YOUR GOALS. OUR MISSION.

July 27, 2015

Via Email and US Mail
Jon Capacasa, Water Division Director
Ms. Lenka Berlin
US EPA Region III, 3WP30
1650 Arch Street
Philadelphia, PA 19103

Re: Draft Wissahickon Total Maximum Daily Load (TMDL)

Dear Mr. Capacasa and Ms. Berlin:

At the request of and on behalf of Whitemarsh Township, T&M has reviewed the proposed draft Wissahickon Total Maximum Daily Load (TMDL). The draft TMDL makes great strides in understanding the role that Phosphorus plays in the health and quality of the Wissahickon. Whitemarsh Township shares the goal of protecting our water resources; however, it should be recognized that policies and mandates, which will require great effort and expense on the part of permittees, will be put in place as a result of the standard set by this TMDL. We offer the following comments for your consideration:

Comment 1
The draft Total Maximum Daily Load (TMDL) Study states that "an essential insight from the causal model in Figure 3 is the identification of alternate potential stressors that co-vary with nutrients such as flow, sediment, and toxics data. If available these should be evaluated for their potential to confound results. As explained above, these other variables have negative effects on macroinvertebrates, their co-occurrence with nutrient stressors could interfere with the nutrient response and this needs to be evaluated to the extent possible." – *from Page 3 "Development of Nutrient Endpoints for the Northern Piedmont Ecoregion of Pennsylvania: TMDL Application"*

This statement, and similar statements made throughout the document appear to indicate that there are still factors which require further study (i.e. flow, sediment, and toxics), in order to avoid the, "potential to confound results". Any policies or mandates should be based on a refined version of the study, which eliminates any potential error and uncertainty due to variables that cannot be understood at this time.

Comment 2
Based on review of the report and documentation on the USACE website, it appears there has been a bias towards the development of this model for coastal and estuarine applications where Nitrogen tends to be the limiting agent with regards to algal growth in brackish waters. With regards to fresh water, phosphorous tends to be limiting agent to algal growth. Where the biochemical processes can vary in comparison to brackish and coastal waters, how extensively has this model been used in solely freshwater applications?

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Comment 3
Ortho-Phosphorous
It is not immediately clear how (or if) ortho-phosphorus (OP) is calculated in the current model run. Assuming it is, what percentage of total phosphorous is made up by OP? Based on a previous question asked in a recent EPA meeting, it was indicated with certainty that some of the OP found fate within periphyton, though there was less certainty regarding whether root uptake by plants (and immobilization by microbes) accounted for any capture of OP. As absorbance by plants roots is a common fate of OP (as well as consumption by microbes), please provide documentation of the steps, biotic factors, math and initial assumptions involved with calculating what amount of total phosphorous becomes ortho- phosphorus through mineralization and immobilization by microbes (bacteria).

Comment 4
MS4 Sewer Sheds
Understandably, the modelers did not have access to the sewer shed boundaries, which would identify the extent of land use area that would be the actual responsibility of the municipal entities within the Wissahickon watershed. Consequently, as is common with TMDL reports the entire wasteload allocation (WLA) is attributed to the municipal entity with deference to the municipal entity to "parse out" portions of the WLA number that would be attributed to the load allocation regions (LA).

Based on the remarkably high reduction amounts calculated by this study it is suggested that EPA request locations of all outfalls, inlets, and if available, sewer shed boundaries from all municipalities so that the large portions of lands which they are not accountable for, can be "parsed" out. It is theorized that this will provide a more realistic, and thus, more attainable reduction figure for many communities. Taking into account that some of the largest contributors to the phosphorous wasteload are farms (highest unit loading factor) and golf courses, many of which contribute runoff into gullies that connect directly into tributaries (and not the MS4 storm sewer), removal of farms and golf courses from the responsibility of the municipal entities could, alone, provide a notable reduction of assigned phosphorus wasteload for a number of communities.

If communities do not have a sewer shed boundary, providing a geo-referenced location of inlets and outfalls will provide enough information for a rough sewer shed to be developed through a GIS tool such as Arc Hydro, which can auto-delineate drainage divide boundaries. It is believed that this work can provide for a more beneficial and attainable approximation of wasteload reductions required by the individual municipalities.

Comment 5
Dissolved Organic Carbon
Based on the report, it is not immediately apparent how the model takes into account the benefit of dissolved organic carbon (DOC) to the ecosystem. The presence of plant material, particularly trees, foster the availability of DOC. DOC is a key component in the support of phosphate solubilizing bacteria (PSBs) that, when available, may mineralize phosphorous and convert it into ortho-phosphorus (plant available phosphorous). In addition microbes (bacteria) may consume ortho-phosphorus (immobilization). Without an indication of if the model takes into account any variation in abundance of PSBs in direct proportionality with available DOC, it is

unclear if proper credit is being given to portions of the Wissahickon that are abundant with wetlands, meadows or forest and their effectiveness as nutrient sinks (P, N).

If a relationship of DOC to microbial growth and subsequent increase in mineralization, immobilization and plant capture of TP is taken into account in the EFDC model, please provide a detailed description of processes, including equations and initial assumptions.

Comment 6

The Allocated Total Phosphorus (TP) Loads are not achievable for Municipal Separate Storm Sewer Systems (MS4) permittees given available Best Management Practices (BMPs). The Draft Wissahickon TMDL requires a total percent reduction for TP of 96.8%, and the lowest Wasteload Allocation (WLA) is 90.3% (Philadelphia). As shown in the table below, only one of the BMPs described in the Pennsylvania Department of Environmental Protection (PADEP) Pennsylvania Stormwater BMP Manual, "Runoff Capture & Reuse" (BMP 6.5.2), achieves a TP Removal Efficiency greater than 85%. Therefore, the only way for an MS4 to achieve the WLA using PADEP recognized BMPs, would be to "Capture & Reuse Runoff" (BMP 6.5.2) from an impossibly large area of the Municipality, in combination with another BMP having a TP Removal Efficiency of 85% to treat the remaining area. In order to implement this combination of BMPs, a municipality would require tanks capable of storing millions of gallons of stormwater, as well as a system to pump and convey the stormwater to a location to be reused.

BMP #	BMP Description	TP Removal Efficiency
BMP 5.6.3	Re-Vegetate and Re-Forest Disturbed Areas, Using Native Species	85%
BMP 5.9.1	Streetsweeping	85%
BMP 6.4.1	Pervious Pavement with Infiltration Bed	85%
BMP 6.4.2	Infiltration Basin	85%
BMP 6.4.3	Subsurface Infiltration Bed	85%
BMP 6.4.4	Infiltration Trench	85%
BMP 6.4.5	Rain Garden / Bioretention	85%
BMP 6.4.6	Dry Well / Seepage Pit	85%
BMP 6.4.7	Constructed Filter	85%
BMP 6.4.8	Vegetated Swale	50%
BMP 6.4.9	Vegetated Filter Strip	20%
BMP 6.4.10	Infiltration Berm & Retentive Grading	50%
BMP 6.5.1	Vegetated Roof	85%
BMP 6.5.2	Runoff Capture & Reuse	100%
BMP 6.6.1	Constructed Wetland	85%
BMP 6.6.2	Wet Pond/ Retention Basin	60%
BMP 6.6.3	Dry Extended Detention Basin	40%
BMP 6.6.4	Water Quality Filters & Hydrodynamic Devices	50%
BMP 6.7.1	Riparian Buffer Restoration	50%
BMP 6.7.2	Landscape Restoration	85%
BMP 6.7.3	Soils Amendment & Restoration	85%
BMP 6.7.4	Floodplain Restoration	85%
BMP 6.8.1	Level Spreader	10%

Based on model runs performed internally by consulting staff, using AVGWLF (now MAPSHED), in the model run where weekly street sweeping would be performed year round, all streams would be fully restored, 100 foot riparian buffers added along all streams as well as every acre of tributary area captured by a combination of bioretention and constructed wetlands, the maximum reduction level that can be achieved is 61.2%, far from the goals listed in the report.

Comment 7
Maximum Extent Practicable
As previously mentioned, the Allocated Total Phosphorus (TP) Loads are not achievable for Municipal Separate Storm Sewer Systems (MS4) permittees given available Best Management Practices (BMPs). The unspoken conclusion of this report (if all numbers were final) appears to be that the Wissahickon Creek cannot attain its designated use.

In cases such as these, there are a variety of strategies that could be looked at. One such approach is already a subject of discussion, an alternative TMDL approach which would fit the *Adaptive Management* model approach. Another approach might be to employ a *Use Attainability Analysis (UAA)* to study and ascertain if a change in designated use for the stream is required, whereby a higher nutrient endpoint may be used.

In the past, where unattainable values have been calculated, a lower, *interim target* has been used, such as was the case in South Carolina's Savannah Harbor TMDL. In the conclusion of this example, instead of the unattainably high value assigned, Georgia and South Carolina were required to achieve a 30% reduction - a much more attainable goal.

We thank you for the opportunity to review and comment on the proposed draft Wissahickon Total Maximum Daily Load (TMDL), and look forward to continued dialogue towards developing water quality standards that are protective, effective and attainable. Should you have any questions regarding this matter, please do not hesitate to contact me at this office.

Sincerely,

James C. Sullivan, PE
Township Engineer

cc. Mr. Richard L. Mellor, Jr., – Whitemarsh Township Manager
Ms. Krista Heinrich, PE, LEED-AP – T&M Associates
Mr. Gregory Duncan, PE, LEED-AP – T&M Associates