**TRANSPORTATION POOLED FUND PROGRAM**

**QUARTERLY PROGRESS REPORT**

Lead Agency (FHWA or State DOT): \_FHWA\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**INSTRUCTIONS:**

*Project Managers and/or research project investigators should complete a quarterly progress report for each calendar quarter during which the projects are active. Please provide a project schedule status of the research activities tied to each task that is defined in the proposal; a percentage completion of each task; a concise discussion (2 or 3 sentences) of the current status, including accomplishments and problems encountered, if any. List all tasks, even if no work was done during this period.*

|  |  |
| --- | --- |
| **Transportation Pooled Fund Program Project #***(i.e, SPR-2(XXX), SPR-3(XXX) or TPF-5(XXX)**TPF-5(551)* | **Transportation Pooled Fund Program - Report Period:**□Quarter 1 (January 1 – March 31) 2025🗹Quarter 2 (April 1 – June 30) 2025□Quarter 3 (July 1 – September 30) 2025□Quarter 4 (October 1 – December 31) 2025 |
| **Project Title:**Soil and Erosion Testing Services for Bridge Scour Evaluations |
| **Name of Project Manager(s):***James Pagenkopf* | **Phone Number:***(202) 493-7080* | **E-Mail***james.pagenkopf@dot.gov* |
| **Lead Agency Project ID:** | **Other Project ID (i.e., contract #):** | **Project Start Date:**  |
| **Original Project End Date:** | **Current Project End Date:** | **Number of Extensions:** |

Project schedule status:

🗹 On schedule □ On revised schedule □ Ahead of schedule □ Behind schedule

Overall Project Statistics:

|  |  |  |
| --- | --- | --- |
|  **Total Project Budget** |  **Total Cost to Date for Project** |  **Percentage of Work**  **Completed to Date** |
|   |   |   |

***Quarterly*** Project Statistics:

|  |  |  |
| --- | --- | --- |
|  **Total Project Expenses**  **and Percentage This Quarter** |  **Total Amount of Funds**  **Expended This Quarter** |  **Total Percentage of**  **Time Used to Date** |
|   |   |   |

|  |  |  |
| --- | --- | --- |
| **Project Description**:

|  |
| --- |
| **Objectives:**The objective of these pooled funds is to provide and/or support soil and erosion testing services for bridge projects over water crossings managed or coordinated by State DOTs, to provide technical assistance to design, fabricate, and install erosion testing devices to support and seek to broaden the use of erosion testing devices among State Department of Transportations, and to compile and analyze the collected soil and erosion testing data in a broader research effort to more accurately estimate reliable scour design depths given the soil conditions and hydraulic load during a given storm event. |
| **Scope of Work:**Task 1: Soil Erosion Test in the Turner Fairbank Highway Research Center (TFHRC) Hydraulics and/or Geotechnical Lab for various bridge projects: The Hydraulics and Geotechnical Lab staff will conduct soil and erosion tests utilizing the Ex-situ Scour Testing Device (ESTD) and/or Erosion Function Apparatus (EFA) on soil samples shipped to the Laboratories for bridge projects managed or coordinated by State DOTs.Task 2: Soil Erosion Test in the field for various bridge projects: The Hydraulics Lab staff will conduct soil erosion tests in the field using the In-Situ Scour Testing Device (ISTD) or Portable Scour Testing Device (PSTD) and collect samples for ESTD and/or EFA tests in the TFHRC Hydraulics Laboratory for projects managed or coordinated by State DOTs.Task 3: Laboratory and In-situ Soil Testing: The TFHRC Geotechnical Lab staff will conduct index testing (e.g. particle-size distribution, unit weight, moisture content, Atterberg limits, etc.) and other, more specialized laboratory soil tests (e.g. undrained shear strength, consolidation, etc.) in the TFHRC Geotechnical Laboratory to determine key soil parameters that may impact erosional resistance. Geotechnical Lab staff will coordinate Cone Penetration Testing at the site with the State DOTs.Task 4: Fabrication of an Erosion Testing Device: The TFHRC Hydraulics Lab staff will design and fabricate an Erosion Testing Device (e.g. ISTD or PSTD) to conduct soil erosion tests for projects managed or coordinated by State DOTs.Task 5: Soil Erosion Tests Support. TFHRC Hydraulics Lab staff will provide technical assistance for conducting and analyzing soil erosion tests in the field or in a Laboratory for projects managed or coordinated by State DOTs.Task 6: Laboratory and In-situ Soil Testing Support. TFHRC Geotechnical lab staff will provide technical assistance for conducting and analyzing ex- and in-situ soil testing for projects managed or coordinated by State DOTs.Task 7: Scour along Longitudinal Structures: This task will use NextScour principles (hydraulic loading functions versus soil erosion resistance), Computational Fluid Dynamics (CFD), Flume Experiments and Case Studies to research scour prediction for various flow conditions on longitudinal structure types and configurations in a riverine environment.   |

 |

|  |
| --- |
| **Progress this Quarter (includes meetings, work plan status, contract status, significant progress, etc.):*** Finalized a simplified scour exceedance probability method combining both distribution of load and clay resistance, and applied it to determine the resistance factor of the clay’s critical shear stress
* Updated the clay resistance fitting function of soil index properties with more ESTD erosion data and incorporated the reduction factor for scour design
* Hosted three lab tours demonstrating scaled FSK Bridge pier scour tests (Pier 24, Piers 22/23) in the TFHRC Hydraulics Lab and presented the research updated to MDTA on effective pier diameter, 2D and storm modeling, 3D CFD simulation on angle of attack effect on the shear stress amplification factor at the piers, CFD scour tool to display the scour hole evolution and comparison with the flume scour tests, and the erosion resistance of the FSK Bridge clay samples
* Picked up a total of seventeen Shelby tubes from MDTA and consultants, completed erosion tests on all of them, and analyzed the critical shear stresses, and presented the preliminary results to MDTA
* Completed the erosion tests on soils from all three ODOT sites and provided preliminary erosion resistance report back to ODOT
* Coordinated with ODOT on getting soils from the 4th project site
* Coordinated with Michigan DOT and received Shelby tube soils from the US-23 Bridge project site
* Met with VDOT on potential scour study technical assistance on three project sites, which have erodible rock and clay materials
* Completed the draft clay resistance TechNote including the ODOT and FSK Bridge soil erosion data. Update the fitting function of soil critical shear stress with index properties
 |
| **Anticipated work next Quarter**:* Sent out the draft clay resistance TechNote for external review
* Conduct ESTD erosion tests on soils from the 4th ODOT site, MDOT US-23 Bridge site, and FSK Bridge site
* Continue the load distribution research using SRH-2D MCS and integrate the results on the reduction factor of the clay resistance in scour design
* Develop the technical assistance work plan for the TNDOT I-55 Bridge replacement project
* Continue technical assistance to the MSDOT Lynch Creek Bridge project
* Continue working on the FDOT riprap study report
* Activate the clay flume and prepare scour tests with pier, abutment and longitudinal walls in clay
 |
| **Significant Results:**Successfully hosted three lab tour demonstrating the flume scaled scour test of FSK Bridge Piers to MDTA, MDOT SHA officials and consultants |
| **Circumstance affecting project or budget. (Please describe any challenges encountered or anticipated that might affect the completion of the project within the time, scope and fiscal constraints set forth in the agreement, along with recommended solutions to those problems).**None to report. |