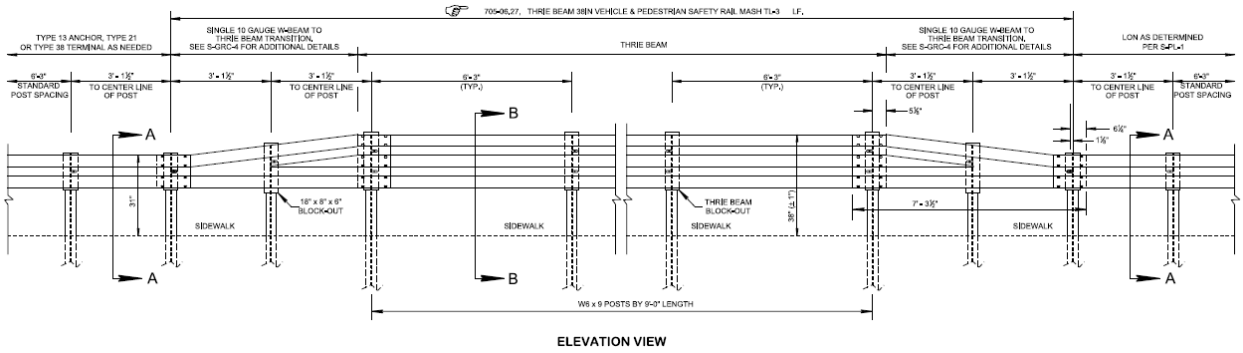
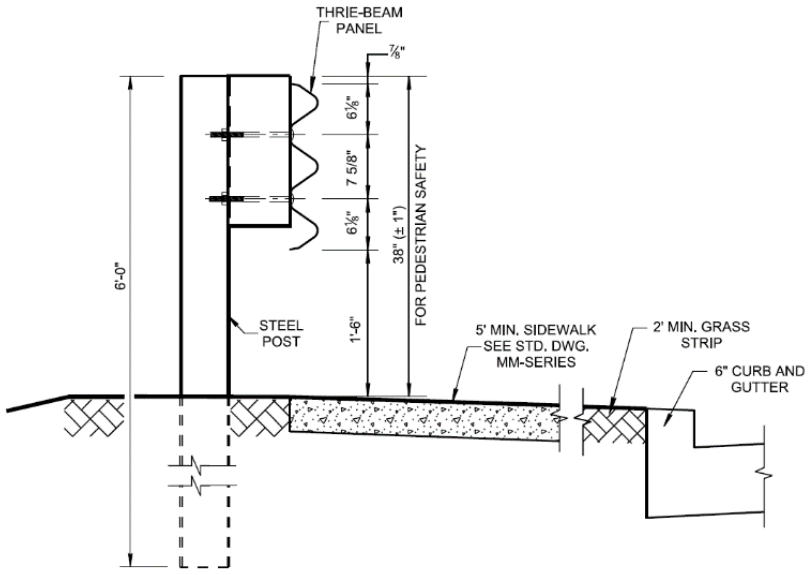
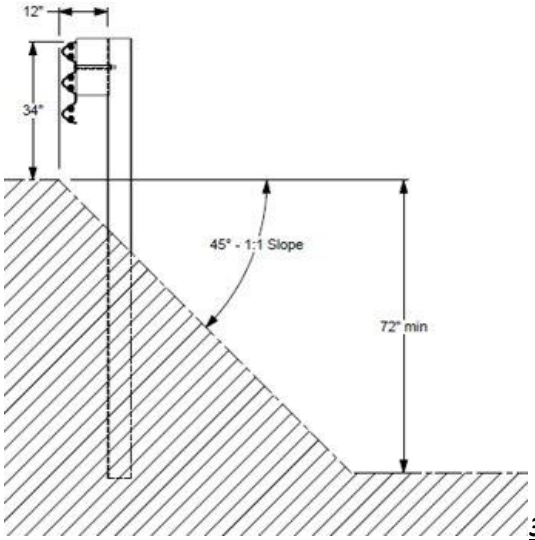
Research Problem Statement

Project Title:	**MASH TL-3 Compliant Thrie -beam Guardrail System for Vehicle and Pedestrian Safety (LSRB).—Phase I (**2024-01-LSRB)
Project Synopsis:	During the development of rehabilitation/reconstruction of roadway projects (widening, multimodal accommodation) for an existing W-beam guardrail system located in urban or suburban context requires to be revaluated to offer a fall protection for pedestrians using the new sidewalk in addition to continue serve for the vehicles. Locations often maintains a ditch section offering non traversable clear zone behind the new sidewalk also drop-off height enough, so it warrants for pedestrian safety rail. To offer a low-cost solution, TDOT is proposing to raise the conventional thrie-beam system by 3 inches to meet the minimum of 36-inch height (37-inch with ± 1 inch construction tolerance) rail height requirement to serve pedestrians while offering re-directive capacity for an errand vehicle. Practice may also improve the performance of the existing thrie-beam system placed near the curb and cutter section. While the modification is minimal, the raised thrie-beam design needs to be evaluated for *MASH* crashworthiness.  ELEVATION VIEW  SECTION B-B FOR THRIE BEAM VEHICLE AND PEDESTRIAN SAFETY RAIL
Project Goal(s):	1.) Develop a design detail and simulation model to validate the concept. 2.) Evaluate 37-inch thrie-beam guardrail system under *MASH* Test 3-11. 3.) Upon successful outcome, further test to evaluate the performance of the eccentric height transition section may be required.

Project Background:	In earlier pool fund project, a thrie-beam guardrail system with 34-inch height at 1:1 slope has been evaluated and successfully passed *MASH* TL-3 evaluation.  ***34-inch height thrie beam system at 1:1 slope*** Based on the experiences gained by this project, a thrie-beam at 37-inch height system placed along with sidewalk and/or curb and gutter roadway section could offer an effective performance as a combined system serving as a pedestrian safety rail and a vehicle guardrail rail applicable *MASH* TL-3 compliant system. Therefore, developing and evaluating such systems would provide several benefits in terms of safety, cost-effective, and constructability. To be an applicable *MASH* TL-3 compliant system, the system should be evaluated under *MASH* TL-3 evaluation criteria and pass full-scale LON and transition tests.
Proposed Work Plan:	1.) Task 1 – Literature Review • Review MASH compliant thrie-beam systems. • Review MASH compliant systems installed along with curb and gutter section. • Review standard guidelines for pedestrian rail design. 2.) Task 2 – Develop a design detail and perform LS-DYNA simulation • Modify and improve system designed by TDOT to meet design standards. • Develop FE model for the thrie-beam system. • Evaluate the system and determine CIP under MASH TL-3 criteria using LS-DYNA. 3.) Task 3 – Conduct full-scale *MASH* Test 3-11 on the thrie-beam system • Design and conduct full-scale *MASH* Test 3-11 to determined LON and evaluate the system.
Deliverables:	Final report providing design details for a *MASH* TL-3 compliant thrie-beam guardrail system for vehicle and pedestrian safety.
Urgency and Expected Benefit:	The results of the project would provide member states with a *MASH* TL-3 compliant thrie-beam guardrail system for vehicle and pedestrian safety in suburban context.
Problem Funding and Research Period:	**Total Estimated Cost = $XX,XXX**
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