Innovations Showcase

Projects

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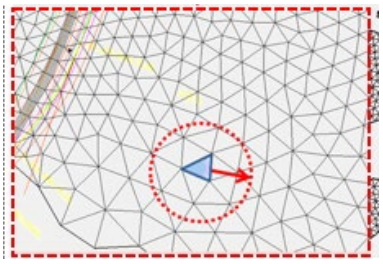
Missouri Department of Transportation

2-Dimensional Hydraulic Modeling

Video



Description

2-Dimensional Hydraulic Modeling provides more accurate water surface elevations, water depths, stream flow velocities and stream flow direction than current 1-Dimensional hydraulic modeling methods. A 2-D hydraulic model provides this data throughout the entire model instead of just at surveyed valley section as provided in a 1-D model. Since a 2-D hydraulic model provides water surface elevations at each cell instead of just an average water surface elevation at a valley section it can better predict the water surface elevations and flood inundation limits. Having this data makes it easier to determine the effects of a project on adjacent properties and avoid impacts that could result in flood damage to those properties.

Benefit

Money is saved in cases where using a 2-D hydraulic model reduces bridge length or number of bridges in a floodplain as compared to the length or number that would be required based on a 1-D hydraulic model. Since a 2-D hydraulic model provides water surface elevations at each cell in its mesh instead of just a single elevation at each valley sections, the bridge location (in relation to the stream channel) and roadway elevations can be adjusted to provide a more efficient crossing that can require less fill.

The 2-D hydraulic model uses a terrain file to develop a mesh that covers the full extent of the model. The program determines the stream flow paths, velocities and water surface elevations using the elevations from the terrain file to determine the stream flow direction and velocity and the amount of water passing through each bridge and culvert opening or over the roadway. A 1-D hydraulic model requires multiple assumptions including flow direction, areas where water accumulated but doesn't flow, and the distribution of water passing through multiple bridge openings. Using a 2-D hydraulic model at crossings with complex roadway geometry, multiple bridges or complex flow paths require very few assumptions, which simplifies work and provides more accurate water surface elevations, velocities, etc. than a 1-D hydraulic model can.

Materials and Labor

There were no material costs.

For More Information Contact

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Additional information, photos or videos can be seen by accessing Innovations Challenge SharePoint page at: http://sp/sites/tp/planpol/SitePages/InnovationHome.aspx