Michigan's Roads Crisis:
What Will It Cost to Maintain Our Roads and Bridges?
2013 Update

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March 10, 2013 Final Draft

As a member of the House Transportation Committee Work Group on Transportation Funding, we made the following findings and conclusions in September, 2011.

> **"House Transportation Committee Work Group.** The September, 2011 report "Michigan's Road Crisis: What Will It Take to Maintain Our Roads and Bridges?" reported on what it would take to just preserve our existing road surfaces and bridges and achieve over a 12 year period 95% of the freeways and 85% of all other paved roads in the state at a "good" or "fair" condition. It found that it would take an investment of **at least $1.4 billion** more per year than current spending. The study used the asset management approach of what would be the least cost long-term combination of "fixes" and timing of fixes to maintaining the value of the state's assets of roads and bridges – a business approach. This approach emphasizes doing the capital preventive maintenance to avoid the much higher cost "fixes" of rehabilitation or reconstruction necessary much sooner in the road life than if the capital preventive maintenance is not done." Michigan's Road Crisis: What Will It Take to Maintain Our Roads and Bridges? 2012 Update

Because new and more expanded data were available in March, 2012, Michigan's Road Crisis: What Will It Take to Maintain Our Roads and Bridges? 2012 Update was prepared, which found:

1. We need at least $1.542 additional funding or savings to maintain our roads and bridges and achieve the 95%/85% good or fair condition in the next 12 years.

2. To avoid another $1.8 billion cost to the taxpayers caused by delay, action needs to be taken timely in 2012 to avoid missing the 2013 construction year as well. Time is not on our side.

(These findings and conclusions, and those of several other transportation funding studies may be found at Transportation Funding Findings and Conclusions, http://ourmiroads.com/findings%20and%20conclusions.html)

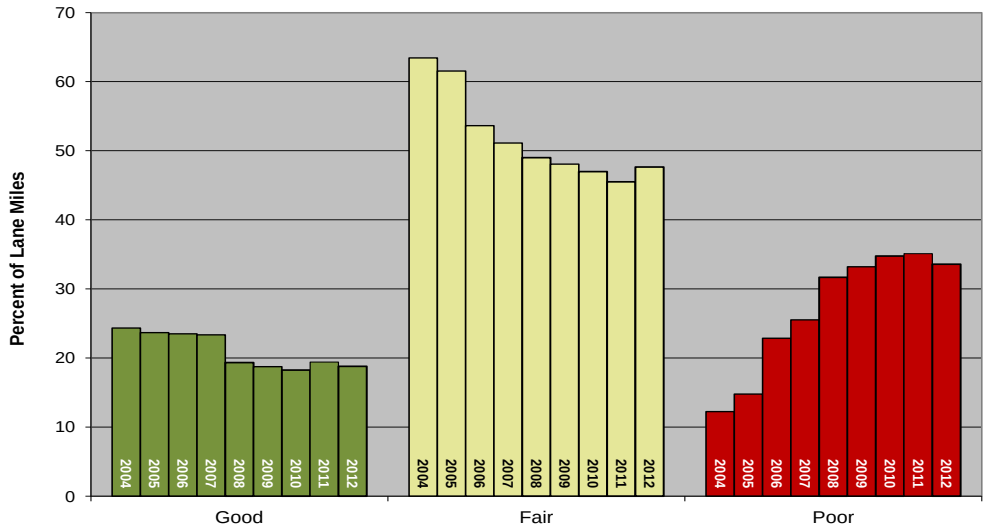
Another year has passed and the 2013 construction year appears to be lost to additional funding. 2012 road condition data has become available, so Jim Ashman and Gil Chesbro from MDOT have rerun the model to see what, if anything has changed.

2013 Findings and conclusions: The amount of additional funding the State of Michigan needs to just preserve our existing road surfaces and bridges and achieve over a 12 year period 95% of the freeways and 85% of all other paved roads in the state at a "good" or "fair" condition has risen to **$1.754 billion**, up from $1.542 billion just a year earlier. The cost of delay from the legislature taking no action in 2012 to 2013 has been **$2.219 billion**.

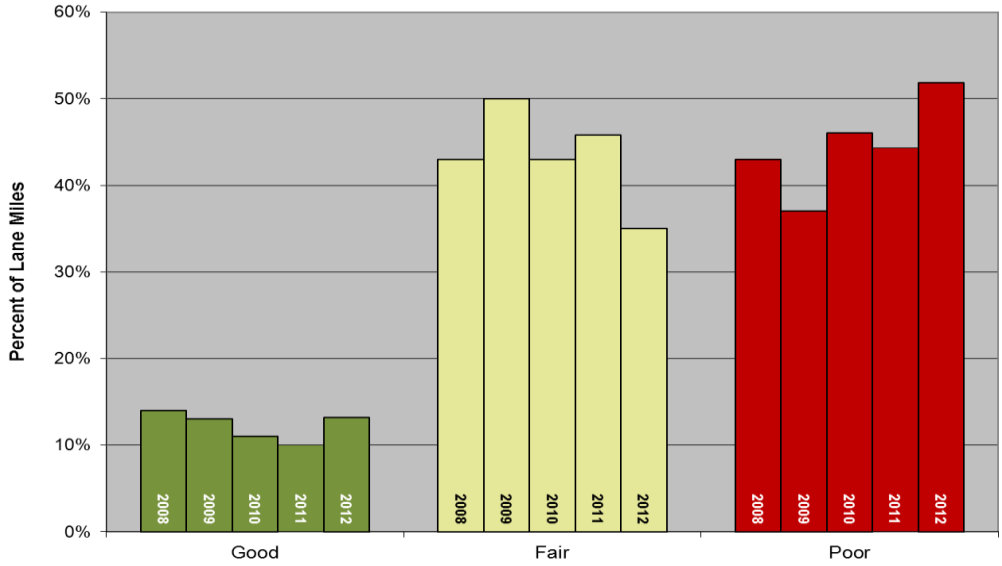
The Michigan Transportation Asset Management Council has provided the following bar charts on the paved road conditions in Michigan from 2004 - 2012. The Federal Aid roads saw a small decline in the percentage in good condition from year to year, a small increase in the percentage of roads in fair condition and a small decrease in the quality of roads in poor condition.

While the data show a slight 1.5 percent decrease in the number of roads rated in poor condition between 2011/12, one out of every three miles of road on the federal-aid eligible road system remain rated in poor condition. This slight decrease may be due to a variety of factors. This includes completed improvement projects associated with the one-time federal American Recovery & Reinvestment Act (ARRA). The decrease may also be attributable to the unusually mild winter of 2011/12, which allowed remaining funds for winter maintenance to be used for road improvements. Though welcome news, there is not sufficient evidence to suggest that the downward trend in road condition is reversing itself; in fact, the Council projects that the situation will only get worse in the coming years.

Michigan Federal Aid Roads

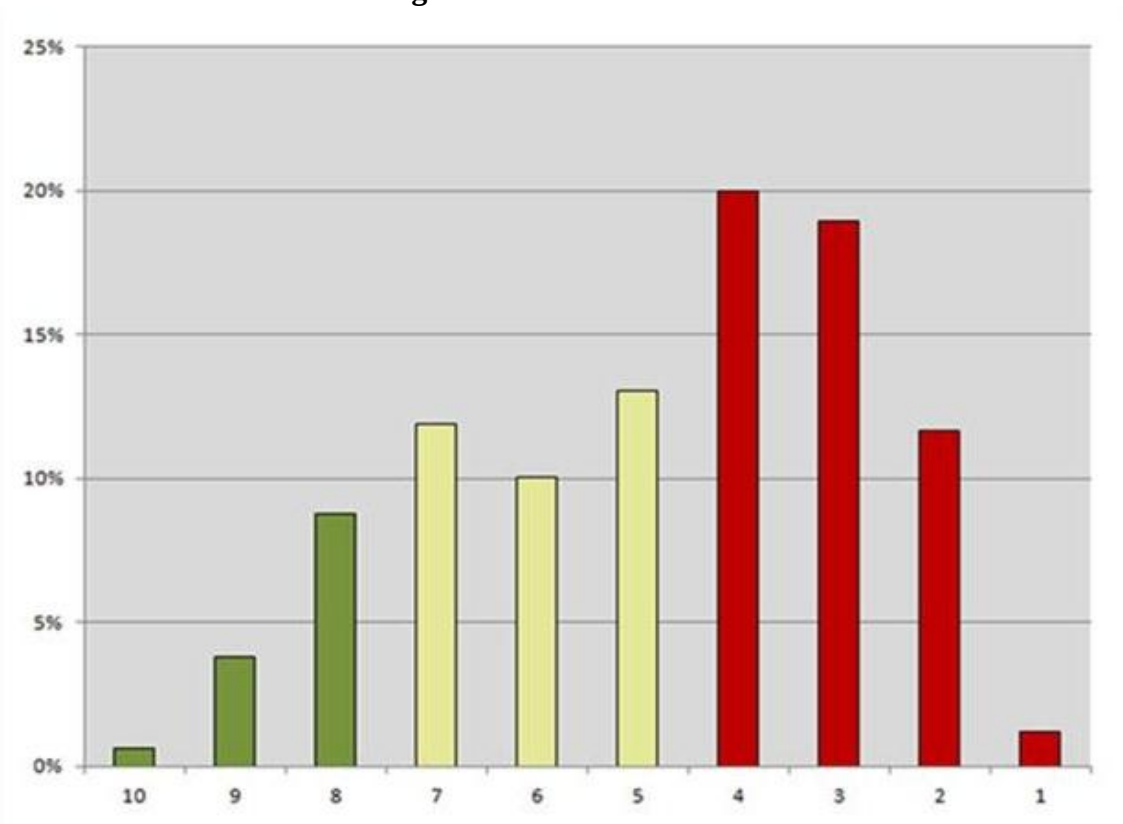


Michigan Non-Federal Aid Roads



The Non-Federal Aid roads are in worse condition, but did see a small increase in the percentage of roads in good condition, while seeing a significant reduction in the roads rated fair and an increase in the percentage rated poor. The following graph shows more specifically, on the 1-10 scale the non-federal aid roads.

Michigan Non-Federal Aid Roads



Ashman and Chesbro reran the same model used in 2011 and 2012 to project how much it would take to maintain our state's roads, with the goal to reach and maintain a road condition where 95% of our state's freeways would be rated good or fair, while all other paved roads in the state being 85% good or fair. The amount of "current budget" allocated to projects was held constant. The "carveouts" from the gross revenue going into the State Transportation Fund was assumed constant, as were the amounts expected from the federal government, the payments on the transportation bonds and the cost of construction. Some of these assumptions may prove to be optimistic, but the attempt was to be able to compare the years' road conditions apples to apples.

2011 vs 2012

Funds Needed (annual average in millions)				
	2011 Data	2012 Data	Difference	Increase
Freeway	$643	$676	$33	5.1%
Federal Aid, Trunkline	$739	$775	$36	4.9%
Federal Aid, Non-Trunkline	$1,108	$1,166	$58	5.2%
Non-Federal Aid	$665	$792	$127	19.1%
Total	**$3,155**	**$3,409**	**$254**	**8.1%**

The chart above looks only at the roads, ignoring bridges for the moment. It shows that the funds needed grew $254 million as an average over the 12 years compared with the 2012 calculations based on the 2011 road condition date. Ashman and Chesbro also provided this summary, showing the results over the 2014-2025 period.

Summary of Model Runs Using 2012 Condition Data

2014-2025
Funds Needed to Achieve Condition Goal

	Goal		Funds Needed	Current Budget	Shortfall
	Paved Lane Miles	Percentage in Good/Fair Condition	..... Annual Average in Millions		
Freeway	10,024	95%	$676	$148	$528
Non-Freeway Trunkline	19,432	85%	$775	$317	$458
Federal Aid, Non-Trunkline	54,396	85%	$1,166	$378	$788
Non-Federal Aid	79,482	85%	$792	$254	$538
Road Subtotal	**163,334**	**86%**	**$3,409**	**$1,097**	**$2,312**

Of perhaps greater interest, however, is the total for both roads and bridges, on an annual basis. The following table shows the amount of additional funding needed is $1.754 billion in 2014 and growing to $3.428 billion in 2025 (using a 5% cost of construction inflation factor).

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	Current Budget	Total Additional Funding Above Current Investment Needed to Meet and Sustain Goals	Increase in Shortfall	Year	Total Funds Needed to Meet Goals	Current Budget	Total Additional Funding Above Current Investment Needed to Meet and Sustain Goals	Increase in Shortfall
	2011 Study Results			**2012 Study Results**					**2013 Study Results**				
1	2012	$2,703	$1,377	2013	$2,868	$1,326	**$1,542**	**$164.87**	2014	$3,080	$1,326	**$1,754**	**$212**
2	2013	$2,688	$1,362	2014	$2,872	$1,326	**$1,546**	**$184.32**	2015	$3,071	$1,326	**$1,745**	**$199**
3	2014	$2,692	$1,366	2015	$2,868	$1,326	**$1,542**	**$176.08**	2016	$3,148	$1,326	**$1,822**	**$280**
4	2015	$2,688	$1,362	2016	$2,949	$1,326	**$1,623**	**$260.54**	2017	$3,232	$1,326	**$1,906**	**$283**
5	2016	$2,834	$1,508	2017	$3,180	$1,326	**$1,854**	**$345.75**	2018	$3,414	$1,326	**$2,087**	**$233**
6	2017	$3,060	$1,733	2018	$3,330	$1,326	**$2,004**	**$270.90**	2019	$3,548	$1,326	**$2,221**	**$217**
7	2018	$3,203	$1,877	2019	$3,478	$1,326	**$2,152**	**$275.16**	2020	$3,725	$1,326	**$2,399**	**$247**
8	2019	$3,344	$2,019	2020	$3,643	$1,326	**$2,318**	**$299.39**	2021	$3,911	$1,326	**$2,585**	**$267**
9	2020	$3,504	$2,178	2021	$3,706	$1,327	**$2,379**	**$201.20**	2022	$4,106	$1,327	**$2,780**	**$401**
10	2021	$3,559	$2,232	2022	$3,861	$1,325	**$2,536**	**$304.23**	2023	$4,313	$1,325	**$2,986**	**$450**
11	2022	$3,707	$2,382	2023	$4,058	$1,327	**$2,731**	**$349.24**	2024	$4,527	$1,327	**$3,201**	**$470**
12	2023	$3,896	$2,569	2024	$4,250	$1,326	**$2,924**	**$354.60**	2025	$4,754	$1,326	**$3,428**	**$504**
				2025	$4,460	$1,326	$3,134						
12 Year Total		**$37,878.31**	**$21,964.72**	**Total**	**$41,063**	**$17,240**	**$25,151**	**$3,186**			**$17,240**	**$28,912**	**$3,761**
							Less 2012 Increase Avoided by Delay	**$1,377**					
							12 Year Increase in Cost Due to Delay in Legislative Action	**$1,809**					
												Less 2013 Increase Avoided by Delay	**$1,542**
												12 Year Increase in Cost Due to Delay in Legislative Action	**$2,219**

(Note this table adds in the results of the model estimating the amount of additional funding for bridges calculated in 2011, but the 2011 results are incorporated into the current estimate due to little, if any, change in the condition of the state's bridges in the two years.)

Perhaps as equally alarming as the increase in the annual cost is the cost of delay. While the cost of delay from 2011 to 2012 was estimated at $1.809 billion, the cost of delay from 2012 to 2013 is now estimated at $2.219 billion. The conclusion a year ago that "time is not on our side" has been reinforced.

Additional Conclusions:

1. The $1.2 billion of funding requested by Governor Snyder (plus $280 million assumed to be raised by local governments through the proposed optional vehicle registration fee the locals could impose) undershoots the mark. Another previous run of the model found that just to maintain our current low quality roads would take over $1 billion additional revenue. http://ourmiroads.com/findings%20and%20conclusions.html The $280 million of additional local money is very speculative, especially if one of the sources of the additional revenue at the state level is increased vehicle registration fees.

2. The model assumes that all of the additional revenue goes to roads and bridges, and no additional dollars for any of the carveouts in Act 51, including the transfer to the Comprehensive Transportation Fund, which supports public transportation. This does not mean that no additional money is wanted or needed for public transportation, but it does mean that if any of the additional money is to go to public transportation, the $1.754 billion needs to be higher to account for that leakage.

3. The model does not assume any additional money for any mega projects, such as the reconstruction of I 94 and 75 in the Metro Detroit area, nor any additional for safety improvements, capacity improvements, intelligent transportation system components (digital signage and the like), etc. That is, no money for these kinds of program beyond what can already be planned for in the Five Year Transportation Plan using existing revenue.

4. The model assumes that the money is spent in the most efficient manner, using the asset management approach of pavement preservation. http://ourmiroads.com/asset_management.html This goal is not always possible, which leads to the conclusion that we need at least an additional $1.742 billion, and we cannot assume away a portion of the amount needed by "increased efficiency" using asset management. We need both: additional funding and the practice of asset management.

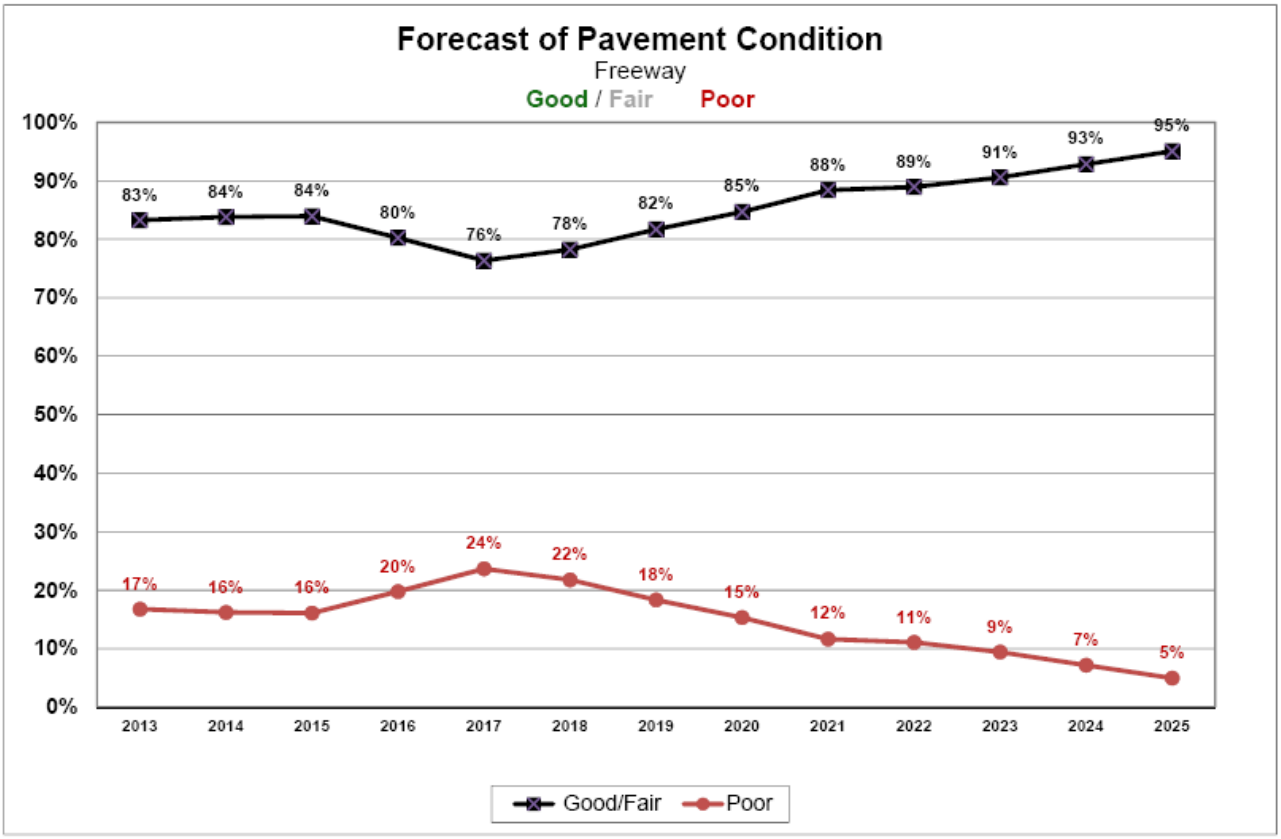
5. The legislature might choose to lower the goal of achieving 85% of the non-trunkline federal aid roads and the non-federal aid roads to become good or fair by 2025 to 80%. Previous calculations have shown that this would reduce the need from $100 million in the early years to $150 twelve years later.

6. Assuming that all additional funding goes to roads and bridges, and current revenues are allocated as done currently, the funding allocation suggested by the model is as follows:

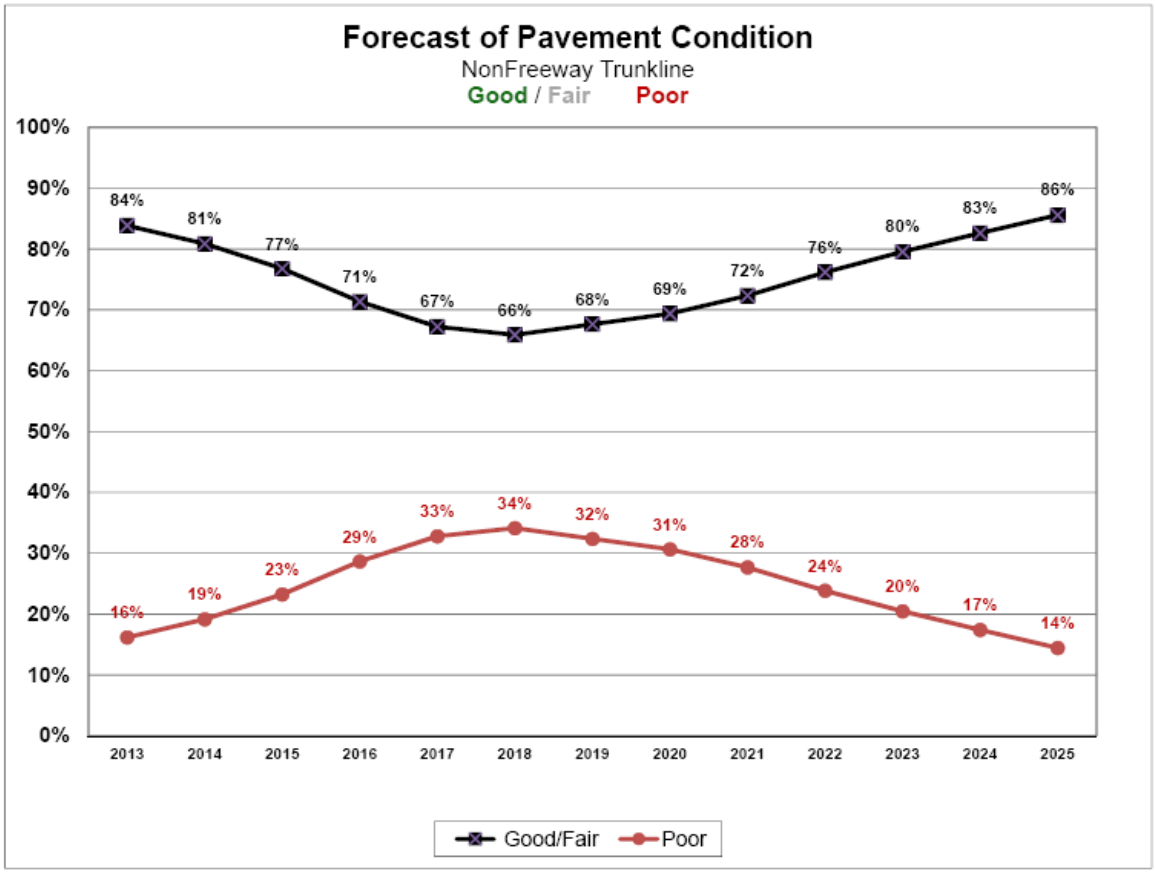
	Year 1			12 Year Average		
Road Category	**Millions**		**Percentage**	**Millions**		**Percentage**
Trunkline Freeways	430.50			528.20		
Non-Freeway Trunkline	360.72			458.21		
Total Trunkline		791.22	45%		986.41	41%
Remainder Federal Aid	542.00			787.85		
Non-Federal Aid	371.00			538.02		
Local Total		913.00	52%		1,325.87	55%
Bridges	50.00		3%	97.04		4%
	1,754.22		100%	2,409.32		100%

7. The models assumes we wish to achieve the goal of 95% of our state's freeways and 85% of the remainder of the state's paved roads in good or fair condition. Even with the additional funding, the improvement will not be instantaneous. We did not get in this condition overnight, and we will not get out of this condition overnight, but we must start now.

Here are the projections from the model showing the improvement.



Note that there will actually be a dip in average quality of the non-freeway trunkline highways, before we see a gradual improvement. There is a limit on how many roads we can work on each year without causing too much congestion.


Forecast of Pavement Condition
NonFreeway Trunkline
Good / Fair Poor
100%
90%
80%
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40%
30%
20%
10%
0%
84%
81%
77%
71%
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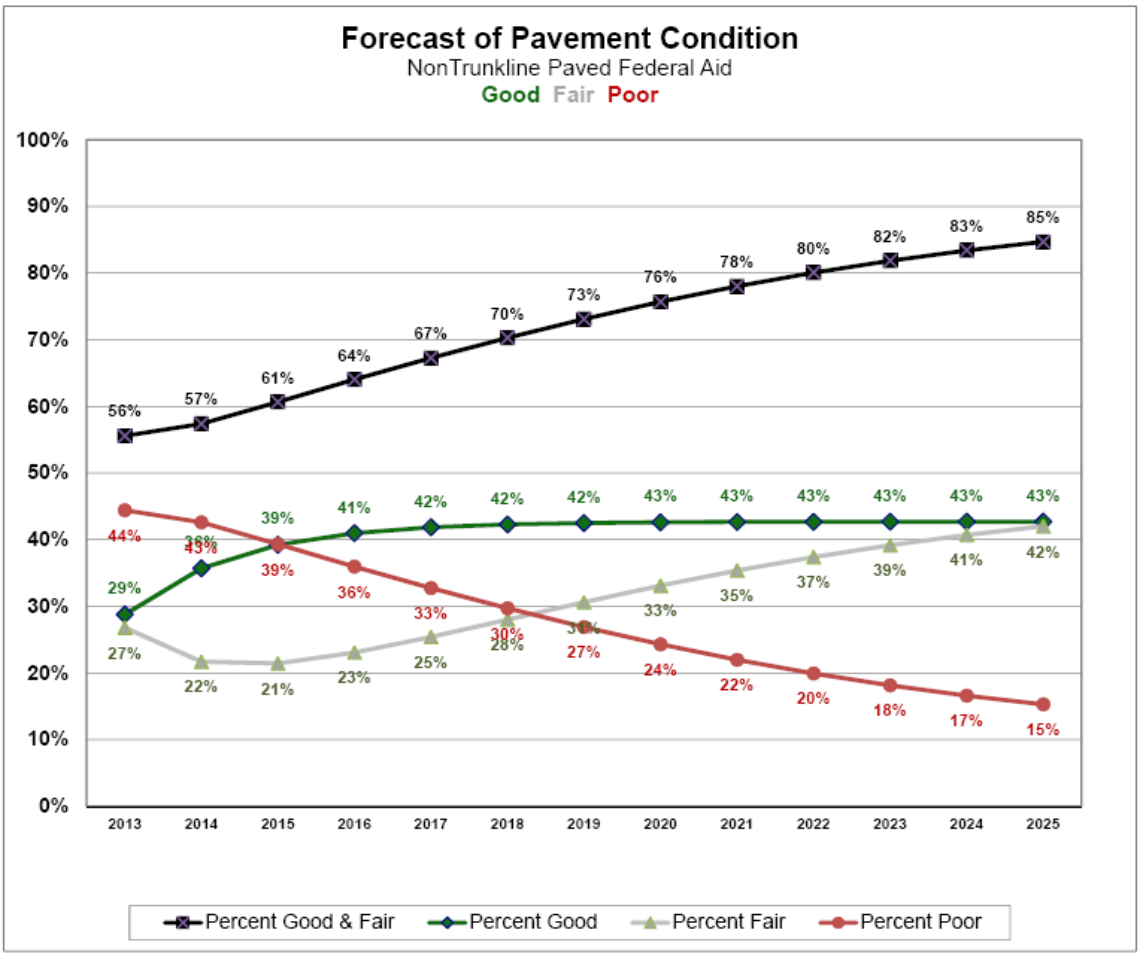
2025
Good/Fair
Poor


Forecast of Pavement Condition
NonTrunkline Paved Federal Aid
Good Fair Poor
100%
90%
80%
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10%
0%
56%
57%
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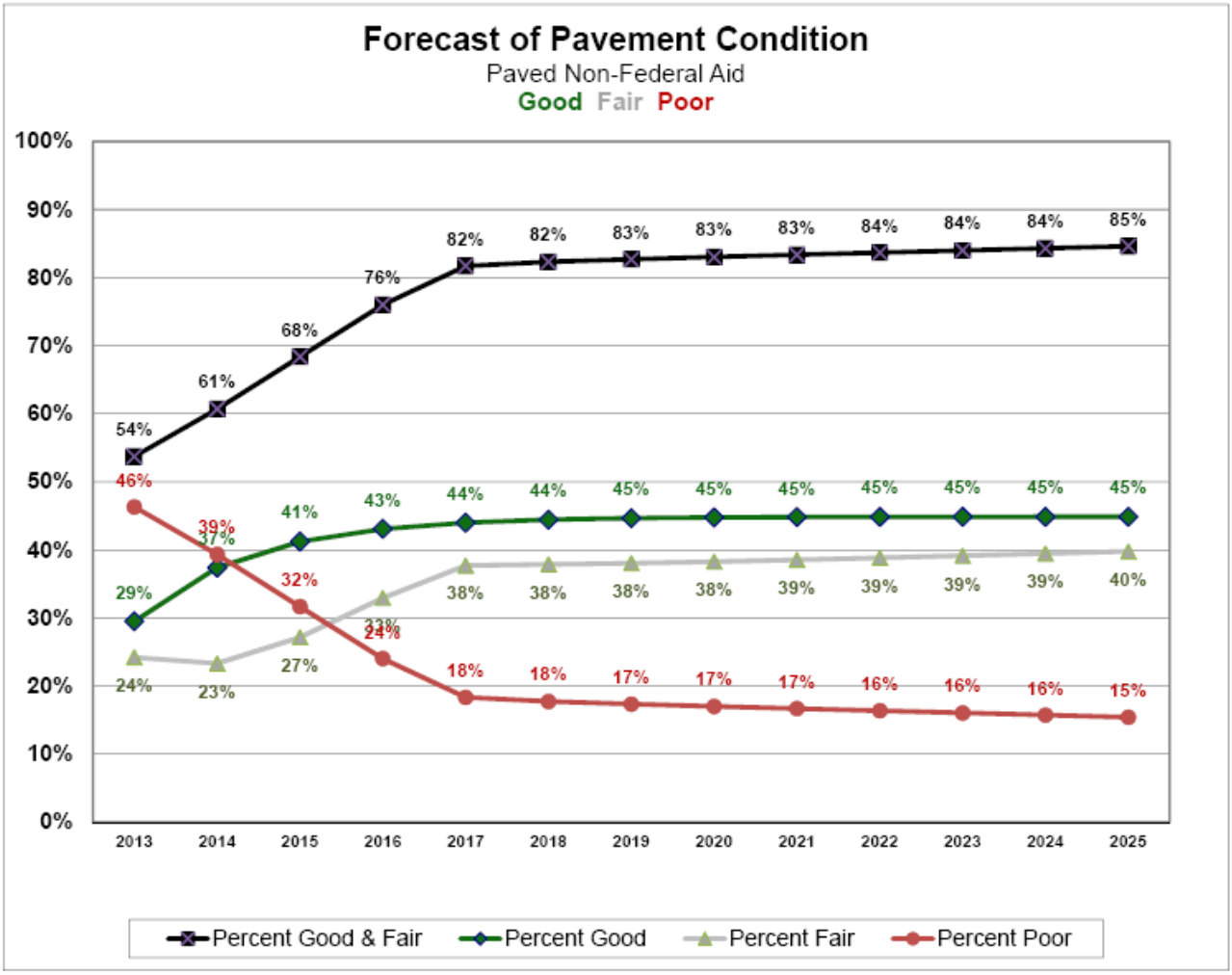
Percent Good
Percent Fair
Percent Poor



Source of all charts: Ashman & Chesbro, MDOT/Michigan Transportation Asset Management Council, February 26, 2013

8. When we are talking about the roads being in "good" or "fair" condition, we are not talking about having our roads in pristine condition. Here are photos of roads in "fair" condition, Paser ratings 5 and 6.

Paser 6
Long Cracks
Transverse Cracks

Paser 6
Block Cracking Starting
Sealed Transverse Cracks

Paser 5
Block Cracking
Transverse Cracks

Paser 5
Moderate Block Cracking
Transverse Cracks w/ secondary cracks
Minor Raveling

Paser 5
Extensive Block Cracking