

## Countermeasure Matrix

The following tables list relevant countermeasures applicable to each combination of focus crash type and facility type by risk level. As discussed elsewhere in the plan, the countermeasures are applicable to all sites at the applicable risk level or above. As such, standard countermeasures are applicable to all risk sites; medium risk level countermeasures are applicable to medium risk, high risk, and primary risk sites; high risk level countermeasures are applicable to high risk sites and primary risk sites; and primary risk level countermeasures are applicable to primary risk sites. The tables are applicable as follows:

- Primary risk sites - Table 3.
- High risk sites - Table 4.
- Medium risk sites - Table 5.
- Standard countermeasures - Table 6.

**Table 3 Countermeasure Matrix for Primary Risk Sites**

Risk Level	Countermeasure (Focus Crash and Facility Type)	Target Crash Types and Facilities						
		Head-On Crashes, Curves and Tangents (1, 6, 12)	Overturn, Curves (2, 7)	Fixed Object Crashes, Curves (4, 9)	Run- Off- Road, Curves (3, 8)	Overturn, Interstate (11)	Nighttime Run-Off-Road Crashes, Curves and Tangents (5, 10)	Overturn, Run-Off Road, Tangents (13, 14)
Primary	Centerline Buffer Area	●						
	Median Buffer	●						
	HFST	●		●	●		●	
	In-Pavement Curve Warning Markings		●	●	●		●	
	Dynamic Chevrons		●	●	●		●	
	Flashing Beacons on Curve Warning Signage		●	●	●		●	
	Roadside Barrier		●	●	●	●	●	●
	Slope Flattening		●		●	●	●	●
	Removal of Trip Hazards		●		●	●	●	●
	Clear Zone Widening			●	●		●	
	Lighting						●	

**Table 4. Countermeasure Matrix for High Risk Sites**

Risk Level	Countermeasure (Focus Crash and Facility Type)	Target Crash Types and Facilities						
		Head-On Crashes, Curves and Tangents (1, 6, 12)	Overturn, Curves (2, 7)	Fixed Object Crashes, Curves (4, 9)	Run- Off- Road, Curves (3, 8)	Overturn, Interstate (11)	Nighttime Run-Off- Road Crashes, Curves and Tangents (5, 10)	Overturn, Run-Off Road, Tangents (13, 14)
High	Centerline Mumble Strips	●						
	Centerline Rumble Strips	●						
	Designate No Passing Zone	●						
	Address Trip Hazards <sup>2</sup>		●			●		●
	Paved Shoulder Widening		●	●	●	●	●	●
	Targeted Clear Zone Widening			●				
	Reflective Pavement Markings						●	

<sup>2</sup> As opposed to removal, "addressing" a risk hazard includes redesigning the trip hazard, relocating it to elsewhere in the clear zone, using barrier to protect vehicles from the trip hazard, or otherwise delineating the trip hazard.

**Table 5. Countermeasure Matrix for Medium Risk Sites**

Risk Level	Countermeasure (Focus Crash and Facility Type)	Target Crash Types and Facilities						
		Head-On Crashes, Curves and Tangents (1, 6, 12)	Overturn, Curves (2, 7)	Fixed Object Crashes, Curves (4, 9)	Run- Off- Road, Curves (3, 8)	Overturn, Interstate (11)	Nighttime Run-Off- Road Crashes, Curves and Tangents (5, 10)	Overturn, Run-Off Road, Tangents (13, 14)
Medium	Widened Centerline Markings	●						
	Supplemental MUTCD Curve Warning Signs <sup>3</sup>	●	●	●	●			
	Post-Mounted Delineators		●	●	●	●	●	●
	Shoulder Rumble Strips		●	●	●		●	●

**Table 6. Countermeasure Matrix for All Sites**

Risk Level	Countermeasure (Focus Crash and Facility Type)	Target Crash Types and Facilities						
		Head-On Crashes, Curves and Tangents (1, 6, 12)	Overturn, Curves (2, 7)	Fixed Object Crashes, Curves (4, 9)	Run- Off- Road, Curves (3, 8)	Overturn, Interstate (11)	Nighttime Run-Off- Road Crashes, Curves and Tangents (5, 10)	Overturn, Run-Off Road, Tangents (13, 14)
Standard	Centerline Pavement Markings	●					●	
	Sloped Pavement Edge	●	●	●	●	●	●	●
	Breakaway Devices	●	●	●	●	●	●	●
	Edgeline Markings	●	●	●	●	●	●	●

<sup>3</sup> Found in MUTCD Table 2C-5. Use fluorescent sheeting for High and Primary risk site applications. Consider gate posting warning signs for Primary risk site applications.