

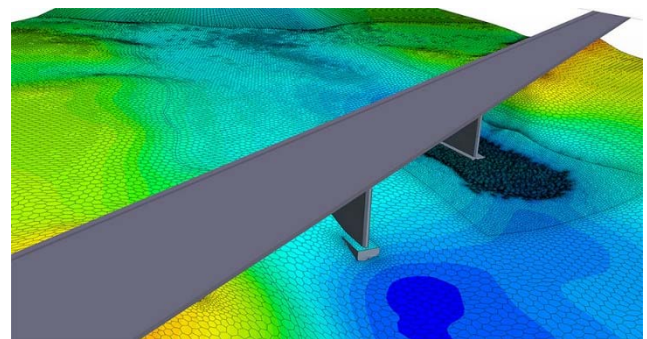
## Collaborative Hydraulics: Advancing to the Next Generation of Engineering (CHANGE)

### *Taking Hydraulic Modeling to a New Level*

The [Collaborative Hydraulics: Advancing to the Next Generation of Engineering \(CHANGE\)](#) innovation is encouraging the shift from one-dimensional (1D) to two-dimensional (2D) hydraulic modeling. This can provide improved understanding of the complex interactions between waterways and infrastructure. CHANGE is a Federal Highway Administration (FHWA) Every Day Counts Round 4 (EDC-4) and FHWA Every Day Counts Round 5 (EDC-5) innovation that Pennsylvania championed.

### *What are the benefits?*

- **Enables more accurate designs** of bridge openings, span arrangements, roadway profiles, scour countermeasures, and bank protection
- **Provides better tools** for communicating interactions between waterways, the transportation network, and the environment
- Allows for a more **streamlined project development** approach
- **Improves the ability to design safer, more cost-effective, and resilient structures over waterways**



### *How does it work?*

2D modeling uses thousands of elements to represent floodplain geometry, and computations are done at each element. The 2D models provide more detailed results than 1D models and contain graphic visualization features, which can better communicate modeling results and impacts to project stakeholders. 2D models eliminate many of the limiting assumptions required by 1D models.



### *How do I learn more?*

To learn more about this innovation, visit [www.penndot.pa.gov/stic](http://www.penndot.pa.gov/stic) or email [penndotstic@pa.gov](mailto:penndotstic@pa.gov).