APPENDIX M

REVISED PAVEMENT DISTRESS UTILITY CURVE COEFFICIENTS FOR ACP, CRCP, AND JCP

Table M1. Current and Proposed Modified ACP Distress Utility Coefficients (all traffic levels).

	Current PMIS			Modified		
Distress	**Alpha**	**Beta**	**Rho**	**Alpha'**	**Beta'**	**Rho'**
Alligator Cracking (Percent WP)	0.5300	1.0000	8.01	0.5476	0.9392	7.76
Patching (Percent)	0.4500	1.0000	10.15	0.2398	1.6978	12.03
Failures (Num)	1.0000	1.0000	4.70	0.9965	0.9997	6.29
Block Cracking (Percent)	1.0000	1.0000	4.70	0.4479	0.8792	12.77
Longitudinal Cracking (Unsealed)	0.8700	1.0000	184.00	0.9571	0.7613	191.44
Longitudinal Cracking (Sealed)				0.3700	1.0000	136.90
Transverse Cracking (Unsealed)	0.6900	1.0000	10.39	0.6670	1.0727	7.24
Transverse Cracking (Sealed)				0.4300	1.0000	9.56

Table M2. Proposed Exponents and Coefficients for ACP Ride Scores.

To be used in the Equation Coefficient*[Speed Limit*SQRT(AADT]^Exponent

Ride Score	Proposed Exponent	Proposed Coefficient		Ride Score	Proposed Exponent	Proposed Coefficient		Ride Score	Proposed Exponent	Proposed Coefficient
3.3	-0.00177	1.1		2.2	-0.28008	5.32		1.1	-0.75586	55
3.2	-0.02289	1.21		2.1	-0.31201	6.5		1.0	-0.82128	80
3.1	-0.04468	1.42		2.0	-0.34550	7.4		0.9	-0.89360	100
3.0	-0.06719	1.634		1.9	-0.38071	9.1		0.8	-0.97445	150
2.9	-0.09046	1.9		1.8	-0.41782	11.2		0.7	-1.06611	230
2.8	-0.11455	2.16		1.7	-0.45706	14		0.6	-1.17192	400
2.7	-0.13951	2.5		1.6	-0.49867	16		0.5	-1.29706	800
2.6	-0.16541	2.85		1.5	-0.54297	20.5		0.4	-1.45023	1850
2.5	-0.19233	3.3		1.4	-0.59033	25.1		0.3	-1.64770	5500
2.4	-0.22036	3.85		1.3	-0.64119	33.5		0.2	-1.92601	20000
2.3	-0.24957	4.55		1.2	-0.69614	44		0.1	-2.40179	50000

Note: The values above are to be used in the following equation:

ACP Condition Score = ACP Distress Score * Coefficient*[Speed Limit*SQRT(AADT)]^Exponent

Table M3. Current and Proposed Modified CRCP Distress Utility Coefficients (all traffic levels).

	Current PMIS			Modified		
Distress Type	**Alpha**	**Beta**	**Rho**	**Alpha**	**Beta**	**Rho**
Spalled Cracks	0.9369	1.0000	62.7000	0.99	0.51	62.70
Punchouts	0.9849	1.0000	5.1400	0.77	0.95	2.91
Asphalt Patches	0.9849	1.0000	5.1400	1.60	0.25	50.00
Concrete Patches	0.8649	1.0000	8.2000	0.90	0.66	13.61
Ride Quality- Low Traffic	1.1810	1.0000	58.5000	1.00	1.60	25.19
Ride Quality – Medium Traffic	1.7600	1.0000	48.1000	1.00	1.60	25.19
Ride Quality- High Traffic	1.7300	1.0000	41.0000	1.00	1.60	25.19

Table M4. Updated JCP Distress Utility Coefficients.

Distress	Traffic		Coefficients		
			ρ	β	α
Failed Joints and Cracks (FJC)	Low	Original	21.40	1.00	0.53
		Updated	33.38	0.98	0.56
	Medium	Original	21.40	1.00	0.53
		Updated	33.56	0.82	0.78
	Heavy	Original	21.40	1.00	0.53
		Updated	31.05	0.67	0.91
Failures (F)	Low	Original	22.15	1.00	1.46
		Updated	33.38	0.98	1.10
	Medium	Original	22.15	1.00	1.46
		Updated	29.87	0.97	1.10
	Heavy	Original	22.15	1.00	1.46
		Updated	24.12	0.89	1.10
Concrete Patches (P)	Low	Original	24.24	1.00	1.07
		Updated	65.00	1.30	0.90
	Medium	Original	24.24	1.00	1.07
		Updated	64.00	0.99	1.10
	Heavy	Original	24.24	1.00	1.07
		Updated	56.00	0.89	1.32
Longitudinal Cracks (LC)	Low	Original	47.80	1.00	1.0058
		Updated	57.21	0.65	1.03
	Medium	Original	47.80	1.00	1.0058
		Updated	37.98	0.71	0.97
	Heavy	Original	47.80	1.00	1.0058
		Updated	31.12	0.71	1.01
Shattered Slabs (S)	Low	Original	16.31	1.00	1.17
		Updated	23.01	0.42	1.09
	Medium	Original	16.31	1.00	1.17
		Updated	18.17	0.48	1.11
	Heavy	Original	16.31	1.00	1.17
		Updated	12.16	0.51	1.09
Ride Score Loss (RSL)	Low & Medium[1]	Original	See footnote	See footnote	See footnote
		Updated	89.00	0.75	1.37
	Heavy[2]	Original	41.00	1.00	1.73
		Updated	76.00	0.74	1.67

Note 1: Original RS utility coefficients for low and medium traffic are:

	Low	Medium
ρ	58.50	48.10
β	1.00	1.00
α	1.818	1.76

Note 2: The best fit for the heavy traffic RSL utility function is the following equation: U=1-0.0072*RSL

ACP DISTRESS UTILITY CURVES

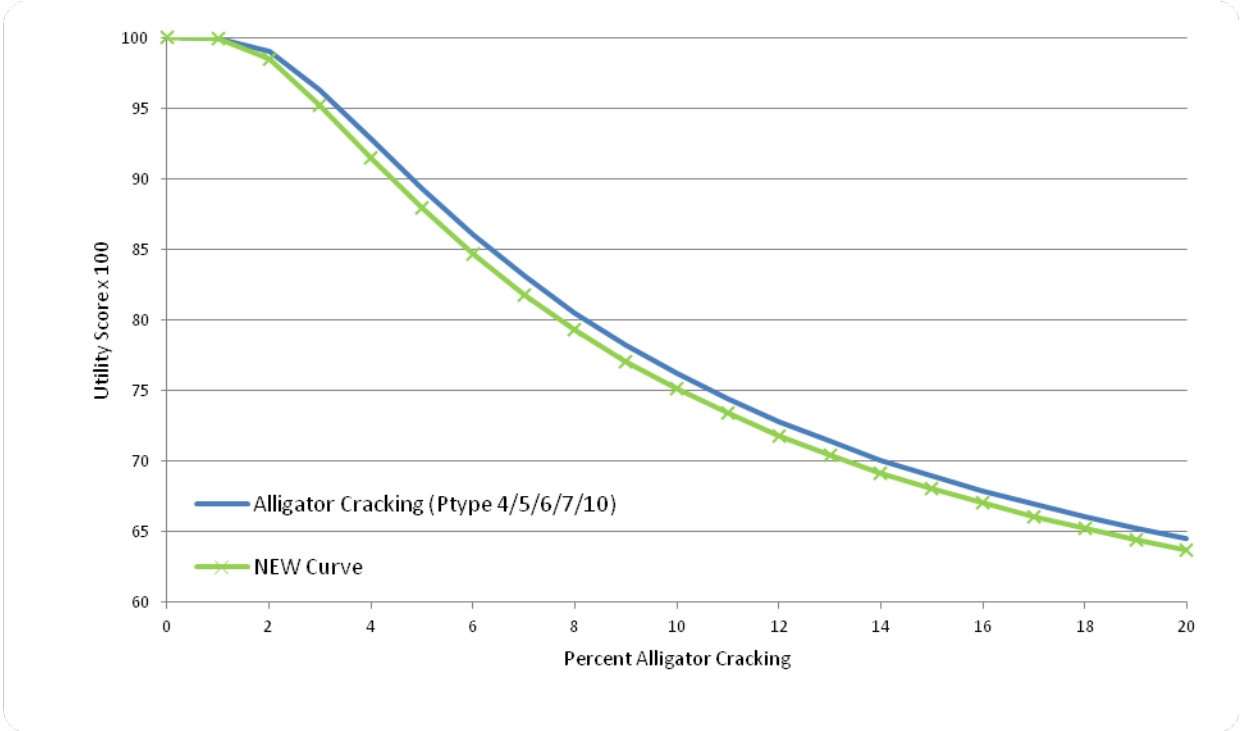

Figure M1. Proposed Alligator Cracking Utility Value.

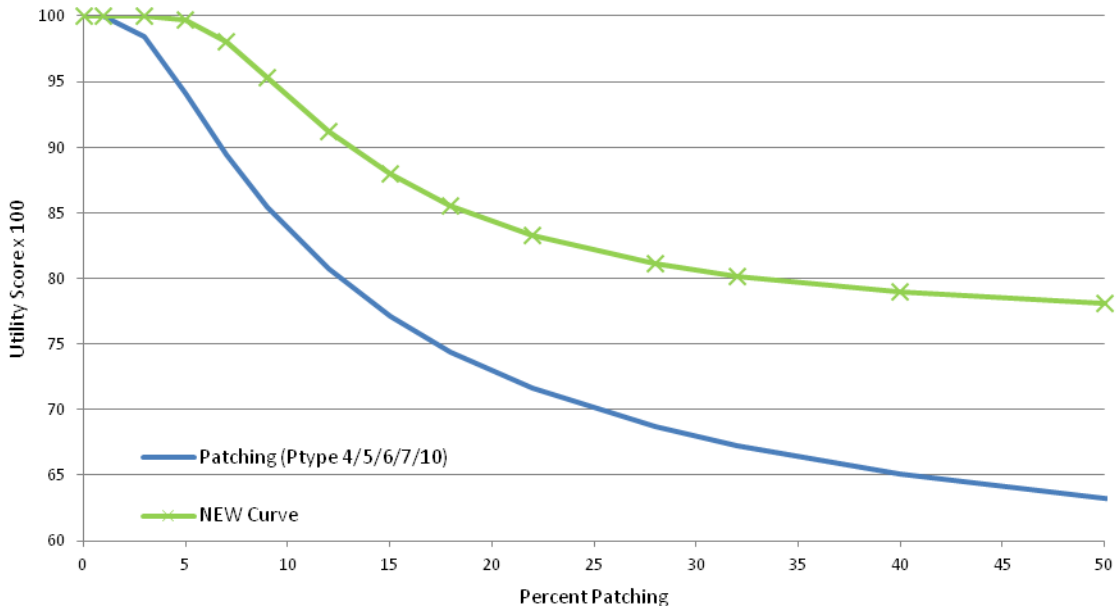

Figure M2. Proposed Patching Utility Value.

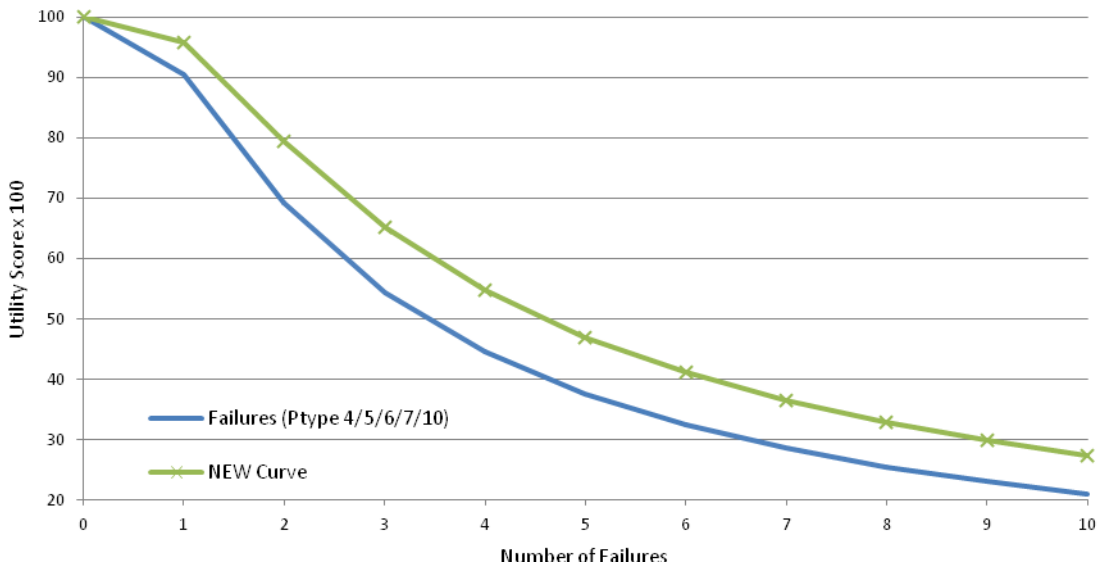

Figure M3. Proposed Failure Utility Value.

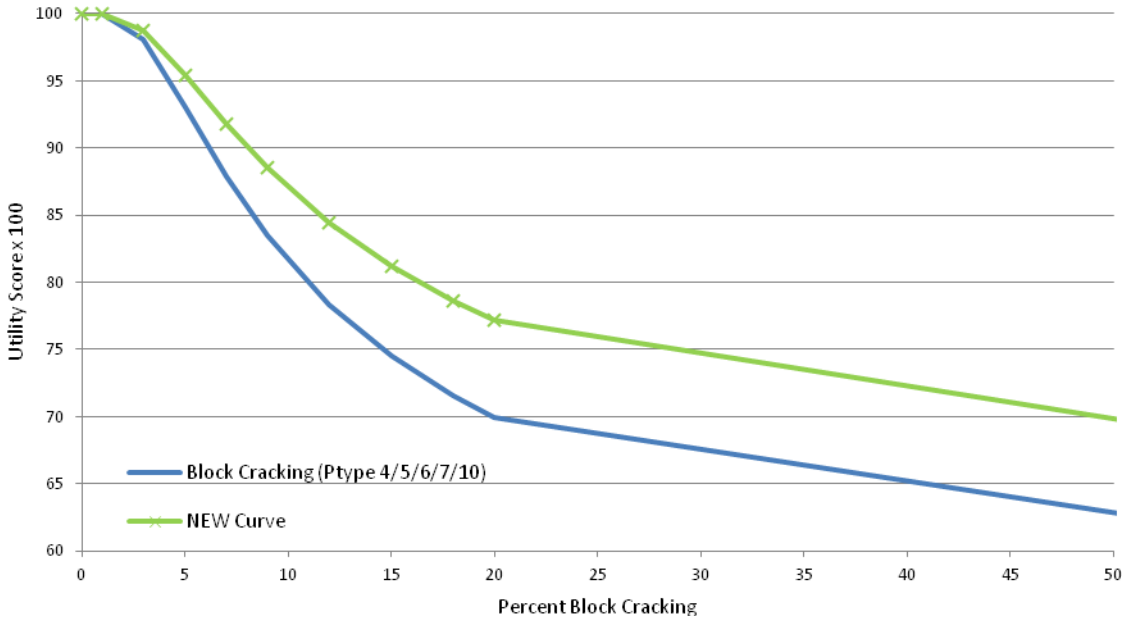

Figure M4. Proposed Block Cracking Utility Value.

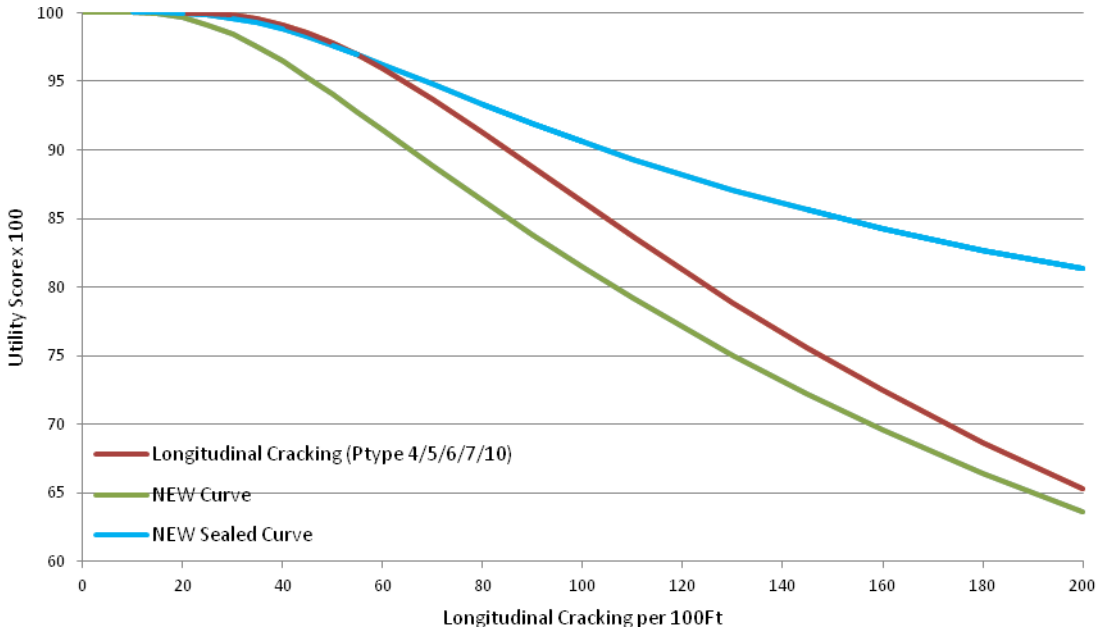

Figure M5. Proposed Longitudinal Cracking Utility Value.

Transverse Cracks

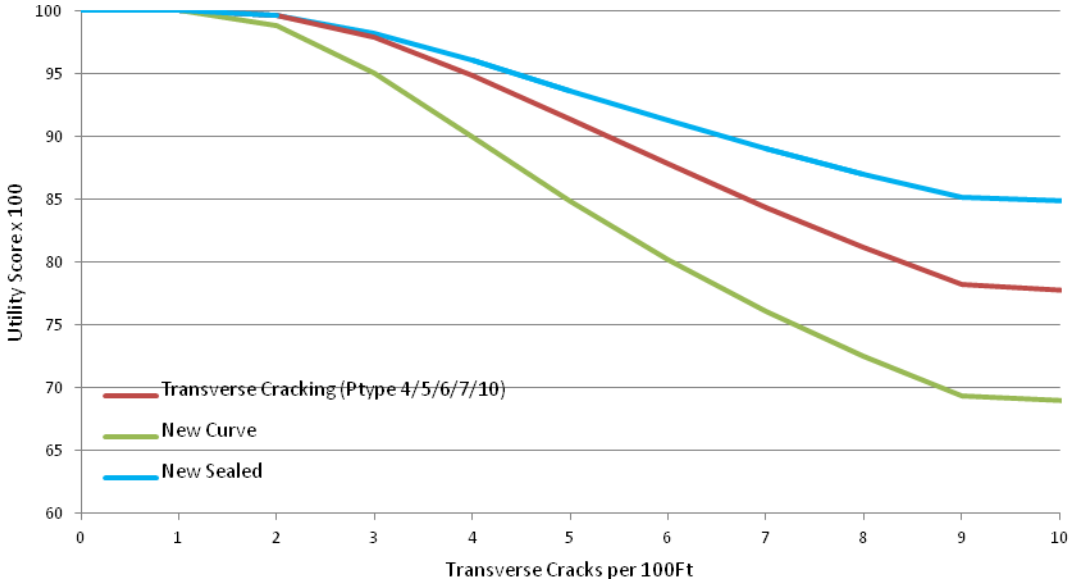

Figure M6. Proposed Transverse Cracking Utility Value.

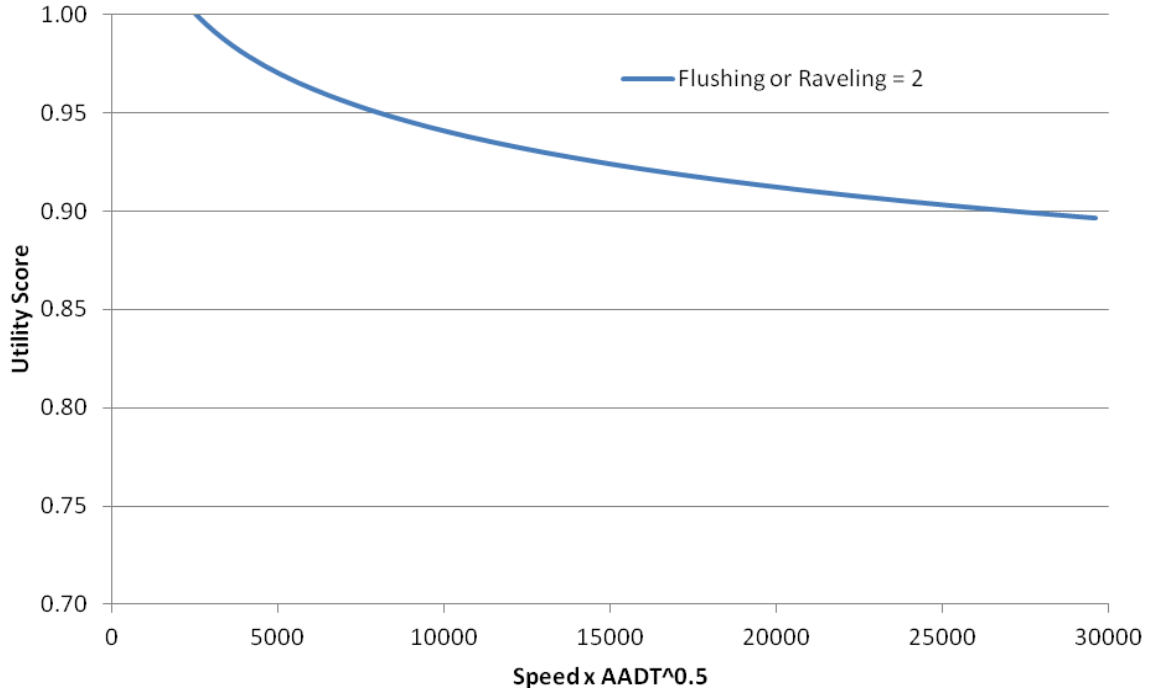

Figure M7. Proposed Level 2 Flushing and Raveling Utility Value.

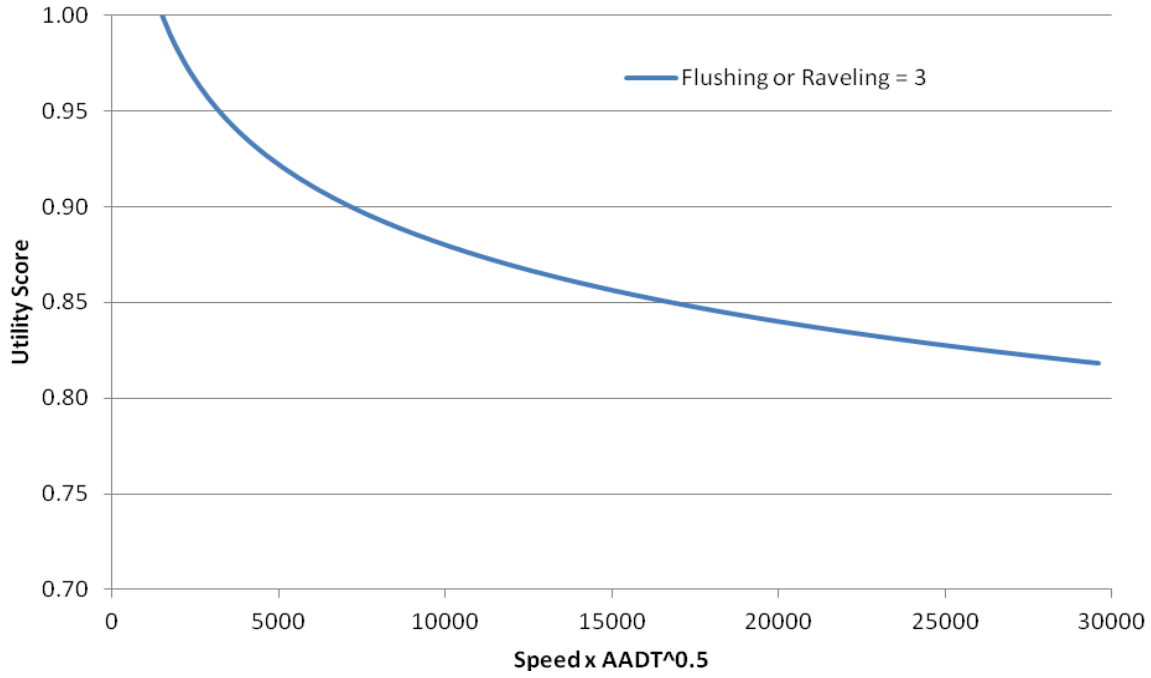

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Figure M8. Proposed Level 3 Flushing and Raveling Utility Value.

CRCP DISTRESS UTILITY CURVES

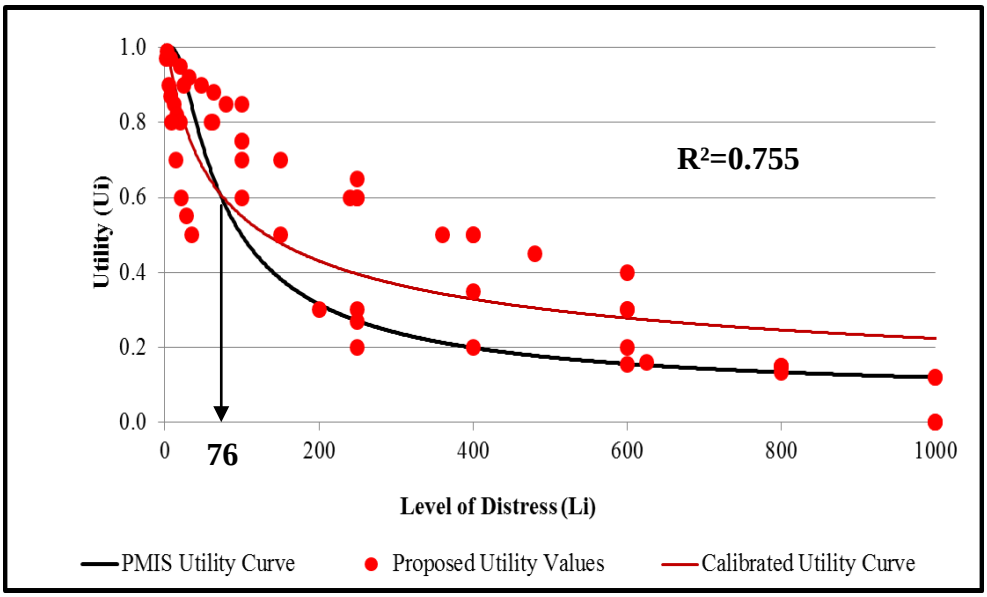

Figure M9. Re-Calibrated CRCP Spalled Cracks Utility Curve, Statewide.

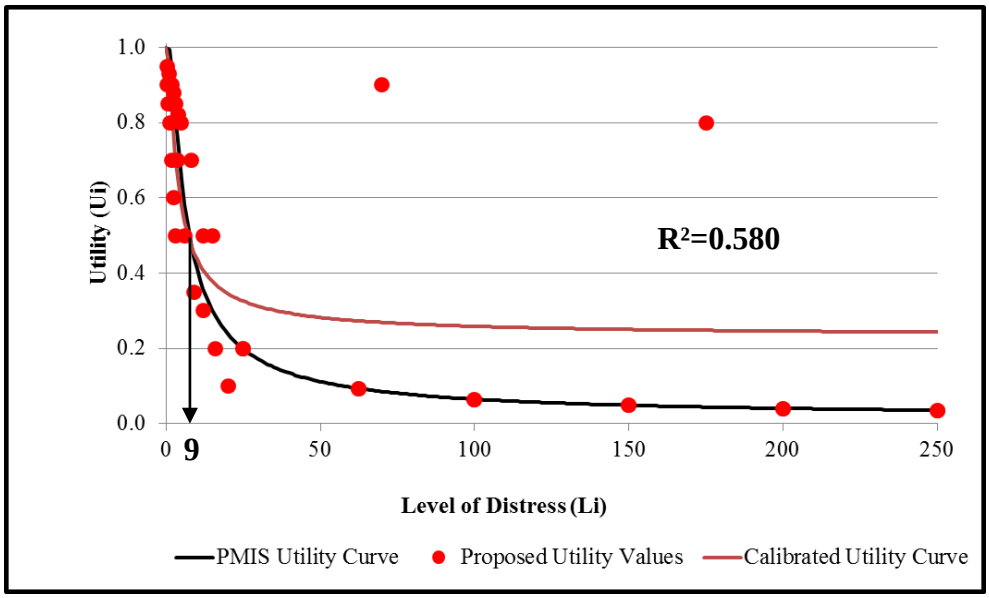

Figure M10. Re-Calibrated CRCP Punchouts Utility Curve, Statewide.

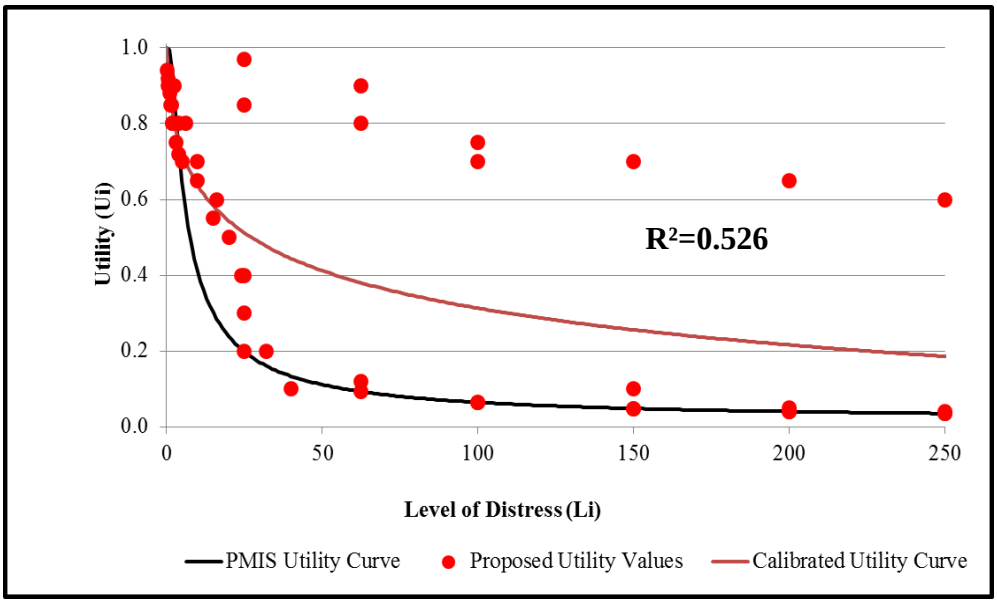

Figure M11. Re-Calibrated CRCP ACP Patches Utility Curve, Statewide.

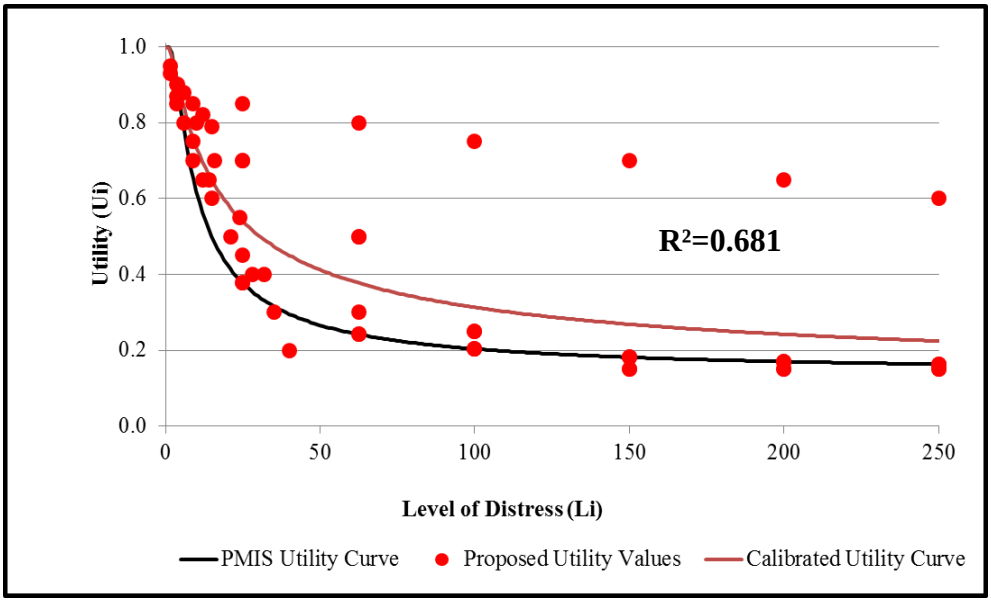

Figure M12. Re-Calibrated CRCP PCC Patches Utility Curve, Statewide.

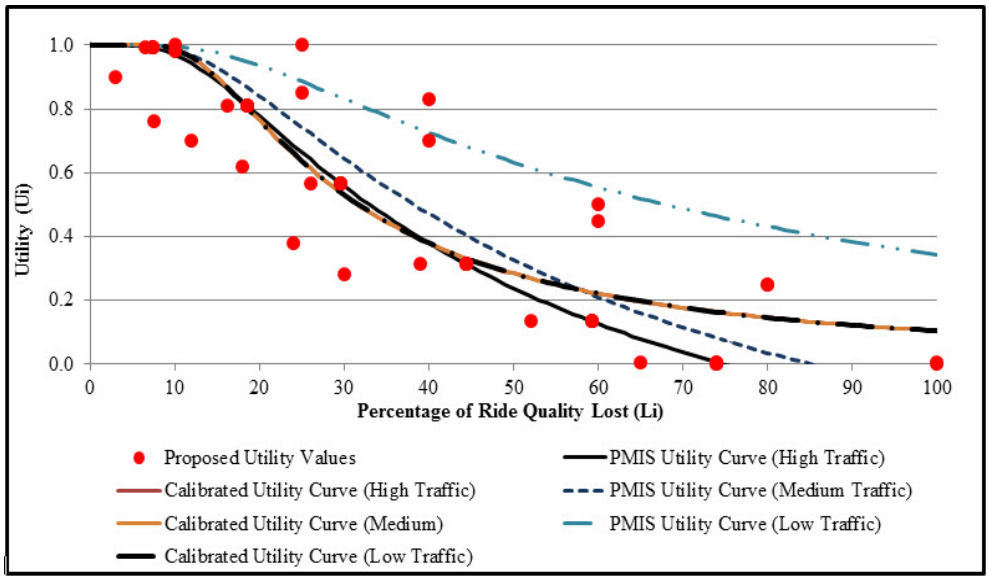

Figure M13. Re-Calibrated CRCP Ride Quality Utility Curve for All Traffic Levels, Statewide.

JCP DISTRESS UTILITY CURVES

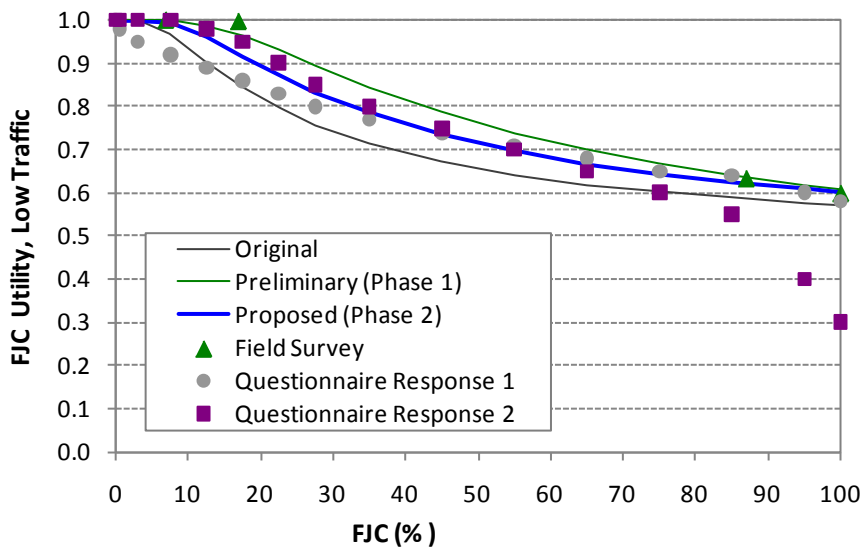

Figure M14. Updated Low Traffic Utility Function for Failed Joints and Cracks.

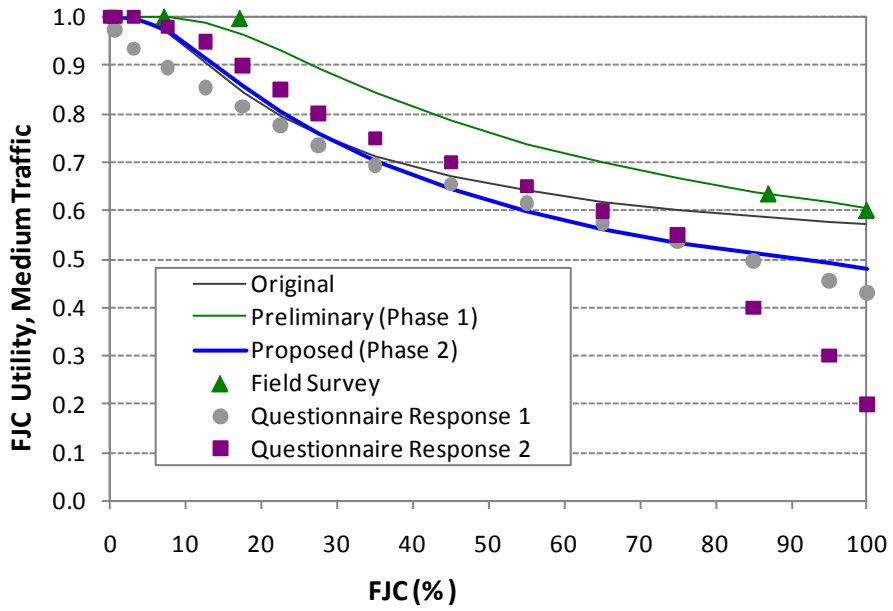

Figure M15. Updated Medium Traffic Utility Function for Failed Joints and Cracks.

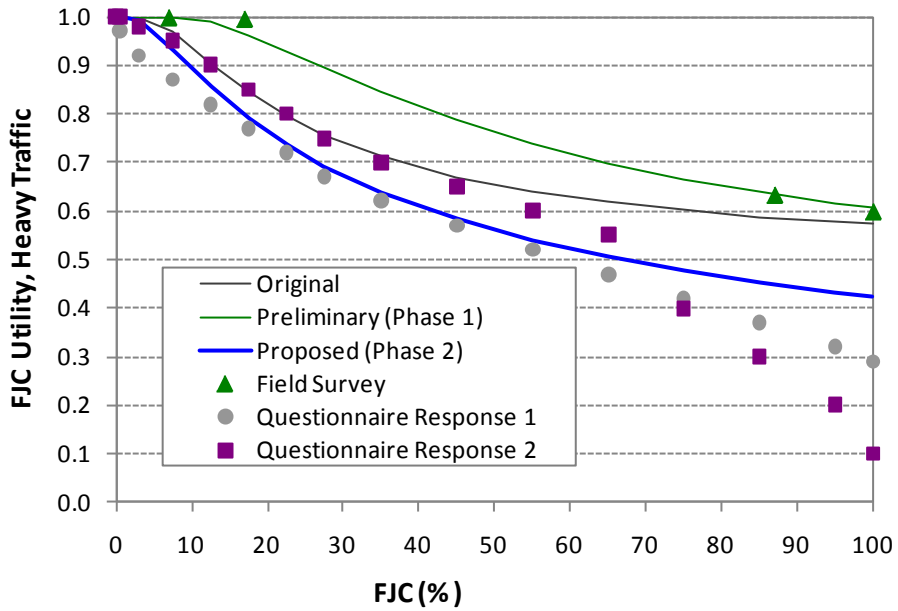

Figure M16. Updated Heavy Traffic Utility Function for Failed Joints and Cracks.

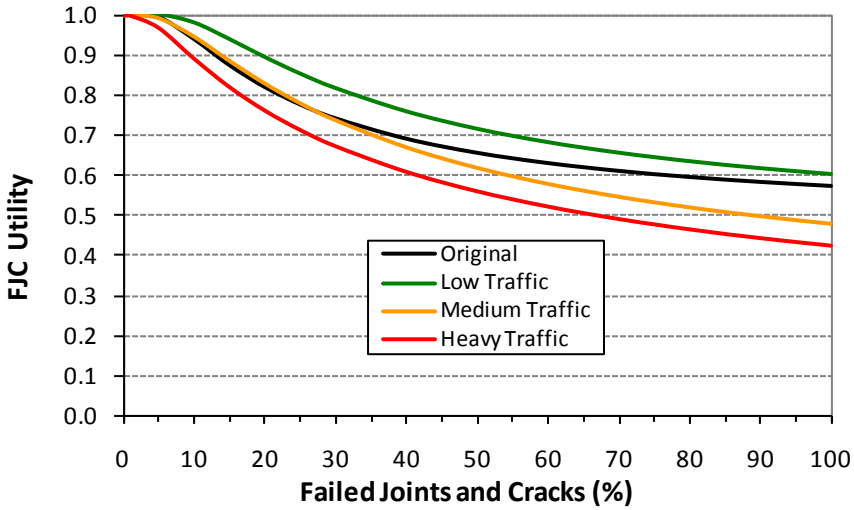

Figure M17. Updated Utility Functions for Failed Joints and Cracks, Comparison.

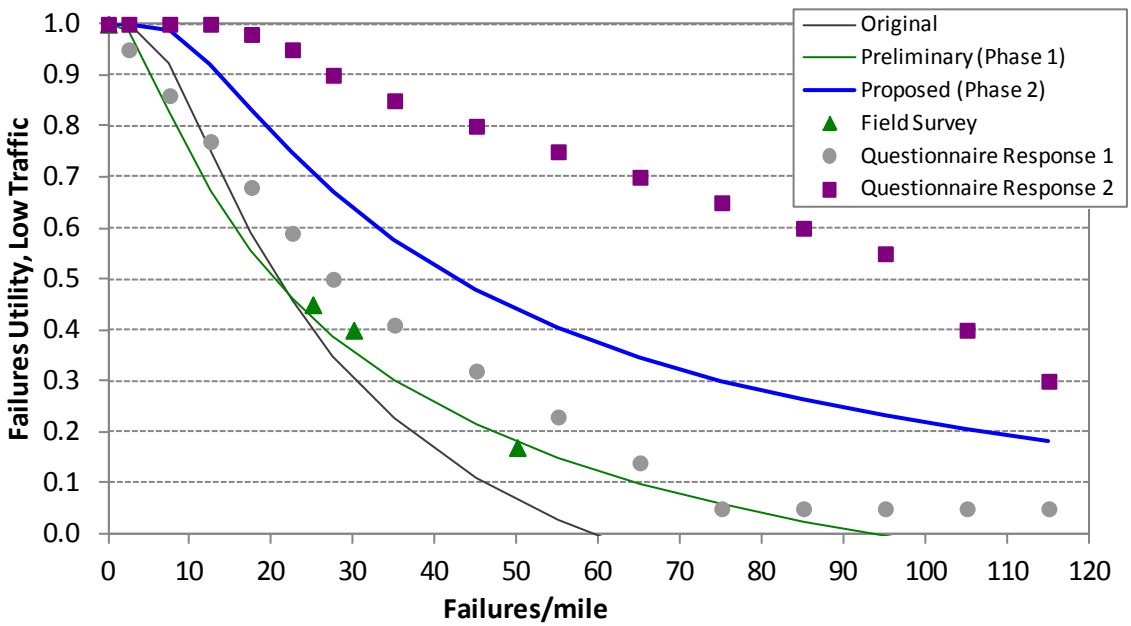

Figure M18. Updated Low Traffic Utility Function for Failures.

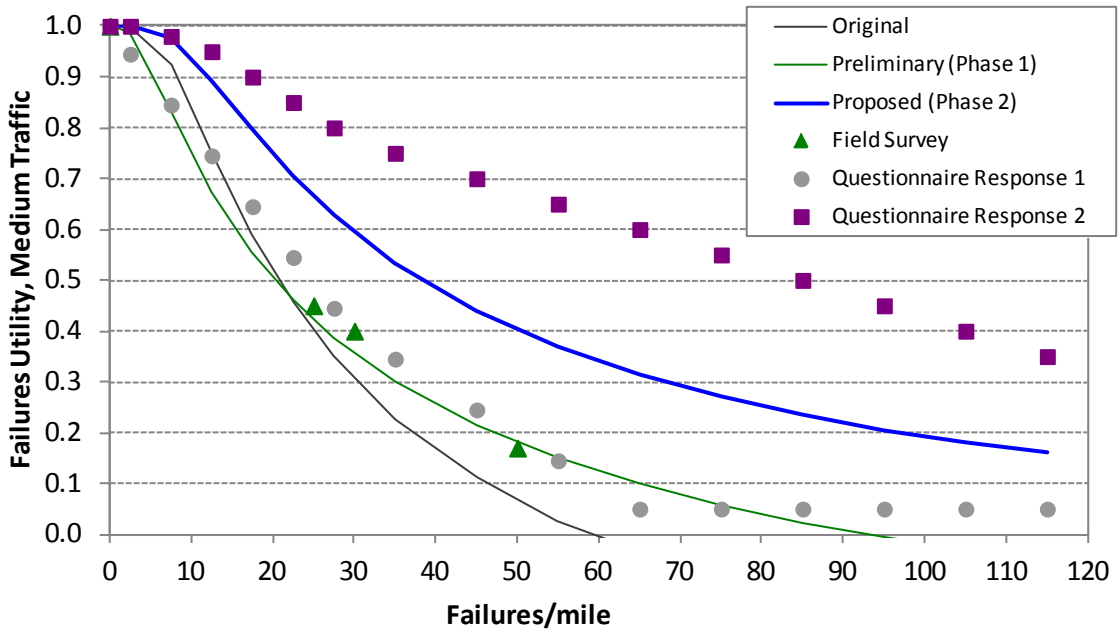

Figure M19. Updated Medium Traffic Utility Function for Failures.

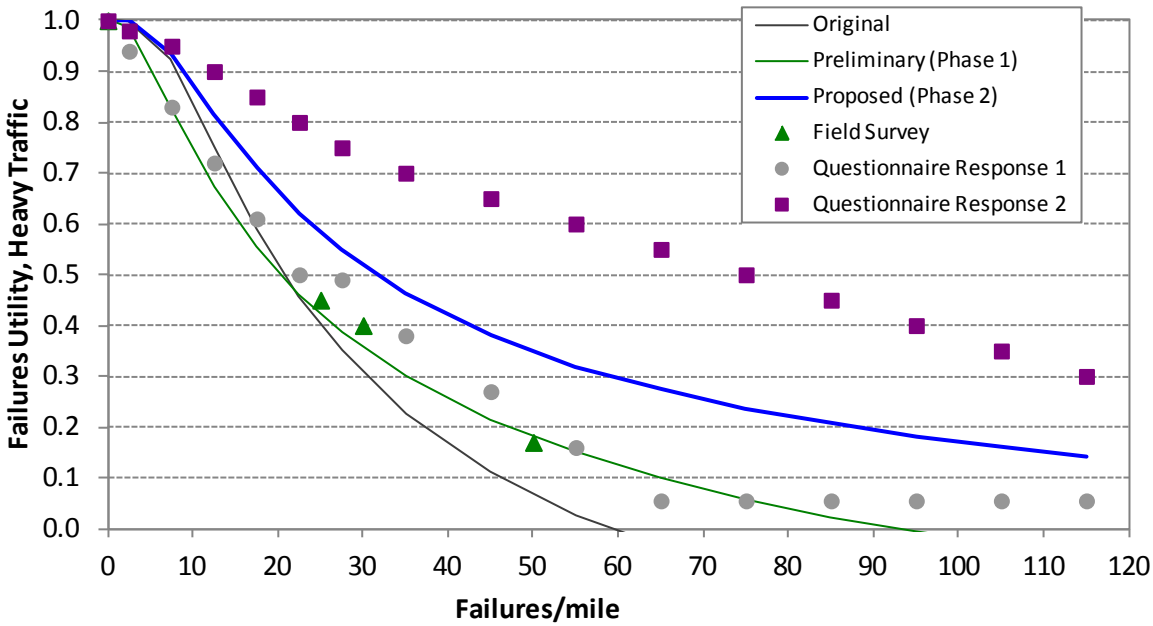

Figure M20. Updated Heavy Traffic Utility Function for Failures.

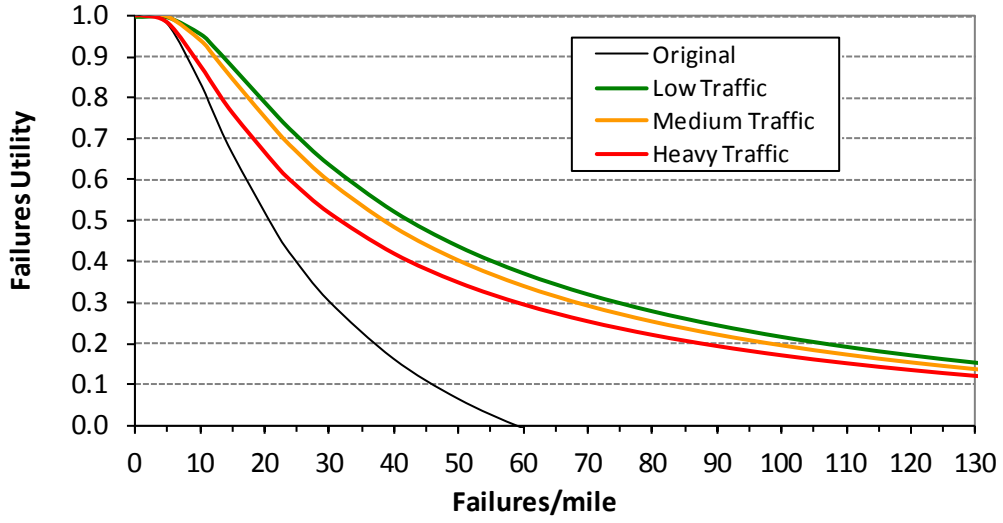

Figure M21. Updated Utility Functions for Failures: Comparison.

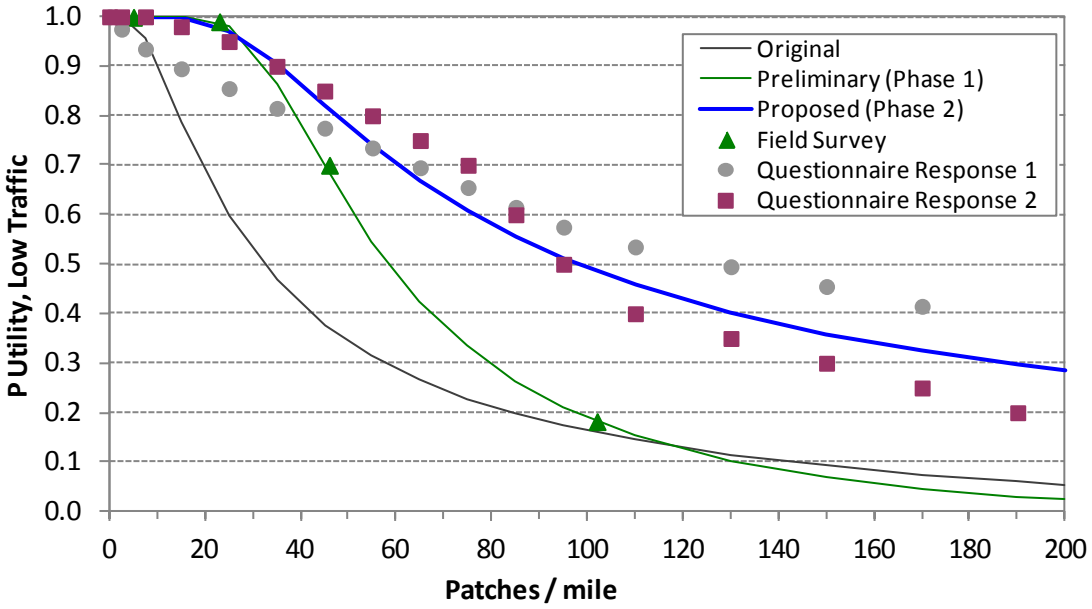

Figure M22. Updated Low Traffic Utility Function for Concrete Patches.

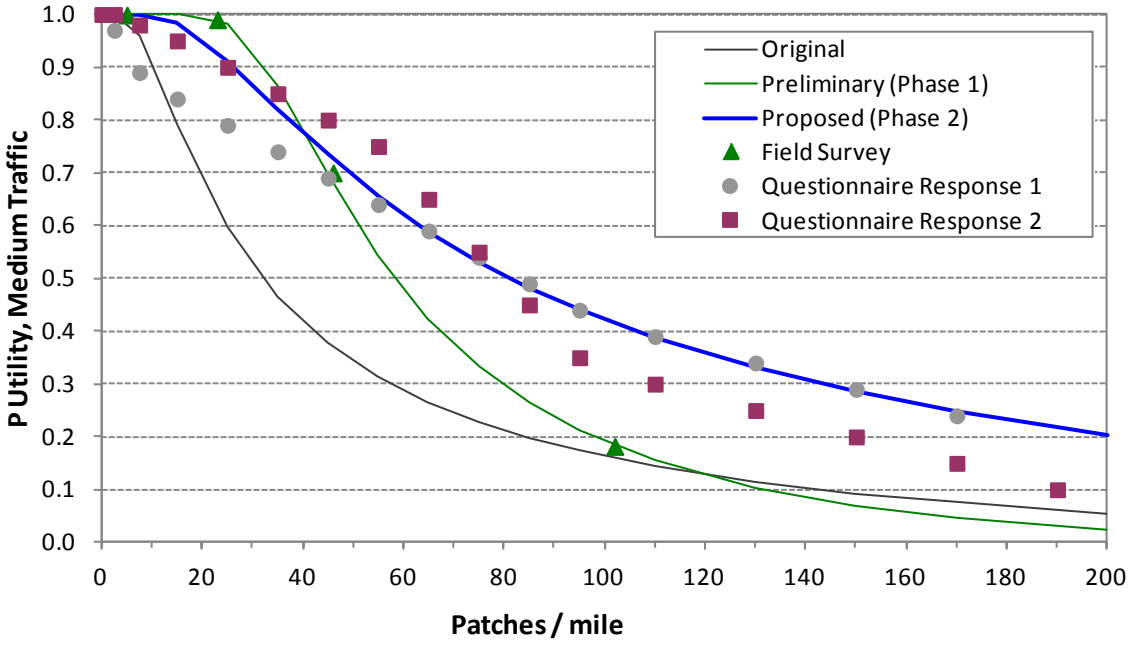

Figure M23. Updated Medium Traffic Utility Function for Concrete Patches.

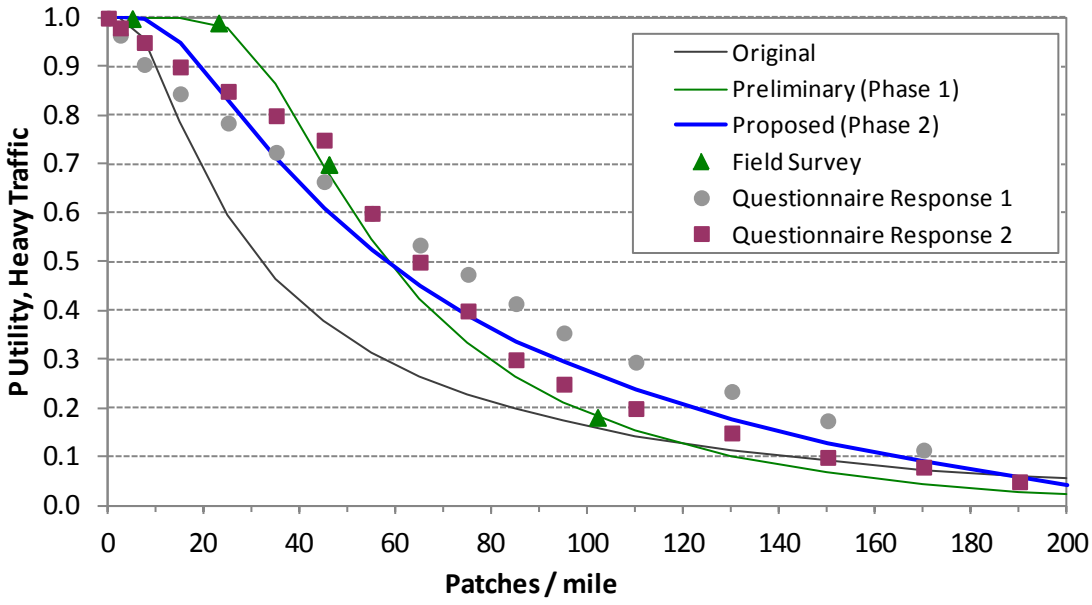

Figure M24. Updated Heavy Traffic Utility Function for Concrete Patches.

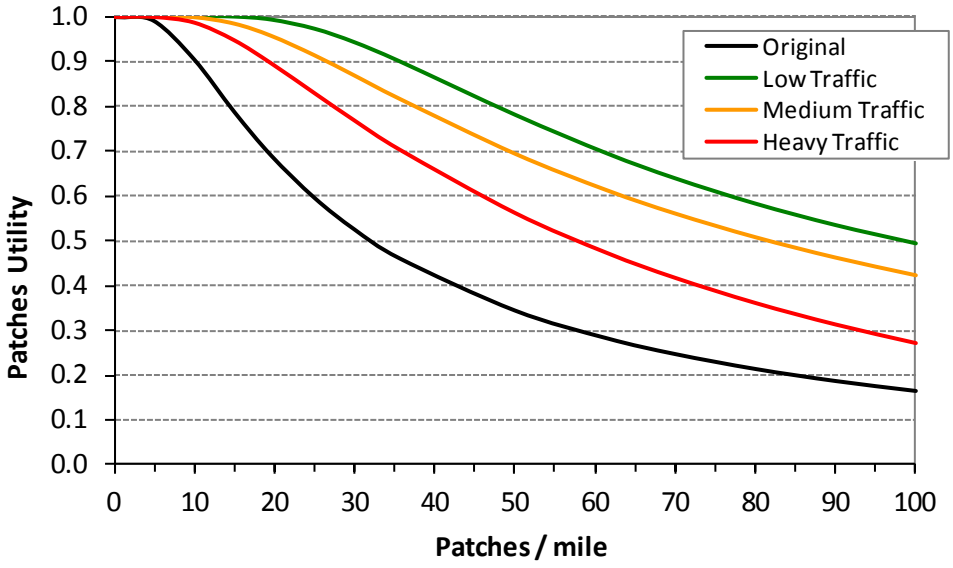

Figure M25. Updated Utility Functions for Concrete Patches: Comparison.

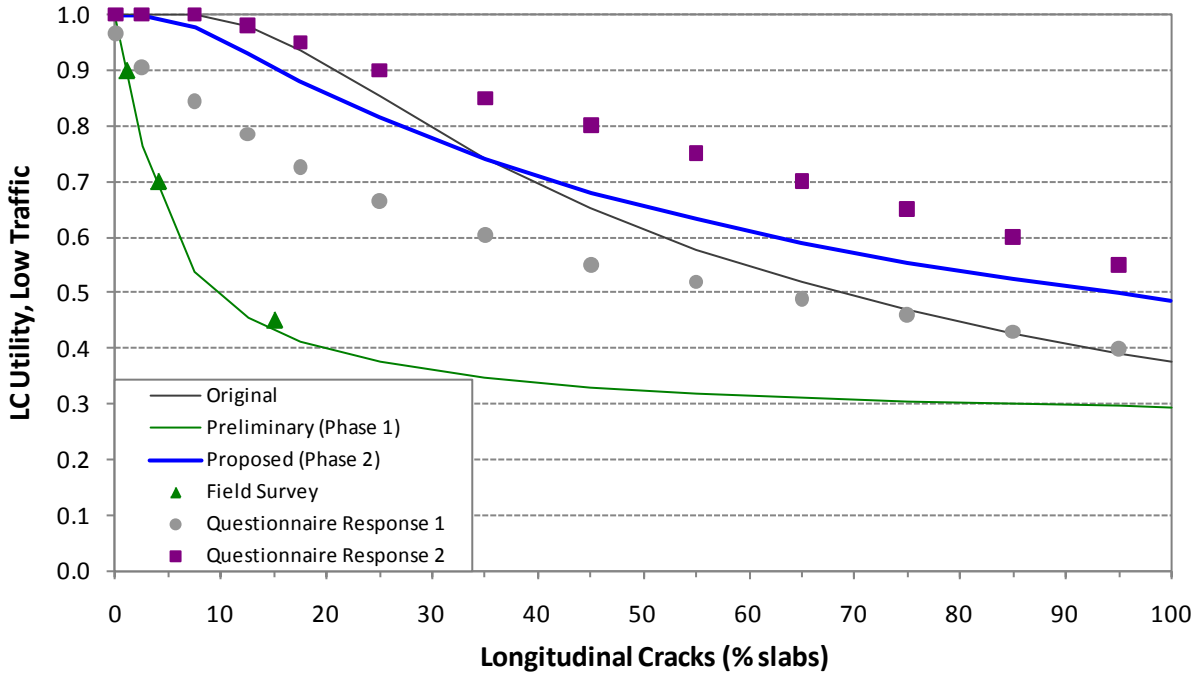

Figure M26. Updated Low Traffic Utility Function for Longitudinal Cracks.

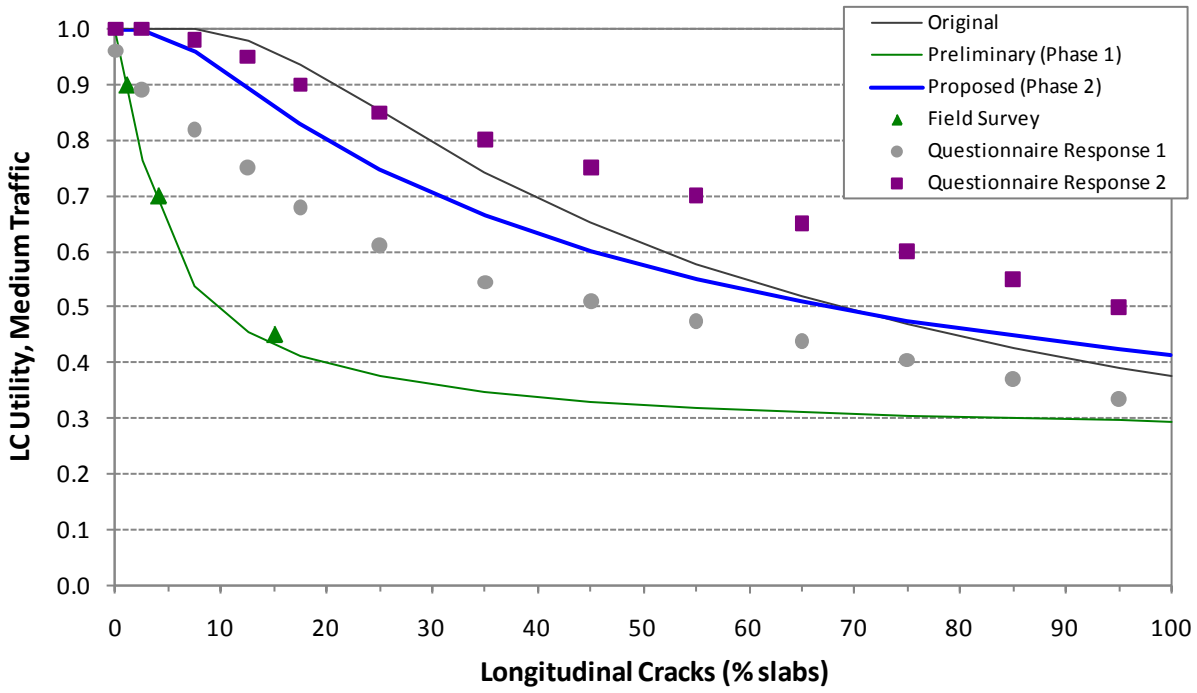

Figure M27. Updated Medium Traffic Utility Function for Longitudinal Cracks.

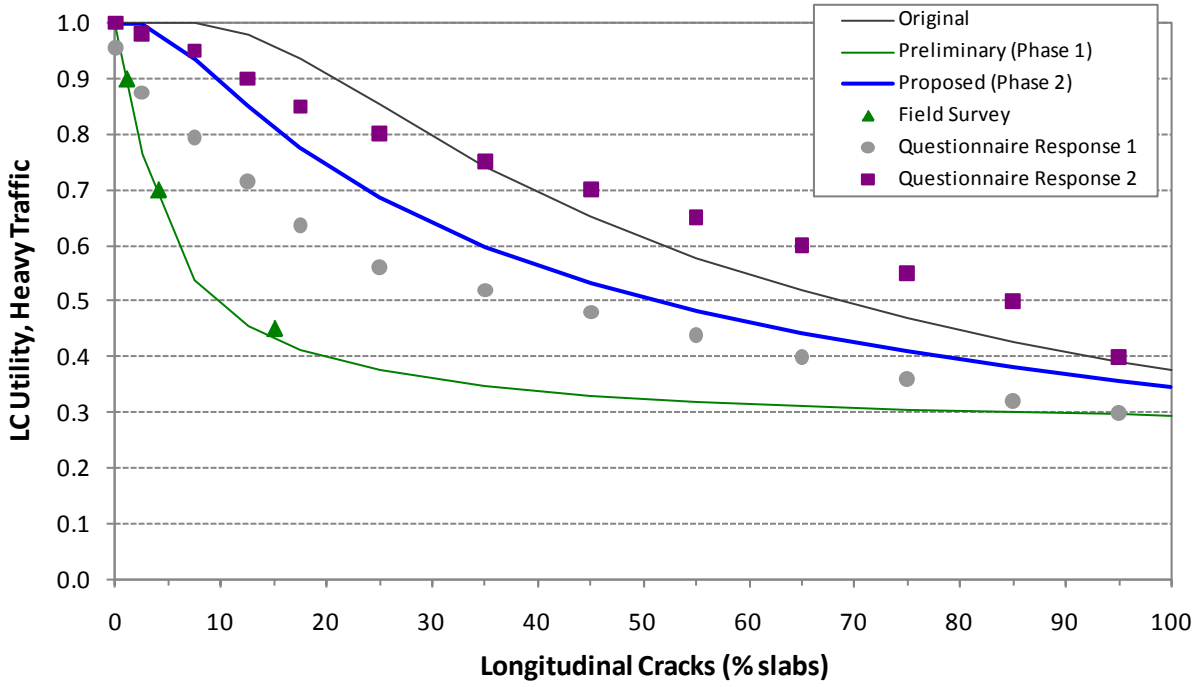

Figure M28. Updated Heavy Traffic Utility Function for Longitudinal Cracks.

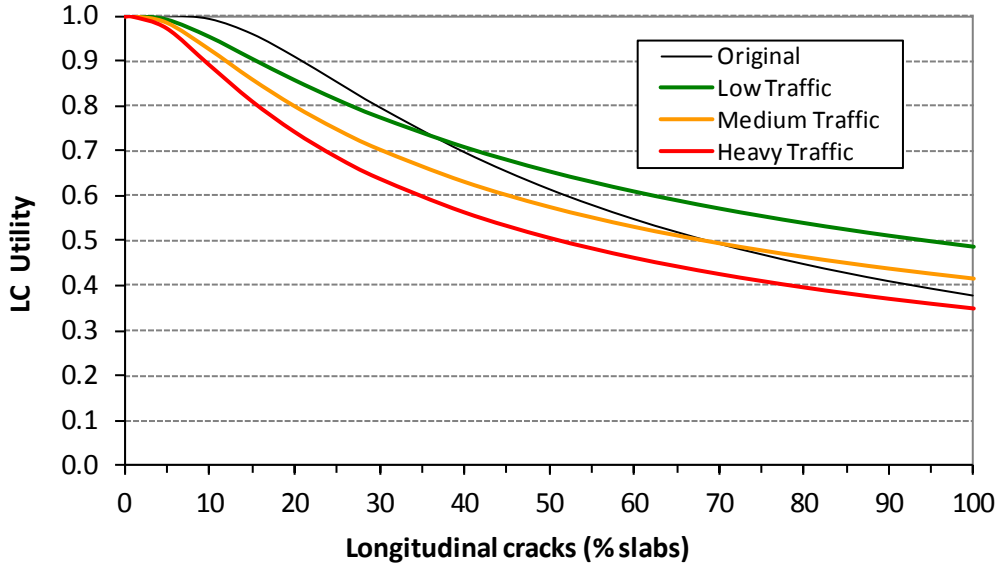

Figure M29. Updated Utility Functions for Longitudinal Cracks: Comparison.

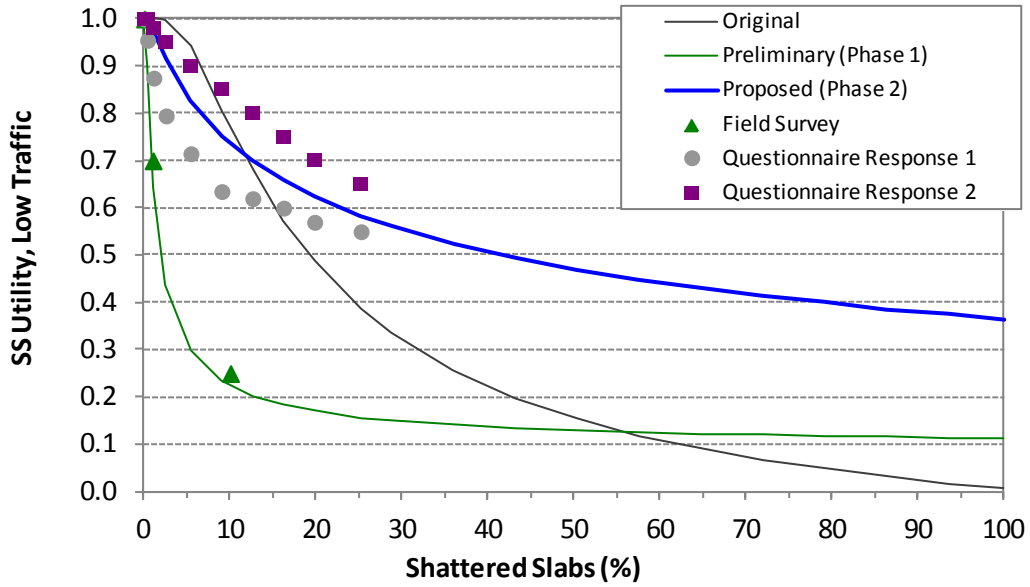

Figure M30. Updated Low Traffic Utility Function for Shattered Slabs.

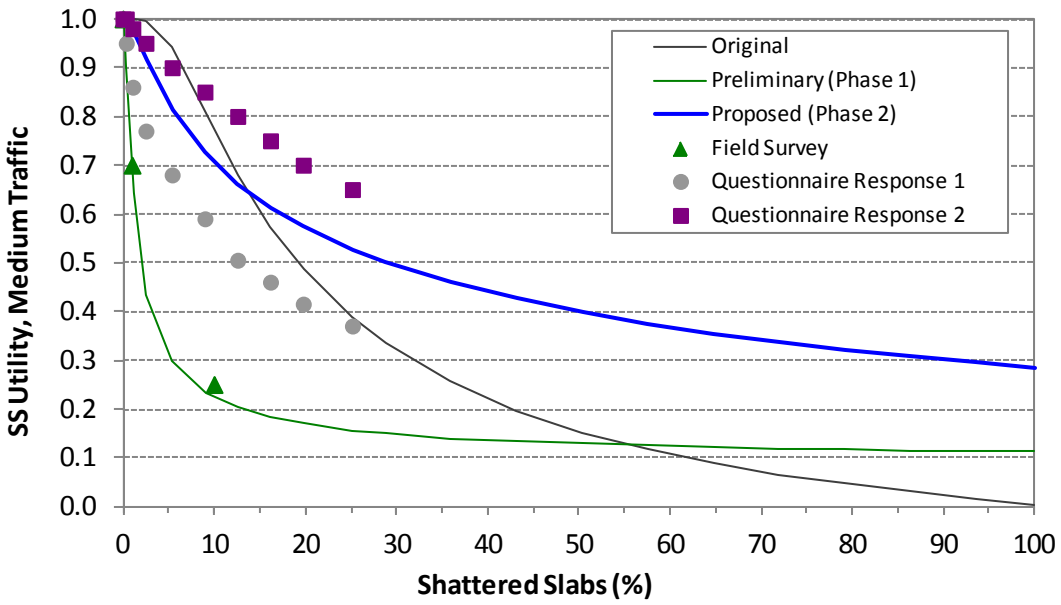

Figure M31. Updated Medium Traffic Utility Function for Shattered Slabs.

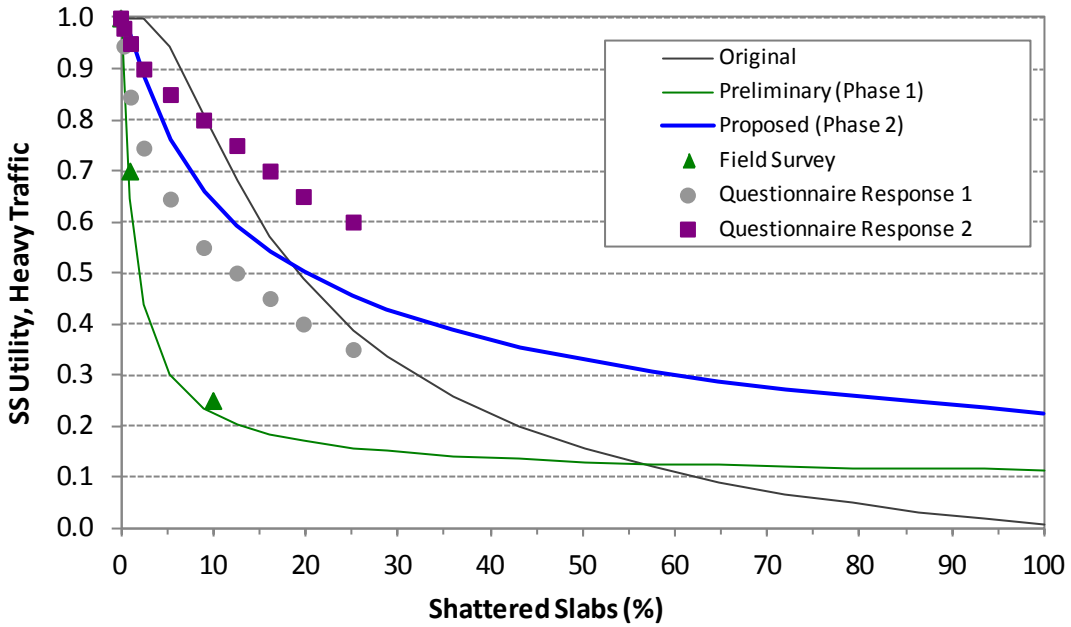

Figure M32. Updated Heavy Traffic Utility Function for Shattered Slabs.

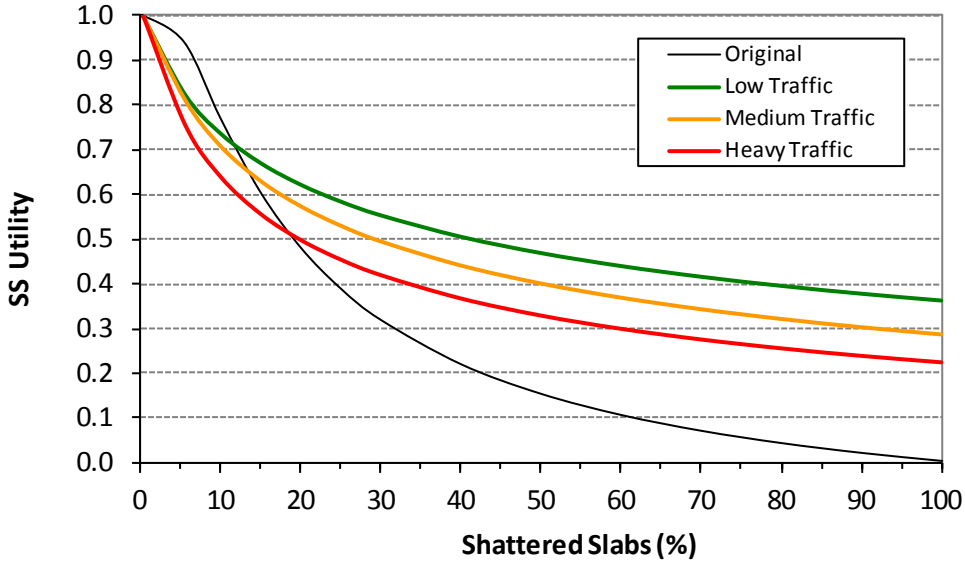

Figure M33. Updated Utility Functions for Shattered Slabs: Comparison.

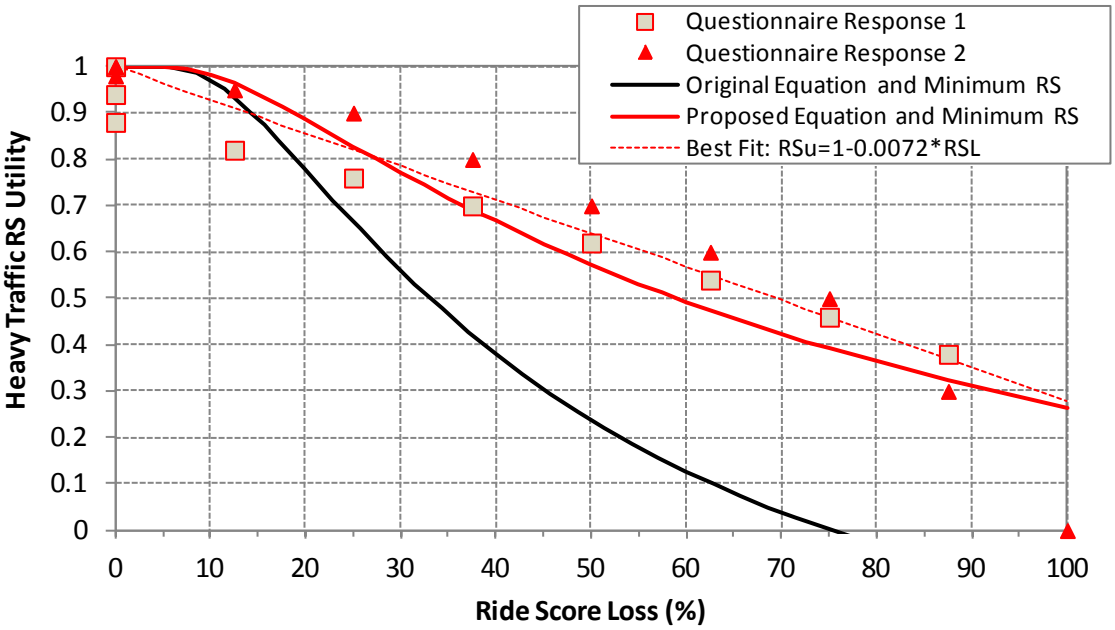

Figure M34. Ride Score Loss Utility for Heavy Traffic.

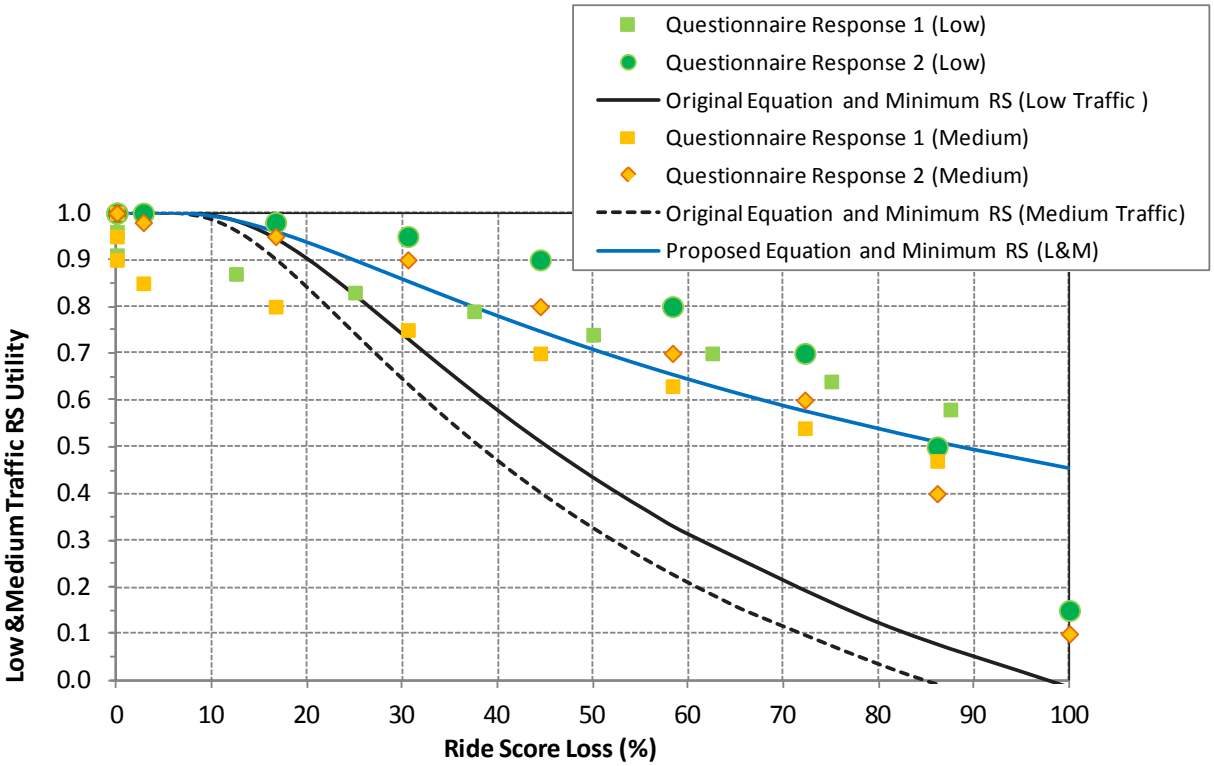

Figure M35. Ride Score Loss Utility for Medium and Low Traffic.