

Virginia Department of Environmental Quality
Draft 2024 305(b)/303(d) Water Quality Assessment Integrated Report
Public Comment – Response Document

Comments received April 22, 2024, through May 22, 2024

Table of Contents

Comments from Wild Virginia.....	2
DEQ Response.....	12
Comments from Chantilly Crushed Stone.....	14
DEQ Response.....	32
Comments from Virginia Association of Municipal Wastewater Agencies.....	34
DEQ Response.....	36
Comments from Chesapeake Bay Foundation.....	37
DEQ Response.....	41
Comments from EPA Region 3.....	44
DEQ Response.....	46
General Public Comments Received and DEQ Responses.....	48

Comments from Wild Virginia



May 22, 2024

Sandra Mueller
Virginia Department of Environmental Quality
Water Monitoring and Assessment Program
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Sent via email

Re: Comments on 2024 Virginia Water Quality Assessment Integrated Report

Dear Sandra Mueller:

Please accept these comments submitted on behalf of Wild Virginia.¹ As explained below, the Virginia Department of Environmental Quality (DEQ) must incorporate and analyze additional information about water quality conditions in state waters that has not been properly assessed in the draft Water Quality Assessment Integrated Report (IR). Also, additional impaired waterbody designations are warranted and necessary. Specifically:

- The draft IR fails to include an analysis of a large body of data showing levels of per- and polyflouroalkyl substances (PFAS) in surface waters, sediment, and fish tissue and this data is not addressed in any substantive way.
- Waterbodies in the Chickahominy River must be designated as impaired, because levels of PFAS have interfered with designated uses.
- Additional stream segments must be considered for impairment designations based on unacceptably-high levels of PFAS in surface waters.
- Levels of PFAS in surface water samples must compel DEQ and other agencies to increase sampling of fish tissue and sediments, given that concentrations in the water will be magnified many times over in organisms and the environment.

As you know, numerous organizations representing many thousands of Virginians asked DEQ to extend the comment period for the draft IR by at least an additional 30 days.² In its response, DEQ stated that the original 30-day period was "sufficient time for review and is consistent with

¹ I can be contacted at: david@wildvirginia.org, 434-964-7455, or Wild Virginia, P.O. Box 1065, Charlottesville, VA 22902.

² Letter from 26 organizations to Sandra Mueller, DEQ, *Re: Request for Extension of Public Comment Period for Water Quality Assessment Integrated Report*, May 14, 2024.

public review periods associated with recent IR's containing this level of detail."³ Clearly, many Virginia residents and water users disagree with the contention that the minimal time allowed is sufficient and DEQ's dismissal of their concerns is troubling. We again call on DEQ to allow additional time for the public to comment, to ensure that the final IR is complete and accurate and that problems identified by the public are addressed.

As noted in the groups' May 14 letter, the set documents available from DEQ for the public to review is extensive. In addition, there is a huge amount of information in agency records that is vital to an understanding of water quality conditions across Virginia and DEQ did not include or address that information in a substantive manner.

In the draft IR, DEQ states that "[a] diverse water monitoring dataset, collected by DEQ and others, is reviewed and evaluated through the IR process."⁴ However, we can find no evidence in the draft IR or any other documentation demonstrating that the thousands of PFAS sampling results described below were included in the review that produced this document. Given the serious implications of detectable PFAS levels in the environment and the need to address these threats expeditiously,⁵ this omission is glaring and unacceptable.

In the absence of a compilation and analysis of PFAS data and any comparison of the evidence to Virginia's water quality standards (WQS) by DEQ, Wild Virginia made an effort to accomplish these tasks. This effort has been very limited due to the time constraints but reveals important information that DEQ should have provided for public review and for review by the U.S. Environmental Protection Agency (EPA) in that agency's oversight role under the Clean Water Act (CWA). A more thorough and complete examination of the PFAS data in DEQ's possession must be made before this IR can be deemed acceptable.

I. The Purpose of the Integrated Report

The IR is prepared to fulfill requirements in two sections of the Clean Water Act (CWA). First, section 305(b) requires that the state provide, among other information, "a description of the water quality of all navigable waters in such State"⁶ and "an analysis of the extent to which all navigable waters of such State provide for the protection and propagation of a balanced population of shellfish, fish, and wildlife, and allow recreational activities in and on the water."⁷ The Environmental Protection Agency (EPA) uses state 305(b) reports and its analysis of findings to make required reports to Congress,⁸ allowing lawmakers to assess whether the objectives of the CWA are being met.

EPA regulations state: "The water quality report serves as the primary assessment of State water quality. Based upon the water quality data and problems identified in the 305(b) report, States

³ Letter from Scott Morris, DEQ to David Sligh et al., *Re: Request for Extension of Public Comment Period for Water Quality Assessment Integrated Report*, May 16, 2024.

⁴ Draft IR at 2.

⁵ See e.g. major steps taken by EPA in the last month as detailed on the agency's website, [Key EPA Actions to Address PFAS](#), describing the adoption of new drinking water standards for PFAS, hazardous substance designations for PFOS and PFOA, and other actions.

⁶ 33 U.S.C. § 1315.b.1A.

⁷ 33 U.S.C. § 1315.b.1B.

⁸ 33 U.S.C. § 1315.b.2.

develop water quality management (WQM) plan elements to help direct all subsequent control activities."⁹ Thus, it is vital that all important information bearing on state waters' capacity to support designated and existing uses is presented in a way that informs the public and gives decision makers adequate bases for any necessary changes to the law and regulations.

As described below, Virginia has failed to provide a useful description of PFAS data at its disposal or to make any observations as to the degree to which these pollutants do or may contravene WQS. DEQ must remedy this failure and if Virginia does not provide the necessary data and analysis in its report, EPA must require it.

Section 303(d) mandates that the state "shall identify those waters within its boundaries for which the effluent limitations required by section 1311(b)(1)(A) and section 1311(b)(1)(B) of this title are not stringent enough to implement any water quality standard applicable to such waters."¹⁰ The code sections cited in this provision describe so-called "technology-based" effluent limitations that are developed for certain industries and publicly owned treatment works, respectively.

Those portions of waterbodies where technology-based controls are inadequate to uphold WQS, are termed "water quality-limited segments" and when waterbodies are so designated a series of actions must follow, including development of total maximum daily loads (TMDLs), imposition of permit limitations reflecting wasteload allocations (WLAs), etc.¹¹ Water quality-limited segments are designated when WQS "applicable to such waters" cannot be met with technology-based limitations and those applicable WQS include all of the following: "numeric criteria, narrative criteria, waterbody uses, and antidegradation requirements."¹² As explained below, the levels of PFAS found in waterbodies and fish tissue in Virginia must be assessed in relation to the narrative criteria and antidegradation policy included in the WQS regulation.

II. Narrative Criteria

Virginia's WQS include both numeric and narrative¹³ water quality criteria as well as an antidegradation policy¹⁴ and all of these conditions must be implemented and enforced by the state in its regulatory actions. Because Virginia has not adopted numeric criteria for PFAS, or even started a process to develop them, the application of narrative criteria and antidegradation is especially important. However, even for pollutants for which numeric criteria exist, application of the other requirements in the WQS is necessary. While criteria are supposed to "describe water quality necessary to protect designated uses such as swimming, drinking water, and the propagation and growth of aquatic life,"¹⁵ it is not certain that the numeric criteria will achieve this goal. These criteria, even if based on the best scientific information available when adopted,

⁹ 40 C.F.R. § 130.8(a).

¹⁰ 33 U.S.C. § 1313(d)(1)(a).

¹¹ 40 C.F.R. § 130.7.

¹² 40 C.F.R. § 130.7(b)(3).

¹³ Virginia's narrative criteria are referred to as "General Criteria" at 9 VAC 25-260-20, however we use the term narrative criteria in these comments, at that designation is consistent with EPA regulations.

¹⁴ 9 VAC 25-260-30.

¹⁵ DEQ website, [Criteria, Designated Uses, Antidegradation](#).

may prove ineffective. In such a case the narrative criteria serve as a necessary "backstop" to ensure that uses are fully upheld.

Virginia's narrative criteria state, in part that

State waters, including wetlands, shall be free from substances attributable to sewage, industrial waste, or other waste in concentrations, amounts, or combinations which contravene established standards or interfere directly or indirectly with designated uses of such water or which are inimical or harmful to human, animal, plant, or aquatic life.

Specific substances to be controlled include, but are not limited to: floating debris, oil, scum, and other floating materials; toxic substances (including those which bioaccumulate); substances that produce color, tastes, turbidity, odors, or settle to form sludge deposits; and substances which nourish undesirable or nuisance aquatic plant life.¹⁶

As described below, conditions in some waterbodies with significant PFAS concentrations in fish tissue are shown to "interfere directly or indirectly with designated uses" and be "inimical or harmful to human, animal, plant, or aquatic life."¹⁷ In addition, PFAS levels in some surface waters are of a magnitude that far surpasses concentrations that would be exceed both EPA drinking water standards and numeric criteria set by other states.

III. Available Data Were Not Assessed for Support of Designated Uses

As stated above, there is a very large amount of PFAS data in DEQ's possession and/or referenced and accessible through DEQ web pages. According to DEQ's Statewide PFAS Sampling Dashboard, there are 29,523 pieces of data¹⁸ on these substances in that source.

Wild Virginia extracted from the DEQ database those results listed as having been measured between January 1, 2017 through December 31, 2022, the six-year period the draft IR covers.¹⁹ Even for that period, the amount of information was much too large for us to properly organize and analyze it in the time available under DEQ's limited comment period. From the information downloaded from DEQ's website, we compiled a total of 8,793 pieces of PFAS data from 83 separate sampling sites for the IR coverage period, including results from analysis of surface water, sediments, and fish tissue.

From that large body of information, we chose to address just one of these substances in detail, perfluorooctane sulfonate (PFOS). The results of this review are enough to require DEQ and EPA to take specific actions for certain waterbodies, but the agencies must not stop there.

¹⁶ 9 VAC 25-260-20.A.

¹⁷ Id.

¹⁸ Statewide PFAS Sampling Dashboard, <https://www.deq.virginia.gov/topics-of-interest/per-and-polyfluoroalkyl-substances-pfas>, accessed on May 21, 2024.

¹⁹ Draft IR at 1.

The draft IR includes only a short description of the characteristics of PFAS and of some monitoring that has been conducted in Virginia waterbodies.²⁰ However, the report includes no useful information about the results of that sampling and, especially, no analysis as to whether findings from the sampling may violate water quality standards. Federal and state officials have expressed the seriousness of the PFAS threat in numerous contexts. State Health Commissioner M. Norman Oliver, M.D., M.A. stated that “PFAS is an extremely important concern in the U.S. and in the Commonwealth,”²¹ but DEQ's failure to confront the data collected seems to indicate that it does not share Dr. Oliver's concerns.

Because of DEQ's failure to complete any analysis of the available data, even for clearly serious environment threats and damages, DEQ must amend the IR with such an analysis and EPA must insist that DEQ do so.

Below are discussions of finding in just a few particular waterbodies.

Chickahominy River watershed

As shown in Figure 1, large concentrations of PFOS were measured in various fish species collected from each of eight locations on the river itself and in White Oak Swamp. Significant levels of PFOS were found in every fish tissue sample measured at every sampling station.

The largest concentration, 68,200 parts per trillion (ppt) was found in Bluegill collected in White Oak Swamp. Of 31 fish samples collected during this reporting period, 19 (61%) exceeded 10,000 ppt. While Virginia has not adopted health-based advisories for PFOS levels and fish consumption there are a range of guidance values that have been developed by various parties, including other states.²²

In any case, Virginia officials have issued a warning as follows:

"It is recommended that sensitive populations (e.g. children and pregnant women) avoid eating fish from the Middle Chickahominy River watershed until EPA finalizes recommendations to protect human health from exposure through fish ingestion."²³

Though not framed as such, this recommendation from the state agencies essentially represents a fish consumption advisory. While we have been unable to determine the threshold level(s) that prompted this warning, it is clear that Virginia officials consider these waterbody segments to be impaired. In the wording of the narrative criteria, conditions caused by PFAS in fish "interfere" with an important use. Thus, Virginia must designate the waterbodies represented in the analysis as "impaired" and take the succeeding steps required under state law and the CWA.

²⁰ Draft IR at 269-270.

²¹ Press Release, [*Elevated PFAS Levels Found in the Chickahominy River Watershed*](#), October 8, 2021.

²² The Agency for Toxic Substances and Disease Registry, *Guidance for Assessment of Per- and Polyfluoroalkyl Substance (PFAS) in Fish and Other Aquatic Organisms*, at 14, <https://www.atsdr.cdc.gov/pha-guidance/resources/ATSDR-PFAS-Exposure-in-Fish-and-Shellfish-508.pdf>.

²³ DEQ/VDH Storymap, Middle Chickahominy PFAS Study, October 15, 2022, <https://storymaps.arcgis.com/stories/1d68144adf54432198e7d56229862d31>

We note that a number of other states have designated impaired waterbodies based on high levels of PFOS in fish, including Alabama, Maryland, Minnesota, Michigan, and Wisconsin.²⁴ These states have taken action to protect their citizens and to ensure that corrective actions are begun, in accordance with CWA regulations. Virginia must do the same.

Figure 1 - PFOS data downloaded from DEQ PFAS dashboard (collected by DEQ and USGS)

CHICKAHOMINY RIVER AT RT 156 NR SEVEN PINES, VA (2042440)

Fish Tissue - PFOS (ng/kg), 11/23/21				Fish Tissue - PFOS (ng/kg), 5/25/22		
Lg. Mouth Bass	Creek chub	Bluegill	Bluegill	Yellow Bullhead	Sediment - PFOS (ng/kg), 12/21/21	Sfc. Water - PFOS (ng/L), 12/21/21
19400	7840	14100	9900	1060	105	4.45

CHICKAHOMINY RIVER AB WALKERS DAM AT WALKERS, VA (2-CCHK030.09)

Tissue - PFOS (ng/kg), 11/9/21		
Lg. Mouth Bass	Bluegill	Sfc. Water - PFOS (ng/L), 12/21/21
27300	12600	4.18

CHICKAHOMINY RIVER NEAR PROVIDENCE FORGE, VA (2-CHK035.26)

Tissue - PFOS (ng/kg), 12/2/21		Tissue - PFOS (ng/kg), 6/3/22		
Lg. Mouth Bass	Bluegill	White catfish	Sediment - PFOS (ng/kg) 12/20/2021	Sfc. Water, mean of 10 samples (12/21-6/22),
25800	17100	15600	260	7.18

²⁴ The listings for each of these states are accessible through the following links: Alabama, <https://adem.alabama.gov/programs/water/wquality/2022AL303dList.pdf>; Maryland, [https://mde.maryland.gov/programs/water/tmdl/integrated303dreports/pages/303d.aspx?a=go&qBasinCode=%20&qBasinName=%20&qHUC=%20&qCountyName=%20&qWaterType=%20&qListingCategory=%20&qImpairmentCategory=PERFLUOROOCCTANE%20SULFONATE%20\(PFOS\)%20IN%20FISH%20TISSU](https://mde.maryland.gov/programs/water/tmdl/integrated303dreports/pages/303d.aspx?a=go&qBasinCode=%20&qBasinName=%20&qHUC=%20&qCountyName=%20&qWaterType=%20&qListingCategory=%20&qImpairmentCategory=PERFLUOROOCCTANE%20SULFONATE%20(PFOS)%20IN%20FISH%20TISSU); Minnesota, <https://www.pca.state.mn.us/air-water-land-climate/minnesotas-impaired-waters-list>; Michigan, <https://www.michigan.gov/egle/about/organization/water-resources/glwarm/integrated-report>; Wisconsin, <https://dnr.wisconsin.gov/topic/SurfaceWater/ConditionLists.html>.

Figure 1 (continued)

CHICKAHOMINY RIVER AT RT 609 AT ROXBURY, VA (2-CHK042.22)

Tissue - PFOS (ng/kg), 12/1/21		Tissue - PFOS (ng/kg), 6/9/22	
Chain Pickerel	Bluegill	White Catfish	Sfc. Water - PFOS (ng/L), 12/15/21
14700	20300	9380	6.41

CHICKAHOMINY RIVER RT. 60 BRIDGE (2-CHK049.59)

Tissue - PFOS (ng/kg), 8/22/22		
Lg. Mouth Bass	Channel Catfish	B luegill
17000	1140	11900

WHITE OAK SWAMP AT RT 156 AT ELKO, VA (2-WOS002.69)

Tissue - PFOS (ng/kg), 11/22/21			Tissue - PFOS (ng/kg), 5/31/22		
Channel Catfish	Creek Chub	Bluegill	Yellow Bullhead	PFOS (ng/kg) 12/21/2021	Sfc. Water - PFOS (ng/L), 12/21/21
26100	31500	68200	4750	3650	27.2

CHICKAHOMINY RIVER NEAR MT AIRY, VA (2CCHK010.28)

Tissue - PFOS (ng/kg), 11/16/21		Tissue - PFOS (ng/kg), 6/28/22	
Lg. Mouth Bass	Redear Sunfish	Blue Catfish	Blue Catfish
16900	7990	839	1560

CHICKAHOMINY RIVER NEAR CHICKAHOMINY SHORES, VA (2CCHK023.37)

Tissue - PFOS (ng/kg), 11/16/21			Tissue - PFOS (ng/kg), 6/28/22	
Lg. Mouth Bass	Lg. Mouth Bass	Redear Sunfish	Blue Catfish	Sfc. Water - PFOS (ng/L), 12/21/21
15500	24800	7750	2560	121

Figure 1 (continued)

CHICKAHOMINY RV AB BIG SWAMP NR PROVIDENCE FRG, VA (2CCHK024.08)

Tissue - PFOS (ng/kg), 11/10/21		Tissue - PFOS (ng/kg), 11/3/22		
Lg. Mouth Bass	Redear Sunfish	White Catfish	PFOS (ng/kg) 12/20/2021	Sfc. Water - PFOS (ng/L), 12/20/21
21900	14900	5250	88	4.92

Surface Water Sample in Other Waterbodies

PFOS data from surface water samples collected during the 2024 IR assessment period were taken from 78 stations in watersheds across the state. Of 181 samples, 40 (22%) exceeded the EPA drinking water standard for PFOS of 4 ppt. While exceedance of the 4 ppt concentration in surface waters is not a violation of the EPA standard, it is a cause of concern, particularly if public water supplies lie downstream. Further, these levels are likely related to higher levels of PFOS in fish tissue. We note that fish tissue concentrations are generally 3-4 orders of magnitude higher than those in surface waters at the same sites, as shown in Figure 1.

Relatively high PFOS concentrations in several streams should prompt DEQ to undertake additional investigations. These included:

<u>Stream</u>	<u>Average PFOS Concentrations</u>
Cub Run	35.75 ppt
West Neck Creek	47.8 ppt
Accotink Creek	8.24 ppt
Kingsland Creek	13.75 ppt
Pocaty River	10.45 ppt

Given that PFOS and other forms of PFAS bioconcentrate to a great degree, DEQ should acquire data from fish tissue in each of these streams, among others, to ensure that any fish consumption warnings or advisories can be made if necessary.

IV. Conclusion - Additions to the IR are Required

Based on the discussion above, we believe it is necessary that DEQ incorporate a substantial body of additional data and analysis into the IR to assess potential impacts and impairments for all types of PFAS. In addition, Virginia must designate segments within the Chickahominy River watershed as "impaired."

Thank you for considering our comments.

Sincerely.

/s/ David Sligh

David Sligh
Conservation Director

cc: Leslie L. Gillespie-Marthaler, Acting Director, Water Division, Region 3, US EPA
Mike Rolband, Director, Virginia DEQ
Members of the Virginia State Water Control Board

DEQ Response to Wild Virginia

DEQ appreciates the comments on the draft 2024 IR submitted by Wild Virginia. DEQ's initial PFAS monitoring efforts started in late 2021 and focused on the Middle Chickahominy watershed, located in central Virginia within the boundaries of the city of Richmond and the counties of Henrico, Hanover, New Kent, and Charles City. In October 2021, the Newport News Waterworks alerted DEQ that the Middle Chickahominy watershed showed elevated PFAS concentrations. DEQ, the Virginia Department of Health (VDH), and Henrico County immediately formed a Unified Command to develop a joint response focused on identifying any potential risks to public health. DEQ contracted with the United States Geological Survey (USGS) to complete fish tissue, sediment and surface water monitoring at locations throughout the watershed, including in Chickahominy Lake, to understand the possible exposure pathways for human health. Since this initial study initiated in late 2021, DEQ has been monitoring PFAS in streams, rivers, and reservoirs across the Commonwealth to understand the prevalence of these substances and to identify potential locations where PFAS concentrations are elevated relative to baseline concentrations. Data from DEQ's PFAS monitoring efforts are available to the public in a dashboard: [Statewide PFAS Sampling Dashboard \(arcgis.com\)](https://arcgis.com).

The 2024 Virginia General Assembly enacted legislation, effective July 1, 2024 as Virginia Code § 62.1-44.34:29 through 33, requiring monitoring and self-reporting of certain discharges, as well as the interagency transfer of data, with a goal to assess and reduce the occurrence of Per- and Polyfluoroalkyl Substances (PFAS) in the Commonwealth's public water supplies.¹ To support Virginian's access to safe drinking water, the legislation charges DEQ to:

- 1) Accept all validated monitoring data from VDH that indicate PFAS maximum containment level exceedance.
- 2) Develop a prioritization plan for identifying the significant sources of PFAS in source water of systems with a maximum containment level exceedance within six months of the receiving the initial monitoring data from VDH
- 3) Require potential sources of PFAS report their use or manufacture of PFAS, and
- 4) Require quarterly discharge monitoring of potentially significant sources of PFAS.

Additionally, the legislation directs DEQ to establish the PFAS Expert Advisory Committee, which will assist DEQ and the Department of Health (VDH) in developing solutions to reduce and eliminate the discharge of PFAS.

This legislation seeks to create a cost-effective solution to PFAS in drinking water for the average consumer. Under the EPA's recently established regulations under the National Primary Drinking Water Regulation, each drinking water supplier exceeding an established PFAS Maximum Contaminant Level (MCL) is expected to take on the cost of treating the water which may include sizeable initial capital expenditures along with continued maintenance costs which would undoubtedly be shared by the customers.

Since the publication of the draft 2024 IR, VDH identified perfluorooctane sulfonate (PFOS), which is one of many PFAS, as a contaminant of concern in a few species of fish collected from

¹ Appendix A Chapters 316 and 343 of the 2024 Acts of Assembly (HB1085, SB243)

the Chickahominy River and White Oak Swamp. VDH initiated a risk assessment pertaining to the consumption of fish from the affected waterbodies. On October 4, 2024, VDH released to the Virginia Regulatory Townhall an initial fish consumption advisory guideline for PFOS. Should the VDH PFOS Guideline become effective, any resulting fish consumption advisories will be used to assess waters in subsequent Integrated Reports.

In December 2024, EPA published draft recommended water quality criteria protective of human health for PFOA, PFOS, and PFBS. These criteria are designed specifically to protect public water supplies and fish consumption and reflect a lifetime exposure duration of 70 years. These criteria will not be considered for adoption in Virginia's Water Quality Standards regulation until they are finalized by EPA. Once effective they would be used to assess waters in subsequent Integrated Reports.

More information on DEQ's PFAS monitoring activities, plus a dashboard containing all available data, are posted to the DEQ Per- and Polyfluoroalkyl Substances (PFAS) webpage.

Comments from Chantilly Crushed Stone



Producers of Quality Stone

May 22, 2024

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RE: 2024 Draft Integrated Report and Section 303 List

Dear Officials Shaver and Mueller,

Enclosed please find comments for the record for the 2024 Draft Integrated Report and Section 303(d) list ("303(d) List") on behalf of Chantilly Crushed Stone (Chantilly). Thank you for meeting with Chantilly on March 15th to discuss our concerns with the listing of Sand Branch on the Virginia impaired waters list. These comments are submitted in accordance with 33 U.S.C. § 1313 Water Quality Standards and Implementation Plans; 9VAC Chapter 720, Water Quality Management Planning Regulation. Chantilly is commenting on listing A22R-05-BEN - Sand Branch Aquatic Life Benthic Macroinvertebrates Bioassessments 5A 1.55 2018 H.

In summary, the Virginia Department of Environmental Quality, (VDEQ) has not assembled and evaluated all existing and readily available water quality-related information as required pursuant to 40 C.F.R. 130.7 and the Federal Clean Water Act, Section 303, 33 U.S.C. 1313, and 9 VAC 25-720-10. As a result, the listing of Sand Branch is flawed. There cannot be impairment as to the "Upper Reach" of the 1.55 mile segment because the reach does not have sufficient natural flow so as to constitute a segment under Section 303 and the listing process. DEQ has existing and readily available information regarding lack of natural flow including Chantilly's permit VAG840106, VDEQ's inspection of Sand Branch on October 26, 2023, observations during VDEQ studies as to flow source and emanation, and information submitted by stakeholders. VDEQ has failed to evaluate information that has been provided to VDEQ by stakeholders and the public, and are part of VDEQ's own Virginia Stormwater Management Act, Va. Code 62.1-44.15.24 – 15.50 such that the information is existing and readily available, demonstrating extraordinarily significant hydraulic and hydrologic impacts causing or contributing to low Virginia Stream Condition Index (VSCI) scores, which are pollution but not pollutants and must

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be distinguished in 303(d) list determinations, issuances, and submittals to the Environmental Protection Agency (EPA) in order to comply with Section 303(d) of the Federal Clean Water Act, 33 U.S.C. 1313.¹ Chantilly has submitted supporting information regarding our prior comments as to lack of natural flow, including the March 15, 2024 meeting and prior comments and submittals, which is found in **Attachment A**, Groundwater & Environmental Services, Inc., *Chantilly Crushed Stone, Inc. Sand Brand and Reference Reach HEC Hydrologic and Hydraulic Analysis*, April 9, 2024.

DEQ and EPA laws, regulations and guidance require that VDEQ perform stressor identification to accurately identify the cause(s) of water quality standards violations for 303(d) listing. EPA's Stressor Identification Guidance Document, EPA 822/B-00/025 (Dec. 2000). As part of the assessment and determination, VDEQ must determine whether the impairment cause is a pollutant, or pollution. "Pollution" is the man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water.² Both VDEQ and EPA guidance documents require assessment of human-induced altered features, which are a common component of watershed assessment and impact. The Water Control Law and the Clean Water Act separate pollutants, which are regulated via National Pollutant Discharge Elimination System (NPDES) permits, and pollution which may encompass non-pollutant alterations such as hydrology. See 33 U.S.C. 1362(19). See, e.g. U.S. EPA, What's New in Impaired Waters and TMDLs (<https://www.epa.gov/tmdl/whats-new-impaired-waters-and-tmdls>; ("clarifying how to assess and assign waters impaired by "pollution" not caused by a "pollutant" to Category 4C").

Under EPA guidance, the proper TMDL category for Sand Branch is Category 4C – water not meeting applicable Water Quality Standards (WQS) due to non-pollutant pollution – for example anthropogenic hydrologic and habitat alteration. See U.S. EPA, Information Concerning 2024 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions (March 29, 2023), at 29.

VDEQ's 303(d) list issued for public comment references Benthic Macroinvertebrate Bioassessment from 2018, well past the five year period identified in VDEQ guidance specifying suitable age of data for listing, and VDEQ lacks any information or evaluation as to 'long term considerations' which are required when older data is incorporated.³ DEQ has insufficient Benthic Macroinvertebrate Bioassessment to support listing as a result of age and lack of long term data and consideration. Chantilly provided data and information on March 15, 2024 addressing this issue. Chantilly also provided data and information showing that the Benthic Macroinvertebrate

¹ See U.S. EPA, Information Concerning 2024 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions (March 29, 2023). EPA guidance has consistently required states to distinguish between pollution and pollutant in 303(d) listing documents and submittals. See Information Concerning 2016 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions, U.S. EPA Aug. 13, 2015 (https://www.epa.gov/sites/default/files/2015-10/documents/2016-ir-memo-and-cover-memo-8_13_2015.pdf); "Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act.

² See, e.g., 9 VAC 25-720-10 (Water Quality Management Planning Regulations; Definitions). The Water Control Law and the Clean Water Act separate pollutants, which are regulated via NPDES permits, and pollution which may encompass non-pollutant alterations such as hydrology. See 33 U.S.C. 1362(19). See also U.S. EPA, What's New in Impaired Waters and TMDLs (<https://www.epa.gov/tmdl/whats-new-impaired-waters-and-tmdls>; "clarifying how to assess and assign waters impaired by "pollution" not caused by a "pollutant" to Category 4C").

³ See, e.g. Guidance Memo No. GM21-2002 2022 Water Quality Assessment Guidance Manual (April 26, 2021); Guidance Memo No. GM23-2002, 2024 Water Quality Assessment Guidance Manual, May 30, 2023.

Bioassessments are not statistically significant because half of available assessments were taken during winter, seasonally at a time when macroinvertebrate communities would naturally be suppressed. The scores were then compared to the 2003 VDEQ VSCI Report, which included very few – 3 out of a total of 247 reference samples or 1.2% - rendering the use of the samples and the VSCI scoring reference statistically insignificant and improper. Chantilly also pointed out that use of the 2003 VDEQ VSCI Report as a reference is scientifically inappropriate because the 2003 VDEQ VSCI Report did not include sufficient reference to the very different Triassic basin physiogeographic characteristics that are known to directly affect microbenthic communities.

The 2024 Draft Integrated Report and Section 303(d) list is not supported by science and not in accordance with EPA and VDEQ 303(d) listing provisions. Chantilly requests that these comments be included in the record and provided to EPA for consideration prior to finalization of the 303(d) List, and that the 303(d) List be revised to either remove Sand Branch, remove the Upper Reach which has no natural flow, and identify the segment properly as a 4C water impaired by pollution specifically hydraulic and hydrologic alteration by virtue of the 60% development of the watershed and the associated impacts.

I. GES Hydrology Study Supports Information VDEQ Has Been Provided Regarding Hydrology and Hydraulics Showing Sand Branch Impairment Due to Substantial Development Flows

The attached recent hydrology study shows the upper reaches of Sand Branch are mostly dry,⁴ flowing only in response to Chantilly's permitted discharge and stormwater runoff from new development in the watershed, 60 percent or 352 acres of the 879-acre watershed is developed.⁵ The study establishes that the Chantilly segment is not perennial as characterized by VDEQ⁶ and is likely ephemeral, which is not jurisdictional under the Virginia Water Quality Control Act.⁷ Therefore, VDEQ's application of water quality parameters, particularly macroinvertebrate VSCI, to a feature with insufficient natural flow is scientifically flawed and legally improper. Moreover, VDEQ's failure to consider hydrological influences in the Sand Branch and reliance on outdated data biased VDEQ's listing determination in 2018 and the TMDL currently under development.

⁴ Groundwater & Environmental Services, Inc., *Chantilly Crushed Stone, Inc. Sand Branch and Reference Reach HEC Hydrologic and Hydraulic Analysis*, April 9, 2024 ("GES Hydrology Study"). GES compared pre-development (pre-1956) and present day peak flows during multiple flow events in the Sand Branch drainage area and determined significant development in the Sand Branch watershed and associated peak flow runoff during precipitation events produce a flashier hydrograph and are likely to have reduced biotic richness consistent with a non-chemical stressor which is likely to cause of a more limited, less rich, and more tolerant species dominated macroinvertebrate complex within water features draining to Sand Branch and Sand Branch itself.

⁵ See Environmental Laboratory. 1987. "Corps of Engineers Wetlands Delineation Manual," Technical Report Y-87-1. U.S. Army Engineer Waterways Experiment Station. Vicksburg, MS (cited at [Wetlands & Streams | Virginia DEQ](#)).

⁶ See email from Sarah Sivers, VDEQ, to Dennis Cumbie, Loudoun County, Water & Environmental Programs Division Manager, regarding CUBR-905-P-2009 data sheets and inconsistency between GIS fieldwork and GIS mapping of Sand Branch and perenniality break point, Aug. 4, 2021; email from David Ware, Loudoun, and Dennis Cumbie, Loudoun, determining perenniality downstream around Pleasant Valley, "our estimate is that perenniality begins in the commercial center further downstream.", July 26, 2021.

⁷ Regulations implementing the Virginia Water Control Act expressly include intermittent in the definition of "surface waters." Ephemeral features are therefore not considered "surface waters" for purposes of Virginia's Water Control Act jurisdiction. 9VAC25-31-10.

II. EPA and VDEQ Guidance Require Distinction Between Waters Impaired by Pollution or Alteration from Impairment by a Pollutant

It is not uncommon that a waterbody may be assessed as impaired, but due to pollution or alteration, not caused by a pollutant. U.S. EPA identifies these water features as Category 4C waters described as follows:

Category 4c: One or more designated uses are impaired or threatened* but establishment of a TMDL is not required because the impairment or threat is not caused by a pollutant (Category 4C).

When biological data and information indicates that the impairment is not caused by a pollutant, the Assessment Unit may be placed in Category 4C.

U.S. EPA Integrated Reporting Categories and How ATTAINS Calculates Them (U.S. EPA ver. 8/31/2018).⁸ See also U.S. EPA, What's New in Impaired Waters and TMDLs clarifying how to assess and assign waters impaired by "pollution" not caused by a "pollutant" to Category 4C." In its guidance on the 2024 303 implementation and integrated list, EPA specifically identifies 'effects of hydrologic and habitat alteration' as a basis for appropriate use of Subcategory 4C. EPA makes clear "[w] here a water is not meeting applicable WQS due to non-pollutant pollution – for example anthropogenic hydrologic and habitat alteration – the water/non-pollutant impairment may be placed in IR Subcategory 4c." U.S. EPA, Information Concerning 2024 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions (March 29, 2023), at 29.⁹ As to category 4C, EPA states Climate change is exacerbating the water quality effects of hydrologic and habitat alteration and EPA continues to encourage states, territories, and authorized tribes to more fully monitor, assess, and report the impacts of all types of pollution, thereby improving the opportunities for increasing resilience and restoration of these waters. *Id.* In addition to EPA's general guidance requirements to assess anthropogenic hydrologic alteration as a TMDL Category 4C non-TMDL determination, with respect specifically to macroinvertebrate impairment, EPA explains that VDEQ must assess non-chemical stressors- specifically flow alteration, physical characteristics, and other influences.¹⁰

The CWA and Water Control Law require VDEQ to utilize all readily available and existing information in development of its CWA Section 303 and Chapter 720 determinations. However, VDEQ has failed to assess anthropogenic hydrologic and habitat alteration of the over 60 percent developed and impervious discharge in the Sand Branch watershed which has anthropogenically altered habitat and hydrology of Sand Branch. The effect and alteration are most pronounced in the Upper Reach of Sand Branch, because there is no flow in that reach except in response to precipitation events, other than the periodic permitted Chantilly discharge which is also sporadic

⁸ https://www.epa.gov/sites/default/files/2018-09/documents/attains_calculations_of_epa_ir_categories_2018-08-31.pdf.

⁹ See also See Environmental Laboratory. 1987. "Corps of Engineers Wetlands Delineation Manual," Technical Report Y-87-1. U.S. Army Engineer Waterways Experiment Station. Vicksburg, MS (cited at Wetlands & Streams | Virginia DEQ).

¹⁰ EPA Stressor Identification Guidance Document, EPA 822/B-00/025 (Dec. 2000), DEQ's 2021 Stressors Analysis incorporates the EPA Stressor Identification Guidance Document, EPA 822/B-00/025 (Dec. 2000), at ES-1.

and based upon precipitation and groundwater with controlled releases to allow for water quality improvements.

EPA provided VDEQ guidance as to the requirement to make these determinations regarding hydrologic effects and analyze potential exclusion of waters impaired for pollution – i.e. hydrologic – effects under Category 4C in its 2006 CWA Section 303 guidance, and in numerous subsequent guidance and directives including the August 13, 2015 guidance to VDEQ and states and the recent 2023 guidance for the 2024 303(d) and integrated waters list.¹¹ EPA’s 2015 guidance specifically included as a major guiding principle for state Section 303 implementation “clarifying how to assess and assign waters impaired by “pollution” not caused by a “pollutant” to Category 4C.” For the Sand Branch 303 implementation – listing and TMDL – VDEQ has no information and no analysis regarding pollution and pollutant determination and accordingly has not established basis for the TMDL work and therefore the TMDL, and listing, is subject reversal. Being scientifically flawed, Chantilly requests VDEQ properly consider all readily available and existing information including that provided in this letter and in our recent communications with VDEQ and the Technical Advisory Committee and make a determination regarding pollution versus pollutant effects as to Sand Branch prior to embarking on a TMDL. Without the required analysis, VDEQ’s wasteload allocation decisions are certain to be scientifically, and legally, flawed and in error sufficient to place the entire TMDL process in jeopardy.

The 2024(d) list itself does not identify a pollutant or pollution, which is required by EPA and VDEQ guidance and the Clean Water Act. The appropriate categorization is Category 4c: One or more designated uses are impaired or threatened* but establishment of a TMDL is not required because the impairment or threat is not caused by a pollutant (Category 4C).

III. DEQ Failed to Evaluate Readily Available Data and Information for the 2024 303(d) List

Environmental Protection Agency guidance and regulation explain that in developing Clean Water Act (CWA) 303(d) listing and impairment decisions, VDEQ should assess non-chemical stressors, specifically flow alteration, physical characteristics, and other influences.¹² The EPA guidances from 2006 through 2023 cited above direct VDEQ to consider hydrologic effects as part of the Section 303, and Chapter 120, analysis. Chantilly has previously provided data and information showing that Sand Branch is significantly affected by development which is the precise anthropogenic hydrologic and habitat alteration discussed in EPA guidance (above), and directed to a Category 4C non-TMDL decision under EPA’s guidance to VDEQ since 2006. The project reaches are in the Triassic Lowlands sub-region of the Piedmont Physiographic Region. As explained more fully in the GES study and below, Triassic Basin streams are unique and not like streams located outside of the Triassic Basin. Triassic Basin streams are highly susceptible to non-point source run-off and the associated impairments including incision,

¹¹ Information Concerning 2016 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions, U.S. EPA Aug. 13, 2015 (Attached)(https://www.epa.gov/sites/default/files/2015-10/documents/2016-ir-memo-and-cover-memo-8_13_2015.pdf); “Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act

¹² EPA Stressor Identification Guidance Document, EPA 822/B-00/025 (Dec. 2000), DEQ’s 2021 Stressors Analysis incorporates the EPA Stressor Identification Guidance Document, EPA 822/B-00/025 (Dec. 2000), at ES-1; 40 CFR 130.7(c)(1) requires that TMDLs must take into account critical conditions for stream flow, ... as part of the analysis.

entrenchment, head-cutting, channel widening, loss of or very unstable benthic habitat, high levels of bed load and suspended sediments, and high levels of Total Dissolved Solids (TDS). Increases to the amount of urban development and impervious surfaces in a Triassic Basin floodplain will accelerate the trend toward reach impairment.¹³

A. DEQ Acknowledges the Watershed is Highly Developed and Has Received Data and Information for the Record, but Has Not Assessed Hydrology and Development Effects on Impairment

Chantilly has long held that the cause of the impairment in the Sand Branch is non-point source pollution from burgeoning development in the watershed and that VDEQ's reliance on outdated land use data skewed the stream assessment by failing to account for these effects.¹⁴ Records obtained under the Virginia Freedom of Information Act (FOIA) reveal Fairfax County (FFC) representatives warned that increased urbanization, the Washington Dulles Airport, and land use changes such as the development of data centers could have a significant impact on County waterways.¹⁵ FFC questioned the adequacy of VDEQ's data and commented that "something around 2000 started altering water quality in the main stem" and the best approach for DEQ is to find out what changed in the watershed, starting around 2000.¹⁶ At the same time, FFC presented VDEQ with information on naturally occurring high conductivity in Triassic basin streams¹⁷ and suggested consideration of the Triassic influence as a factor in the Sand Branch impairment and TMDL.¹⁸

VDEQ acknowledged that the Sand Branch watershed is impaired by substantial development with over 60 percent, or 352 acres, of the 879 acre watershed developed. VDEQ did not, however, consider the watershed impairment as a cause, even a partial cause, of the absence of macroinvertebrate community composition consistent with VDEQ VSCI criteria for non-

¹³ See GES analysis (2024), at 2-3.

¹⁴ Chantilly expressed concerns with VDEQ's analysis through participation on the Technical Advisory Committee and in written comments on March 31, 2023, July 25, 2023, August 2, 2023 (TAC submissions), and in meetings with the agency on September 26, 2023 meeting with VDEQ Director Mike Rolband, and November 16, 2023 VDEQ site visit.

¹⁵ VFOIA-88184 Response Documents, email from Bryant Thomas, VDEQ, to Takisha Cannon, FFC, addressing FFC's comment that "the primary threat to water quality in the Occoquan watershed is impervious surface", Dec. 4, 2019.

¹⁶ VFOIA-88184 Response Documents, email from Christopher Ruck, FFC to Jonathan Witt, Shannon Curtis, Chad Grupe, LeAnne Astin, May 28-29, 2020; email from Shannon Curtis to Chris Ruck, Jonathan Witt, Chad Grupe, LeAnne Astin, FFC, "so where does this leave us? Are you saying that all this data is basically useless for us to glean anything from?" May 29, 2020.

¹⁷ See VDEQ FOIA Response documents, email from Shannon Curtiss, Chief of Watershed Assessment Branch, Fairfax County, to Sara Sivers, VDEQ, "my group raised the red flag to DEQ and EPA that the Triassic Basin is very different than the surrounding piedmont" June 10, 2020; see presentation on Triassic Basin prepared by Fairfax County.

¹⁸ Fairfax County PPT presentation, 2019, "Triassic Lowlands, a unique region in the Piedmont."; email from Jonathan Witt, FFC, to William Isenberg and Sarah Sivers, VDEQ, conveying "Countywide Increases in Fairfax Stream Conductivity, 2004-2017" illustrates elevated specific conductance (SPC) around 2010 when the County experienced two 36 inch snowstorms in one season and sites located in the Triassic Basin had elevated background levels of SPC due to underlying physiography, recommends factors contributing to high conductivity such as increased winter salt application rates, new development since the last GIS land use layers and the inability of streams and waterbodies to process the salt may all contribute.

Traissic waterbodies. EPA's Stressor guidance which is repeatedly cited in VDEQ's TMDL development documents requires assessment of hydrology as a stressor as to macroinvertebrate communities, and the EPA CWA 303 implementation guidance also requires VDEQ to assess anthropogenic hydrologic and habitat alteration. The EPA Stressor guidance requires VDEQ to apply an iterative approach identifying first all causes of impairment. Development, lack of flow, anthropogenic hydrologic and habitat alteration are the primary cause of impairment to macroinvertebrate criterion but are not assessed.

The Sand Branch impairment is macroinvertebrate community, and it is well known and established that streams in developed watersheds exhibit flashier hydrograph, elevated concentrations of nutrients and contaminants, altered channel morphology, and reduced biotic richness, with increased dominance of tolerant species. Walsh, C.J., Roy, A.H., Feminella, J.W., Cottingham, P.D., Groffman, P.M., and Morgan, R.P., II, 2005b, The urban stream syndrome—Current knowledge and the search for a cure: *Journal of the North American Benthological Society*, v. 24, no. 3, p. 706–723. This is exactly what VDEQ found in Sand Branch, as discussed below. For Sand Branch, in fact, the macroinvertebrate score was *higher* in the Upper Reach where the flashy hydrograph is less pronounced, clearly supporting a finding of anthropogenic hydrologic and habitat alteration as cause or stressor to Sand Branch in accordance with CWA Section 303 and Chapter 120 guidance.

To support Chantilly prior comments to VDEQ, Chantilly requested GES to perform a hydraulic study on Sand Branch, where analysis focused on pre-development (pre-1956) and present-day peak flows during multiple flow events (1-year to 100-year) based on precipitation-based run-off events in the Sand Branch drainage area. The hydrology study, attached as **Attachment A** shows the upper reaches of Sand Branch are mostly dry,¹⁹ flowing only in response to Chantilly's permitted discharge and stormwater runoff from new development in the watershed, 60% or 352 acres of the 879- acre watershed is developed.²⁰

GES found that due to the precipitation related hydrologic discharge from development, Sand Branch is stripped of any substrate more substantial than silt or sand. GES also found that the bed was essentially featureless with no bedform (riffles, pools, glides or runs) for multiple hundreds of feet as documented with long profiles, cross sections, and pebble counts. GES concluded that based upon their study, assessments of habitat, stream flow assessments, and stream stability assessments, Sand Branch habitat is impaired due to hydrologic alteration from development. Therefore, the resulting low VSCI scores are due to the lack of habitat and not a pollutant. Under EPA guidance, the proper TMDL category for Sand Branch is therefore Category 4C – water not meeting applicable WQS due to non-pollutant pollution – for example anthropogenic hydrologic and habitat alteration. See U.S. EPA, Information Concerning 2024 Clean Water Act Sections

¹⁹ **Attachment A**, Groundwater & Environmental Services, Inc., *Chantilly Crushed Stone, Inc. Sand Branch and Reference Reach HEC Hydrologic and Hydraulic Analysis*, April 9, 2024. GES compared pre-development (pre-1956) and present day peak flows during multiple flow events in the Sand Branch drainage area and determined significant development in the Sand Branch watershed and associated peak flow runoff during precipitation events produce a flashier hydrograph and are likely to have reduced biotic richness consistent with a non-chemical stressor which is likely to cause of a more limited, less rich, and more tolerant species dominated macroinvertebrate complex within water features draining to Sand Branch and Sand Branch itself.

²⁰ See Environmental Laboratory. 1987. "Corps of Engineers Wetlands Delineation Manual," Technical Report Y-87-1. U.S. Army Engineer Waterways Experiment Station. Vicksburg, MS (cited at Wetlands & Streams | Virginia DEQ).

303(d), 305(b), and 314 Integrated Reporting and Listing Decisions (March 29, 2023), at 29; see also citations in Section II, above.

The analysis provides the geomorphic characteristics, bankfull and peak flows of Sand Branch under the pre-development and current conditions. The study provides VDEQ with a more informed understanding of the level of degradation that has occurred in Sand Branch resulting from development, and the effects of the degradation on the channel habitat and the presence of aquatic biota. The results indicate that the significant development and addition of impervious surface in the Sand Branch watershed, and associated peak flow runoff during precipitation events, produce a flashier hydrograph and are likely to have reduced biotic richness consistent with the scientific literature, representing a non-chemical stressor which is likely cause of a more limited, less rich, and more tolerant species dominated macroinvertebrate complex within water features draining to Sand Branch and Sand Branch itself.

The GES Study results indicate that the significant development and addition of impervious surface in the Sand Branch watershed, and associated peak flow runoff during precipitation events, produce a flashier hydrograph and are likely to have reduced biotic richness consistent with the scientific literature, representing a non-chemical stressor which is likely cause of a more limited, less rich, and more tolerant species dominated macroinvertebrate complex within water features draining to Sand Branch and Sand Branch itself. VDEQ's failure to consider this available data resulted in a skewed analysis.

B. DEQ Has not Considered Established Data and Information Demonstrating the Upper Reach of Sand Branch is a Dry Drainage Naturally Unsuitable to Support Macroinvertebrate Water Quality Criteria

As part of readily available data and information for this 303(d) List determination, Chantilly requested VDEQ to conduct observation of Sand Branch during periods in which there was (1) no precipitation related hydrology in Sand Branch, and (2) Chantilly's permitted periodic discharge was zero. On October 26, 2023, some five years after the initial impairment listing and two years into development of the TMDL, VDEQ staff walked down the dry ditch line of the Upper Reach of Sand Branch to Willard Road and verbally expressed surprise with the little to no flow condition of the stream where Chantilly's discharge was absent, and there was no ongoing precipitation related flow. Chantilly has been commenting and providing this information for several years for the record. VDEQ acknowledged the dry condition of no flow impossible to support macroinvertebrate communities as per water quality standards criteria. Further, VDEQ acknowledges in its VIRGINIA'S 2024 305(b)/303(d) Water Quality Assessment Integrated Report (April 2024) that smaller streams, which Sand Branch certainly would qualify and the Upper Reach would not even qualify, that stressors such as hydrology would have a much more pronounced impact: "This may suggest that, given a similar amount of stress, larger streams are more resilient to stress while smaller streams demonstrate a stronger response to stress." *Id.* at 113. VDEQ categorizes a small stream as one with a watershed of 10 square miles. Sand Branch is identified in VDEQ records as 800 acres in size, just over 1 square mile in size, and accordingly is amongst the smallest of basins or stream orders in VDEQ's 2024 integrated report.

However, to date VDEQ has not assessed this information from October 26 or other information from Chantilly or other readily available data and information as to the hydrologic characteristics of Sand Branch and has acted contrary to findings of the 2024 Integrated Report.²¹

In addition to EPA's general guidance requirements to assess anthropogenic hydrologic alteration as a 303(d) list Category 4C non-TMDL determination (discussed above), with respect specifically to macroinvertebrate impairment EPA explains that VDEQ must assess non-chemical stressors- specifically flow alteration, physical characteristics, and other influences.²² Here, as the GES study establishes, the hydrologic flow alteration is "highly augmented" as acknowledged by VDEQ, but not considered or assessed as a stressor or cause of impairment. See 2021 Stressors Analysis at 96. VDEQ's failure to consider these non-chemical stressors led to use of the wrong macroinvertebrate benchmarks for determining impairment of the upper segment of the Sand Branch and similarly resulted in a flawed listing determination.²³

C. DEQ Has Not Quantified Natural and Nonpoint Source Background for Conductivity, Dissolved and Undissolved Solids Prominent in this Triassic Watershed

Chapter 120 and CWA Section 303 require accurate identification of background condition as part of baseline and determination as to whether pollution, pollutant, or background is cause of water quality criteria deviation. Natural and nonpoint source loads should be distinguished.

Chantilly obtained information showing that VDEQ has been aware of specific high conductivity and dissolved and undissolved constituents naturally occurring in Sand Branch due to its geomorphology. VDEQ's August 2021 TMDL development document acknowledges that VSCI scores were negatively correlated with conductivity and that this natural condition indicates that specific conductivity may play a significant role in Sand Branch and the ecoregion (see 6.7.3). VDEQ found that Sand Branch maintains a high baseline conductivity level from underlying geology and during storm events but has not as required quantitatively assessed the natural and nonpoint source baselines as required under EPA and VDEQ guidance.

The GES study addresses these issues regarding influence of location of the Sand Branch in the Triassic Lowlands sub-region of the Piedmont Physiographic Region. The underlying geology of the Triassic Lowlands is unique within the Piedmont and influence the geomorphologic, geochemical, hydrologic, and ecologic characteristics of the local watersheds, floodplains, and streams. Triassic Basin soils are comprised of siltstones, sandstones, shales, conglomerates, and diabase materials that have high clay content and low permeability and infiltration rates, which decreases the time of concentration and increases run-off even on forested or other vegetated surfaces. The resulting non-point source run-off onto floodplains and into streams is rapid even in undeveloped conditions.

²¹ We note that the TMDL and 303 record also appears completely absent of readily available information and data which would be found under the Virginia Stormwater Management Act program and potentially as part of political subdivision, municipal and county programs overseen by VDEQ relating to hydrology, development, impervious surface, and other anthropogenic hydrologic alterations as specified in EPA 303 and Chapter 120 guidance.

²² EPA Stressor Identification Guidance Document, EPA 822/B-00/025 (Dec. 2000), DEQ's 2021 Stressors Analysis incorporates the EPA Stressor Identification Guidance Document, EPA 822/B-00/025 (Dec. 2000), at ES-1.

²³ Id.

The soils in the Triassic Lowlands are highly erodible and streams flowing in them are very susceptible to incision and entrenchment (i.e. down cutting and disconnection from the floodplain). The streams are typically located on wider than normal floodplains, where shallow channels (Rosgen C Channels) are the common bedforms. Also, the flow is typically slower than normal due to little or no groundwater input because of the epiaquic or perched water table, which makes the streams very flashy and prone to rapid dry up - especially in low order streams. The riffles in these streams are generally comprised of flat and platy rocks versus the proto-typical rounded river rock. The flat and platy rocks are prone to mobilization due to hydrodynamic lift created during storm events as the flat shape allows the rocks to be easily lifted and moved - much like the air flow that acts on the wing on a plane that provides lift. Therefore, stream beds in the Triassic Lowlands are highly mobile and prone to being transported downstream, especially when a watershed becomes more developed and storm flows are more regular and more intense.

Based on the foregoing, Triassic Basin streams are unique and not like streams located outside of a Triassic Basin. Triassic Basin streams are highly susceptible to non-point source runoff and the associated impairments including incision, entrenchment, head-cutting, channel widening, loss of or very unstable benthic habitat, high levels of bed load and suspended sediments, and high levels of TDS. Increases to the amount of urban development and impervious surfaces in a Triassic Basin floodplain will accelerate the trends toward reach impairment.

These natural conditions as to the Triassic Basin and higher expected TSS, TDS, conductivity, salts and other natural features have been well known to VDEQ for many years and acknowledged in recent meetings regarding Sand Branch. Failure to evaluate this information is contrary to legal requirements for the 303(d) list and DEQ should revise the listing to remove Sand Branch until an adequate evaluation is performed in accordance with the legal requirements.

D. VDEQ Data is Insufficient to Support a TMDL and Includes Old and Aged Data, and Data Taken During Outlier Conditions Not Representative of Conditions and Impairment Status

The impairment determination, which is the basis for the TMDL regarding the Upper Drainage, is not legally and scientifically accurate, or robust enough from a data and statistical standpoint to support listing or TMDL for the Sand Branch. The TMDL support documents issued by VDEQ state the sole basis for Clean Water Act Section 303(d), 33 U.S.C. 1313(d) identification and listing are “based upon assessment of the benthic macroinvertebrates, meaning there is not a healthy and diverse community.” However, the lack of macrobenthos in general and lower than average VSCI scores were only attributed to poor water quality and not the more obvious lack of habitat caused by the altered hydrology, despite clear guidance requiring assessment of flow and hydrology in U.S. EPA guidance and scientific literature.

1. VDEQ Relies on Data Older than Required under 303 and Chapter 120 Guidance

The water quality data underlying the initial impairment listing of Sand Branch is both old and lacking in frequency such that it is over seven years old and does not reflect current conditions. Specifically, the aquatic life use impairment, which is the basis of VDEQ’s impairment determination and focus of VDEQ’s water quality study, was based upon the Virginia Stream Condition Index (VSCI) assessment of two biological monitoring events, in the Spring and Fall of

2016 at stations 1ASAN000.34 (at Route 609) and 1ASAN001.45 (at Route 639) (Table 1-1). Guidance disfavors use of data greater than five years for 305(b) and 303(d) listing decisions, and by extension TMDLs, and data regarding the Upper Reach has been infrequent. Full reports and data are absent. There is reference to 2020 macroinvertebrate sampling in TMDL support documents, but no results are available. In addition, we have serious concerns with the biological monitoring conducted. VDEQ's sampling, conducted in March (too early to obtain representative) and August (too late). In VDEQ's development of VSCI, only 3 out of 247 reference samples were taken in March, or 1.2%, meaning that compared to VSCI scores, March samples are an outlier. See Figure 1, below:

Benthic Index for Virginia

Table 3-2. Description of data in 62 Virginia non-coastal classification/development Reference sites (247 samples).

A. Number of Reference Sites and Samples by Ecoregion						
	#45 Piedmont	#64 Northern Piedmont	#66 Blue Ridge	#67a & #67f Limestone valleys	#67 Ridge & Valley w/o Limestone Valleys	#69 Central Appalachians
# Sites	4	7	8	15	23	5
# Samples	22	48	22	64	82	9
B. Number of Reference Sites and Samples by DEQ Administrative Region						
	1 Southwest	2 West Central	3 Valley	4 Northern	5 Piedmont	
# Sites	23	10	19	9	1	
# Samples	57	63	59	62	6	
C. Number of Reference Samples by Month and Year Sampled						
	1994	1995	1996	1997	1998	ALL
January				1		1
February						0
March		1		1	1	3
April	1	5	6	6	4	22
May		20	22	16	10	68
June			4	1	12	17
July		1			1	2
August				3		3
September	2	2		7	5	16
October	20	14	12	19	11	76
November	8	5	5	4	7	29
December	1	3		6		10
ALL	32	51	49	64	51	247
D. Number of Reference Sites and Samples by Stream Order						
Order:	1	2	3	4		
# Sites	3	11	25	23		
# Samples	23	46	94	84		
E. Number of Reference Sites and Samples by Alkalinity/Gradient						
	High Alk, Low Grad	High Alk, High Grad	Low Alk, Low Grad	Low Alk, High Grad		
# Sites	15	8	18	21		
# Samples	52	26	79	90		

Figure 1: A Stream Condition Index for Virginia Non-Coastal Streams, Tetra Tech (Sept. 2003)("2003 VDEQ VSCI Report"), prepared for U.S. EPA and VDEQ, at 3-14.

Problems and confounders with the March timing combined with the effluent dominated hydrologic regime of the Upper Segment, which demonstrates identified macroinvertebrates are consistent with scientific literature characterizing intermittent, not perennial, streams are discussed below.

Based upon the 2003 VDEQ VSCI Report, the March 8, 2016, and March 11, 2020 are invalid for a comparison of VSCI scoring because the samples were taken during the outliers 1.2% probability that the macroinvertebrate community would be within the reference stream values. No samples were taken for VSCI in February, and the Upper Segment samples taken March 8, 2016, and March 11, 2020 are outside the reliable scope of VSCI reference.

VDEQ characterizes samples taken on March 8, 2016, as 'spring' samples, however, the sample dates are so early as to be significantly influenced by winter temperatures, when macroinvertebrate populations are naturally depressed due to life cycles of macroinvertebrates. A more appropriate and less biased approach would require sampling in mid- to late-June. VDEQ acknowledges that VSCI scores have fluctuated by season. In addition, VDEQ used 200 count as a threshold, but this threshold was not applied or met with 2020 samples. Johnson et al. recommend, to minimize potential biases in quantifying taxa diversity, 300 minimum count is often applied.

In addition to being aged, VDEQ has insufficient data to support a 303(d) listing. Section 303(d) requires VDEQ to assess waters of the state, and this requirement creates an incentive due to limited state water quality resources to overstate the number of waters that are actually properly assessed. VDEQ reports 20 percent of waters have been assessed, but as noted herein Sand Branch has not been assessed since 2018, according to the 2024 Draft 303(d) list. VIRGINIA'S 2024 305(b)/303(d) Water Quality Assessment Integrated Report (April 2024) at 2. DEQ however reports 3,421 water quality monitoring stations for which data was collected from 2017 to 2023, and three quarters of a million data points (755,459) used in the 2024 list. *Id.* at 32. Sand Branch clearly has not been assessed consistent with VDEQ's data collection efforts applied elsewhere in the 2024 Integrated list, and so at face value the lack of data would not meet VDEQ's own standards.

The problem of using old and outlier data is exacerbated and the data insufficient for TMDL development due to the known additional impacts on macroinvertebrate community and habitat from the naturally high and background conductivity and solids in this Triassic watershed, and the substantial development causing anthropogenic hydrologic and habitat alteration, which are known and acknowledged by VDEQ. See Section II.A-D, above. EPA recognizes these uncertainties and recommends "in some circumstances, due to a lack of sufficient data or significant uncertainties, it may be particularly challenging to determine suitable approaches for addressing an impairment, particularly where a state, territory, or authorized tribe believes that climate change effects may have an important impact on pollutants and impairments. In such cases states, territories, and authorized tribes may consider these challenges when setting their priorities for TMDL development as further information is developed." U.S. EPA, Information Concerning 2024 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions, at 30.

2. VDEQ's Limited and Old Data Demonstrate Dominance of Tolerant Benthic Species Consistent with Lack of Flow and High Background Conductivity and Solids

Additionally, the macroinvertebrate sampling data supports the conclusion that the Upper Segment is not perennial, but rather, it flows only in response to Chantilly's discharge. The dominant macroinvertebrate organism identified in the March 8, 2016, macroinvertebrate sampling event as well as the March 11, 2023, event was within the genus Chironomidae. This genus is well known to be among the most common macroinvertebrate taxa in intermittent streams. Pond et al. found that over half of the macroinvertebrate genera observed in a six-month longitudinal study of Western Allegheny headwaters was Chironomidae. Here, the presence of Chironomidae can be attributed to this tolerant species ability to colonize within Chantilly's discharge flow, which provides some beneficial habitat features that would otherwise be absent. Here, over 66 percent of genera in the March 11, 2020, samples are the flow tolerant, Chironomidae, which Pond identifies as associated with intermittent streams when found as the dominant taxa. For the March 8, 2016, macroinvertebrate sampling event, 33% of macroinvertebrates were Chironomidae. Stenelmis was the second most populated genus in the March 2016 sampling event, and first in the March 2020 sampling event. As Straka et al. state, even short-term stream (i.e. days to weeks) drying can substantially alter benthic macroinvertebrate community composition." Both Chironomidae and Stenelmis genera are in the same tolerance grouping, group IV, under the VSCI guidance. The fact that the dominant macroinvertebrate found by DEQ is associated with intermittent, not perennial, streams is yet another indicator that the Upper Segment is not perennial. The interpretation of ecological status based on metrics developed in perennial streams can be misleading (Munné and Prat, 2009, Menció and Mas-Pla, 2010, Wilding et al., 2018). Stenelmis also dominates the August 31, 2016, and September 17, 2020 sampling events, such that the intermittency of the macroinvertebrate population seems clear from the listing data and is supported by Chantilly's permitted discharge, and is not an intermittent feature.

In summary, in terms of identifying impairment using macroinvertebrate genus, the March samples are taken during outliers compared to the VSCI reference data set and should not be used for impairment listings, much less TMDL assessment. VDEQ guidance states that listing decisions will not be based on datasets that are solely targeted or biased. Here, however, the use of early March datasets which are an outlier as to VSCI reference data severely biases the data.

Further supporting this is the very little data VDEQ obtained for the listing, which is also the core data for the TMDL documents. For example, Chironomidae species are a Group IV macroinvertebrate that dominated microbenthic samples taken for the Upper Reach of Sand Branch. There is very strong scientific evidence that Chironomidae species are the dominant macroinvertebrates in intermittent water features. Chironomidae species dominance in intermittent streams are primarily due to drought adaptive strategies employed by the species to find refuges (e.g. hyporheic habitats, use macrophyte cover, building tubes or bury themselves in sediment to avoid desiccation) and other morphological adaptations where larvae can survive the loss of body water. Therefore, the family is more typical of intermittent streams, or even ephemeral, versus perennial streams. Furthermore, the lack whole groups of microbenthic taxa is more a result of non-chemical stressors such as flow alteration, whereby the stream receives flows and corresponding shear values exceeding the D100 and in some cases the D200 values of stone and sediment in this first order stream, thus pushing large volumes of substrate, leaf packs, woody debris, etc. progressively downstream until only a clay bottom is left and no habitat for microbenthic taxa to live, forage, or avoid predators.

E. Information Act Disclosures Show that DEQ Has Improperly Bypassed and Omitted Important Scientific and Legally Required Analysis and Procedures

Chantilly has consistently questioned fundamental VDEQ assumptions in this TMDL and 303/Chapter 120 process and provided data and information to assist VDEQ, but this data and information has largely been ignored. To assist VDEQ, Chantilly engaged professionals in environmental and natural resource consulting and 303/Chapter 120 process and requirements. Recently Chantilly obtained information through Virginia Freedom of Information Act (VFOIA) responses which we submit for the record which show that VDEQ and other stakeholders have been aware of the issues identified above - natural conditions of high conductivity and solids; substantial development; hydrologic and habitat alteration; lack of flow and no flow in the Upper Reach of Sand Branch.

FOIA records suggest that the genesis of the Sand Branch TMDL may be to address Fairfax County's (FFC) concerns with specific conductivity in the Occoquan watershed²⁴ where conductivity levels increased downstream of the confluence of Cub Run and the Sand Branch. Early on, VDEQ worked closely with FFC to share data and observations about Sand Branch.²⁵ In those emails, specific conductivity was a known issue that Fairfax was dealing with and because of that, it became almost the sole focus of the Sand Branch TMDL. FFC's ecologist, Chris Ruck, observed, "It really seems like this is a bit of a fishing exercise to support specific conductivity/salt issue in the OCC."²⁶ As set forth above in Section II.C, due to the geologic history of the Sand Branch watershed within the Triassic basin conductivity levels are naturally elevated. Accordingly, water quality criteria and macrobenthos adaption to higher conductivity and associated parameters is necessary for implementation of CWA Section 303 (impaired waters listing and total maximum daily loads) but this information is all but absent in DEQ's data and analysis to date.

Similarly, VFOIA responses reveal a concerted effort to discount other potential causes of impairment. Communications between VDEQ and FFC show that VDEQ was responding to pressure from FFC largely urging VDEQ to "do something" (emphasis added), and that FFC's Shannon Curtis, appeared to be driving the study to pre-determined conclusions.²⁷ VFOIA

²⁴ VFOIA-88184 Response Documents, Part 2, 141, 156-7, email from Shannon Curtis, Chief, Watershed Assessments Branch, FFC, to FFC staff "so the genesis of the TMDL is largely due to our urging DEQ to do something." Part 2 #141, 156-7.

²⁵ Fairfax County PPT presentation, 2019, "Triassic Lowlands, a unique region in the Piedmont."; email from Jonathan Witt, FFC, to William Isenberg and Sarah Sivers, VDEQ, conveying "Countywide Increases in Fairfax Stream Conductivity, 2004-2017" illustrates elevated specific conductance (SPC) around 2010 when the County experienced two 36 inch snowstorms in one season and sites located in the Triassic Basin had elevated background levels of SPC due to underlying physiography, recommends factors contributing to high conductivity such as increased winter salt application rates, new development since the last GIS land use layers and the inability of streams and waterbodies to process the salt may all contribute.

²⁶ VFOIA-88184 Response Documents, Part 3, 174, email from Christopher Ruck, FFC, to Jonathan Witt, Shannon Curtis, Chad Grupe, LeAnne Astin, May 28-29, 2020; emails between FFC staff regarding data center development and specific conductivity in Cub Run, Part 1, 1-20; see comments on proposal for rezoning for data centers submitted by Catie Torgersen, Nov. 14, 2019, (the primary threat in the Occoquan watershed is impervious surfaces).

²⁷ *Id.* at Part 1, 185, email from Shannon Curtis to multiple FFC staff, June 10, 2020 ("So, the genesis of the TMDL is largely due to our urging DEQ to do something."). This contradicts the well-established scientific method set out in Section 303

response documents show that, FFC had significant influence over the TMDL development, including working closely with VDEQ to draft language responding to suggestions that naturally occurring conditions should be analyzed as a cause for impairment. FFC's Shannon Curtis suggested that VDEQ's response did not "properly rule out naturally occurring conditions that could limit the benthic activity."²⁸ VDEQ's, Sarah Sivers replied that she would review that response and see how she could phrase it better to rule out naturally occurring conditions as a potential cause of impairment.²⁹ VDEQ, at FFC's suggestion, disregarded legitimate data suggesting at least part of the water quality impairment is due to naturally occurring conditions. This approach improperly shifts the burden of addressing TDS to regulated entities, imposing expensive technology requirements with little to no environmental benefit.

Chantilly has long held that the downstream impairment VDEQ seeks to address is caused by non-point source pollution from burgeoning development in the watershed and that DEQ's reliance on outdated land use data skewed the stream assessment by failing to account for these effects.³⁰ For example, Chantilly raised concerns with potential PFAS discharges from adjacent landowners, Dulles Airport (firefighting training facility), into the Chantilly segment, but VDEQ refused to consider any data beyond the original scope of the study.³¹ Other TAC members shared this view, including staff with FFC, Department of Public Works and Environmental Services. Records obtained through VFOIA reveal FFC suggested that increased urbanization, the Washington Dulles Airport, and future land use changes such as the development of data centers could have a significant impact on County waterways.³² FFC commented that "something around 2000 started altering water quality in the main stem" and the best approach for DEQ is to find out what changed in the watershed, starting around 2000.³³ At the same time, FFC presented VDEQ with information on naturally occurring high conductivity in Triassic basin streams and suggested

²⁸ See email from Shannon Curtis to Sarah Sivers, encouraging revisions to VDEQ's Response to Comments on the TMDL Benthic Study suggesting there may be naturally occurring conditions limiting the benthic community health. "The justification in the last paragraph, while sound in its approach, does not rule out the possibility of TDS (toxicity) coming from groundwater. The first paragraph seems to imply that the quarry effluent WQ predominantly defines (or alternatively, is similar in composition to) the WQ within Sand Branch. I don't think the approach being employed for the TMDL endpoint in any way eliminates the possibility of the toxicity of the TDS originating from groundwater. I don't see the connection there that makes monitoring the GW unnecessary.", August 17, 2021.

²⁹ Id.

³⁰ Chantilly comment letters March 31, 2023, July 25, 2023, August 2, 2023, September 26, 2023 meeting with VDEQ Director Mike Rolband, November 16, 2023 VDEQ site visit.

³¹ Email from Jeff Talbott, DEQ, to Stephanie Bellotti, DEQ, Jan. 17, 2023, "Stephanie, I do not think we should open the discussion on PFAS. We conducted this study years ago and the parameters chosen then were those of concern. I think they [Chantilly] are trying to deflect to other issues. This is a completely different issue and should be addressed differently than in the context of the past study. They just want to make it someone else and not them causing the problem"; Letter from Thomas Faha, Northern Regional Director to Robert Lanham, Virginia Transportation Construction Alliance, Aug. 22, 2022, "DEQ recognizes that there may be other stressors such as PFOA/PFOS, and a myriad of chemicals found in urban runoff, but the data on these, including what you provided, do not warrant changing the results of the stressor analysis."

³² VFOIA-88184 Response Documents, email from Bryant Thomas, VDEQ, to Takisha Cannon, FFC, addressing FFC's comment that "the primary threat to water quality in the Occoquan watershed is impervious surface, Dec. 4, 2019.

³³ VFOIA-88184 Response Documents, email from Christopher Ruck, FFC to Jonathan Witt, Shannon Curtis, Chad Grupe, LeAnne Astin, May 28-29, 2020; email from Shannon Curtis to Chris Ruck, Jonathan Witt, Chad Grupe, LeAnne Astin, FFC, "so where does this leave us? Are you saying that all this data is basically useless for us to glean anything from?" May 29, 2020.

consideration of the Triassic influence as a factor in the Sand Branch TMDL.³⁴ VDEQ dismissed these significant pollution sources and geological differences and instead decided to pursue point source discharges of primarily three pollutants, among them total dissolved solids (TDS).

In response to FFC's suggestion that VDEQ should evaluate changes in the watershed post-2000, Chantilly provides three maps spanning the area between 2002 and 2020, Attachment B. These maps illustrate the drastic increase in development, including buildings, parking lots, and overall impervious surface during this time period. Furthermore, these photographs are consistent with the spike in specific conductivity during this same timeframe and what would be expected considering the changes in land use depicted. These photographs and communications provide compelling evidence that VDEQ's study is designed to support a pre-determined outcome while ignoring available, credible evidence of non-point pollution and other factors that must be considered.

F. DEQ's 303(d) List Draft is Legally Flawed and Must be Revised to Remove Sand Branch, or Properly Identify Impairment as a 4c Category Pollution, not Pollutant, Based Impairment

VDEQ dismissed these significant pollution sources and geological differences in making its listing determination. Documents issued by VDEQ state the sole basis for Clean Water Act Section 303(d), 33 U.S.C. 1313(d) identification and listing of the Sand Branch is "based upon assessment of the benthic macroinvertebrates, meaning there is not a healthy and diverse community."³⁵ However, the lack of macrobenthos in general and lower than average VSCI scores were only attributed to poor water quality and not the more obvious lack of habitat caused by the altered hydrology; despite clear guidance requiring assessment of flow and hydrology in U.S. EPA guidance and scientific literature. VDEQ's failure to consider these non-chemical stressors led to use of the wrong macroinvertebrate benchmarks for determining impairment of the upper segment of the Sand Branch and similarly resulted in a flawed listing determination.³⁶

Chantilly provides three maps spanning the area between 2002 and 2020 to answer the question, "what changed in the watershed?" and illustrate the drastic increase in development, including buildings, parking lots, and overall impervious surface during this period. Indeed, the documented spike in specific conductivity during this same timeframe is consistent with what would be expected considering the changes in land use depicted. These photographs and communications provide compelling evidence that VDEQ relied on outdated land use data and ignored evidence of significant land development in making water quality decisions in the Sand Branch, beginning in 2018 and continuing today.

³⁴ See VDEQ FOIA Response documents, email from Shannon Curtiss, Chief of Watershed Assessment Branch, Fairfax County, to Sara Sivers, VDEQ, "my group raised the red flag to DEQ and EPA that the Triassic Basin is very different than the surrounding piedmont" June 10, 2020; see presentation on Triassic Basin prepared by Fairfax County.

³⁵ Stressor Analysis to Identify Probable Stressors to the Impaired Benthic Macroinvertebrate Community in the Sand Branch Watershed (VDEQ 2021)("2021 VDEQ Stressors Analysis"), at 1. <https://www.deq.virginia.gov/home/showpublisheddocument/10571/637662595915270000>.

³⁶ Id.

CONCLUSION

VDEQ's reliance on outdated data and failure to consider hydrological influences in the Sand Branch biased VDEQ's listing determination in 2018 and the Total Maximum Daily Load (TMDL) currently under development. VDEQ dismissed available scientific evidence that poor stream conditions, combined with the intermittent flashy and dry periods of a Triassic Basin, results in a channel condition devoid of macro-benthos habitat. Even when macro-benthos are trying to establish in the stream, peak flows are inhospitable for a significant macro-benthos population establishment. Available data indicate that the significant development and addition of impervious surface in the Sand Branch watershed, and associated peak flow runoff during precipitation events, produce a flashier hydrograph and are likely to have reduced biotic richness consistent with the scientific literature, representing a non-chemical stressor which is likely cause of a more limited, less rich, and more tolerant species dominated macroinvertebrate complex within water features draining to Sand Branch and Sand Branch itself.

For these reasons, Chantilly requests that VDEQ propose to delist the Sand Branch in the 2024 Integrated Report and State 303(d) list. The scientific evidence supports listing Sand Branch on VDEQ's List of Naturally Impaired Waters (Category 4C) No TMDL Needed.³⁷ This is warranted where a water is impaired or threatened for one or more designated uses but does not require a TMDL because the impairment is not caused by a pollutant and/or is determined to be caused by natural conditions.

Please contact Edward Hoy IV at edhoy4@gudelskygroup.com should you have any questions.

Respectfully Submitted,



Edward Hoy IV
Chantilly Crushed Stone Inc.

CC: Sandra Mueller, Water Monitoring and Assessment Program Manager, DEQ
Elizabeth McKercher, Director, Water Planning, DEQ
Justin Williams, Director, Office of Watersheds and Local Government Assistance Programs, DEQ
Margaret Dannemann, Water Quality Planning and Assessment, DEQ
Sarah Sivers, Water Permits and Planning, DEQ
Scott Morris, Director of Water, DEQ
Mike Rolband, Director, DEQ
Jennifer Walle, Deputy Secretary of National and Historic Resources
Phil Skorupa, Director, Mineral Mining, Gas and Oil Programs
Emily Coyner, Senior Director, NSSGA

³⁷ List of Category 4C Naturally Impaired Waters ([virginia.gov](http://www.virginia.gov)) available at www.virginia.gov

May 22, 2024

Page 18 of 18

Gordan Dixon, Executive Vice President, VTCA
Rob Lanham, Aggregate Program Manager, VTCA

DEQ Response to Chantilly Crushed Stone

DEQ appreciates the opportunity to respond to Chantilly Crushed Stone Inc.'s (CCS) comments on the 2024 Water Quality Assessment Integrated Report (IR) regarding the Sand Branch impairment listing and on-going Total Maximum Daily Load (TMDL) study. A number of comments and concerns outlined in the IR comment letter are those that CCS had previously shared with DEQ during the TMDL development process addressing the aquatic life impairments in Sand Branch. These comments were addressed in a letter from DEQ to CCS dated August 21, 2023, which is included for reference as Attachment 1. Responses to comments not previously addressed by DEQ in the referenced correspondence are provided below.

Evaluating benthic macroinvertebrate assemblages to assess the aquatic life designated use status of wadable streams is well established in most states, including Virginia. Sand Branch does not support the aquatic life designated use based on DEQ's evaluation of biological monitoring of the benthic macroinvertebrate community. The 303(d)-impairment determination for Sand Branch was first identified during the 2018 Water Quality Assessment Integrated Report (IR) cycle based on data collected in 2016. DEQ conducted biological monitoring again in 2020, and the evaluation of these data support the original assessment determination that Sand Branch does not support the aquatic life designated use. In the comment letter submitted for the 2024 IR, CCS raised a number of concerns on the technical merit of the Sand Branch benthic macroinvertebrate monitoring and the aquatic life designated use impairment determination. Based on thorough evaluation of the data and methods used, Virginia DEQ supports the biological monitoring and the assessment determination completed for Sand Branch and offers the following responses on biological monitoring and assessment.

- The 2016 and 2020 Sand Branch benthic monitoring events occurred within acceptable spring and fall sampling windows per DEQ's biological monitoring Quality Assurance Project Plan². DEQ's sample index period for spring sampling is March 1 through May 31 and for fall sampling the sample index period is September 1 through November 30. Professional judgment is applied when sample dates occur near seasonal cutoffs due to temperatures or weather events. DEQ applies a 2-week buffer between seasons to account for seasonal uncertainties.
- The upstream Sand Branch biological monitoring station, 1ASAN001.45, is located on a stream of appropriate size and with appropriate flow for benthic macroinvertebrate monitoring for assessment purposes. While the 1ASAN001.45 station falls within a small stream, several streams of this size and within this ecoregion were used to develop and validate the Virginia Stream Condition Index (VSCI)³ for bioassessment and for the

² DEQ Biological Monitoring Program, Quality Assurance Project Plan for Wadeable Streams and Rivers: <https://www.deq.virginia.gov/home/showpublisheddocument/6996/637520993335570000>

³ [A Stream Condition Index for Virginia Non-Coastal Streams, USEPA, Tetra Tech, VA DEQ, September 2003](#)

application of biocriteria. It is not uncommon for streams of this size to be included within DEQ's biological and probabilistic monitoring networks.

- The Virginia Stream Condition Index (VSCI) is a multi-metric macroinvertebrate index used to assess the aquatic life use for wadeable freshwater streams and rivers in non-coastal areas of the state. The VSCI was developed in the mid 2000s in partnership with Tetra Tech and EPA and validated using a robust and spatially diverse (ecoregion and stream size) dataset. These spatially diverse data allowed DEQ to narrow data gaps, test the VSCI against many classification variables and confirm with certainty that the VSCI is a good assessment tool for Virginia streams. VSCI development entailed a public comment period and review by the Academic Advisory Committee.
- The biological taxa found in the 2016 and 2020 Sand Branch samples indicate that this portion of the stream has consistent flow during the spring and fall biological sampling windows for appropriate use and application of the VSCI. The taxa present do not support an ephemeral stream determination. The VSCI scores observed are consistent with those that occur at sites with reduced biological integrity.
- The Benthic Stressor Analysis (BSA) conducted for the Sand Branch watershed identified as probable stressors to the benthic community the following pollutants for which a TMDL can be developed: conductivity from total dissolved solids (TDS), sulfate, total phosphorus and sediment. The BSA also identified contributing factors, which cannot be addressed through a TMDL, consisting of underlying geology, land disturbance, percent imperviousness and degraded riparian buffer. The BSA recommended TMDLs be developed for TDS (to address both conductivity and sulfate), sediment (in the form of total suspended solids) and total phosphorus. Development of the BSA included public participation which entailed input from the Technical Advisory Committee and two public review and comment periods. This analysis was completed in August 2021 and is available on DEQ's website at <https://www.deq.virginia.gov/home/showpublisheddocument/10571/637662595915270000>. Note, subsequent to the finalization of the BSA, a composting facility identified as being a significant contributor of phosphorus closed and the discharge permit terminated. Therefore, TMDL development is for that pollutant ceased. TMDLs to address TDS and TSS are still in development as of this response.

Given the BSA identified the probable stressors as being pollutants and the sources of these pollutants are identified in the watershed as stemming from both point source and nonpoint sources, a TMDL is required. Therefore, a Category 4C determination (i.e., a water is impaired or threatened for one or more designated uses but does not require a TMDL because the impairment is not caused by a pollutant) is not appropriate.

Comments from Virginia Association of Municipal Wastewater Agencies (VAMWA)



VIRGINIA ASSOCIATION OF MUNICIPAL WASTEWATER AGENCIES, INC.

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City of Danville
County of Fairfax
Frederick Water
Frederick Winchester Service Authority
Town of Front Royal
Hampton Roads Sanitation District
County of Hanover
Harrisonburg-Rockingham Reg. Sewer Auth.
County of Henrico
Hopewell Water Renewal
Town of Leesburg
Loudoun Water
City of Lynchburg
City of Martinsville
Pepper's Ferry Regional Wastewater Auth.
Prince William County Service Authority
City of Richmond
Rivanna Water and Sewer Authority
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County of Spotsylvania
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Upper Occoquan Service Authority
City of Waynesboro
Western Virginia Water Authority
City of Winchester

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Town of Kilmarnock
King George County Service Authority
Louisa County Water Authority
Maury Service Authority
Montgomery County Public Service Auth.
County of New Kent
Town of Onancock
County of Powhatan
Town of Purcellville
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Town of Strasburg
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Stantec
Timmons Group
TRC
Whitman, Requardt & Associates
Wiley/Wilson
WW Associates

LEGAL COUNSEL

AquaLaw PLC

May 22, 2024

By Email (Sandra.Mueller@deq.virginia.gov;
deqecology@deq.virginia.gov)

Ms. Sandra Mueller
Office of Water Monitoring and Assessment
Virginia Department of Environmental Quality
1111 East Main Street
Suite 1400
Richmond, Virginia 23219

Re: 2024 Water Quality Assessment Integrated Report (Draft)

Dear Ms. Mueller:

Please accept this comment in support of the Department's draft 2024 Integrated Report ("IR"). This is submitted on behalf of the Virginia Association of Municipal Wastewater Agencies ("VAMWA") and its Water Quality Committee. As you know, VAMWA represents a large majority of the clean water utilities of Virginia, whose purpose is to work together to promote water quality based on scientific principles and sound policy.

We support the approach and procedures of the draft IR, and we appreciate the May webinar, which was helpful. In particular we encourage the Department to aggressively implement the Prioritization Framework, to work toward effective and implementable water quality projects.

As always, we appreciate the efforts of the Department and its personnel on the IR and related matters.

Sincerely,

Jamie S. Heisig-Mitchell
Chair, Water Quality Committee

Copy: VAMWA Board
VAMWA Water Quality Committee
Christopher D. Pomeroy, Esq.

DEQ Response to VAMWA

DEQ appreciates the letter of support and positive feedback on the public webinar.

Comments from Chesapeake Bay Foundation



CHESAPEAKE BAY FOUNDATION
Saving a National Treasure

May 22, 2024

Sandra Mueller
Water Monitoring and Assessment Program
Virginia Department of Environmental Quality
P.O. Box 1105
Richmond, VA 23218

Submitted via email to: deqecology@deq.virginia.gov

RE: Comments on the 2024 Integrated Report

Dear Ms. Mueller:

On behalf of the Chesapeake Bay Foundation (CBF), please accept the following comments on Virginia's 2024 305(b)/303(d) Water Quality Assessment Integrated Report (Report). We appreciate the opportunity to provide our feedback to the Virginia Department of Environmental Quality (DEQ).

CBF is a non-profit organization founded in 1967 and is devoted to the restoration and protection of the Chesapeake Bay. We are the largest independent conservation organization dedicated solely to the fight for effective, science-based solutions to the pollution degrading the Bay and its rivers and streams within the 64,000-square-mile watershed. CBF boasts more than 91,000 members in Virginia and conducts restoration activities through advocacy, education, and litigation.

The Report represents a tremendous level of effort and improves the Commonwealth's understanding of the health of Virginia's waterways. We appreciate the presentation of biological conditions at river basin-specific scales, the prioritization of impaired waters for action, and continued consideration of volunteer and non-agency data. The success stories noted that span more than 20 years are inspiring. Nonetheless, the Report makes clear that despite recent restoration efforts, Virginia's waterways are still severely degraded, as nearly 80 percent of assessed waterways are impaired. The Virginia tidal waters of the Chesapeake Bay remain degraded in part due to excessive nutrient and sediment loads. Further, it is challenging to discern whether actions taken (e.g., restoration plans, projects, monitoring regimes) to address these and other ongoing impairments are working.

We provide the following recommendations for the agency's consideration.

The value of Virginia's 303(d) reporting efforts could be vastly improved if assessment results were presented in the context of restoration initiatives.

The Report provides substantive insights regarding our waterways, but one of the most important uses of this information is how it might inform decisions making. We recommend the agency attempt to address questions such as, "What factors correspond to water quality improvements or degradation?" The agency has a unique capacity to consider a broad set of factors such as invested restoration dollars, implemented best management practices, and land use changes, among others. We urge the agency to increase connections between our investments in water quality and our water quality monitoring databases through future integrated reports. For example, being able to follow a waterway segment from (a) monitoring data (b) to listing (c) to Total Maximum Daily Load or Alternative Restoration Plan development and implementation, and then (d) back to monitoring results, would enable greater learning and adaptive management.

Water quality trends' analysis would be improved with the addition of flow normalized plots and reference to similar water quality evaluations (e.g., the Chesapeake Bay indicator tool) from partner agencies such as United States Geological Survey (USGS).

Flow normalized trends can provide insights to changing inputs of pollutants outside the context of interannual weather and discharge variations. Adding such data for a suite of parameters and/or geographies strongly impacted by flows should be considered for the next report. Adding consideration of flow-normalized trends would improve the utility of the Report.

The agency should add a chapter focused upon designated use impacts associated with Harmful Algal Blooms (HABs) and filamentous algae. More details should be spelled out related to advisories, underlying drivers, and details about impairments.

The report documents several HAB-related assessments and yet very limited details are provided in association with these assessments (e.g., Lake Anna). Further, the Report represents the first complete assessment of filamentous algae, yet there is little explanation of the results of this assessment. Further, HAB assessments draw upon Virginia Department of Health (VDH) advisories but underlying information (e.g., species, duration of bloom, record of complaint, and monitoring) associated with those advisories is absent. We urge the agency to add a chapter dedicated to assessment results associated with HABs, and within that chapter, present the data associated with HABs in much more detail.

The HAB assessment approach referenced on page 53 is not protective of water quality and could result in de-listing of HAB-impaired waterbodies without sufficient basis.

The 2024 assessment guidance proposed an assessment methodology where HAB-impaired waterbodies may be de-listed if an absence of a VDH advisory occurs over the course of the assessment window. However, VDH advisories are often complaint-driven and in the absence of complaints, there may not be information to confirm conditions of attainment have been met. De-listing of waterbodies must occur based on documentation (i.e., water quality indicating designated use attainment) and not rely upon citizen complaints (or the lack thereof).

The agency should add a chapter focused on observed effects associated with climate change.

Climate change offers one of the greatest threats to water quality across the Commonwealth, and yet is only referenced a handful of times in the Report. We urge the agency to include a chapter in the Report and future versions of this report that evaluates the state's assessment data in the context of climate pressures. A future goal should be to consider all individual listings in the context of climate change. Specifically, temperature, salinity, flooding, and discharge would be valuable parameters to summarize across the assessment window and through trend analyses. The state has extensive databases that could be analyzed to improve the agency's capacity to protect current and future designated uses.

In addition to the mainstem Chesapeake, Virginia's tidal tributaries to the Chesapeake Bay remain significantly degraded as a result of nutrients and warrant increased nutrient controls.

Virginia has made substantial progress towards reducing nutrient loads, particularly through the installation of wastewater treatment plant upgrades. Still, there are several remaining significant facilities, particularly in the James and York River watersheds, that present opportunities for nutrient reductions. Given inadequate progress from unregulated sources, Virginia should advance efforts to achieve nutrient reductions from point sources.

A summary of Virginia's water quality monitoring for Polyfluoroalkyl Substances (PFAS) should be included in the Report despite a current lack of associated adopted water quality standards.

We appreciate DEQ's efforts to begin monitoring of PFAS throughout the Commonwealth and the results of these efforts should be included within the Report. There is clear evidence that these emergent contaminants degrade designated uses, and we urge the agency to summarize available results. Even if this data cannot currently be utilized to establish impairment designations, they provide important information about the status of Virginia's waterways.

Thank you for your consideration of these comments.

Sincerely,

A handwritten signature in black ink that reads "Joseph D. Wood". The signature is written in a cursive, slightly slanted style.

Joe Wood, Ph.D.
Virginia Senior Scientist

cc: Chris Moore, Virginia Executive Director, CBF
Mike Gerel, Virginia Science Manager, CBF

DEQ Response to Chesapeake Bay Foundation

DEQ appreciates the Chesapeake Bay Foundation's comments on the draft 2024 Integrated Report. Responses to specific comments are provided below.

CBF Comment 1.

Chapter 6 of the 2024 305(b)/303(d) Water Quality Assessment Integrated Report (IR) aims to provide an overview of all Water Quality Programs in Virginia. Total Maximum Daily Load (TMDL) Implementation Plan efforts are summarized in Section 6.3.

The federal Clean Water Act requires states to monitor, assess and develop TMDLs. The EPA reporting database is limited in functionality to make connections beyond which impaired waters have TMDLs developed. DEQ currently tracks assessment units through the TMDL implementation phase and can explore in-house database enhancements on how best to report this information in future IRs.

CBF Comment 2.

DEQ maintains a network of 413 permanent trend stations statewide. The objective of the DEQ trend analysis is to quantify changes in water quality that have occurred over the 20-year period. The goal of DEQ's trend analysis is to detect changes in concentrations of key water quality parameters and not to determine whether the measured values are particularly high or low.

DEQ acknowledges that there are multiple trend analyses conducted on Virginia waters by several organizations that are mainly focused on the status of the Chesapeake Bay progress on meeting TMDL milestones and criteria attainment. DEQ works with partner monitoring organizations, such as the USGS, and aims to better understand the connection between pollutant load trends, which are the focus of the Chesapeake Bay analyses versus concentration trends which are the focus of DEQ's trend analyses. We also recognize that trend analysis can be difficult to digest and there may be ways to improve the presentation of the results. We will consider process and presentation improvements in future Integrated Reports.

CBF Comment 3.

Segments where benthic chlorophyll-a data was available to be assessed in the Shenandoah River Basin was reported to EPA through the Draft IR submittal process. This parameter-specific detailed information can also be found in comments provided by DEQ assessment staff through DEQ's Environmental Data Mapper (<https://apps.deq.virginia.gov/EDM/>). Monitoring between 2017-2022 did not indicate any segments as impaired for the recreation use where the criteria apply. DEQ will continue to monitor segments during the growing season (May through October) and report statuses in future IRs. Once the 2024 IR is finalized assessment information

for parameters reported as supporting or insufficient will be available through EPA's How's My Waterway application (<https://mywaterway.epa.gov/>).

Data used by the Virginia Department of Health to make swimming advisory decisions due to potential harmful algal blooms (HABs) is available by using the contact form on the VDH website: <https://www.vdh.virginia.gov/waterborne-hazards-control/contact-waterborne-hazards-control-programs/>.

More resources related to underlying drivers and details about impairments can be found on the DEQ Harmful Algal Blooms website: <https://www.deq.virginia.gov/topics-of-interest/harmful-algal-blooms>

We will update Section 6.6 of the Final 2024 IR to reflect these resources.

CBF Comment 4.

The Commonwealth's Harmful Algal Bloom (HAB) activity occurs through a partnership known as the HAB task force, a collaborative group comprised of DEQ, Virginia Department of Health (VDH), state universities and other agencies as appropriate for specific cases. DEQ maintains a robust monitoring network but has no budget or staff resources to perform the additional monitoring needed to support a consistent schedule of freshwater HAB monitoring. There is no routine, ambient monitoring program for freshwater HAB species and toxins, as there is for many other water quality factors monitored by DEQ. Neither DEQ nor VDH receives funding specifically to support the 100,000 miles of freshwater rivers and streams and 248 publicly owned lakes, all designated to support recreational uses throughout the state. As such, the freshwater HAB program is entirely a response driven program triggered by reports, with field investigations triggered either by reports from the public, made through the [VDH HAB Online Report Form](#) or by observations by DEQ field staff that indicate that a bloom may be occurring. DEQ provides much of the field support for the HAB task force and conducts the vast majority of the associated freshwater HAB investigations, with laboratory analytical support from the Old Dominion University Phytoplankton Laboratory. VDH evaluates the results of these investigations to make advisory decisions, upon which DEQ bases our assessments for HABs.

The Final 2024 Water Quality Assessment Guidance Manual states, "A waterbody impaired for the recreational use due to HABs may be delisted and assessed as Fully Supporting if, within the 6-year assessment window, there are no VDH swimming advisories or there are VDH swimming advisories that are lifted after the minimum required follow-up sampling providing evidence which indicate there are no persistent HABs." Through this guidance language, DEQ believes that if a waterbody does not exceed the levels necessary to issue a no swim advisory for a duration of over six years, the recreation use has been restored. This assessment approach is consistent with the response-driven freshwater HAB monitoring framework and is a very practical method that aligns with DEQ's monitoring resources.

CBF Comment 5.

Thank you for the comment, this is something we will consider for a future IR. Chapter 6.2 of the Final 2024 IR describes Virginia's Prioritization Framework to implement EPAs 303(d) Program Vision. One of the focus areas is climate change and resiliency. Through the Prioritization Framework, DEQ is developing a consistent approach, as many programs are interconnected. The approach will consider strategies to account for the impacts of climate change and addressing climate resiliency in the development of TMDLs and other restoration plans to attain and maintain water quality standards.

CBF Comment 6.

The Code of Virginia (COV) § 62.1-44.19:14.D requires that the Board review, during 2020 and every 10 years thereafter, the basis for allocations granted in the Water Quality Management Planning Regulation (9VAC25-720). As a result of the review, the Board must propose for inclusion in the regulation either the reallocation of unneeded allocations to other facilities registered under the Watershed General Virginia Pollutant Discharge Elimination System Permit or the reservation of such allocations for future use. DEQ performed this review in 2020 and updates to the regulation went into effect in 2022.

In 2023 a "Pay-for-performance" pilot program was implemented to reduce nutrient loads beyond VPDES permit limits. The program provided cost effective reductions of nitrogen and phosphorous by offsetting the operational cost (chemical, electrical, and other similar expenses) of those reductions for facilities that choose to participate in the program. The program avoided any disproportional impact to rate payers within the service area of a participating facility, while achieving a higher nutrient reduction for the Chesapeake Bay. 14 facilities pledged to participate in the first year of the program, 5 of which were able to achieve their commitments. The Pay for Demonstrated Performance Pilot year achieved a reduction of 118,433 pounds of nitrogen beyond their historical baseline, with an average cost of \$8.44 per pound of nitrogen.

In addition to these actions that are geared toward nutrient reductions from point sources, Virginia is taking unprecedented action through General Assembly funding to address agricultural needs, encouraging innovation and addressing the regulated sectors (such as the "Pay for Performance" pilot program) to achieve the WIP III goals. While the WIP goals aim to achieve the attainment of dissolved oxygen in critical areas of the Bay, they are also predicted to ensure water quality and living resources are achieved in other areas of the Bay as well. We remain committed to achieving both our overall Federal Planning Targets and the sector-specific reductions laid out in the Phase III WIP.

CBF Comment 7.

Thank you for the comment. Chapter 6.6, Public Health and Aquatic Life Concerns, in the final 2024 IR has been updated to describe the Commonwealth's efforts related to PFAS.

Comments from EPA Region 3

Dear Sandra Mueller,

Thank you for the opportunity to review and provide comments on Virginia Department of Environmental Quality's (VADEQ) Draft 2024 205(b)/303(d) Water Quality Assessment Integrated Report (IR), which was released for public review and comment from April 22, 2024, through May 22, 2024. Based upon the U.S. Environmental Protection Agency's (EPA) review of the draft IR, we are offering the following comments:

- EPA appreciates VADEQ's commitment to improving and updating data management and sharing systems. EPA commends VADEQ's implementation of R tools and automated analysis methods throughout the assessment process and various program offices.
- EPA has conducted a preliminary review of some of the biological assessment information provided to EPA on May 17th, 2024. VADEQ must provide a technical, science-based rationale for decisions where impairment may be indicated by low VSCI or CPMI scores, but a macroinvertebrate assessment decision was not made or the decision was attainment. EPA will discuss these segments with VADEQ upon completing EPA's review of the data.
- Thank you for providing documentation to EPA to support your determination that new impairments would be resolved by existing TMDLs. For the segments below, it appears that the impairments are outside of the original TMDL boundary (or EPA was unable to evaluate the geographic extent of impairment since the segment was not in DEQ's Environmental Data Mapper). Please provide additional documentation that the geographic extent of the existing TMDLs includes the geographic extent of impairment for these segments.

AUID	EPA Preliminary Review
VAP-A33E_SHA01A98	Appears outside of TMDL boundary on DEQ's Environmental Data Mapper. Not able to cross reference with TMDL report since it is not found in VADEQ's Approved TMDLs Website, ATTAINS, or EPA's files.
VAP-C04E_NOR04A22	Assessment Unit seems to be downstream of TMDL boundary.
VAP-C04E_NOR04A22	TMDL report not found in VADEQ's Approved TMDLs Website, ATTAINS, or EPA's files.
VAP-E24E_RPP03D24	Difficult to see if Assessment Unit is near the study area of the TMDL.

EPA appreciates your coordination and working with us to answer questions and provide clarification during our review process. If you have any questions regarding these comments please don't hesitate to contact me, or contact Juan Vicenty-Gonzalez, the EPA's State Coordinator for Virginia's water quality standards and 303(d) programs, cc'd on this email.

Sincerely,

Jessica



Jessica Martinsen

Chief, Standards and TMDLs Section

Water Division

US EPA Mid-Atlantic Region

Phone 215-814-5144

Cell 267-449-3848

Email martinsen.jessica@epa.gov



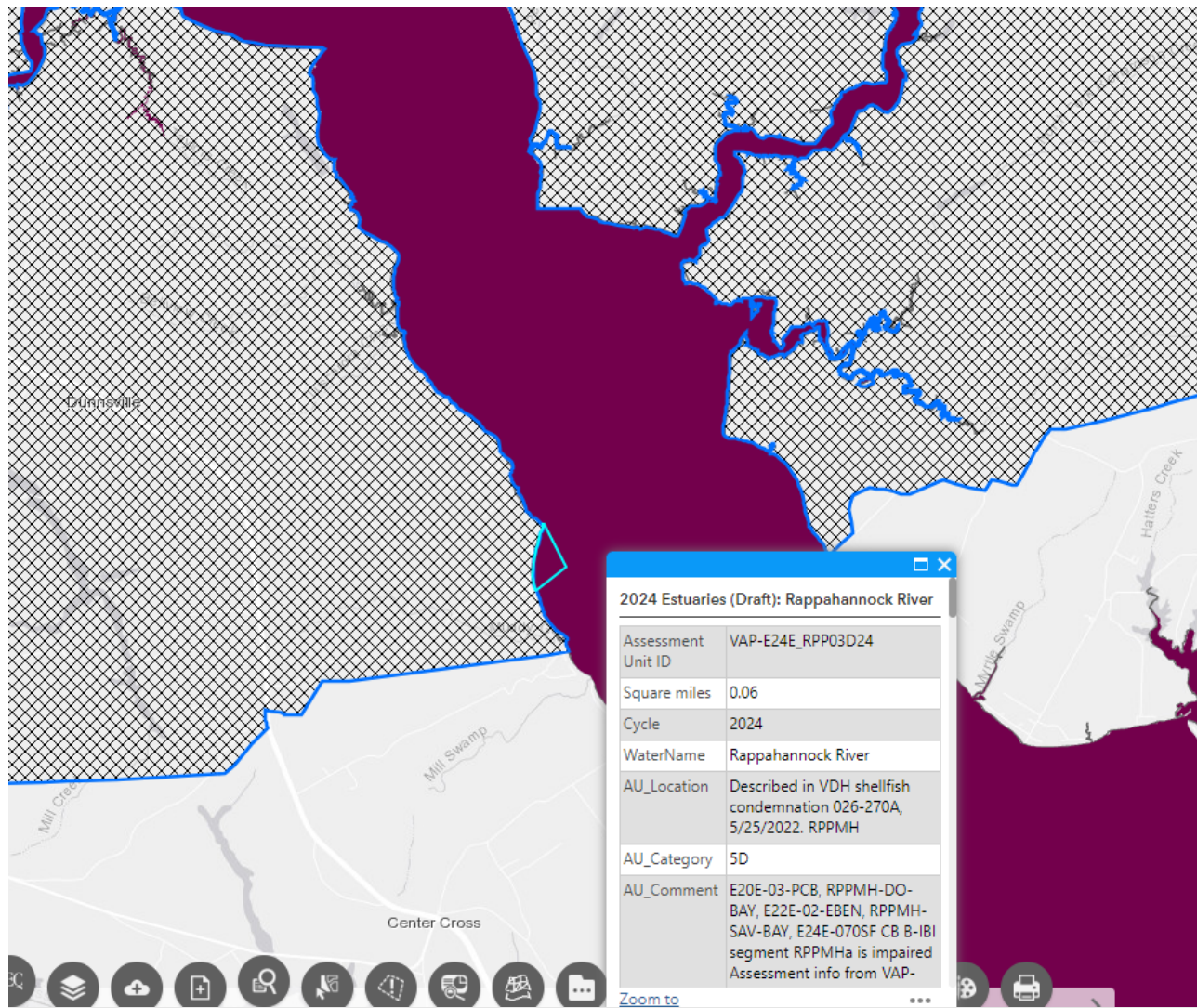
Biological Assessment Data Review

EPA reviewed 150 monitoring station-assessment unit combinations where freshwater biological assessments were made for the Draft 2024 IR. As a result of the review, 11 water segments were moved from Fully Supporting or Insufficient Information (Parameter Category 2 or 3) to Impaired (Parameter Category 5) in the Final 2024 IR due to low VSCI or CPMI scores and no documented evidence of natural variability in the samples. Eighty-seven water segments were moved from Fully Supporting to Insufficient Information due to low VSCI or CPMI scores and there is documented evidence of natural variability in the samples. This additional documentation was submitted through EPA's assessment database (ATTAINS) and will be available through EPA's How's My Waterway application once Virginia's 2024 IR is approved. The remaining 52 segments were unchanged between the Draft and Final IR. We appreciate the ongoing discussions as it relates to Virginia's biological assessment methodologies. We will continue to work through the biologist's requirement for documentation when judgement is reserved and clarify this in the 2026 Water Quality Assessment Guidance.

Nesting Reviews

Although it appears that both VAP-A33E_SHA01A98 and VAP-C04E_NOR04A22 were included in the original TMDL watershed study areas, it was ultimately determined that there is no approved TMDL equation developed for either waterbody. Both assessment units will remain impaired and needing a TMDL in the Final 2024 IR.

VAP-E24E_RPP03D24 is on the south shore of the Rappahannock River near the southern boundary of the Upper Rappahannock River Watershed (Growing Areas 25 and 26) Shellfish TMDL, which is available at <https://www.deq.virginia.gov/home/showdocument?id=11307&t=637692132904270000>. A map is below. The AU is purple with blue highlight. The TMDL watershed area is in grey hatch. This AU will remain nested in the Final 2024 IR.



General Public Comments Received and DEQ Responses

Questions submitted during Draft 2024 Integrated Report Public Webinar on May 2, 2024

John Copeland, New River Conservancy: You mentioned a high rate of 'lake' impairment, which are, of course reservoirs. What is the primary source of Virginia reservoir impairment?

DEQ Response: Fish Consumption impairments (PCBs and Mercury in Fish Tissue) are the leading cause of impairment in Virginia lakes/reservoirs. The graphic is available on page 65 of the Draft Integrated Report. The other leading causes of impairment in lakes/reservoirs can be found on page 63 of the Draft IR.

John Copeland, New River Conservancy: I see a degrading phosphorus trend on the Upper New River. Is there any thinking about why this trend is occurring there?

The agency has no data to provide evidence as to the cause of the observed increasing trend at the New River Station over the period of observation (DEQ Station ID 9-NEW127.49, observations from 2002-2022). Whereas the trend was statistically significant according to the analysis conducted (Seasonal Kendall Test, $p > 0.03$), the rate of increase was determined by the analysis to be 0.0007 milligrams per liter per year. The analysis is not a prediction regarding future phosphorus values; however, this rate of change equates to an increase in phosphorus concentrations at the site of 0.014 milligrams per liter over a 20-year period. Most measured phosphorus values at the site were less than 0.1 mg/l; however, there were periodic elevations of total phosphorus concentrations throughout the 20-year data record at the site. The analysis conducted provides no evidence as to whether the frequency or magnitude of these elevated values have changed over the 20-year period. Phosphorus concentrations at the site ranged from below detection limits to 0.4 mg/l. The site was sampled 6 times per year on average. This sampling frequency is not sufficient to determine whether periods of elevated phosphorus concentrations have changed, or to determine whether high-flow events driven by precipitation runoff have affected phosphorus concentrations. Nine additional sites on the New River and its tributaries, within 10 river-miles of site 9-NEW127.49, were also analyzed, and no increasing trends were observed. This result provides evidence that the observed trend was a local occurrence, rather than a condition that is descriptive of the water body or watershed at a larger scale.

Dick Sedgely, Aqua Law: What NEW issues or functions are addressed in the IR?

DEQ Response: Notable updates include an assessment methodology for assessing benthic chlorophyll-a in parts of the North and South Forks and mainstem of the Shenandoah River, the addition of Category 3E to categorize stressors identified in TMDL development that do not have water quality standards and a streamlined data submittal process for volunteer and non-agency data using the new Virginia Data Explorer database. The Final 2024 Water Quality Assessment Guidance Manual, which is available on DEQ's website, describes these updates further.

Dick Sedgely, Aqua Law: What does DEQ have available that identifies in more detail the workings of the TMDL "Prioritization Framework"?

DEQ Response: Chapter 6/Section 6.2 fully lays out Virginia's efforts towards the 303(d) Program Vision/TMDL Prioritization Framework. The TMDL priorities for 2025-2026 are listed in Appendix 8. In summary, Virginia's Prioritization Framework is grounded in five goals: Planning, Prioritization, Restoration, Data and Analysis, and Partnerships. The first three goals define Virginia's long-term (2032) planning priorities designed to achieve improved water quality through restoration projects. Further, the Data and Analysis and Partnerships goals are integral to the success of the planning, prioritization, and restoration goals. Planning, prioritization, and restoration will focus on the following types of water quality impairments through 2032: aquatic life and fish consumption impairments, harmful algal blooms, temperature impairments, impairments in watersheds draining national forests, dissolved oxygen and pH conditions in swamp waters, and mercury. The first cycle of the 303(d) Program Vision ran from 2012-2022, with a TMDL prioritization cycle spanning 2016-2022. Vision 2 is effective through 2032 and includes an iterating process whereby states will develop a priority list of impaired waters for TMDL or ARP development every two years guided by the Prioritization Framework. This began with priority impairments selected for the 2023-2024 period. These impaired waters were reported in the 2022 IR. The waters selected for prioritization in the 2025-2026 cycle are impaired for fish consumption, aquatic life, or recreation use. Prioritization considerations include an evaluation of other factors and watershed characteristics such as age of impairment, community stakeholder interest, and the existence of co-existing impairments and size of the watershed to maximize efficiency.

Public comment received on draft 2024 Integrated Report

Why was the Implementation Plan on the TMDL for the Little Calfpasture for sediment reduction (2018) not included in the Integrated Report, Category 5?
Sandra Stuart

DEQ Response: Thank you for your comment, Sandra. We will include a reference to the Implementation Plan completed in 2018 in the Impaired Waters Fact Sheet for Little Calfpasture River (I32R-02-BEN). The plan is available on our website here:
<https://www.deq.virginia.gov/home/showpublisheddocument/17928/638175795373600000>.

Attachment 1



Commonwealth of Virginia

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

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Richard Doucette
Regional Director

August 31, 2023

VIA ELECTRONIC MAIL

Mr. Edward J. Hoy IV
Chantilly Crushed Stone Inc.
P.O. Box 220112
Fairfax, Virginia 20153
edhoy4@gudelskygroup.com

Subject: Total Maximum Daily Load (TMDL) Study for the Sand Branch Watershed
Response to Chantilly Crushed Stone Inc. Comment Letter dated August 2, 2023

Dear Mr. Hoy IV,

The Virginia Department of Environmental Quality (DEQ) appreciates the opportunity to respond to Chantilly Crushed Stone Inc.'s (CCS) comments on the Sand Branch TMDL study provided by letter dated and received via email on August 2, 2023. A number of comments and concerns outlined in the letter are those that CCS has previously shared with DEQ and that CCS feels have not been fully addressed in the responses and/or during Technical Advisory Committee (TAC) meetings. CCS also requested DEQ delay the TMDL study in response to United States Supreme Court's May 25, 2023 ruling, *Sackett v. EPA*, given the expectation that this ruling impacts the Commonwealth of Virginia's jurisdiction as it pertains to surface waters.

DEQ addresses each of the comments in the August 2, 2023 letter, numbered below to correspond with each point. Regarding the comment on the potential impact of *Sackett v. EPA* on Virginia's jurisdictional oversight of surface waters, there is no impact to DEQ's authority over waters within the Commonwealth. As stated in DEQ's June 29, 2023 memo to stakeholders "In contrast to the CWA, Virginia has a very broad and comprehensive statutory definition of state waters..." State waters are defined in the Code of Virginia under Section 62.1-44.3 as "all water, on the surface and under the ground, wholly or partially within or bordering the Commonwealth or within its jurisdiction, including wetlands." Virginia has authority to regulate and protect state waters under the regulatory programs Virginia implements regardless of the variations that have occurred over time to the federal definition of Waters of the U.S.

1. Stream Perennialism, WetCAT Designation and Perennial Stream Assessment

As CCS acknowledges, DEQ does not agree that the upper portion of Sand Branch (near DEQ monitoring station 1SAN001.45) is intermittent in its current condition. DEQ understands the flow in the stream is highly augmented by CCS's discharge. DEQ assesses and protects streams based upon the current condition. The characterization that the upstream segment is perennial is based upon Loudoun County's 2009 Stream Assessment, DEQ's staff observations from 2015 to present, and a wetland

jurisdictional determination conducted by TNT Environmental in support of a Virginia Water Protection (VWP) Permit.

CCS's comment that DEQ's WetCAT database does not align with the characterization of Sand Branch as perennial in the upstream reach appears to stem from an outdated description of the extent of the Assessment Unit (AU) for Sand Branch. The information in WetCAT is from the 2018 Integrated Report (IR) and not the current 2022 IR. During an assessment cycle, DEQ uses available resources such as the National Wetland Inventory (NWI) and the National Hydrology Dataset (NDH) to assist in the characterization of an AU. As more information becomes available, AUs may be updated. The AU for Sand Branch was updated for the 2020 IR based on information provided by DEQ monitoring staff regarding sample ability and presence of aquatic life in the upstream reach.

DEQ has reviewed the Perennial Stream Assessment dated October 28, 2022 and completed by Groundwater & Environmental Service Inc. (GES) that CCS shared by email dated March 31, 2023. DEQ noted the assessment was conducted on a single day during which "CCS (Chantilly Crushed Stone) provided a period of non-discharge to the stream during the assessment and for several days prior to the assessment, in order to restore the natural hydrology of the stream." This further supports DEQ's statement that the flows in Sand Branch are highly augmented by the operation of the quarry. As stated above, DEQ assesses and protects waterbodies based upon the current ongoing condition. As shared in previous correspondence, based upon DEQ's observations since 2015, and as supported by other available data, the upper segment of Sand Branch experiences a more constant hydrologic source than may otherwise be expected based upon watershed size. Additionally, Sand Branch's impaired status for aquatic life due to an impaired benthic macroinvertebrate community is based upon data collected at both monitoring stations on Sand Branch, of which the downstream station (1ASA000.34) is perennial.

DEQ provided a more detailed response to this topic in the email dated May 8, 2023, and response to comments on the Benthic Stressor Analysis dated August 23, 2021, which are provided as an attachment to this letter.

2. Stream Perenniality and Jurisdictional Extent

As discussed above, DEQ has authority to regulate and protect state waters under the regulatory programs Virginia implements regardless of the variations that have occurred over time to the federal definition of Waters of the U.S. This is because the Commonwealth's definition of state waters is broader than the federal definition. Response to the perenniality of the stream is provided above in No. 1.

3. Lack of Data

DEQ respectfully disagrees with the statement that there is a lack of data and understanding of this watershed as this TMDL study has been rigorously conducted using the most current methods and practices. DEQ's data collection and TMDL development to address a benthic macroinvertebrate community is conducted in accordance with agency policy and practice following the "Stressor Analysis in Virginia: Data Collection and Stressor Thresholds" dated March 2017. Additionally, the benthic stressor analysis also followed EPA's Causal Analysis/Diagnosis Decision Information System (CADDIS) to conduct a causal assessment. For TMDL development, the All-Forested Load Multiplier (AllForX) approach is being used to establish TMDL endpoint for sediment. For Sand Branch, DEQ used a site-specific toxicity method for TDS that follows the approach used nationally to set numeric Water Quality Criteria for establishing a MDL endpoint.

There is more data than is typically available for a study of this type due to the watershed size. Also, the purpose of stakeholder involvement is to gather information, both qualitative and quantitative, from those who live and work in the watershed to augment the data DEQ has collected.

Additional information on the study can be found in the Benthic Stressor Analysis dated August 23, 2021, minutes from past TAC meetings held on January 25, 2021, April 21, 2021, April 20, 2022, and January 31, 2023, DEQ's response letter dated August 22, 2022, and DEQ's email dated May 8, 2023.

4. Potential for PFAS to be a Stressor to the Benthic Macroinvertebrates

PFAS, a group of manufactured chemicals, have been used in industry and consumer products since the 1940s and are found widespread in the environment. Based upon studies conducted thus far, the main concern is human health due to it being the highest potential impact as demonstrated by USEPA's proposal of draft maximum contaminant levels in the range of 4.0 parts per trillion (ppt), also expressed as nanograms per liter (ng/L). Conversely, studies have shown the impact of PFAS on aquatic life is much less severe, with draft Aquatic Life Criteria of 49 mg/L (acute) and 0.094 mg/L (chronic) for PFOA and 3.0 mg/L (acute) and 0.0084 mg/L (chronic) for PFOS. These draft criteria are much higher than found in the data collected and shared by CCS for samples taken in and around the quarry.

DEQ began monitoring for PFAS in 2021. Information regarding PFAS can be found on DEQ's website [here](#). Further information regarding this comment was provided in the response letter dated August 22, 2022 and email dated May 8, 2023, response to comments on the Benthic Stressor Analysis dated August 23, 2021, and minutes from the TAC meeting held on Jun 24, 2021, which are provided as an attachment to this letter.

5. Impact from Dulles International Airport (IAD) Live Fire Training Facility (LFTF)

DEQ reviewed the photos and video provided by CCS via email on October 22, 2021 and January 12, 2022. Based upon DEQ's review, the provided photos and video were taken during a wet weather event and therefore, are not representative of runoff from training activities conducted at the LFTF. As shared in previous correspondence, DEQ staff inspected the LFTF and identified no concerns with how training activities are performed. Please see No. 4 above and the attached inspection report dated November 16, 2021.

6. Establishing Appropriate Thresholds for Total Dissolved Solids (TDS)

Staff conducted an analysis of monitoring data from DEQ stations within the same ecoregion (Triassic Basin) as Sand Branch. The specific conductivity (which strongly correlates to TDS and thus is reliably used as surrogate measurement) showed a range of 64-861 $\mu\text{S}/\text{cm}$, with the two stations in Sand Branch representing 98th and 100th percentile.

Background levels of a pollutant that may naturally exist in surface water are taken into consideration during TMDL development. Deep ground water is not considered part of that background concentration as its water quality differs from that of surface water. While bedrock may be close to the surface in this watershed, the time scale in which surface water or even shallow groundwater interacts with that material is much shorter than the amount of time that deep groundwater interacts with bedrock. As such, the character of water changes with depth in this area due to two geologic factors, the structure of the basin and the rock solubility.

The Culpeper Basin is a rift-fill type of structure consisting of deep sequences of terrestrial sediments that eventually lithified into sandstones and shales. Rocks in the Basin are more permeable and more soluble than the crystalline rock that the basin was rifted into. Horizontal groundwater gradients in the Basin are usually low because of a lack of topography to drive groundwater movement. These factors in combination result in a deep, permeable "tub" of sedimentary rock that is capable of storing relatively large quantities of groundwater but the groundwater has no easy means of rejoining the surface once it gets past a certain depth in the system. Consequently, it has plenty

of time to solubilize the rock that it comes into contact with. As such, deep groundwater is not indicative of surface water quality.

DEQ and Virginia Energy have collaborated on the Sand Branch TMDL study, including Virginia Energy's active participation in the TAC meetings. Their participation is considered along with the rest of the TAC members, which include Fairfax and Loudoun Counties, Fairfax Water, Loudoun Soil and Water Conservation District, Northern Virginia Regional Commission and VT-OWML. As noted in the discussions during several TAC meetings, the ions that comprise TDS vary due to differences in the specific geology of the area. The exact make-up and concentration of the different ions leads to different levels of toxicity for TDS. It was specifically due to this reason why DEQ chose to develop a site-specific TMDL threshold for TDS based upon toxicity data conducted on the ions and concentrations of ions found in the surface water of Sand Branch.

Further information regarding this comment was provided in DEQ's response email dated May 8, 2023, response to comments on the Benthic Stressor Analysis dated August 23, 2021, and minutes from the TAC meetings held on January 25, 2021, April 21, 2021, and Jun 24, 2021, which are provided as an attachment to this letter.

DEQ appreciate CCS's concerns of the potential impact on their operations. DEQ understands we may continue to share different viewpoints on the scientific rigor of the TMDL study for Sand Branch and DEQ's regulatory authority to carry on with this effort. DEQ continues to develop the TMDLs and anticipates holding the seventh and last TAC meeting in October/November, which will focus on draft allocations.

As stated in the June 12, 2023 meeting with DEQ's Central Office to discuss implications of TMDLs on the aggregate industry and how the industry can be more involved and prepared for these studies, implementation of a TMDL wasteload allocation (WLA) in a permit is expected to be iterative, showing measurable progress. The exact means towards meeting a WLA is specific to each permittee depending on their exact operations. DEQ is willing to meet with permittees to discuss the implications for them and their proposed methods to meet those WLAs.

Thank you again for your letter and continued participation in the development of the TMDL. If you have questions, please contact either myself (Margaret.Dannemann@deq.virginia.gov) or Sarah Sivers (Sarah.Sivers@deq.virginia.gov)

Sincerely,



Margaret Dannemann
Regional Water Quality Supervisor

Attachments: Benthic Stressor Analysis dated August 23, 2021; response to comments on the Benthic Stressor Analysis dated August 23, 2021; minutes from past TAC meetings held on January 25, 2021, April 21, 2021, June 24, 2021, April 20, 2022, and January 31, 2023; LFTF inspection report dated November 16, 2021 and DEQ's response letter dated August 22, 2022 and email dated May 8, 2023

CC: Michael Rolband, DEQ Director, Michael.Rolband@deq.virginia.gov
Scott Morris, Director of Water, Anthony.Morris@deq.virginia.gov
Sarah Sivers, Regional Water Permits and Planning Manager, Sarah.Sivers@deq.virginia.gov
Richard Doucette, Regional Director for Northern Regional Office, Richard.Doucette@deq.virginia.gov