Michigan's Roads Crisis:
What Will It Cost to Maintain Our Roads and Bridges?
2012 Update

**(A Report of the Work Group on Transportation Funding,
of the House of Representatives Transportation Committee)
March 22, 2012 Final Draft**

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Executive Summary

The "Michigan's Roads Crisis: What Will It Cost to Maintain Our Roads and Bridges?" report produced by the Work Group on Transportation Funding of the House of Representatives Transportation Committee dated September 19, 2011 was updated to (1) reflect the 2012 construction year which will not benefit from additional funding and (2) to take advantage of additional road condition data.

When it comes to funding our road and bridge maintenance, trying to attain and maintain the quality goals for our roads set of 95% and 85% to be good or fair condition, time is not on our side. The condition of our roads has continued to deteriorate. Delay in finding the adequate funding to meet those goals set last year has raised the beginning additional money needed from about $1.4 billion per year to over $1.5 billion per year, for a total cost increase over the 12 years of over $1.8 billion. In addition, we will drive on roads in poorer condition during the 12 years projected than if legislative action had occurred in 2011. The time to address this problem is now.

Excerpts from the Executive Summary from the September 19, 2011 Report.

"Of the key questions developed by a work group appointed from among the House Transportation Committee members, this report focuses only on the question of "How much money do we need?"

A technical analysis team tackled the question using computerized models, made possible by road condition data recently gathered by the Asset Management Council. The models used an asset management strategy of applying the right fix at the right place at the right time (among the choices of capital preventive maintenance, rehabilitation or reconstruction) which minimizes the cost of maintaining the asset value of the road system by performing the lower cost preventive maintenance rather than allowing the roads to deteriorate to the point of needing a higher cost fix.

The model projected that almost $1.4 billion dollars more revenue per year would be needed in 2012-2015 and rising to almost $2.6 billion per year by 2023 to achieve the goals set. This result is consistent with the TF2 findings regarding pavement preservation. The graphs included in the report

show that this would not result in a “gold plated” road system, as many of the roads in fair condition would be just that - fair- and not good.

The conclusion reached was that if the investments projected by these models are not done, either the deferred costs of maintaining our roads will be much higher OR we choose to accept lower quality roads. From a business perspective, the set of investments recommended is the lowest long-term costs of maintaining our roads."
(The original report is available at http://gophouse.com/Publications/55/Michigan'sRoadsCrisis.pdf.)

Reasons for This 2012 Update

This update became necessary because the 2011 model assumed that the additional money projected would be available for the 2012 construction season. This did not happen. Also, the 2011 model used road condition data from the Michigan Transportation Asset Management Council for 40% of the approximately 80,000 paved non-federal aid roads and we assumed that the 40% was representative of the remainder 60%. The Asset Management Council now has preliminary data on an additional 9,766 lane miles of the roads rated in 2011, for an updated total of about 50% of the non-federal aid roads. The rerun of the model gave the opportunity to provide projections with greater confidence.

In addition, MDOT has updated pavement condition data for the trunkline system that was released after the presentation of the original report. This new data included the most current measures of pavement deterioration as well as improvement from MDOT pavement preservation projects concluded in FY 2011. Incorporating the new data into this update will provide a more accurate assessment of MDOT's future needs required to meet pavement condition goals.

Collaborators:

The computer models for 2012 were run by the two members of the extended technical analysis team who ran the models for the 2011 report, namely:

- Gilbert Earle Chesbro, MDOT Transportation Planning Specialist
- James Ashman, MDOT Transportation Planner
  (charts and graphs obtained from them will be referred to as "Chesbro and Ashman")

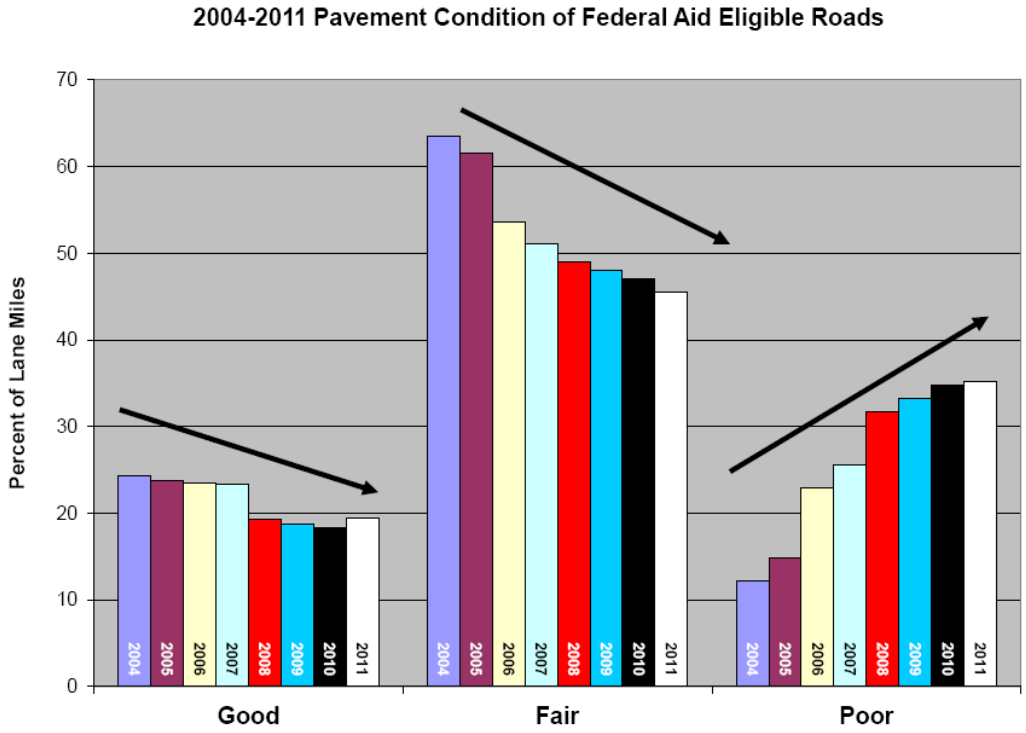
Changes in Assumptions

To make the comparisons from year to year valid, the only assumptions in the model that were changed were the lag of one year in assuming the additional money would be available and the updated road condition data available through the MDOT RQFS model and the Asset Management Council data collection efforts. We assumed the costs for each category of "fix" remained the same, as well as the constraints on what percentages of the roads could be worked on each year.

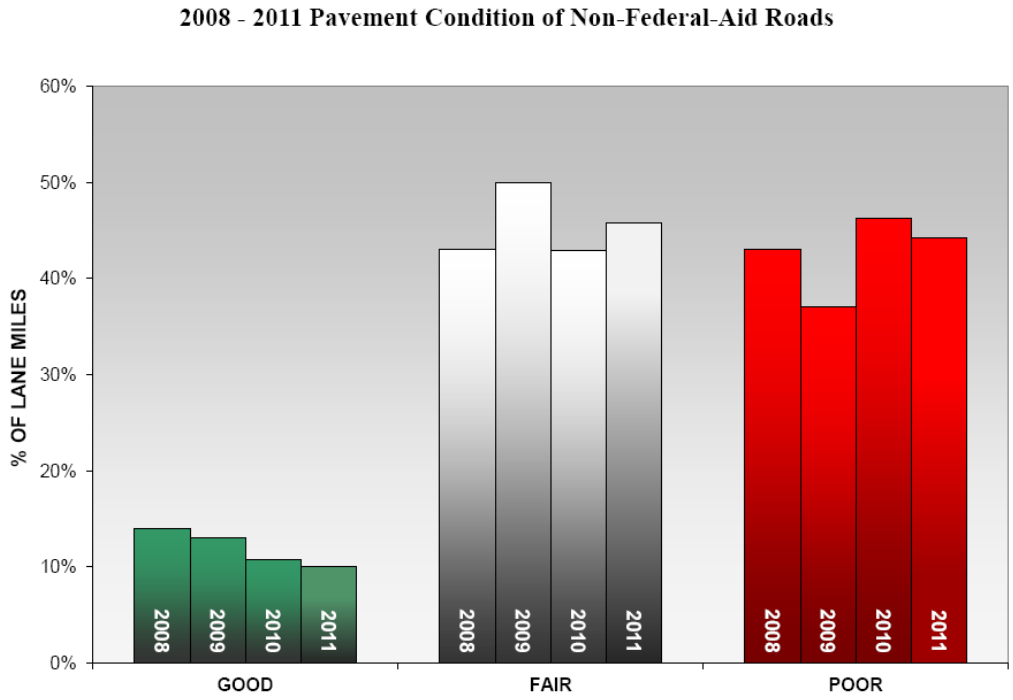
The model for bridges was not rerun, but the 2011 model data was used intact and extrapolated for the final two years in the projections.

Changes in Road Condition from Those Reported in the 2011 Report

The overall condition of our state's roads has continued to deteriorate, both on the federal aid roads and the non-federal aid roads.

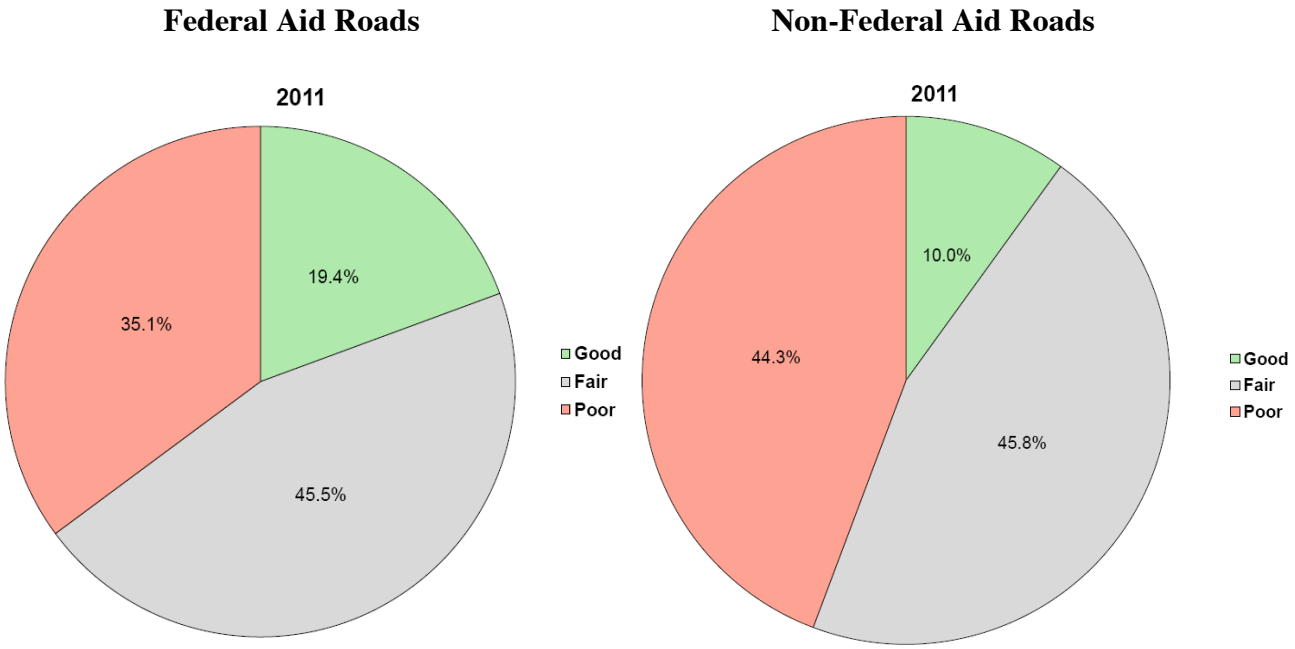


Source: Michigan Transportation Asset Management Council preliminary 2011 data



Source: Michigan Transportation Asset Management Council preliminary 2011 data

The condition of the federal aid roads is better than the non-federal aid roads.



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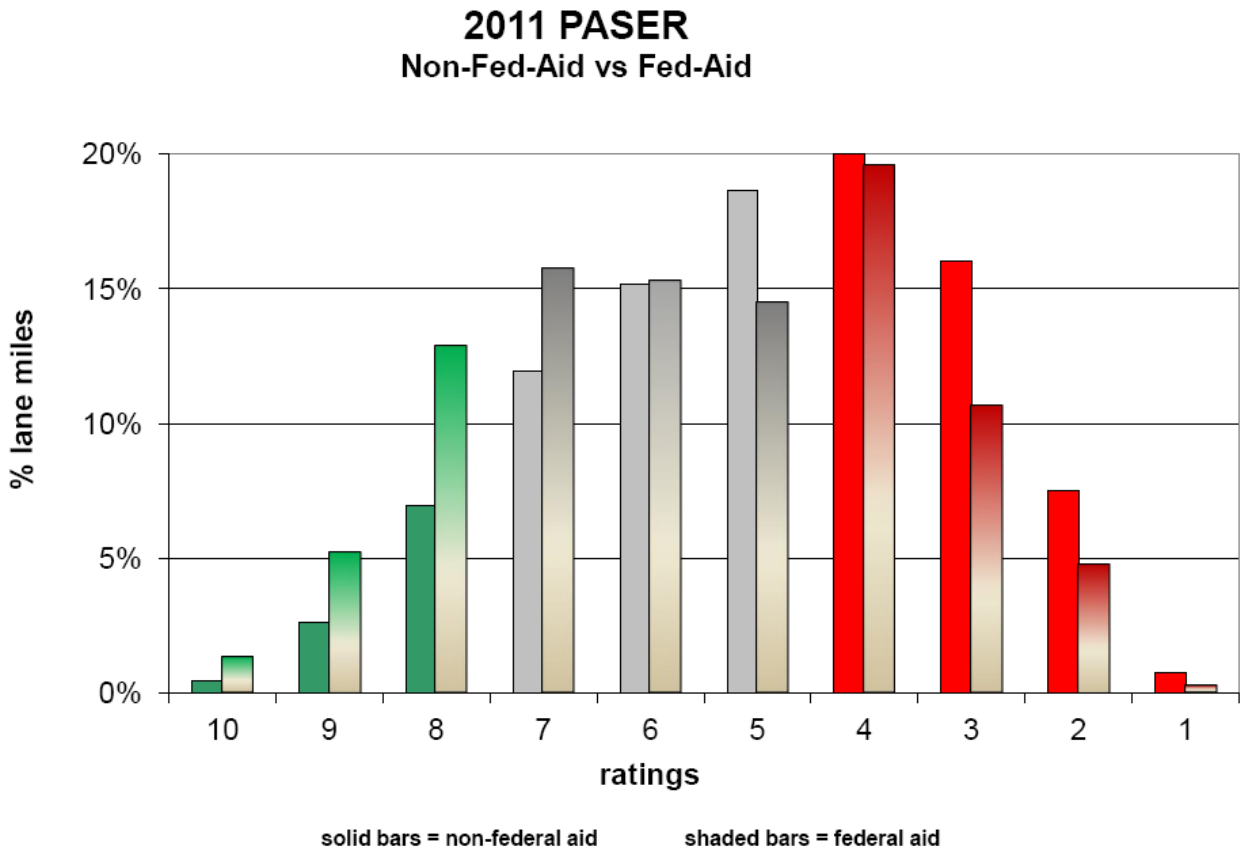


Source: Michigan Transportation Asset Management Council preliminary 2011 data

Analysis Results

Over the span of years studied, 2013-2025, the annual average "lowest cost combination" additional cost to achieve and maintain our roads at 95% good or fair for the freeways and 85% good or fair for all other paved roads went up from $1.732 billion per year to $2.058 billion per year.

New Model Runs Using 2011 Pavement Condition Data

2013-2025 Funds Needed to Achieve Condition Goal					
Using 2011 Pavement Data	Goal		Funds Needed	Current Budget	Shortfall
	Paved Lane Miles	Percentage in Good/Fair Condition	..... Annual Average in Millions		
Freeway	10,024	95%	$643	$148	$495
Federal Aid, Trunkline	19,432	85%	$739	$317	$422
Federal Aid, Non-Trunkline	54,396	85%	$1,108	$378	$730
Non-Federal Aid	79,482	85%	$665	$254	$411
Total	**163,334**	**86%**	**$3,155**	**$1,097**	**$2,058**

Source: Chesbro and Ashman

Funds Needed (annual average in millions)				
	2010 Data	2011 Data	Difference	Increase
Freeway	$614	$643	$29	4.7%
Federal Aid, Trunkline	$696	$739	$43	6.2%
Federal Aid, Non-Trunkline	$958	$1,108	$150	15.7%
Non-Federal Aid	$561	$665	$104	18.5%
Total	$2,829	**$3,155**	$326	11.5%

Source: Chesbro and Ashman

The table above shows the percentage increase in the average annual shortfall. Note that the non-state trunkline road categories saw the greatest percentage increase. Trunklines are deteriorating at a slower rate than non-trunklines.

But, more important than the average shortfall per year is the year by year shortages, to which lawmakers would want to match any addition annual revenue. The following table compares the year by year results from the 2011 report to the 2012 model run. In short, the additional $1.4 billion we

were talking about needing has grown to over $1.5 billion, with a first year increase of $164 million and rising through the years.

All Roads & Bridges ($ in millions)							
Year	Year	Total Funds Needed to Meet Goals	Total Additional Funding Above Current Investment Needed to Meet and Sustain Goals	Year	Total Funds Needed to Meet Goals	Total Additional Funding Above Current Investment Needed to Meet and Sustain Goals	Increase in Shortfall
	2011 Study Results			2012 Study Results			
1	2012	$2,703.13	$1,377.13	2013	$2,868	**$1,542**	**$164.87**
2	2013	$2,687.68	$1,361.68	2014	$2,872	**$1,546**	**$184.32**
3	2014	$2,691.92	$1,365.92	2015	$2,868	**$1,542**	**$176.08**
4	2015	$2,688.46	$1,362.46	2016	$2,949	**$1,623**	**$260.54**
5	2016	$2,834.30	$1,508.25	2017	$3,180	**$1,854**	**$345.75**
6	2017	$3,059.50	$1,733.10	2018	$3,330	**$2,004**	**$270.90**
7	2018	$3,202.86	$1,876.84	2019	$3,478	**$2,152**	**$275.16**
8	2019	$3,344.49	$2,018.61	2020	$3,643	**$2,318**	**$299.39**
9	2020	$3,503.72	$2,177.80	2021	$3,706	**$2,379**	**$201.20**
10	2021	$3,558.88	$2,231.77	2022	$3,861	**$2,536**	**$304.23**
11	2022	$3,707.19	$2,381.76	2023	$4,058	**$2,731**	**$349.24**
12	2023	$3,896.18	$2,569.40	2024	$4,250	**$2,924**	**$354.60**
				2025	$4,460	$3,134	
12 Year Total		**$37,878.31**	**$21,964.72**	**Total**	**$41,063**	**$25,151**	**$3,186.28**
						Less 2012 Increase Avoided by Delay	**$1,377.13**
						12 Year Increase in Cost Due to Delay in Legislative Action	**$1,809.15**

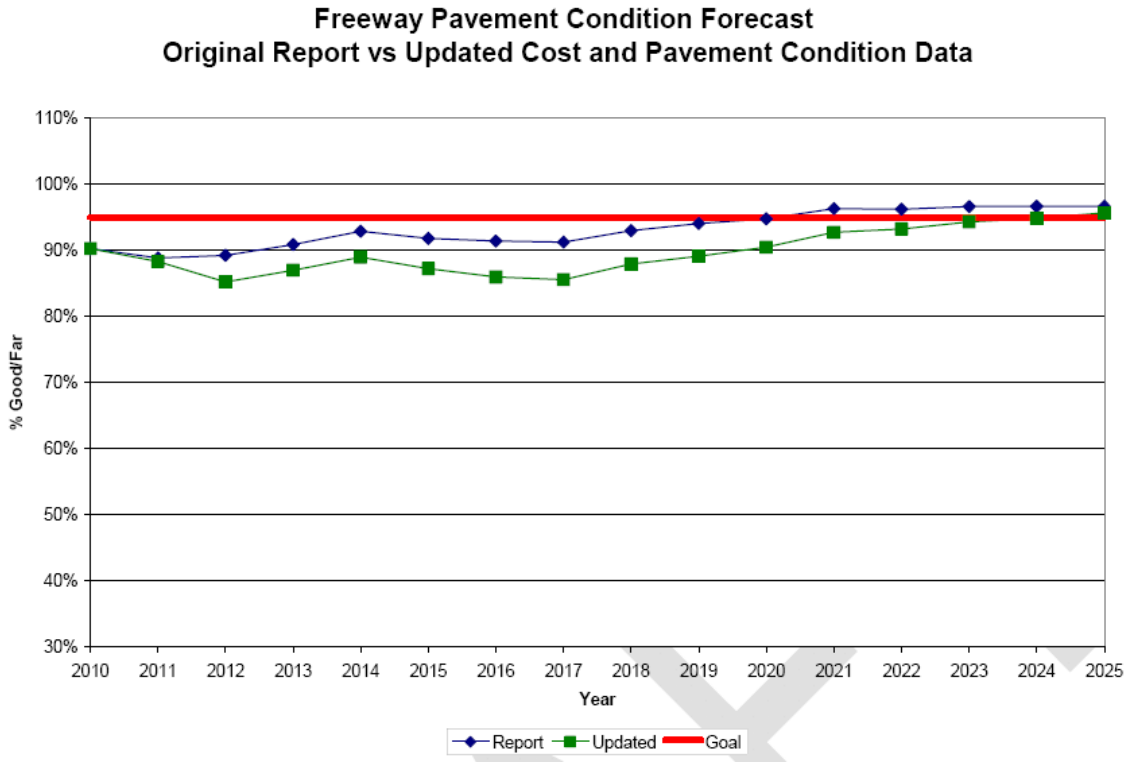
Source: Chesbro and Ashman data

The total cost increase over the 12 years is $3.186 billion, but the additional $1.377 billion we will not spend in 2012 needs to be credited from that amount, to derive a $1.809 billion net additional cost over the next 12 years due to the funding shortfall not being addressed in 2011. By comparison, the Asset Management Council in its 2010 report estimated the loss in the asset value of our roads from 2004 to 2010 to be over $4.8 billion. http://www.mcgi.state.mi.us/MITRP/document.aspx?id=631

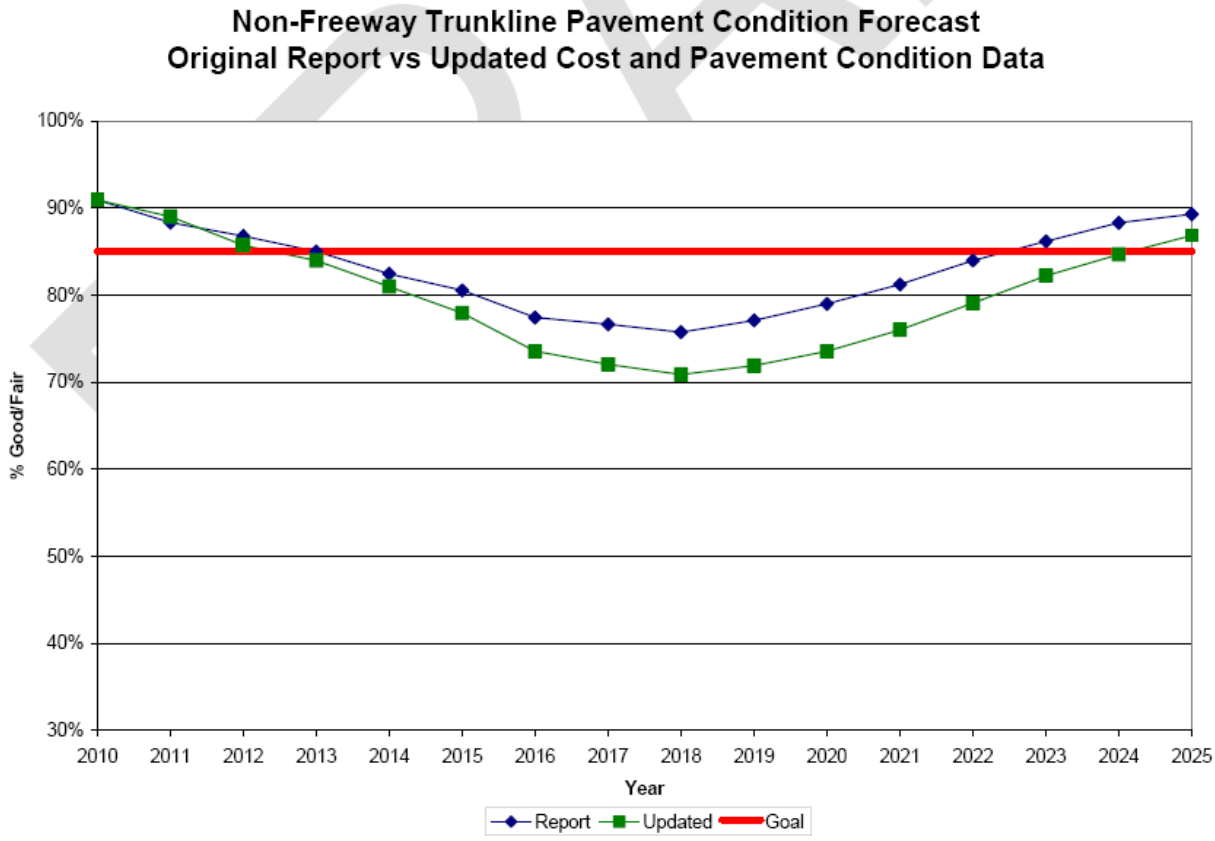
Road Condition Results

Note that for the non-freeway state trunkline roads, the model actually projected that we would need 13 years to achieve the 85% good or fair condition, compared with 12 years in the 2011 report. The first year of the 2011 model is lined up with the 2012 to calculated the year by year differences.

The following two graphs show that for both the freeways and the non-freeway state trunkline roads, the year delay in getting additional money would result in lower quality roads during the next 12 years than we would have experienced if the additional money had been raised a year earlier - in addition to the increased costs.

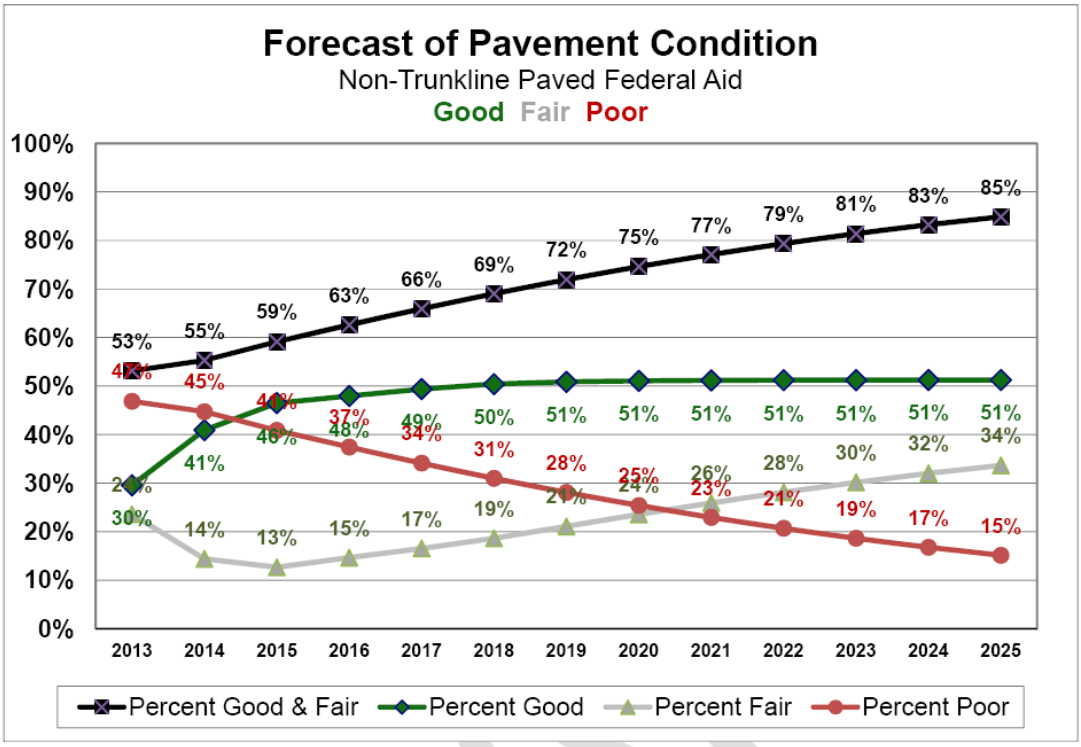


Source: Chesbro and Ashman

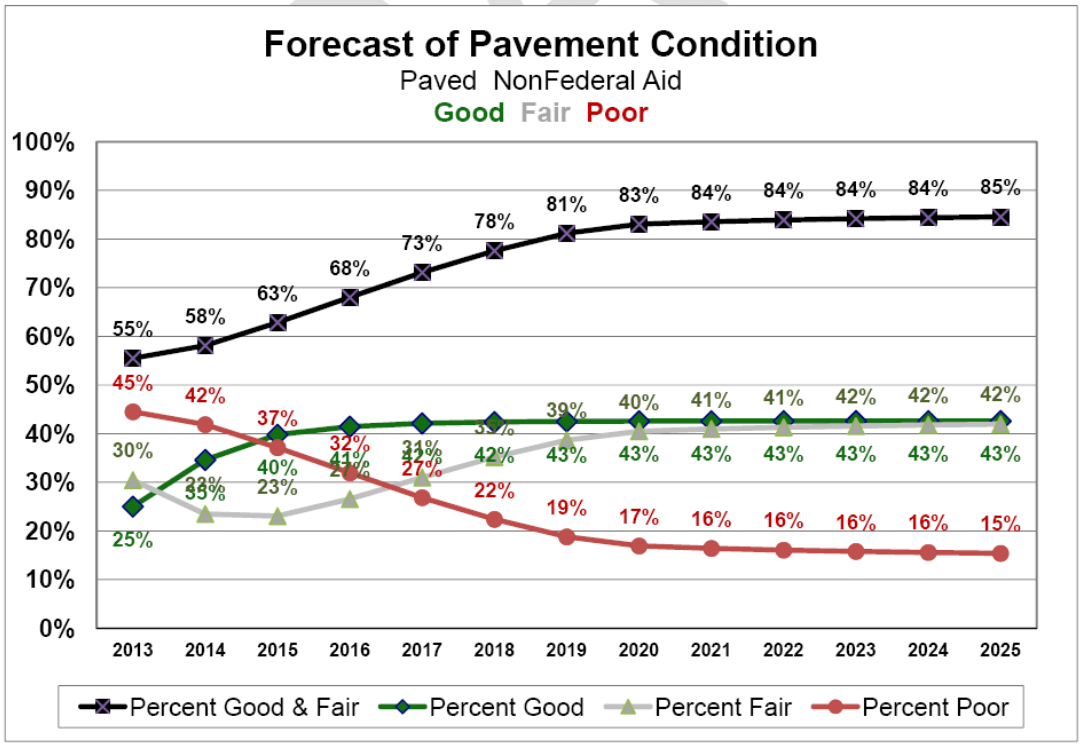


Source: Chesbro and Ashman

We do not have charts for the remaining two road categories in the same format as above, but the two charts below show the improvement expected for the non-state trunkline roads over the years projected with the additional money.



Source: Chesbro and Ashman



Source: Chesbro and Ashman

Conclusion

When it comes to funding our road and bridge maintenance, trying to attain and maintain the quality goals for our roads set of 95% and 85% to be good or fair condition, time is not on our side. Delay in finding the adequate funding to meet those goals set last year has raised the beginning additional money needed from about $1.4 billion per year to over $1.5 billion per year, for a total cost increase over the 12 years of over $1.8 billion. In addition, we will drive on roads in poorer condition during the 12 years projected than if legislative action had occurred in 2011.

Other Findings of the 2012 Model

One of the current questions the legislature is considering is the proper or best allocation of any new money that is raised. House Bill 5303 and Senate Bill 921, the "Commercial Corridor Fund" bills, attempt to allocate the new money more to the most important commercial roads, distributing money on a "vehicle miles traveled" basis, until the current Act 51 formula is phased out completely. The proposed bills do not take into account the current road condition, which the legislature may wish to do. The shortfalls by road category shown in the following tables, expressed in nominal dollar amounts and percentages of the additional money, may be instructive.

Additional Funding Above Current Investment Needed to Meet and Sustain Goal

(millions)

Year	Trunkline	Fed-Aid Non-Trunkline	Non-Fed-Aid	Freeway Bridges	Non-Freeway Trunkline Bridges	Non-Trunkline Bridges	Total
2012				30	0	20	
2013	644	547	301	30	0	20	**1,542**
2014	648	547	301	30	0	20	**1,546**
2015	644	547	301	30	0	20	**1,542**
2016	711	547	301	39	2	23	**1,623**
2017	853	593	329	48	4	27	**1,854**
2018	910	642	358	58	6	30	**2,004**
2019	960	693	388	68	8	34	**2,151**
2020	1,024	746	421	79	10	38	**2,318**
2021	977	803	454	91	13	42	**2,379**
2022	1,021	862	490	102	15	46	**2,537**
2023	1,097	924	527	115	18	51	**2,731**
2024	1,176	989	566	193			**2,924**
2025	1,258	1,057	607	212			**3,134**
Total	**11,923**	**9,496**	**5,344**				

Source: Chesbro and Ashman

Additional Funding, by Percent of Total Additional Needed

Year	Trunkline	Fed-Aid Non-Trunkline	Non-Fed-Aid	Freeway Bridges	Non-Freeway Trunkline Bridges	Non-Trunkline Bridges	Total
2012				30	0	20	
2013	0.42	0.35	0.20	0.02	0.00	0.01	1.00
2014	0.42	0.35	0.19	0.02	0.00	0.01	1.00
2015	0.42	0.35	0.20	0.02	0.00	0.01	1.00
2016	0.44	0.34	0.19	0.02	0.00	0.01	1.00
2017	0.46	0.32	0.18	0.03	0.00	0.01	1.00
2018	0.45	0.32	0.18	0.03	0.00	0.02	1.00
2019	0.45	0.32	0.18	0.03	0.00	0.02	1.00
2020	0.44	0.32	0.18	0.03	0.00	0.02	1.00
2021	0.41	0.34	0.19	0.04	0.01	0.02	1.00
2022	0.40	0.34	0.19	0.04	0.01	0.02	1.00
2023	0.40	0.34	0.19	0.04	0.01	0.02	1.00
2024	0.40	989	566				
2025	0.40	1,057	607				

Source: Chesbro and Ashman data