PBS&J

MEMORANDUM

TO: Denny Meier

FROM: Cindy Matyas

DATE: November 5, 2009

SUBJECT: H/H Review for the I-75 Reversible Lane Widening over Sope Creek, Marietta, Cobb Co.

Upon initial review of the Sope Creek hydraulic model, it was noticed that the I-75 crossing was not simulated in the FEMA model. Instead, the cross section located on the upstream side of I-75 had a water surface elevation (WSEL) of 1014.65' established. Due to the absence of a report explaining the reasoning of the set WSEL along with the omission of the I-75 crossing, further investigation was performed.

First, the triple 7' x 5' RCBC present at the I-75 crossing was simulated using a steady state backwater analysis. Due to the height of the roadway, the flow rate of 5,210 cfs resulted in an elevation of 1036.66' at the upstream side of I-75. It is apparent that this depth would require more volume of runoff than the basin could produce during a 100-year event. Therefore, the steady state backwater analysis was deemed invalid.

The next step taken was the calculation of the volume stored at the set WSEL given in the FEMA model. At the elevation of 1014.65', the triple 7' x 5' RCBC present at the I-75 crossing produce a flow rate of 1,420 cfs. The peak discharge present at the I-75 crossing for the 100-year event is simulated as 5,210 cfs. After performing the necessary hand calculations comparing the approximate total runoff with the amount of outflow, it is estimated that the maximum storage volume required behind the I-75 structure would be about 365 ac-ft. Using the ten foot contours on the respective quad maps, the total volume available behind I-75 at an elevation of 1014.65' was calculated as 290 ac-ft. Although the volume of available storage appears to be approximately 80% of the required stored runoff volume, it is noted that errors in the topographic information and/or the estimation of stored volume under an assumed inflow minus outflow relationship could account for this 20% discrepancy. It is felt that the storage available behind I-75 may be sufficient to accept the FEMA set WSEL.

Since I-75 is not being overtopped by the 100-year event, the triple 7' x 5' RCBC appears to act as the control for the I-75 crossing. However, we would need to verify the validity of the established FEMA WSEL and hydrology before moving forward.

Note, that in an 11/4/09 meeting with yourself and Cobb County, we were advised that a revised model has been submitted to FEMA for this site. Data for the new model is not available at this time. Therefore, an analysis of the impacts of a culvert extension on the upstream side of the I-75 crossing at Sope Creek cannot be conducted at this time.