

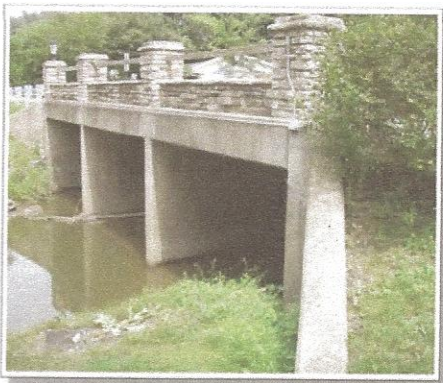
PALATINE TOWNSHIP ROAD DISTRICT
PLUM GROVE ESTATES
SALT CREEK (UPPER REACH)

HEC-RAS
CREEK STUDY
Route 53 to Crestwood
Briarwood Lane Crossing Replacement

Palatine Township Road District
530 North Smith Street
Palatine, IL 60067

Project Number: 08-041E

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 **HAEGER ENGINEERING**
consulting engineers • land surveyors

1300 N. Plum Grove Road - Schaumburg, Illinois 60173-4546
tel: 847.394.6600 fax: 847.394.6608
www.haegerengineering.com

the elevations from the 2008 FIS profile. The elevations calculated in Model 2 at the crossing are all approximately 0.2' higher than those shown on the 2008 FIS Flood Profiles, so the models can be considered conservative. The elevations calculated in Model 3 upstream of the proposed crossing are slightly lower for events lower than the 50 year model event and slightly higher (0.07') at the crossing for the 100 year model event. At the FEMA approved 100 year base flood elevation of 709.77 the area of flow over the centerline of the roadway overflow is virtually identical for the existing and proposed modeled conditions as the proposed centerline of roadway overflow profile below 709.77 was designed to generally match that of the existing centerline roadway overflow profile. The elevations downstream of the crossing are the same for the existing and proposed conditions. Please see *Appendix 10* for HEC-RAS Model Results, and *Appendix 11* for Waterway Information Table (BBS 2802) and Preliminary Bridge Design Hydraulic Report Form (BLR 10210).

5. DISCUSSION

The existing structure is not the source of demonstrable flood damages as it is the creek itself that does not have adequate capacity. Due to the age, condition and other factors the PTRD would like to completely remove and replace the existing structure and several replacement options were considered as was outlined above. The box culvert option was eliminated due to the inner walls and debris accumulation that has been a problem in the past with the existing structure. The free span bridge or precast pre-stressed box beam option was eliminated as adequate clearance requirements could not be met from the high water elevation to the bottom of the beams without the vertical approach grades to the bridge being too steep or significant change to the profile of the centerline of the roadway overflow which is not feasible given the existing site constraints. The 3-sided precast single-span structure was therefore determined to be the best replacement solution.

The proposed 3-sided single span structure will have an open area that is slightly larger than that of the existing structure without any inner walls and the proposed centerline of roadway overflow profile below the 2008 FIS 100 Year Base Flood Elevation (BFE) of 709.77 was designed to generally match that of the existing centerline roadway overflow profile which results in similar to slightly lower profiles upstream of the crossing and the same elevations downstream of the crossing. Please note that there is no net fill proposed below the BFE, thus no loss of floodplain/floodway storage, and the project results in net cut below the BFE. Further, given the slightly larger open area and maintained roadway overflow elevation below BFE, the proposed replacement structure will maintain the existing conditions conveyance and not increase flood profiles.

IDOT policies for created head and clearance have been met, but due to the existing conditions constraints and location of existing low points in the roadway on either side of the existing crossing, a design variance from the three of freeboard requirement will be required. Based on previous discussions the Palatine Township Road District and Haeger Engineering with the IDOT Bureau of Local Roads and Streets the variance would almost certainly be granted in this instance.

There is no evidence of any significant scour at the existing structure. Per the Master Structure Report (S-107) the existing structure has a scour critical rating of 8 based on evaluation method B, based on an analysis that was performed on 4/10/2006 by the Central Bureau B&S. Hy-Span recommended the rip rap scour protection shown on the plans to protect the proposed structure.

Please see Plans entitled "*Briarwood Lane Re-Alignment and Salt Creek Crossing Replacement Plans*" for additional information on proposed re-aligned Briarwood Lane and crossing replacement including scour protection measures.