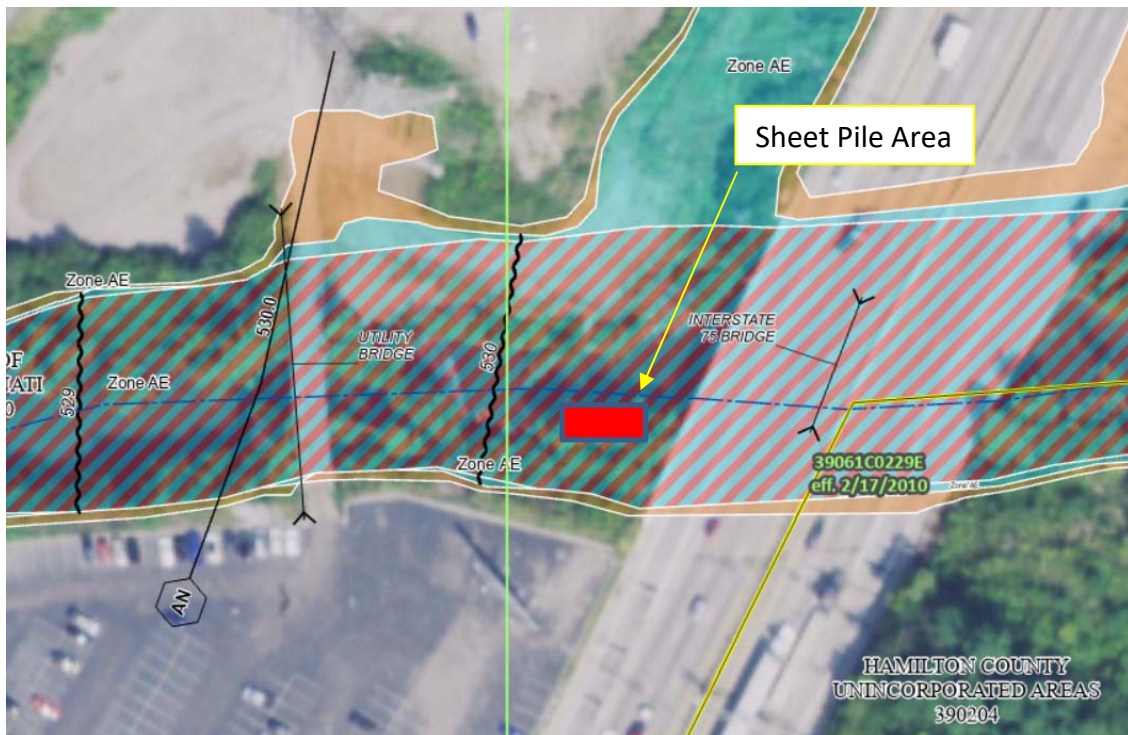


MEMO

Date: October 12, 2023
To: Heath Brendlinger, PE
From: Douglas Turney, PE, CFM
Subject: HAM-75 Temporary Sheet Piling Wall Hydraulic Calculations
Copies: File

A temporary sheet pile wall is being constructed at the storm sewer outfall to Mill Creek just upstream of FEMA Lettered Section AN as shown on Figure 1. The wall will help prevent small storms from overtopping the sheet pile so that construction of the outlet works can continue during smaller storm events. The sheet piling starts at the edge of water at an elevation of 514 +/- . The top of the sheet pile is planned to be near an elevation of 519. The 10-year FEMA flood elevation is approximately 527. FEMA does not have a published 2-year flow rate for Mill Creek, but this study will look at the impact of the sheet pile wall for the 10% AEP through the 0.2% AEP.

Figure 1 – Location Map/FEMA Panel



The effective FEMA model for Mill Creek was able to be obtained. Four cross sections were added to the model with a section 5-feet upstream and downstream of the sheet piling and a section at the upstream and downstream edge of the piling. The two sections at the edge were modified in the post conditions model to show an obstruction from basically the edge of stream up to 519 and then horizontal into the bank based on an estimated location of the sheet pile. Even though inside of the sheet pile will be open, for modeling purposes we assumed the area behind the sheet pile to be floodplain fill with no conveyance. The results on Table 1 show limited increases in flood elevation for the various storm events. The top of bank in this section of Mill Creek is generally around the 535 elevation as the stream is very channelized with little to no floodplain bench. The peak water surfaces do not increase to an elevation that would be outside of the bank. An electronic version of the HEC-RAS model is included with this submittal. The effective model is on 1929 vertical datum, which is 0.60-ft higher than 1988 vertical datum. The sections that were coded into the model were increased by 0.60-ft since the existing topographic information is on 1988 vertical datum. The results in Table 1 are on 1988 vertical datum. The biggest increase in elevation is 0.07-feet just upstream of the sheet pile during the 10-year event. The fill associated with the sheet pile has less affect during larger events.

Table 1 – HEC-RAS Result Summary Table

Section		10- year (ft)	50- year (ft)	100- year (ft)	500- year (ft)	Notes
156635	Existing	527.17	529.76	530.87	533.46	Existing Section Upstream of sheet pile
	Post	527.22	529.81	530.91	533.49	
156600.3	Existing	526.48	528.96	530.04	532.58	5-ft Upstream of Sheet Pile
	Post	526.55	529.02	530.09	532.61	
156595.3	Existing	526.48	528.96	530.03	532.57	@ Upstream Extent of Sheet Pile
	Post	526.44	528.93	530.00	532.55	
156531.2	Existing	526.54	529.03	530.10	532.63	@ Downstream Extent of Sheet Pile
	Post	526.51	529.00	530.07	532.60	
156526.2	Existing	526.52	529.01	530.08	532.60	5-ft Downstream of Sheet Pile
	Post	526.52	529.01	530.08	532.60	
156410	Existing	526.41	528.95	530.04	532.60	Existing FEMA Section AN
	Post	526.41	528.95	530.04	532.60	