



Meliora Design

July 7, 2016

Maya van Rossum
Delaware Riverkeeper Network
925 Canal Street, Suite 3701
Bristol, PA 19007

Re: Headquarters Road Over Tincum Creek
Determination of Effects Report

Dear Ms. van Rossum:

Meliora Design has reviewed the comment response documents provided by Delaware Riverkeeper Network in order to respond to concerns over potential instream impacts to Tincum Creek, an Exceptional Value stream, due to construction of various alternatives to replace or rehabilitate the Headquarters Road Bridge by the Pennsylvania Department of Transportation. The documents reviewed include:

- Determination of Effects Report for S.R. 1012, Section BRC in Tincum Township, Bucks County, PA
- A.D. Marble "S.R. 1012, Section BRC, Headquarters Road Bridge Project, Tincum Township, Bucks County, Pennsylvania, ER #05-8029-017, Response to PA SHPO comments on Determination of Effect Report, Alternatives Analysis- Additional Information
- Determination of Effects Report (November 2015) Comment Response Document - June 23, 2016
- Alternatives Analysis Hydraulic Summary (Urban Engineers, February 2012)

In response to Meliora Design comments and comments by others, PennDOT authored The Determination of Effects Report Comment Response Document. This document makes two key points in response to comments in support of the chosen alternative bridge design, Alternative 6. These two points are:

- 25 – Year Water Surface Elevations on drawings are not accurate and were part of a previous Hydrologic and Hydraulic Analysis that was not updated for updated scenarios.
- The long-term permanent impact to Tincum Creek will be decreased for this alternative.

Both of these points are **very** concerning from a stream impacts point of view. Not only was incorrect information provided on a plan to be reviewed, but there is no intent by PennDOT to include updated information that would help the public evaluate and compare alternative bridge designs. Anecdotal information is provided throughout the response comments that suggests knowledge of bridge hydraulic performance but no report or data is provided to substantiate these claims. Beyond providing data, it is explicitly stated by PennDOT that the studies have not been updated. If the information provided in the Determination of Effects Report cannot be relied on, then what information is PennDOT relying on to determine how each bridge alternative will perform hydraulically? It is critical that this information help inform which alternative is chosen. The chosen alternative should not be the alternative that performs the worst hydraulically.

In a previous Alternatives Analysis Hydraulic Summary (2012), Urban Engineers determined that the hydraulic improvements of removing piers was "not as significant as anticipated." Additionally, the reduced low chord

elevations of the single-span options also did not provide as much hydraulic benefit as expected. Both of these findings led Urban Engineers to recommend the alternative where abutments and piers remain in existing locations for a three-span bridge. Choosing Alternative 6 as the preferred option ignores the recommendations of PennDOT consultants with respect to the hydraulic studies previously performed.

Additionally, this Hydraulic Report does not support the PennDOT comment response that Alternative 6 will provide a decrease to long-term impacts to the stream. An alternative similar to Alternative 6 (Two-span, shifted abutments) was evaluated by Urban Engineers to reveal that it increases the stream velocities at the bridge more than any other alternative evaluated for the 25-year water level. This increase in velocity will lead directly to additional scour of the stream bed and cause more erosion in the vicinity of the Headquarters Road bridge. This increase in velocity, as well as an unevaluated shift in bridge alignment, can lead to consequences that must be thoroughly analyzed and considered. PennDOT consultants should be aware of the different hydraulic implications of each plan and provide that information for review. The bridge's hydraulic implications play as much of a role for Tinicum Creek as traffic circulation across the bridge will impact the surrounding communities. Excessive erosion following a change in bridge design and/or location of bridge elements (including piers and abutments) is unacceptable. Based on the information provided, the Alternative 6 option will change the flow of Tinicum creek at and downstream of the bridge site, obviously resulting in a shift of the stream westward, causing bank erosion and flow alterations that will cause significant changes to the creek, its flows, habitats and quality at and downstream of the bridge site that have not been considered by PennDOT.

Meliora Design previously recommended incorporating natural channel design principals as a way to stabilize and rehabilitate the area around Headquarters Road Bridge and to address and prevent scour and erosion issues. PennDOT dismissed such solutions by stating that it is "beyond the scope of the current project to incorporate natural channel design and stream restoration principals beyond the project limits." This response fails to recognize that natural channel design and restoration interventions are not in fact outside the project limits given that they address issues at, and resulting from, the identified project area and are merely softer bioengineering approaches that would work with the design and location of the bridge to limit scour, streambank erosion, redirect flow, and protect the stream bed. The proposal to armor the bridge to protect against scour fails to evaluate the impacts of this approach on the stream.

Because Tinicum Creek is an Exceptional Value resource directly impacted by this project, the impacts to Tinicum Creek cannot be dismissed or ignored. Response #11 seems to indicate that there is current analysis of the bridge alternatives that are not being provided. These studies should be provided for review. Other features that would improve scour and erosion conditions around the bridge should also be evaluated. Natural Channel Design was dismissed as being out of this projects scope but preventing future scour and maintaining the exceptional quality of the stream is a priority of this project. A more holistic view of the alternatives is warranted to evaluate more than just the bridge itself, which would include impacts and alternatives to mitigate the impacts the bridge restoration will have on Tinicum Creek.

If you have any other questions or need additional information, I can be reached at (610) 933-0123 or March@melioradesign.com.

Sincerely yours,



Marc Henderson, PE

cc:

Michele C. Adams, P.E., LEED AP, President