sampler is impacted, lost, or deemed to be compromised, a replacement sampler will be installed.

While LDPE passive sampler devices are not commercially available for purchase, SiREM, a commercial lab with locations in Canada and Tennessee, offers services to provide stock samplers for passive sampling. SiREM's SP3™ passive sampler consists of a 4 cm × 10 cm polyethylene sheet housed in a steel-mesh envelope attached to an 8 cm × 18 cm × 0.1 cm stainless steel support plate (Figure 2-2). SiREM will pre-load the SP3™ samplers with performance reference compounds (PRCs) to enable quantification (i.e., concentrations) of individual PCB congeners. SiREM uses a standard list of 10 PCB congeners rarely found in the environment as PRCs. These 10 PCBs are rarely found in sediment and biological tissue and are used to evaluate the sampling kinetics of the sampler during the exposure period. As these congeners are added to each SP3™ sampler, a freely dissolved concentrations (Cfree) value for these 10 PCBs cannot be reported (although by assumption, due to their rarity, they would not be detectable).

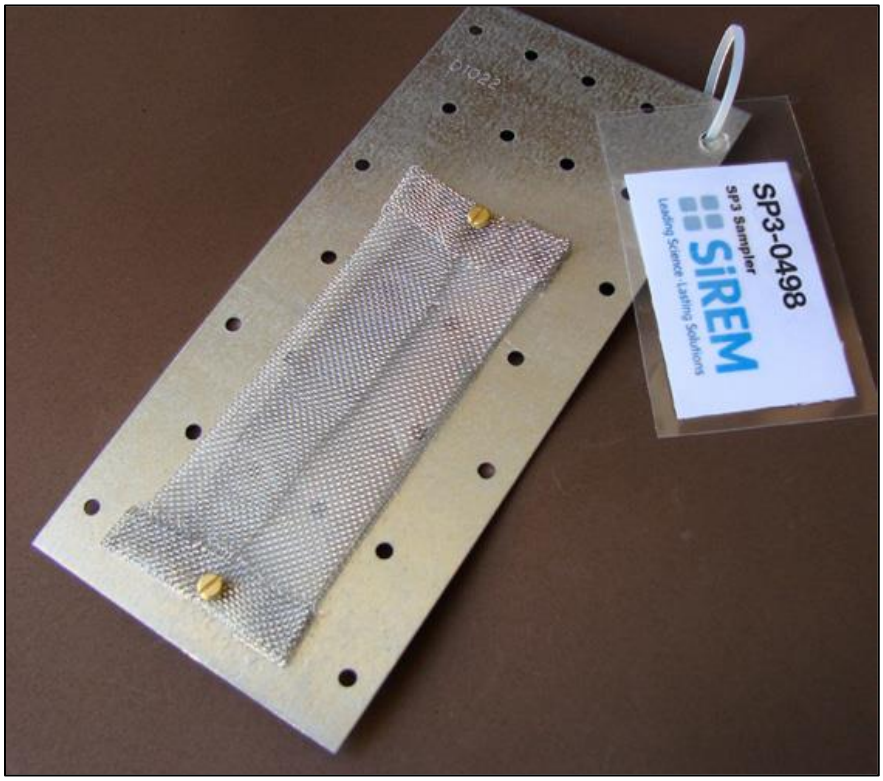

Figure 2-2: Low Density Polyethylene Passive Sampler

2.2.2 Analytical Methods

The SP3™ samplers for this application will be used to quantify the freely dissolved concentrations (Cfree) of PCB congeners in the surface water via an in-situ deployment. The samplers will be deployed instream for a minimum of 3 months to enable measurement of as many of the target analytes as practicable under static (unagitated) conditions. Quantification of Cfree is dependent on the site-specific conditions surrounding each sampler that affect the sampling rates for each analyte. Cfree estimates of analytes that do not reach at least 10% of steady state concentrations in the SP3™ sampler during deployment will be reported with a qualifier.

After retrieval, the passive samplers will be collected and shipped to Eurofins Environment Testing America Knoxville, Tennessee, for PCB congener analysis by EPA 1668A (US EPA, 2003), a low detection level congener-based method, and PRC analysis. Method 1668 was developed by EPA's Office of Science and Technology for congener-specific determination of PCB congeners designated as toxic by the World Health Organization. Revision A of Method 1668 has been expanded to include congener-specific determination of more than 150 chlorinated biphenyl (CB) congeners. The toxic PCBs and the beginning and ending level-of-chlorination CBs are determined by isotope dilution high resolution gas chromatography/high resolution mass spectrometry (HRGC/HRMS).

2.3 Sampling Locations

MDE's PCB Implementation Plan Guidance requires a single sampling site at the outlet of each subwatershed with the goal to identify sampling locations that are representative of the entire drainage

area of the subwatershed and are not influenced by backwater conditions. The County needed to modify this approach where necessary to account for large subwatersheds, direct drainage tributaries, County boundaries, and drainage network patterns. Figure 2-3 presents potential locations for the County's reference and subwatershed screening sites (i.e., sampling locations) in the Patuxent River watershed. Reference site selection and subwatershed screening site selection are both described in more detail in sections 2.3.1. and 2.3.2., respectively.

Sampling locations identified in this SAP are preliminary and have not been field verified for access or feasibility of sampling. Once MDE has approved the County's monitoring approach, the County will begin property owner outreach and perform field reconnaissance of the final sampling locations.

In addition to potential sampling locations, Figure 2-3 presents total risk score by 12-digit subwatershed determined during the County's Subwatershed Risk Assessment. Section 2.1 above briefly describes MDE's risk score methodology with individual risk scores for each 12-digit subwatersheds provided in Table 2-1. Full risk score derivations and results are included in Appendix A of the implementation plan (Anne Arundel County, 2024).

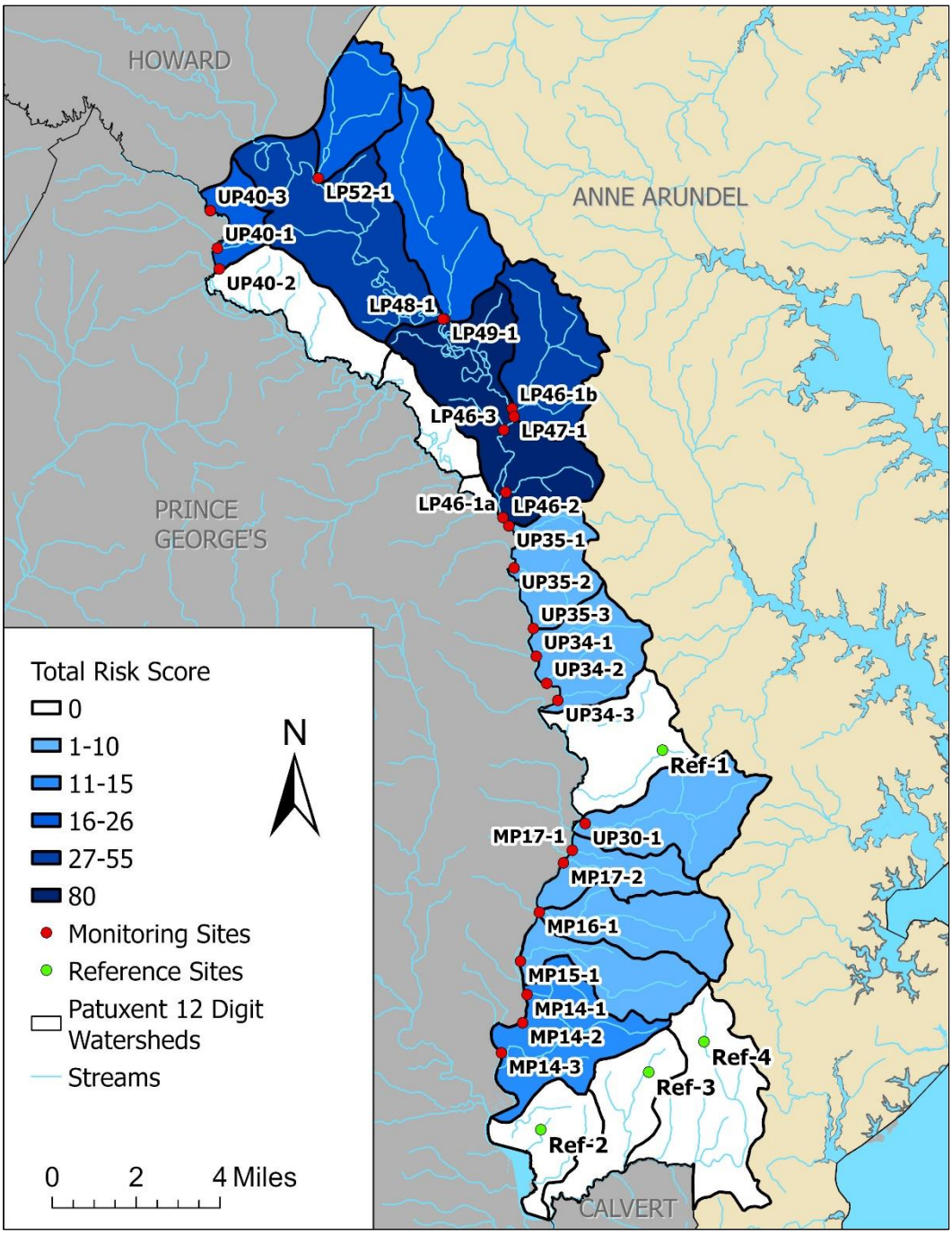

Figure 2-3: Potential Sampling Locations within Anne Arundel County's Portion of the Patuxent River Watershed

2.3.1 Reference Site Selection

To establish background levels of PCBs within the TMDL watershed, MDE's guidance recommends concurrent sampling at two reference sites located within any portion of a subwatershed where no urban development or potential source of PCBs are present as identified through the PCB Source Assessment. The County will locate the reference sites in perennial streams with sufficient flow to not become dewatered during sampling, and in locations where PCB levels should only be influenced by background concentrations due to atmospheric deposition. In the unlikely event that one reference site contains illicit sources that could not be identified through the PCB Source Assessment, the PCB concentration data from that reference site will not be used to establish background levels.

Figure 2-4 and Figure 2-5 present the locations of four potential reference sites identified by the County, which will be verified during field reconnaissance. Table 2-2 includes information for the four potential reference sites including nearby PCB sources and parcel ownership.

Anne Arundel County is collaborating with Howard and Montgomery Counties on Phase I screening in the Patuxent River watershed. Potential reference sites will be preliminarily selected in each County and final selection of sites will be made once field investigations are completed in each County. MDE's guidance requires two reference sites per TMDL watershed. It is proposed that the three counties collaborating in the Patuxent each sample at one reference site (one in each County) such that three total reference sites are sampled rather than the six that would be sampled if the counties were conducting Phase I independent of each other. Data from the three reference sites will be used by each County in their analysis.

Table 2-2: Potential Reference Site Information within Anne Arundel County's Portion of the Patuxent River Watershed

Site ID	Subwatershed	Nearby PCB Sources	Site	Parcel
Ref-1	UP 32	None	Forested/ Residential	County
Ref-2	MP 8	Some low-density residential PCB era parcels upstream	Forested; Established County sampling site	County
Ref-3	MP 9	Some low-density residential PCB era parcels upstream	Forested/ Agricultural	County
Ref-4	MP 10	Some low-density residential PCB era parcels upstream	Agricultural/ Residential	County

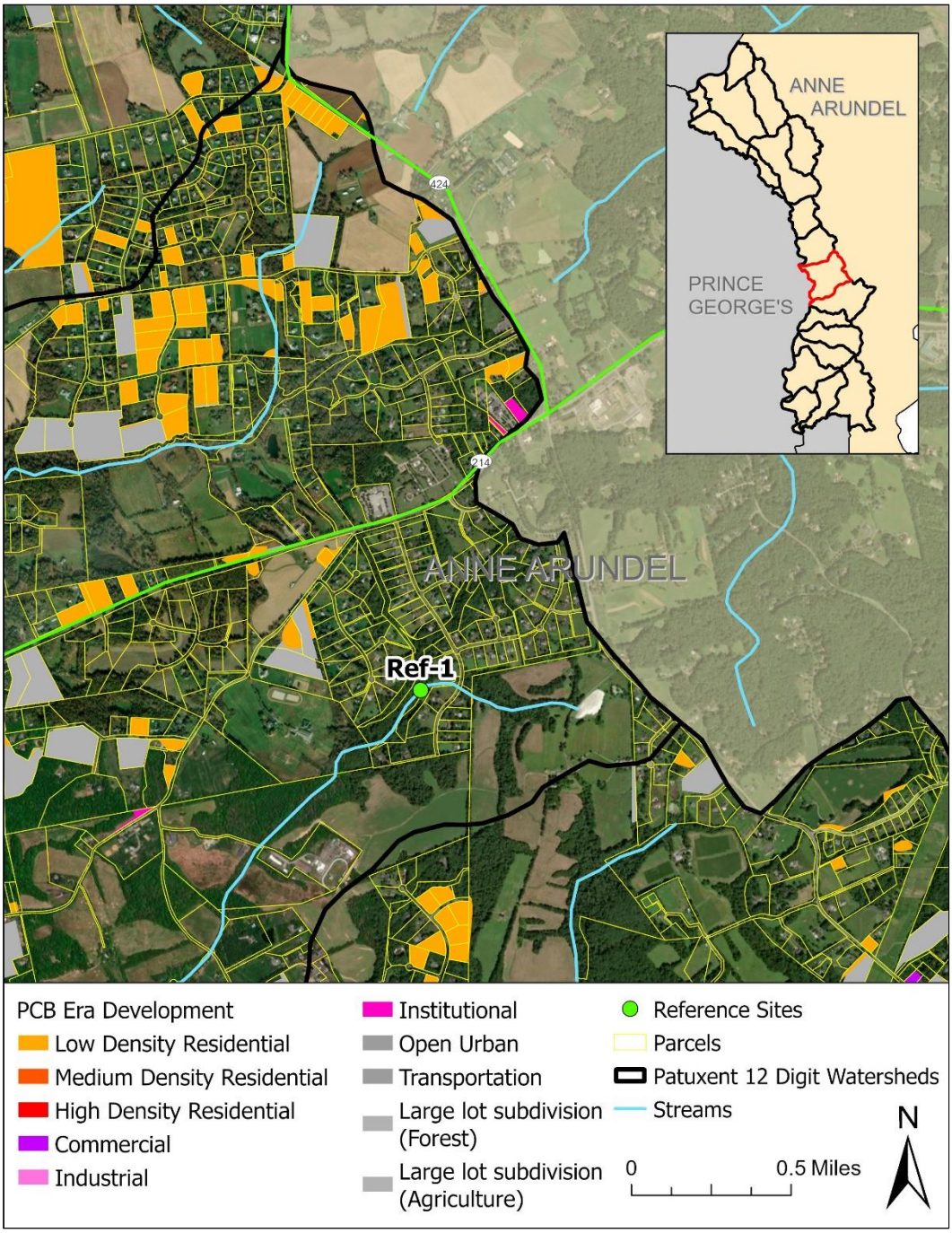

Figure 2-4: Potential Sampling Locations: Ref-1

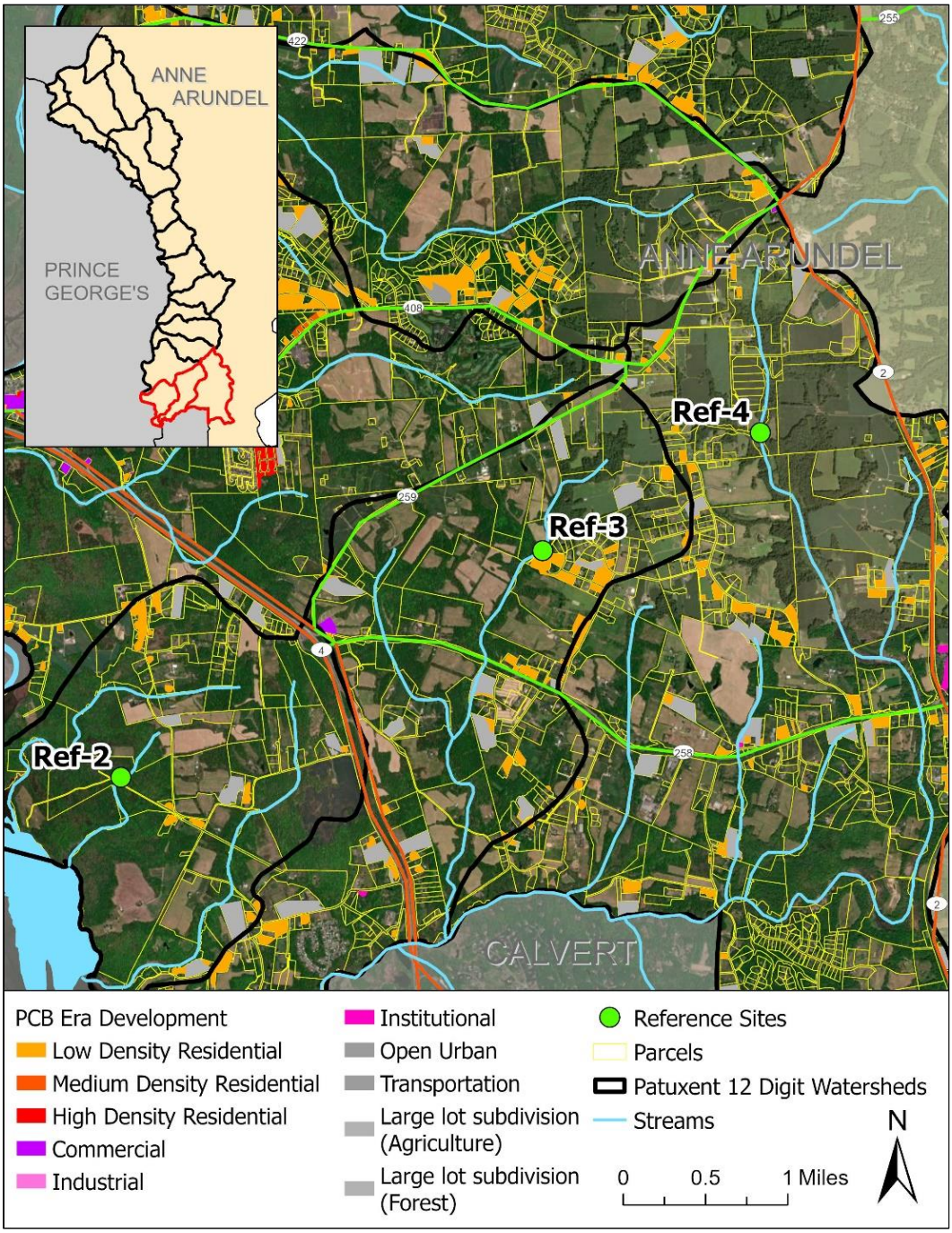

Figure 2-5: Potential Sampling Locations: Ref-2, Ref-3, and Ref-4

2.3.2 Subwatershed Screening Site Selection

The County selected screening sites that capture subwatershed conditions, with the site selection approach varying based on the subwatershed risk score, drainage area size, direct drainage tributaries, County boundaries, and drainage network patterns. In cases where a subwatershed is made up of several tributaries of various sizes that drain directly into the mainstem, the County will sample the largest and most PCB risk representative tributaries rather than sampling each tributary indiscriminately. Specific monitoring sites are generally located at publicly accessible locations, where feasible, to ensure access is available to deploy and recover samplers. The locations target lower order (i.e., 1st, 2nd, or 3rd order), wadable streams to provide ease of deployment and retrieval of samplers and provide access necessary (i.e., wadable) to secure the samplers in the free-flowing waters. The final sampling locations will need to have sufficient depth such that samplers remain completely submerged during deployment. The County will ensure that monitoring sites are not influenced by backwater from bridges, culverts, or dam and although not an issue in Anne Arundel County, ensure that sites will not be tidally influenced. Field reconnaissance will be required to verify the specific and final sampling locations. If publicly accessible sites are not available, the County will coordinate permission from private landowners.

Several Patuxent River subwatersheds were situated conveniently to have a single downstream monitoring site before the tributary joined the mainstem. However, in five cases where subwatersheds are made up of several large tributaries, each flowing independently into the mainstem, a modified approach was used to capture the subwatershed conditions. In the cases of the UP34, UP35, UP40, MP14 and MP17 subwatersheds, monitoring sites were placed at the outlet of the largest and therefore most representative tributaries to capture as much of the subwatershed as possible.

Multiple monitoring sites were placed in subwatershed LP46 because it is made up of one large tributary that flows through several other subwatersheds before its outlet into the mainstem. Monitoring sites LP46-2 and 3 isolate large offshoots of the main tributary while LP46-1a is situated at the downstream end of the subwatershed where it flows into the mainstem Patuxent. Subwatershed LP46 also has an additional site location option in the form of LP46-1b. Site 1b may be used in addition to LP46-1a depending on field reconnaissance efforts. It may be useful if more data is needed for the upstream half of the subwatershed, or it may be unnecessary if 1a is determined to be a sufficient representation of the subwatershed. Figure 2-7 shows the locations of monitoring sites for subwatersheds LP46, LP47, LP48 and LP49.

Figure 2-6 through Figure 2-10 present the locations of 25 potential subwatershed screening sites , which will be verified during field reconnaissance. Table 2-3 includes information for the subwatershed screening sites, in order of risk score, including parcel ownership and notes on site conditions.

Table 2-3: Potential Subwatershed Screening Site Information for Anne Arundel County's Portion of the Patuxent River Watershed

Site ID	Subwatershed	Risk	Site	Parcel
LP46-1a	LP 46	80		State Park
LP46-1b				Patuxent River Park
LP46-2				County
LP46-3				Private landowner
LP47-1	LP 47	55		Patuxent river park
LP48-1	LP 48	45		County
LP52-1	LP 52	26		US GOV
LP49-1	LP 49	25		County
UP40-1	UP 40	22	Forested	SHA
UP40-2			Forested	SHA
UP40-3			Forested	Racetrack
MP14-1	MP 14	16	Forest wetland	LLC
MP14-2			Mobile home park	Mobile home park LLC
MP14-3			Forested wetland	County
UP34-1	UP 34	11		Business
UP34-2				Business
UP34-3				Business
MP17-1	MP 17	11	Forested	Business
MP17-2			Forested	LLC
UP35-1	UP 35	10		County land
UP35-2				Patuxent Preserve park
UP35-3				Parks & Rec
MP15-1	MP 15	10	Natural Area	County
UP30-1	UP 30	5		County park
MP16-1	MP 16	5		Holt Landfill

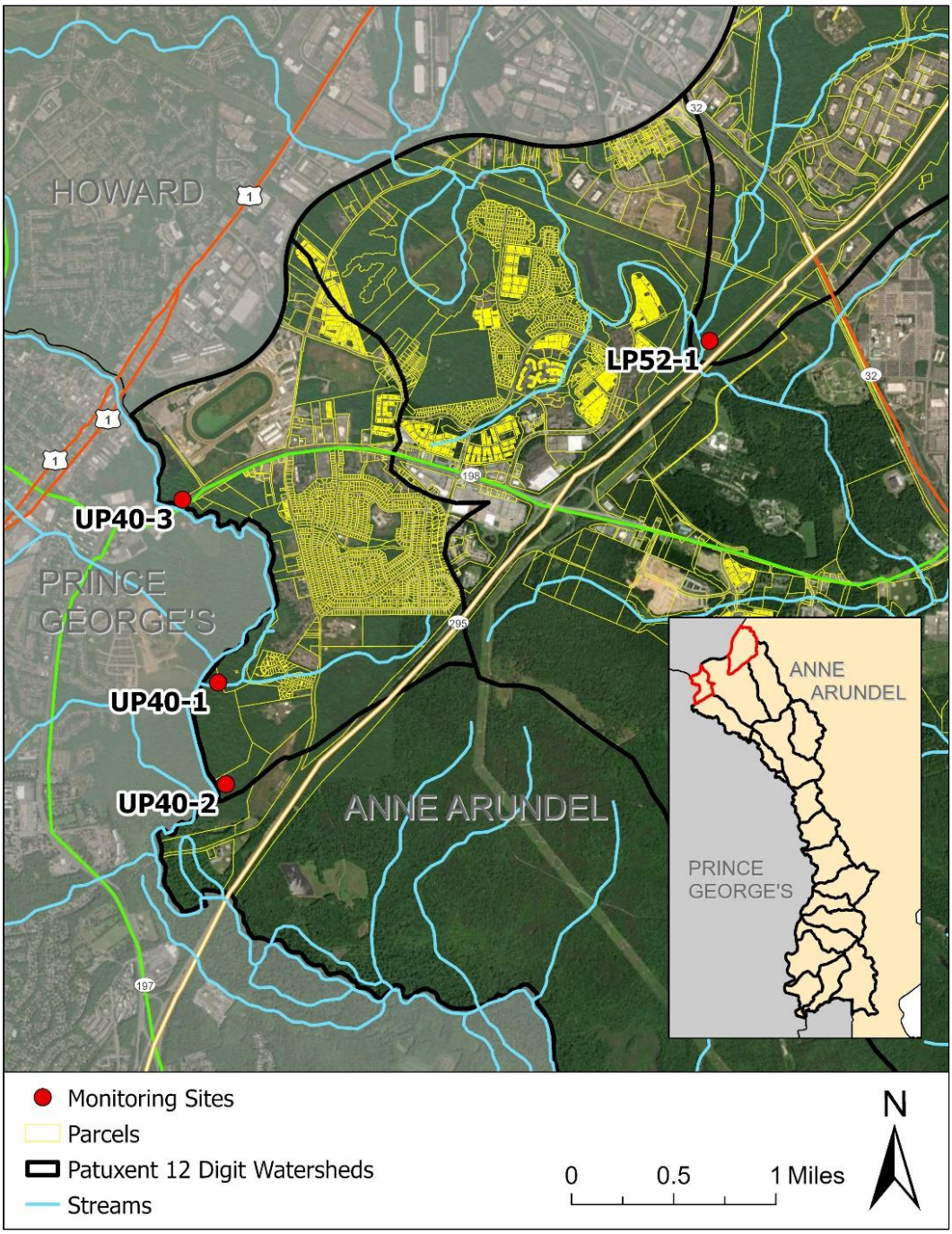

Figure 2-6: Potential Sampling Locations: LP52-1, UP40-1, UP40-2, and UP40-3

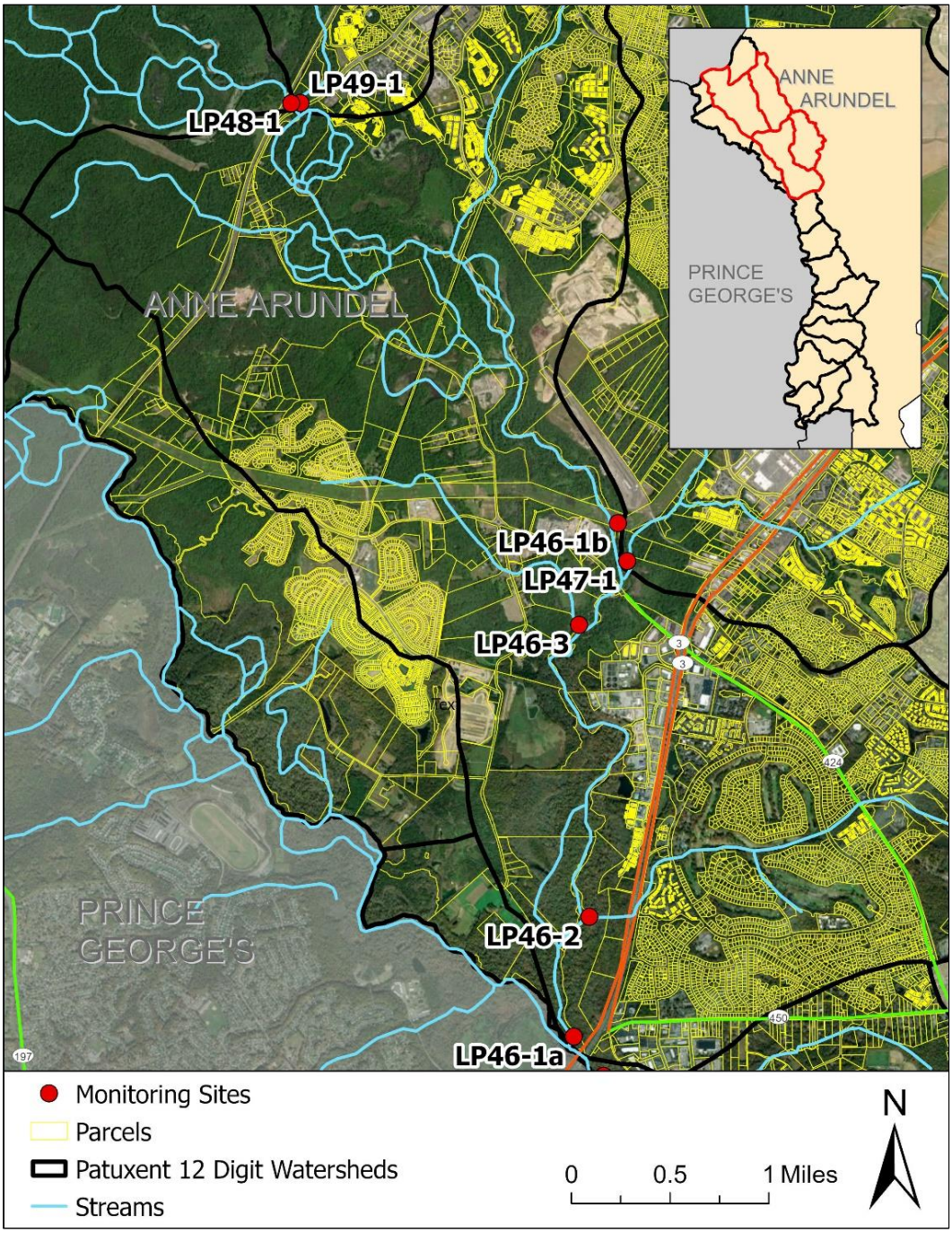

Figure 2-7: Potential Sampling Locations: LP46-1a/1b, LP46-2, LP46-3, LP47-1, LP48-1, and LP49-1

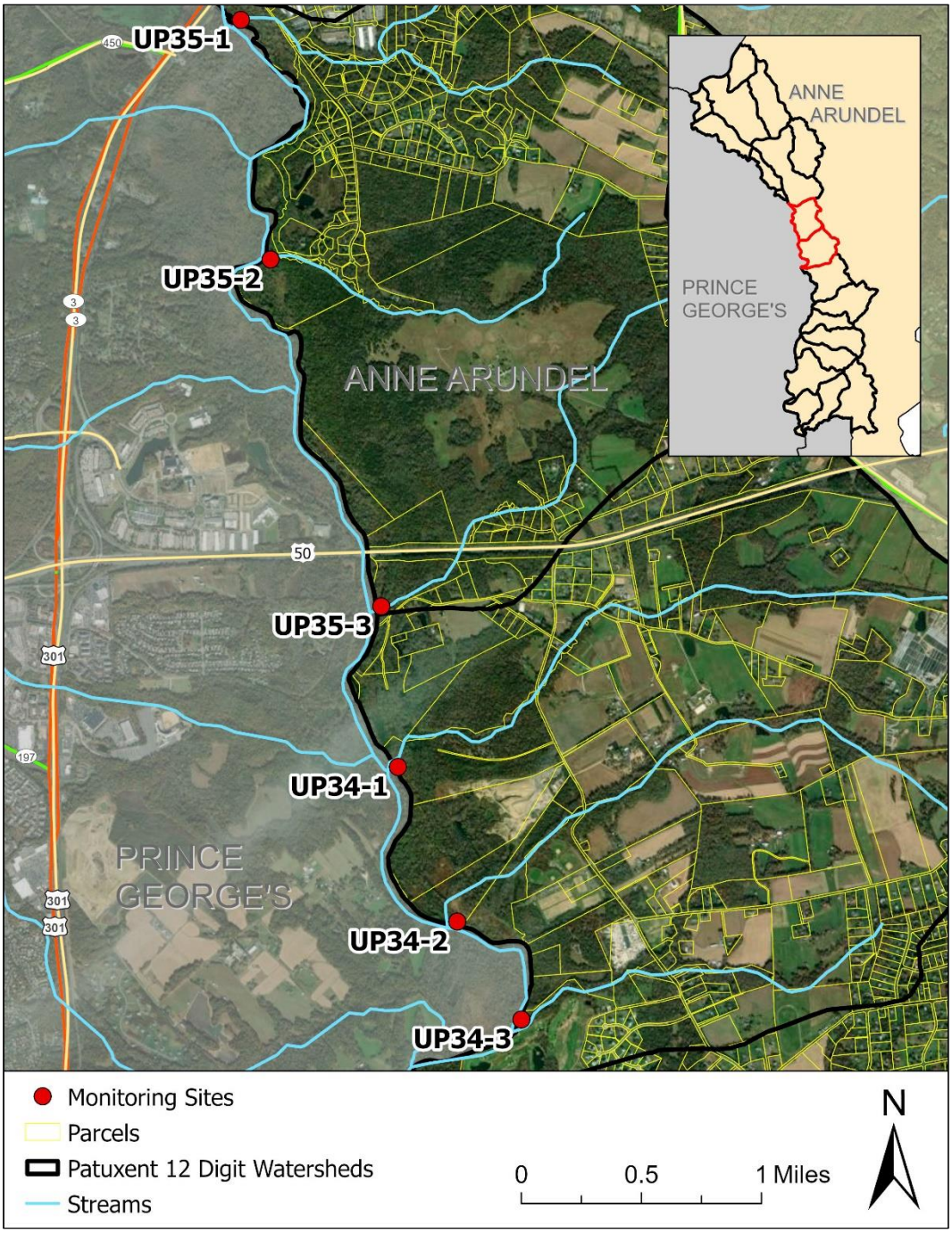

Figure 2-8: Potential Sampling Locations: UP34-1, UP34-2, UP34-3, UP35-1, UP35-2, and UP35-3

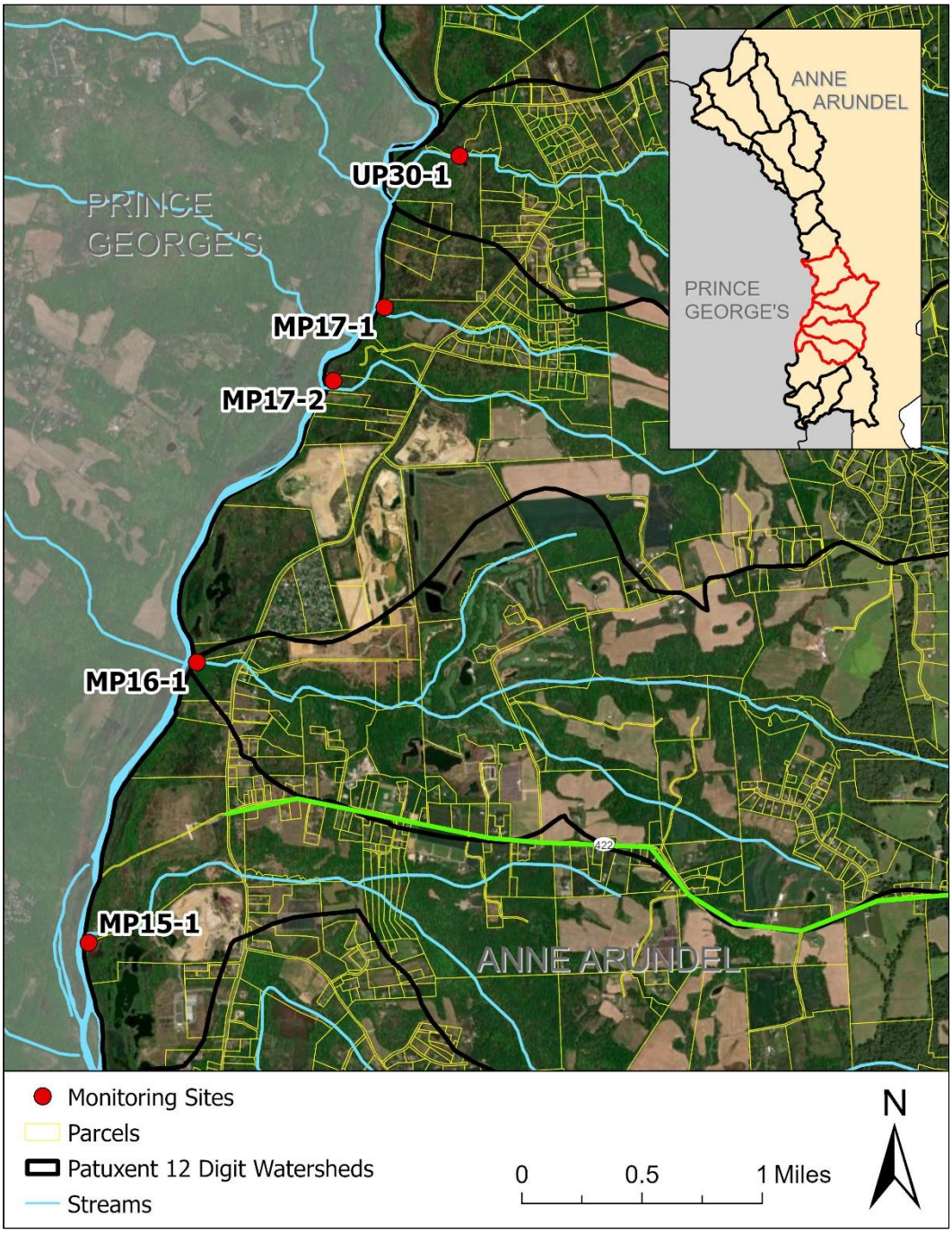

Figure 2-9: Potential Sampling Locations: UP30-1, MP17-1, MP17-2, MP16-1, and MP15-1

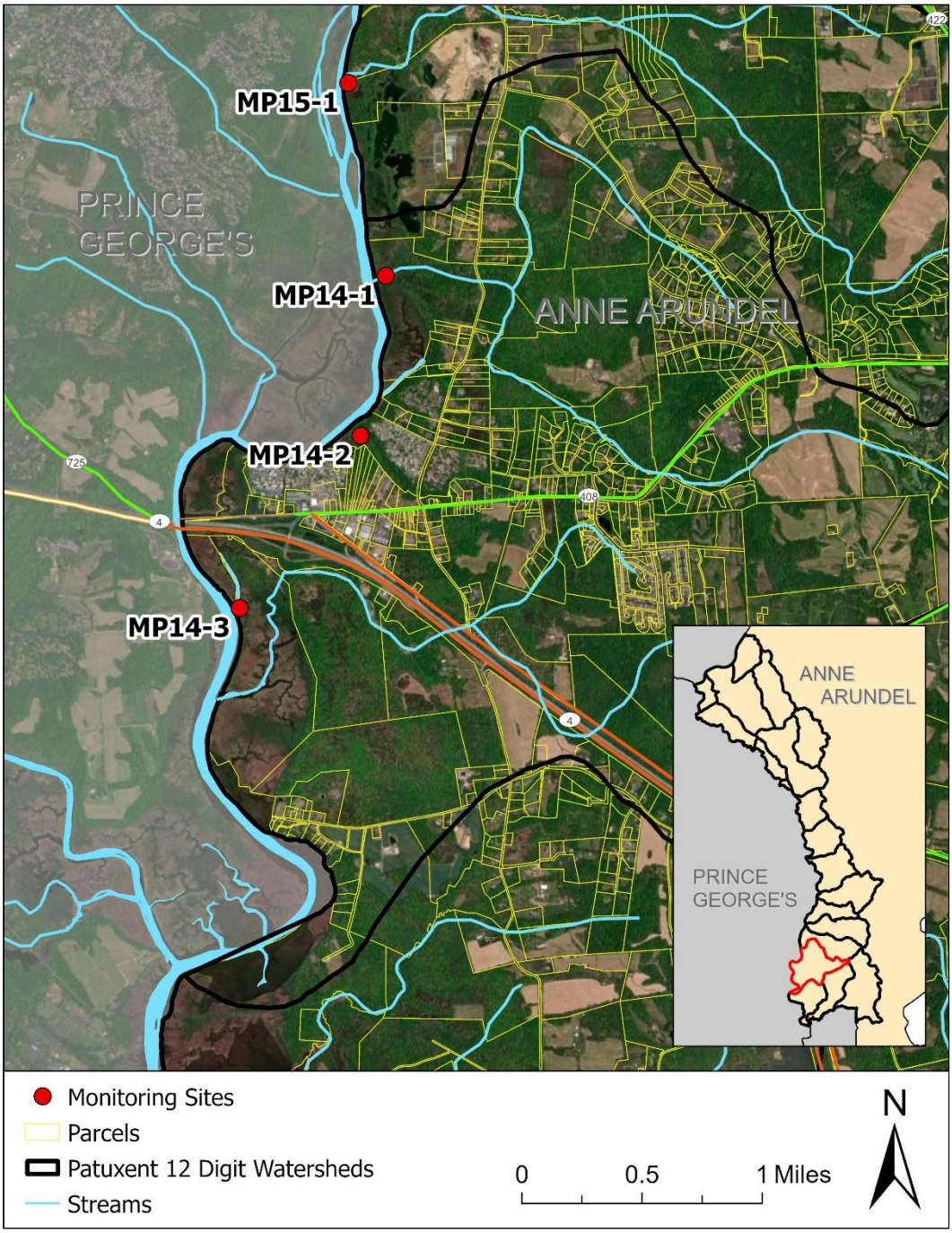

Figure 2-10: Potential Sampling Locations: MP14-1, M14-2, and MP14-3

2.4 Sample Collection

During deployment, SP3™ samplers will be securely attached to a cinder block with a zip tie or attached to a steel u-channel post anchored into the stream bed. Samplers will be installed in an area of the stream with sufficient water depth to remain fully submerged for a minimum of 3 months. Each sampling location will be visited twice: first to install the sampler and then a second time to uninstall and collect the sampler for analysis. Additional visits to ensure everything is functioning as it should during the 3-month sampling period will occur as needed depending on site conditions and discharge characteristics such as periods of high flow due to intense rainfall. Two follow-up visits prior to retrieval (after one month and after two months) are planned in addition to post high flow event visits as needed. If the sampler is impacted, lost, or deemed to be compromised, a replacement sampler will be installed.

2.5 Sample Forms

Field sampling staff will document the sampling location (site ID), specific description of the location where the passive sampler was installed, time the sampler was installed, initials of sampling personnel, and other notes or comments. Photographs of the sampler installation location will also be collected and recorded on the sampling forms to facilitate retrieval.

2.6 Sampling Team Personnel

Sampling activities will be performed by a minimum of a two-person team. The personnel responsible for sample collection will be trained to perform those activities. The training for field staff will include a review of applicable SOPs, sampling locations, sampling equipment and containers, field forms and labels to be completed on-site (e.g., chain-of-custody forms, sample collection forms, sample labels), sample preservation information, and coordination with the analytical laboratory. All field personnel will understand the field safety elements of the data collection and use appropriate personal protective equipment for the field conditions.

2.7 Sample Transportation

Following sampler retrieval, the SP3™ samplers will be stored under refrigeration at 4°C or lower, with minimal exposure to higher temperatures and sunlight for up to two (2) weeks. Once all samplers are retrieved, they will be shipped directly to the analytical laboratory Eurofins Environment Testing America[1] for PCB congener analysis by EPA 1668A and PRC analysis.

The laboratory will be notified a few days before the shipment is sent so that it is prepared to process the samples promptly. Chain-of-custody procedures will be followed at the laboratory for all samples delivered.

3 Data Analysis

Subwatershed sampling site PCB concentration results will be compared to several values to determine whether subwatersheds will require further source trackdown investigations or if the subwatershed can be considered to have no PCB impact. These values include Maryland's Numerical Criteria for Toxic Substances in Surface Waters including the freshwater chronic criterion of 14 ng/L for protection of life in

[1] Address: 5815 Middlebrook Pike, Knoxville, TN 37921

non-tidal systems and the human health criterion of 0.64 ng/L that addresses the consumption of PCB-contaminated fish. Since the human health criterion is more stringent, meeting it will satisfy all applicable water quality criteria. The TMDL endpoint for the Patuxent River watershed was derived in the TMDL development with a translation from a fish tissue listing threshold concentration to an associated water column threshold concentration using the most conservative estimates. The result is a PCB water column threshold concentration and endpoint of 0.60 ng/L for the Patuxent River watershed (MDE, 2017). Finally, the Phase I sampled concentration results will be compared against the reference values collected at the reference sites in the Patuxent River watershed.

Subwatershed sampling sites with PCB concentrations at or below the reference and TMDL water column endpoint will be determined as having no significant sources of PCBs within the subwatersheds, and further source trackdown investigation will not be pursued in future monitoring phases.

Subwatershed sampling sites with PCB concentrations at or above reference or TMDL water column human health threshold/ endpoints will be determined as an indication of sources of PCBs within the subwatersheds. Further source trackdown investigations will be required in these subwatersheds and will be prioritized during future monitoring phases. Subwatersheds with the greatest exceedances will be prioritized over those with lower levels and the total number of subwatersheds to be investigated in Phase II will be determined based on the results and the County's available resources.

For subwatershed sampling sites with PCB concentrations above reference site results, but below TMDL water column threshold/ endpoints, there can be no definitive determination as to whether there are significant sources of PCBs within the subwatershed. While passive samplers analyze the freely dissolved portion of the total PCB concentration, the TMDL water column endpoints are derived based on total PCB concentrations (i.e., dissolved organic carbon (DOC) bound PCBs, particulate organic carbon (POC) bound PCBs, and freely dissolved PCBs). Therefore, it is possible that the total PCB concentration containing the freely dissolved portion measured through passive sampling could exceed the TMDL water column endpoint. In these cases, the County will coordinate with MDE to determine whether these subwatersheds can be ruled out for further source trackdown investigations based on the existing data and information provided by the PCB Source Assessment, or if additional sampling may be required.

4 Quality Control Activities

Analytical samples collected during Phase I sampling will follow all quality assurance/quality control (QA/QC) procedures and standards outlined in the forthcoming QAPP.

4.1 Field Blanks

For each batch of passive samplers deployed, SiREM will prepare one (1) SP3™ sampler per location along with one (1) additional SP3™ sampler for a field blank and three (3) PRC blanks that will be shipped directly to Eurofins Environment Testing America, Knoxville, Tennessee for initial PRC concentration determination.

4.2 Field Quality Controls

Field personnel will strictly adhere to the SOPs included within the QAPP to ensure the collection of representative, uncontaminated samples. Sampling methods are designed to be consistent with those

recommended by MDE to facilitate comparability with data from other jurisdictions. The most important aspects of quality control associated with sample collection are as follows:

- Field personnel will be thoroughly trained in the proper use of sample collection equipment and will be able to distinguish acceptable versus unacceptable samples in accordance with pre-established criteria presented in this SAP and relevant SOPs.
- Field personnel will be thoroughly trained to recognize and avoid potential sources of sample contamination or improper storage.
- Sample containers will be pre-cleaned and of the recommended type.

4.3 Data Review Procedures

SiREM will provide a sampler report that provides the basic analytical chemistry data, including Eurofins Environment Testing America laboratory report, basic methodology and calculation of Cfree estimates for the samples. Electronic results will also be provided. KCI will review the data report for any values that appear to be outliers. Flagged values will require confirmation from SiREM and/or Eurofins Environment Testing America before they will be included in the final data deliverable to MDE.

5 Documentation, Forms, and Data Management

All field documentation, including the various data collection forms discussed in this SAP, and field notes, will be reviewed for completeness and accuracy, scanned, and stored electronically on the County's networks consistent with the County's Record Retention Policy which requires that records associated with NPDES permits be retained for ten years.

All laboratory analytical data generated under this SAP will be submitted to and stored on the County's networks.

6 References

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MDE. 2022a. Guidance for Developing Local PCB TMDL (Total Maximum Daily Load) Stormwater Wasteload Allocation (SW-WLA) Watershed Implementation Plans (WIPs). August 2022. Accessed from: https://mde.maryland.gov/programs/water/TMDL/DataCenter/Documents/PCB_guidance/PCB_TMDL_Implementation_Guidance_SW-WLA_08302022.pdf

MDE. 2022b. General Guidance for Local TMDL Maximum Daily Load Stormwater Wasteload Allocation Watershed Implementation Plans. August 2022. Accessed from: https://mde.maryland.gov/programs/water/TMDL/DataCenter/Documents/TMDL%20General%20Guidance.pdf

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U.S. Environmental Protection Agency (US EPA). 2012. Guidelines for Using Passive Samplers to Monitor Organic Contaminants at Superfund Sediment Sites. Sediment Assessment and Monitoring Sheet (SAMS) #3. Office of Superfund Remediation and Technology Innovation and Office of Research and Development. OWER Directive 9200.1-110 FS.

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