

# Rippled Waters Engineering, LLC

14 September 2020

**VIA EMAIL**

Mr. Richard Schilling  
Township Manager  
Bedminster Township  
432 Elephant Road  
Perkasie, PA 18944

**Re: Technical Expert Report on the Pollution Reduction Plan  
for Bedminster Township  
Bucks County, Pennsylvania**

Dear Mr. Schilling,

This letter serves as an expert opinion and comments on the Pollution Reduction Plan prepared by Bedminster Township. This report is being provided on behalf of the Lower Delaware Wild & Scenic River Management Council.

For this report, I reviewed the Pollution Reduction Plan Bedminster Township, Bucks County, PA, prepared by C. Robert Wynn Associates, Inc. dated March 4, 2020. The context of the comments included herein also refer to the PADEP Pollutant Reduction Plan Instructions revised March 2017.

Pollutant Reduction Plans are required to meet the requirements outlined in the PRP Instructions document entitled, "NPDES Stormwater Discharges from Small Municipal Separate Storm Sewer Systems Pollutant Reduction Plan (PRP) Instructions" revised March 2017. As noted in the PRP draft, Bedminster Township is required to "reduce the sediment load by 10% within five years following PADEP approval of coverage under the NPDES permit."

This report serves as a summation of comments and concerns related to the draft Pollution Reduction Plan.

**General comments on the Township watersheds and context of the PRP**

The comments included in this section are general comments related to the PRP and clarification related to the watersheds within the Township:

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1. We recommend that the PRP specifically identify all the watercourses within Bedminster Township in the narrative. Based on a review of the PADEP eMap, the watercourses include the following:
  - Three Mile Run
  - East Branch of the Perkiomen Creek
  - Morris Run
  - Tohickon Creek
  - Mink Run
  - Deer Run
  - Wolf Run
  - Deep Run
  - Cabin Run

Most of the watercourses in Bedminster Township ultimately drain to the Delaware River with the exception of Three Mile Run and the East Branch of the Perkiomen Creek which drains into the Schuylkill River and are not identified impaired watercourses on the mapping included in the PRP.

2. Portions of the Township in the south adjacent to Dublin Boro<sup>1</sup> are located within the Philadelphia Urbanized Area/Urbanized Area 12 as referenced by PADEP with Municipal Separate Storm Sewer Systems (MS4s) located in Urban Areas of the Tohickon Creek Watershed (Deep Run sub-watershed) and are impaired with nutrients/siltation. The mapping included in the PRP shows that Mink Run, Deer Run, Wolf Run, Deep Run, and Cabin Run are all impaired (shown in red), however, they are not referenced in Table 1. This should be clarified in the narrative as it appears that most of the tributaries to the Tohickon Creek are impaired.

The remaining comments included below are identified by the section headings from the draft PRP and the numbers and naming for each.

**B. Map**

1. The PRP notes that “contour information was provided by LIDAR shapefile information downloaded from” PASDA. The date of the download for the LiDAR information should be included and a reference if known to the date of the topography should also be included.
2. The PRP includes a reference to impairment areas. It states, “after the drainage areas were outlined, a storm sewershed boundary was delineated.” It is unclear how the

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<sup>1</sup> South and east of Souderton Road and north of Dublin Pike

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impairment areas differ from the drainage areas and additional clarity should be provided in the description included to better distinguish the differences.

3. The PRP notes that the impervious surface areas “were generated from 2015 DVPRC Land Use Data. Additional information was added based on aerial imagery for more recent projects.” It is recommended that the aerial imagery referenced be identified by date. For reference, the most recent aerial photography from Google Earth and is dated June 15, 2018.
4. The following are comments related to the map entitled, “Bedminster Township Storm Sewer Map”
  - a. Overall, the map is difficult to read. The hatch pattern density for the “Non-Urbanized Drainage Area” makes it difficult to read the road labels and other features.
  - b. The impaired streams are shown in red, however, unimpaired streams and watersheds are both shown as solid blue and are difficult to differentiate. Further the drainage pipes are also shown as solid blue. Can additional line types and/or colors be used to better differentiate these features?
  - c. Several tributaries shown to the Tohickon Creek are shown as not impaired, however, no explanation is noted in the narrative text or on the map related to this. RWE reviewed the list and mapping of impaired waters available online and all tributaries to the Tohickon appear to be impaired within the Township. Clarification should be provided.

**C. Pollutants of Concern**

1. The PRP states that “all watersheds within the Township are listed as impaired on the PADEP MS4 Requirements Table. The streams are impaired due to sediment.” This is inconsistent with the table listed and should be clarified. All of the streams do not drain to the Deep Run, so this statement does not appear to be correct. It is recommended that the statement be amended to indicate that the urbanized areas within the Township drain to the Deep Run.
2. Table 1 included in the report notes that the pollutants of concern are nutrients, siltation, and mercury. No additional discussion is provided in the narrative regarding these pollutants and their watercourses. Additional information should be included regarding the impairments and how the BMPs proposed will reduce the targeted pollutants.

**D. Determine Existing Load for Pollutant(s) of Concern**

1. The Township utilized the Simplified Method to estimate the existing load for the pollutants of concern. Using this method, the percent impervious and pervious cover in the urbanized areas of the storm sewersheds are determined. Once determined, those values are multiplied by the annual pollutant loading rates. The draft PRP notes that “this

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method does not take into consideration the different types of land uses within the storm sewershed.”

2. The use of terminology like “urbanized areas of the storm sewersheds” in the PRP is confusing. Is this section referring to the impaired areas referenced in Section B. Map above? If not, why aren’t the areas shown on mapping to add additional clarity.
3. PRP Parsing Procedures section
  - a. There is reference to BMPs being installed in the same “storm sewershed that will result in meeting the minimum required reductions.” It is unclear why references are being made to watersheds that are not regulated by the PRP. Based on a review of the Urbanized Area 12 boundaries, the only watershed covered by the PRP is the Deep Run watershed. Please clarify.
  - b. The draft PRP states “to take credit for the additional pollutant reduction provided by a BMP, the Township must demonstrate that the BMP exceeds its regulatory requirements.” How does the Township do this? This procedure should be spelled out in the plan or otherwise reference to another document should be provided.

**E. Select BMPs to Achieve the Minimum Required Reductions in Pollutant Load**

1. The PRP includes an objective to “Reduce Sediment Load by 35, 346 lbs/year within Lower Tohickon Creek Subwatershed.” This is the first time in the PRP that the Lower Tohickon Creek Subwatershed is mentioned. The overall location and context of the watersheds should be further detailed in the introduction narrative for clarification.
2. Items 1 through 4 include retrofitting existing stormwater management basins with outlet orifice controls to increase the TSS removal efficiency from 10% to 60%. These measures are effective at reducing TSS loads, however, additional measures should also be considered. It is recommended that the basins be considered for retrofit as infiltration, bioretention, or constructed wetlands depending on overall drainage area to each feature. Additional TSS reductions can be realized by these modifications up to 95% based on the BMP Effectiveness Values included in the NPDES Small MS4 table. These should be included as potential BMP alternatives in the PRP as they provide additional protections to the Lower Delaware Wild and Scenic River, which possesses characteristics deemed to be outstanding by Congress.

Moreover, the infiltration BMP practices have the potential to reduce overall runoff volumes entering the streams, which contribute to both sediment and nutrient impairments. By encouraging recharge and infiltration, the Township is improving water quality for the entire Tohickon Creek watershed.

3. Item 10 includes a potential stream restoration segment along Lower Tohickon Creek. The TSS removal load of 44.88 pounds per year was utilized in the analysis. The 44.88 pounds

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per year is the current default rate adopted by PADEP. Why wasn't a MapShed analysis employed for this project? There is potential that the project implementation could reduce the sediment load by a much larger amount if MapShed were employed (typically 115 lbs/ft/yr).

4. All of the BMPs identified are located on private property, were no projects identified on public lands during the preparation of the PRP? It is recommended that the stream segments throughout the urban area be reviewed for potential restoration projects as well.

### **PRP Compliance Summary**

1. The draft PRP states "it is not feasible to reduce sediment loading within every individual planning area, so an analysis was completed based on HUC12 drainage sheds as permitted by the PADEP PRP Guideline document." This is the first mention of HUC12 drainage sheds. As noted previously in this report, the terminology within the PRP is inconsistent and confusing. The introduction to the watersheds in the Township should be more detailed with reference to HUC12 watersheds, impairment areas, storm sewersheds, and other elements referenced in the document, but not otherwise explained. It is recommended that a definitions section be added for clarity.
2. According to the PRP "other combinations of items are possible/acceptable, provided that the total sediment loading reduction is equal to or greater than 35,346 lb/yr." What combinations are considered acceptable to the Township? If the desire is to be flexible with potential project sites, the PRP should be amended to describe the process that must be followed to utilize alternative sites or the process to amend the PRP to include them. This section should be clarified further.

### **Appendix F Stormwater Basin Database**

1. In accordance with the PRP guidance, the table should include the permit numbers for the BMPs if known and information on the operation and maintenance activities and frequencies for each BMP. Without this information it is not possible to confirm the TSS reduction claims made for each BMP.

### **Recommendations**

It is recommended that the final PRP for Bedminster Township be revised to include the clarifications and supplemental information referenced in this report. The Lower Delaware Wild and Scenic River Management Plan seeks to maintain existing water quality in the watershed and the PRP has the potential to improve water quality in an already identified impaired watershed. To ensure that the Lower Delaware River Wild and Scenic status is protected, it is my opinion that additional BMPs should be included in the PRP. Additionally, the simplified analysis completed for the Township should be replaced with a more detailed analysis conducted in MapShed to define the various land uses in the Township and the pollutant loads associated with each.

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I have attached a copy of my resume (Attachment A of this document) outlining my background and qualifications. Should you have any questions or would like to discuss this report further, please do not hesitate to reach out to me directly at 732.735.3440 or by email [mary@rippledwatersllc.com](mailto:mary@rippledwatersllc.com).

Sincerely,

A handwritten signature in blue ink that reads "Mary L. Paist-Goldman". The signature is written in a cursive style with a large initial 'M' and 'G'.

Mary L. Paist-Goldman, P.E.  
Founder

Attachments  
Attachment A – Resume

Attachment A

Resume

# Rippled Waters Engineering, LLC

**Mary L. Paist-Goldman, P.E.**  
Principal, Owner

## **Education:**

- B.S. 2000. Civil Engineering, University of Maryland, College Park, MD

## **Professional Certifications:**

- Professional Engineer:  
Maryland, New Jersey, North Carolina, New York, Pennsylvania
- Rosgen Level I – Applied Fluvial Geomorphology Certification

## **Professional Affiliations:**

- Musconetcong Watershed Association, Board Trustee
- Musconetcong River Management Council Member Alternate
- North Jersey RC&D Technical Advisory Committee member

## **Summary of Qualifications:**

Ms. Paist-Goldman has more than 20 years of experience in the fields of wetland and stream restoration, stormwater management, regulatory compliance, hydrology and hydraulics, dam safety, and wastewater management. Prior to founding Rippled Waters Engineering in 2018, Ms. Paist-Goldman served as Principal Engineer and Director of Engineering Services at Princeton Hydro. Her attention to detail and creative eye lead to out-of-the-box solutions to complex stormwater, stream, wetland, and wastewater problems.

Throughout her career, Ms. Paist-Goldman has designed dozens of projects with low impact development techniques, green infrastructure, and with a focus on water quality – particularly in regard to TMDL compliance. She has designed rain gardens, cistern systems for water re-use in the form of landscape irrigation, bioretention islands, manufactured LID devices, and constructed wetlands. She has developed projects with goals of zero discharge upon completion, groundwater recharge to address aquifer deficits, and retrofits to reduce water quality impacts on Category One waters and EV streams.

Additionally, Ms. Paist-Goldman has served as Project Manager and Lead Designer for a multitude of wetland restoration and mitigation projects. Frequently, these projects are planned for use as mitigation banks or serve as mitigation for development onsite. Working closely with wetland ecologists and landscape architects, she has designed a variety of wetlands including subtidal channels, marsh, and upland habitats for estuarine and marine systems. She also has experience in design development of living shorelines and edge treatments for coastal resiliency and climate change.

Ms. Paist-Goldman has been actively involved in regulatory compliance since the beginning of her career. She is an expert at navigating the New Jersey Department of Environmental Protection's (NJDEP) Division of Land Use Regulation's Flood Hazard Area Rules and demonstrating compliance with the Flood Hazard Area Control Act. Ms. Paist-Goldman has extensive experience in dealing with the NJDEP Bureau of Nonpoint Pollution Control and the Dam Safety programs. She served on the Hunterdon County Stormwater Ordinance Review Committee, was an active participant in the preparation of the Hunterdon County model ordinance, and has given presentations to municipalities and colleges and universities throughout the State of New Jersey on the impacts and requirements of the Stormwater Management Rules (N.J.A.C. 7:8). She prepared Stormwater Management Plans for various municipalities and Stormwater Pollution Prevention Plans for various colleges and municipalities.

Ms. Paist-Goldman's modeling experience includes hydrologic, hydraulic, and pollutant loading modeling for a variety of projects types, from developing floodplain limits, designing culvert openings for new and replacement bridge and culvert

## **Areas of Expertise:**

- Wetland restoration and mitigation
- Stream restoration and stabilization
- Floodplain management and design
- Stormwater management design
- Teaching – continuing education courses at introductory to advanced levels
- Permitting and regulatory compliance
- Hydrologic and hydraulic modeling
- Dam removals, dam inspections and inundation/breach analyses
- Onsite wastewater disposal system design – including alternative systems
- Wastewater and watershed management planning and design

crossings, water quality impact analyses, dam inundation analyses, and stormwater facility design and analysis. She is skilled in the use of a wide range of software, including ESRI ArcMap Geographic Information Systems (GIS); United States Army Corps of Engineers' (USACE) HEC-HMS, HEC-RAS; WinSLAMM; XP-SWMM, and HydroCAD.

Ms. Paist-Goldman is experienced in dam breach analyses and dam removal design. She has also prepared inundation mapping, Emergency Action Plans, Operation and Maintenance Manuals and Dam inspection reports for both low and high hazard dams. She has completed dozens of dam safety inspections throughout New Jersey and Pennsylvania and has experience with dam owners to address deficiencies on dams from low to high hazard.

Additionally, Ms. Paist-Goldman has designed wetland mitigation projects ranging in size from less than one acre to nearly 100 acres in size. These projects are planned for use as mitigation banks or serve as mitigation for development onsite. Working closely with wetland scientists, Ms. Paist-Goldman has designed a variety of wetland habitats including creation, enhancement, restoration, and preservation. The designs have included the use of check dams and detailed grading; subtidal channels, wetland pools, intertidal marsh, and upland island habitats for both freshwater and estuarine systems.

### **Select Project Experience**

**Stream and Wetland Mitigation Bank**, Charles County, MD (2015-2018) – Served as project manager and lead design engineer for design and permitting of approximately 85 acres of wetland and approximately 1,500 feet of stream restoration associated with mitigation impacts for work at a military base in the same watershed. The wetland hydrology incorporated both groundwater and surface water inputs and the design incorporated floodplain reconnection through Protocol 3 of the Chesapeake Bay Expert Panel Report.

**Stream Restoration for MS4 Compliance**, Prince Georges County, MD (2017-2019) – Served as project manager and lead design engineer for the preliminary design of approximately 6,900 linear feet of stream restoration in accordance with the Chesapeake Bay Expert Panel Report. Restoration activities were designed for first order, second order, and third order tributaries in a holistic approach addressing stream bed and bank erosion together with stream geomorphology using a combination of rock and large woody debris.

**Dam Removal and stream restoration**, Hunterdon County, NJ (2011-2017) – Project manager for the completion of a feasibility study, final design, and permitting for the removal of a run of the river dam on a river in New Jersey, which was the first blockage from the confluence with the Delaware. Removal of the dam increased the total unobstructed river miles within the Wild and Scenic designation region.

**Urban stream restoration and floodplain connectivity project**, Trenton, NJ (2008-2011) – Project manager for the completion of engineering design, permitting, and construction management services associated with the restoration of approximately 900 feet of urban stream including daylighting a portion of the stream that had been piped within the City of Trenton.

### **Publications and Presentations**

M. Paist-Goldman. Navigating the Permitting Process to Implement a Mitigation Project in New Jersey. Society for Wetland Scientists Annual Meeting. 30 May 2019, Baltimore, MD.

M. Paist-Goldman and Beth Styler-Barry. 2018. Recognizing the Power of Dam Removal to Reconnect & Restore our Ecosystem. NJ Land Conservation Rally, 2 March 2018, New Brunswick, NJ.

G. Messinger, C. Hall, L. Peterson, P.E. and M. Paist-Goldman, P.E.. 2011. "Walnut Brook Riparian Restoration Project," Land and Water Magazine, January/February 2011.