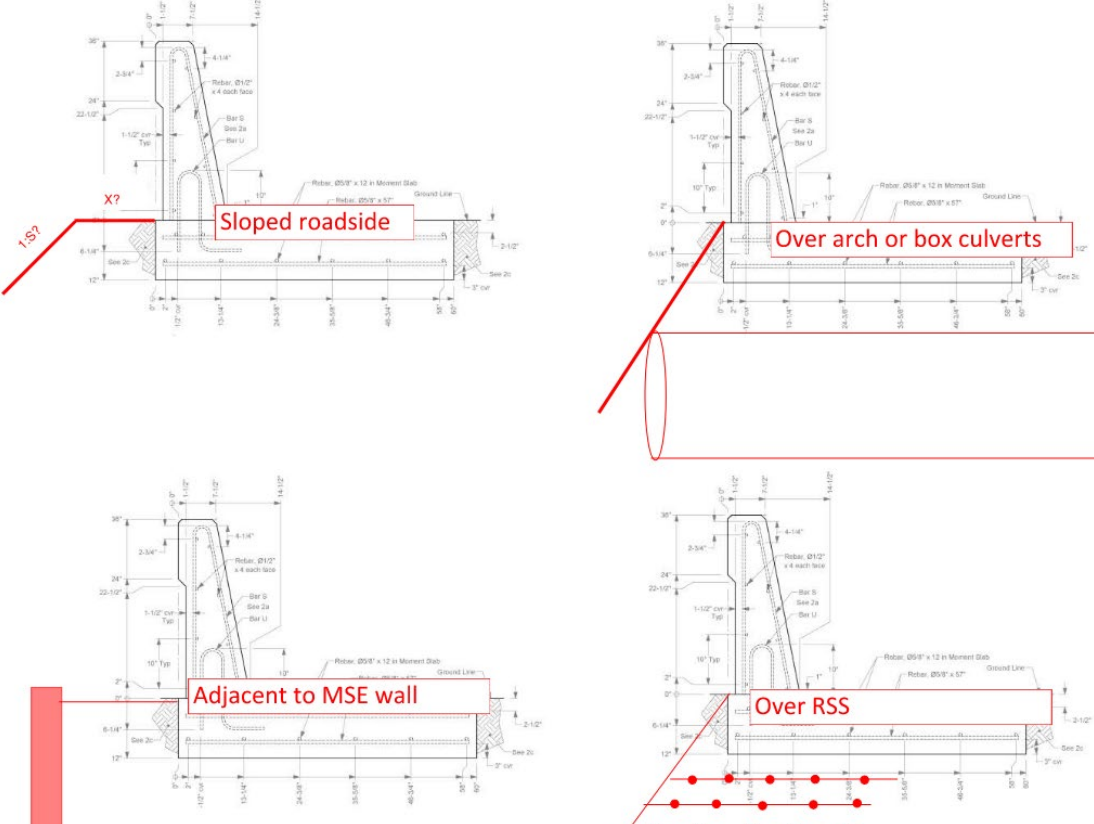


<b>Project Title:</b>	<b>LCB:</b> Foundation criteria and slope design guidance for Structurally Independent Concrete Barrier. (2024-02-LCB)
<b>Project Synopsis:</b>	<p>This project would seek to develop foundation criteria and slope design guidance for previously tested (TL-4) Structurally Independent Concrete Barrier for other roadside applications. It would focus on the at-grade moment slab and beam foundation concrete barriers developed from a previous project. The guidance will assist states better understand requirements to design for uses case other than the tested condition of infinitely wide level terrain.</p>
<b>Project Goal(s):</b>	<ol style="list-style-type: none"> <li>1.) Provide guidance for states for foundation criteria and necessary grading behind concrete barrier for various sloped roadside application.</li> <li>2.) Guidance would be for moment slab and beam foundation concrete barriers.</li> <li>3.) Guidance would be for TL-3 and TL-4.</li> </ol>
<b>Project Background:</b>	<p>TTI has already done extensive work on various footing designs and testing for concrete barriers. The TL-4 Structurally Independent Barrier footing designs TTI developed for Report No. 0-6968-R7 were only crash tested in level ground. Real-world conditions require flexibility to adapt concrete barrier placement to various locations and in constraint locations. These concrete barriers can often be placed in cases such as in front of slopes and over other structures where plate beam guardrail cannot be used.</p> 
<b>Proposed Work Plan:</b>	<ol style="list-style-type: none"> <li>1.) Task 1 – Conduct background research to             <ol style="list-style-type: none"> <li>a. assemble available test data and other research results from prior evaluation of concrete barrier on sloped roadside.</li> <li>b. survey states on practices and needs around structurally independent barrier footings.</li> </ol> </li> <li>2.) Task 2 – Employ finite element analysis to identify critical foundation design configurations and relationships between the barrier, soil parameters, and slope design.</li> </ol>

	<p>3.) Task 3 – Use the results to prepare table or equation-based guidance for states for designing short independent concrete barriers for roadside applications.</p> <p>4.) Task 4 – Identify possible future critical crash testing that would be needed.</p>										
<b>Deliverables:</b>	The primary deliverable would be a report providing a simplified process for designing of foundation and slope design for structurally independent concrete barriers for sloped roadside applications. This document would include specific design parameters for states to use such as minimum length of barrier segment, soil characteristics, and grading design to assist states.										
<b>Urgency and Expected Benefit:</b>	Few concrete barrier footing designs have been crash tested for common sloped roadside applications. States need additional guidance sloped design behind barrier of short length concrete barrier on outside roadside applications.										
<b>Problem Funding and Research Period:</b>	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">Task 1 Literature Review</td> <td style="text-align: right;">\$6,394</td> </tr> <tr> <td>Task 2 FEA</td> <td style="text-align: right;">\$120,056</td> </tr> <tr> <td>Task 3 Guideline Development</td> <td style="text-align: right;">\$13,580</td> </tr> <tr> <td>Task 4 Crash Test Plan</td> <td style="text-align: right;">\$2,038</td> </tr> <tr> <td><b>Total Estimated Cost All Tasks</b></td> <td style="text-align: right;"><b>\$142,068</b></td> </tr> </table> <p>The simulation budget for the vertical beam evaluation is \$36,426. That can be subtracted from the Task 2 FEA budget if the vertical beam is eliminated from the matrix.</p>	Task 1 Literature Review	\$6,394	Task 2 FEA	\$120,056	Task 3 Guideline Development	\$13,580	Task 4 Crash Test Plan	\$2,038	<b>Total Estimated Cost All Tasks</b>	<b>\$142,068</b>
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<b>Developer(s) of the Problem Statement:</b>	<p>Name: Khamsai Yang, PE, MnDOT</p> <p>Email: Khamsai.Yang@state.mn.us</p> <p>Phone: 612-322-5601</p>										