

Delaware Riverkeeper Network, Inc.,
Maya van Rossum, Delaware Riverkeeper,
Richard Lennox, Stana Lennox,
Vladimir Salamun, Jesse Salamun, and
Plaintiffs,

vs.

Commonwealth of Pennsylvania,
Department of Transportation,
Defendants.

IN THE COURT OF COMMON PLEAS
OF BUCKS COUNTY, PENNSYLVANIA
CIVIL ACTION

AFFIDAVIT OF EMMA B.L. GUTLZER

I, Emma B.L. Gutzler, hereby declare:

1. My name is Emma B.L. Gutzler..
2. I hold a B.S. in Environmental Science from Mary Washington College in 2002.
3. I have successfully completed Levels I-IV of the fluvial geomorphology courses offered by Wildland Hydrology and taught by Dave Rosgen.
4. I am currently employed as the Restoration Manager by Delaware Riverkeeper Network, a 501(c)(3) organization.
5. As Restoration Manager with Delaware Riverkeeper Network since 2006, I have conducted fluvial geomorphic assessments of streams within the Delaware River basin for purposes of developing management and restoration plans for municipalities, homeowners' associations, institutions and private landowners. I have developed and implemented riparian buffer restoration and planting plans. I have prepared local, state, and federal permit applications and oversaw construction of stream bank stabilization projects. I have conducted instream fish habitat and large woody debris assessments. I have prepared state-approved monitoring plans, quality assurance project plans.
6. Pertinent to this declaration, from 2006 to 2010 I managed project efforts of the Delaware Riverkeeper Network to develop a comprehensive stream restoration plan for over half a mile of Tinicum Creek near the Headquarters Road – Sheep Hole Road Bridge. My work involved the collection and analysis of hydraulic, hydrologic, pavement and subpavement sediment, stream pattern, longitudinal profile, channel dimension, and riparian vegetation data. As a result of this work construction documents were prepared that reestablished an appropriate pattern profile and dimension for transport of sediment and stream flow, stabilized eroding stream banks, and enhanced instream habitat. All collected data

analysis, and developed restoration documents are contained in the “Final Project Report for Tinicum Creek Streambank Stabilization and Habitat Improvement Project” prepared by Rivers Unlimited, Inc. for the Delaware Riverkeeper Network in December 2009.

This project was funded by the Pennsylvania Department of Environmental Protection through a Growing Greener Grant and built upon identified priority recommendations of the 2004 “Tinicum Creek Survey and Restoration Assessment” report produced by the Delaware Riverkeeper Network.

7. Pertinent to this declaration, I also authored Delaware Riverkeeper Network’s 2009 “Study of Gravel Roads Along Tinicum and Rapp Creek” which reported findings of gravel road assessments completed by the Delaware Riverkeeper Network for 1.8 miles of gravel road running adjacent to Tinicum Creek above the Headquarters Road – Sheep Hole Road Bridge and Rapp Creek, and provided road improvement and maintenance recommendations to minimize stream impacts.
8. At Delaware Riverkeeper Network, I have also conducted fluvial geomorphic assessments of Swamp Creek near the historic Erwinna Covered Bridge in order to identify stream restoration opportunities. Swamp Creek is located in Tinicum Township and is the neighboring watershed of Tinicum Creek to the north.
9. Prior to joining Delaware Riverkeeper Network, I worked as the Restoration Coordinator with the Urban Creeks Council, a non-profit organization in Berkeley, California from 2002 until 2006. There I assessed urban streams through the collection of geomorphic, physio-chemical, and biological data, developed and oversaw construction of stream restoration plans utilizing natural channel design and soil bioengineering techniques, prepared state and federal permit applications, wrote monitoring plans and quality

assurance project plans, provided technical assistance to municipalities and property owners on the management of streams, and founded and facilitated a consensus-based watershed council. A main focus of my work in this position involved assessing instream habitat, water quality, and stream crossings for the development of restoration plans to improve upon existing conditions for trout and salmonid populations.

10. I was appointed and currently sit on the Abington Township, PA Environmental Advisory Council where I have reviewed township plans that either involved township streams or impacted them due to stormwater, led restoration of riparian buffers, and developed an educational program for residents on how to improve and manage stormwater from their property.
11. I was appointed to and served on the City of Berkeley, CA Creeks Task Force and helped develop ordinance and policy language to protect riparian buffers and stream function in this built-out city.
12. I contributed to “Effect of New Road Construction on the Macrobenthic Communities in Two Small Stream Tributaries of the Rappahannock River” and “Baseline Water Quality Study of England Run and Unnamed Tributary to the Rappahannock River” as submitted to the Virginia Academy of Science.
13. I have presented at multiple professional conferences on stream restoration, stream assessment, instream fish habitat enhancement, and soil bioengineering.
14. From my previous work in the Tincum Creek watershed, I know that Tincum Township, Tincum Conservancy, and private citizens have taken numerous measures to monitor, protect, and enhance the health and biodiversity of Tincum Creek.

Furthermore, I know that Tincum Creek is stocked by residents with rainbow, brook, and

brown trout. Based on my field observations of sizeable trout within spring-fed pools in Tinicum Creek, Tinicum Creek is able to support, at least to some degree, these cold water fish.

15. I have reviewed engineering designs entitled “Drawings for Construction of State Route 1012 Section 61M” and visited both the Tettmer Road-Headquarters Road (Tributary to Little Tinicum Creek), hereafter referred to as Tettmer Road bridge, and the Cafferty Road – Headquarters Road (Little Tinicum Creek), hereafter referred to as Cafferty Road bridge, site on March 28, 2011 with Maya K. van Rossum, the Delaware Riverkeeper.
16. I have also reviewed correspondence and related files obtained by the Delaware Riverkeeper Network through a Freedom of Information Act Request dated May 23, 2011 from the US Army Corps of Engineers, the erosion and sediment pollution control plan approval letter from the Bucks County Conservation District dated December 12, 2008 and December 3, 2009, and the declarations of John A. Miller and Paul M. Woodworth, both with Princeton Hydro, LLC.
17. The entire Tinicum Creek basin is an Exceptional Value (EV) stream according to PA Code Title 25 Chapter 93. Therefore according to state antidegradation requirements the water quality of Little Tinicum Creek, also referred to as Sundale Creek, and its tributaries must be maintained and protected.
18. According to plans Headquarters Road at the bridges will be widened. Per Paul M. Woodworth’s and John A. Miller’s declarations and reviewed materials it appears Antidegradation standards and Post Construction Stormwater Management measures set forth in the PennDOT Design Manual have not been addressed.

19. Stream crossings should mimic natural channel conditions in terms of bankfull channel width, flow rate, and shape in order to minimize change in channel hydraulics and sediment transport and to avoid resulting habitat and water quality impacts. Plans for both sites increase the bridge opening width; however, proposed opening widths are still narrower than existing channel widths observed in the reach outside of influence of the existing bridges. This narrower crossing constricts flows of bankfull and higher which may cause bulbous scour of the banks both upstream and downstream of the bridges. The constriction will decrease velocities upstream of the bridge causing sediment to drop out of the water column which may result in channel aggradation and habitat loss. Velocities will be increased through the bridge and may result in degradation or down cutting of the channel downstream. Over time this can create, depending upon channel substrate, a knickpoint which can move upstream through the reach disconnecting the stream from its floodplain. These occurrences impact water quality and habitat by increasing turbidity and sedimentation. Additionally, crossings narrow relative to the stream channel can create temporal and partial barriers for the passage of fish and other aquatic life.

20. According to Project Description Narrative submitted with the project Join Permit Application, efforts were taken to improve stream alignment of the bridges. However, both the Cafferty and Tettemer remain skewed. This decreases the efficiency of the crossing to pass flows and transport sediment which can result in localized bank scour and deposition of sediment by the bridge. These occurrences impact aquatic habitat and create bridge maintenance issues. Because of these impacts stream crossings are ideally located on stable straight sections of stream.

21. Plans for the Cafferty Road site include approximately 330 linear feet of retaining wall along Sundale Creek.

- a. Retaining walls offer little cover for aquatic life and preclude streamside vegetation. Shade provided by riparian vegetation can lower water temperature in summer months by as much as 9°F¹. By limiting streamside vegetation water temperatures may increase and impact available dissolved oxygen for aquatic life. Limiting streamside vegetation also limits leaf litter and debris which is an important component of the aquatic food chain.
- b. Retaining walls decrease a channel's hydraulic roughness (or resistance) resulting in increased stream velocity. A natural gravel bottom channel with concrete sides has a Manning's n roughness coefficient of roughly 0.020, while a channel with vegetated bank a Manning's n between 0.35 and 0.1 depending upon vegetation composition. Manning's n is inversely proportional to velocity ($V = (1.49R^{0.66}S^{0.5})/n$ where R = hydraulic radius, and S = energy slope). Increased velocities may result in increased bank erosion and sedimentation therein increasing turbidity and water temperature and impacting water quality and habitat for benthic macroinvertebrates and fish.
- c. Proposed retaining walls appear to be built out from existing stream banks therein encroaching into the existing active channel, narrowing the channel, constricting flow, and increasing instream velocity. As the channel adjusts, this may result in erosion along the opposite bank, including the steep slope along the right bank (looking downstream) downstream of the Tettemer bridge. Erosion may impact water quality by increasing suspended sediment, turbidity, and water temperature

as well as impacting available instream habitat by embedding channel substrate with fines and filling in pools.

22. Reviewed documents included one planting detail which was added to the plans and involved only a limited area at the Headquarter Road – Tettemer Road site. Riparian buffers are a documented best management practice that provide numerous water quality and habitat benefits for streams. They shade the stream helping to regulate water temperatures which influences dissolved oxygen levels. Riparian buffers provide cover for aquatic organisms and introduce organic debris into the stream important for periphyton and the aquatic food chain. Riparian buffers provide stability to the banks and decrease a bank's Bank Erosion Hazard Index (BEHI)² based on root depth and root density. Buffers increase infiltration rates and filter out pollutants from runoff. No planting of riparian tree and shrub species are proposed at the Cafferty Road bridge site and no planting is proposed downstream of the new Tettemer Road bridge. Riparian buffers are a stated BMP in the PennDOT Design Manual and would help mitigate some of the permanent impacts to Sundale Creek and the unnamed tributary to Sundale Creek due to the widening of the bridge structures.
23. Meeting notes from May 13, 2009 as well as comment from the Pennsylvania Fish and Boat Commission suggest instream structures. Instream structures could be used to reduce near bank stress, protect stream banks from erosion, direct and focus flow through the bridge opening, and create habitat variability for fish and other aquatic organisms. It is possible that instream structures could also decrease the need and use of retaining walls (artificial stream banks) along these EV streams. No instream structures are included in the reviewed plans.

24. According to Project Description Narrative submitted with the project Join Permit

Application, this project will result in a “permanent loss of habitat” at both project sites.

No measures are shown to help offset this loss or add to habitat.

For the above stated reasons, it is my professional opinion that proposed plans for the Cafferty Road and Tettemer Road bridges do not adequately address antidegradation standards for EV streams, and that if implemented as proposed will result in unmitigated water quality impacts and a permanent loss of habitat. Water temperatures are likely to increase due to increased impervious pavement and road runoff. Enhancing the riparian buffer would help offset increased temperatures during the summer. Bank and stream bed erosion likely to occur due to placement of concrete walls within the bankfull channel, skew of the bridges, and the width of the bridge opening relative to observed bankfull channel width will introduce fine sediments into the system and can embed channel substrate and fill important pool habitat. Embeddedness decreases habitat for benthic macroinvertebrates and impacts suitable spawning habitat for fish.

I verify that the foregoing information provided by me is true and correct to the best of my knowledge and belief. I understand that my statements are made subject to the penalties of Pa. Cons. Stat. § 4904, which relates to unsworn falsification to authorities.

Dated this 14 day of July, 2011

A handwritten signature in dark ink, appearing to read 'EBL Gutzler', is written over a horizontal line.

Emma B.L. Gutzler