

## **WSDOT 2023 Scour Training**

5/30/2023 – 6/01/2023

### **Q&A for Module 10: Scour Countermeasures (Julie Heilman and Casey Kramer)**

- **Q: If we calculate needing Class C, do we still increase the Size 1 Class?**
  - We are working on the gradation for Class D. Until this is available, please coordinate with HQ Hydraulics.
- **Q: In slide 24, what does WSDOT envision being placed between the scour countermeasure and proposed streambed material?**
  - We envision the use of native material, but coordination with the Geotechnical and Project Offices should occur. Landscape may recommend placement of stream restoration features such as coir logs or other features. Coordination with a Landscape Architect should happen to ensure they are aware of the proposed scour countermeasures and can design plantings/ restoration accordingly.
- **Q: Rarely do we have no risk of lateral migration at a structure (e.g. known competent bedrock at thalweg elevation at both abutments). Does this mean scour countermeasures should be proposed for almost all structures at the PHD stage to protect against potential lateral migration? How much risk is acceptable with regard to lateral migration at the PHD stage?**
  - At the PHD stage, the scour countermeasures are intended to promote discussion of structure alternatives. Otherwise, if a scour countermeasure isn't present, we would need the structure to be built to accommodate the scour, possibly through deep foundations. Essentially considering countermeasures in this stage provides more structure options.
- **Q: To follow up on Alec's question, is the expectation that we have figures similar to the examples shown in every PHD, so that scour countermeasures are at least included in the more detailed design discussions**
  - Yes.
- **Q: At the FHD for unconfined systems and potential migration, what is WSDOT accepting for determination of lateral extents to design a scour countermeasure for an abutment scour countermeasure rather than a revetment?**

- If the structure is designed to total scour a countermeasure likely wouldn't be necessary. In the cases where you have lateral migration risk and a scour countermeasure need, the scour countermeasures should be placed at the potential lateral migration extents.
  - The May 2023 Hydraulics Manual Update expanded on the expectations for lateral migration extent analysis.
- **Q: Can you clarify total scour elevation for a countermeasure elevation with regard to the longitudinal stream profile? For example, some DOTs have a single total scour elevation at the downstream face, and it's projected as a constant elevation upstream.**
  - This depends on your site. In steep systems, carrying a constant elevation upstream could be difficult to construct. The countermeasure elevation does not need to be below total scour, it needs to be below LTD + contraction scour at the scour check flood.
- **Q: HEC 23 discusses using launching aprons for scour countermeasures, which are useful when excavation down to the scour depth is not practical. Are these acceptable to WSDOT?**
  - No, not for a new project. WSDOT does not recommend using launching aprons. For existing sites, scour countermeasures may utilize launching aprons if excavation down to total scour depth is not practicable.
- **Q: Does WSDOT have specs for streambed restoration, specifically while burying countermeasures? What are the key aspects for success?**
  - The General Special Provisions includes specs for streambed aggregates which are adapted for specific sites. We are working on updating our Standard Specifications to include best practices for building streambeds in lifts and watering in finer sediment between each layer to avoid subsurface flow.
- **Q: Regarding specifying a rock wall-type material for the countermeasure toe: Presumably this could end up being a very large, poorly graded material. Is there a typical special provision or methodology that considers how to construct this toe specific to filling void spaces, granular filters, etc.**

- The toe is the D100 of the gradation (Class A, B, or C). The intent of using individual rocks for the toe is for estimating quantities and ensuring there is sufficient large rock to construct the toe. There is a need to fill in the voids, this depends on your material size (quarry spalls or streambed sediment may be sufficient). Do not use the WSDOT spec for Heavy, loose, light-loose. WSDOT is removing this spec.
- **Q: For a site where the stream must be "allowed to regrade," are countermeasures not to be used?**
  - Scour countermeasures can still be used if it makes sense. This is a project by project decision that should involve HQ Hydraulics.
- **Q: Is the primary difference between ROW and TCE the permanent vs. temporary nature of the two? Would a TCE ever be sufficient for installation of scour countermeasures beyond ROW? Or is long-term maintenance always required for scour countermeasures - thus mandating ROW rather than TCE for countermeasures?**
  - If it is expected the scour countermeasure will not need maintenance during the design life of the structure, a TCE may be sufficient. If maintenance is expected to be required, ROW is needed and permanent acquisition of a property might be necessary to ensure maintenance access is available.