

The State of Michigan Transportation



2003-2017 PASER Road Survey

For Van Buren County, Michigan



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INTRODUCTION

Every year since 2003 there has been an annual assessment of the condition of the southwest region's federal aid eligible roads, using the Pavement Surface Evaluation and Rating (PASER) system. The effort is funded and administered through the State of Michigan Transportation Asset Management Council (TAMC) and satisfies the Governmental Accounting Standards Board Statement 34 (GASB 34), requiring tri-annual road assessments for governmental units receiving federal aid, doing so with minimal staff over short time periods. SWMPC uses the data gathered to assist member agencies in developing plans for the effective management of their pavement networks.

From 2003 to 2007, SWMPC rated the entire county's federal aid eligible roads each year. Starting in 2008 funding from TAMC was redirected to pay for rating 50 percent of the road network each year. This led to an annual split in the road network into two approximately equal segments. On even number years, the northern half of the county is rated and in odd years the southern half is rated. Attempting to rate the entire county has its difficulties and due to previous budget and time constraints the entire road network was attempted but not completely rated. By splitting the network and its ratings over two years, the SWMPC insures county-wide coverage every two years.

In 2017 (an odd year), the southern half of the county was rated (see Appendix C). Since half ratings began in 2008, results are paired in two-year increments to show ratings for the county's entire federal aid network. The first set of paired ratings, 2008-2009, includes the ratings for the northern half in 2008, and the southern portion in 2009. Using this method, the most recent complete county rating is 2016-2017.

METHODOLOGY

PASER, or Pavement Surface Evaluation and Rating, is a visual test of the surface condition of the road that utilizes a ten-point scale, focusing on pavement conditions; structural or geometric defects are not considered in determining the ratings. Ratings are applied to road segments of varying length, with ratings values ranging from 10 for a new road segment to 1 for a completely failed segment, and specific ratings determined by the number and type of surface defects. There are separate criteria for rating based on pavement type with concrete and asphalt being the two types rated in Van Buren County (for a full rating scale see Appendix A. Currently, gravel roads are not rated.). The ratings are compiled by teams of three to four individuals who drive the roads and conduct windshield surveys. The State of Michigan Transportation Asset Management Council (TAMC) has requested that the information gathered in this survey be reported using the following categories:

Roads with PASER ratings of 8-10 are in good condition and require Routine Maintenance. Routine maintenance encompasses day-to-day maintenance activities, such as street sweeping, drainage clearing, shoulder gravel grading, and sealing cracks to prevent standing water and water penetration.

Roads with PASER ratings of 5-7 are in fair condition and require Capital Preventative Maintenance. Capital preventive maintenance is a planned set of cost effective treatments to an existing roadway system that retard future deterioration and maintain or improve the functional condition of the system without significantly increasing structural capacity. The purpose of capital preventive maintenance fixes is to protect the pavement structure, slow the rate of pavement deterioration, and/or correct pavement surface deficiencies. These treatments are targeted at pavement surface defects primarily caused by the environment and by pavement material deficiencies.

Roads with PASER ratings of 1-4 are in poor condition and require Structural Improvements. This category includes work identified as rehabilitation and reconstruction, addressing the structural integrity of a road.

EQUIPMENT AND STAFF TIME

The rating team consists of three people made up of a representative from the Southwest Michigan Planning Commission (SWMPC), the Van Buren County Road Commission, and the Michigan Department of Transportation (MDOT). The team collects data using a laptop computer with the Roadsoft GIS Laptop Data Collector software loaded. A GlobalSat BU-353 Waterproof USB GPS receiver was connected to the laptop to track position and locate road segments. Roadsoft GIS is an asset management software package created and distributed free of charge by the Michigan Technological University's Technology Development Group. The current version of the program was designed with a special module to collect PASER rating data, known as the Laptop Data Collector (LDC). Upon completion of ratings collection, another SWMPC team member loaded the data into the SWMPC Roadsoft database and generated reports for submission. All those who were in the vehicle during the rating process were required to attend a daylong training session on using the PASER system for road ratings. Participants also received an overview of the project and were given instruction on how to use the Roadsoft software.

RESULTS

SUMMARY OF 2016-2017 RATINGS

In 2016 (an even numbered year) the northern half of Van Buren County was rated while in 2017 (an odd numbered year), the southern half was rated. The most recent full county rating therefore is the 2016-2017 ratings (Table 1, Figure 1). At 49.0 percent, just under half of the miles of federal aid eligible roads are in poor condition, while 30.1 percent of miles are in fair condition. On the other hand, only 20.9 percent of the miles rated are in good condition. The most common rating by number of miles is a 3, with 23.9 percent; almost a quarter of all miles or roads rated. No roads were rated a 1 and approximately 5 percent of miles were rated a 2. This means that while many of the roads are in poor condition very few have reached a point that could be considered to have completely failed.

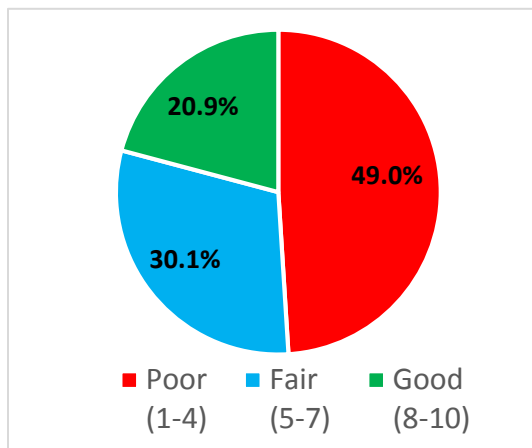


Figure 1. Percentage of Federal Aid Eligible Roads Rated Good, Fair, and Poor 2016/2017

While just under half of the rated roads are in poor condition (PASER rating of 1-4), this is mostly split between roads rated a 3 and those rated 4. At a rating of four, a structural overlay is recommended (Appendix A), but Capital Preventive Maintenance (CPM) can still be performed, such as a “mill and fill.” CPM guidelines fall under MDOT’s local agency program guidelines for resurfacing, restoration, and rehabilitation (3R). Once a road deteriorates to a three, a more extensive repair is required such as a full depth reconstruction. These fall under the new constructing/reconstruction (4R) guidelines.

Table 1. Pavement Ratings for Van Buren County for 2016-2017

Rating	1	2	3	4	5	6	7	8	9	10	Total
Miles	0.2	23.3	112.7	94.9	62.6	48.5	31.0	65.3	33.0	0.0	471.5
Percent	0.04%	4.94%	23.9%	20.1%	13.3%	10.3%	6.6%	13.8%	7.0%	0.0%	100%

The entire federal aid network includes state trunkline roads (roads maintained by MDOT) as well as locally maintained roads. Trunkline roads include the interstate and other limited access highways (US-31) as well as other non-divided or “surface streets.” Maintenance on Non-Trunkline Federal Aid (NTFA) roads within a city or village are the responsibility of a city or village, while NTFA roads within townships are maintained by the Van Buren County Road Commission. In 2016-2017, of the total 471.5 miles rated, 169 miles were trunkline roads, while 302 miles were NTFA.

Trunkline roads are in far better condition overall than the NTFA (Table 2, Figure 2). When the total miles of Cass County federal aid eligible roads are considered there is a noticeable difference in condition between them and the NTFA category. Only 22.8 percent of trunkline roads are in poor condition compared to 63.6 percent of the NTFA. There is a much smaller difference in the percentage of roads in fair condition with 34.5 percent of trunkline roads in fair condition compared to 27.7 percent for NTFA. The difference in roads rated in good condition is large with 42.7 percent of trunkline roads in good condition compared to only 8.7 percent of the NTFA. There is an acknowledged gap in funding for road maintenance statewide. Federal resources are most heavily applied to the Interstate followed by the major arterials, which are mostly maintained by MDOT (the National Highway System). Therefore, the conditions are worse for the roads in the NTFA network. However, this speaks to the opportunity of asset management principles applied in an environment where resources are diminished.

Table 2 Pavement Ratings for Van Buren County by Trunkline vs. NTFA in 2016-2017

Rating	1	2	3	4	5	6	7	8	9	10	Total
MDOT	0.0%	0.5%	7.6%	14.8%	13.8%	12.9%	7.8%	24.7%	17.9%	0.0%	100%
Local	0.1%	7.4%	33.0%	23.1%	13.0%	8.8%	5.9%	7.8%	0.9%	0.0%	100%

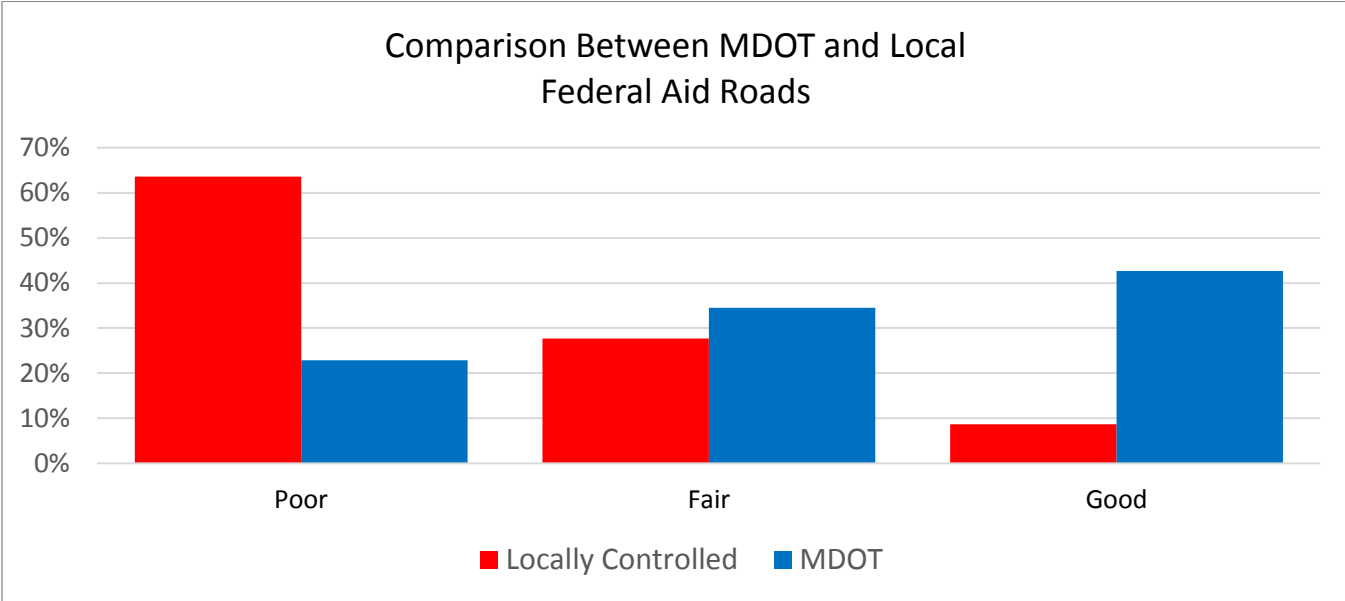


Figure 2. Percentage of Federal-Aid Eligible Road Segments Falling Under Each PASER Rating Classification, by Ownership in Van Buren County for 2016-2017

COUNTYWIDE TRENDS

Ratings for Van Buren County over the previous fourteen years show a general trend of worsening pavement condition (Table 3, Figure 3). In the fourteen years since PASER rating began, the percentage of assessed road segments receiving a good rating (8-10) fell from a high of 33 percent in 2004 to a low

of 12.5 percent in 2008/2009. Since then the percent of roads rated in the good category has steadily increased to 21 percent in 2016/2017. The roads rated fair fell from a peak of 68 percent in 2003 to a low of 30 percent in 2016/2017. The percentage of road segments rated poor (1-4) grew from a low of 1.3 percent in 2003 to a high of 49 percent in 2016/2017. With an increase of 47.7 percentage points, this represents the greatest change across the three PASER categories.

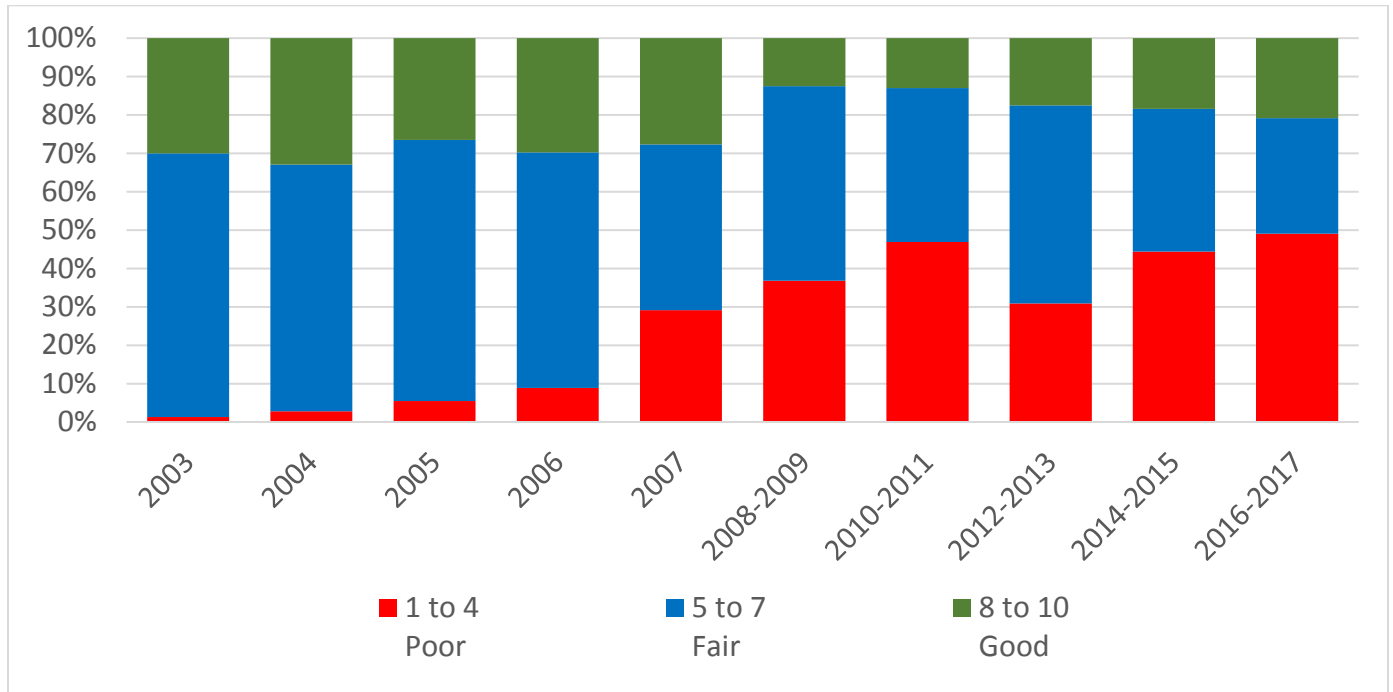


Figure 3. Percentage of Federal-Aid Eligible Road Segments Falling in Each PASER Rating Classification, for Van Buren County, from 2003 to 2016-2017.

Table 3 Road Segment Classifications and Total Road-Miles Rated, by Year.

Year	Poor	Fair	Good	Miles Rated
2003	1.30%	68.70%	30.00%	511
2004	2.80%	64.30%	32.90%	481.2
2005	5.50%	68.10%	26.50%	546.5
2006	8.90%	61.30%	29.70%	563.8
2007	29.10%	43.20%	27.70%	569.3
2008-2009	36.82%	50.68%	12.49%	572.6
2010-2011	46.90%	40.07%	13.03%	527
2012-2013	30.89%	51.59%	17.51%	471
2014-2015	44.36%	37.23%	18.42%	471
2016-2017	49.04%	30.12%	20.85%	471
Change from 2003 to 2016-2017	47.74%	-38.58%	-10.37%	

ROAD RATINGS BY JURISDICTION

In addition to the aggregate county-wide conditions displayed above, Table 4 (starting on page 9) displays yearly ratings data by local jurisdiction. The table displayed on page 17 of this document provides a detailed list of how road conditions have changed at the jurisdictional level over the past 14 years.

Of the 29 cities, villages, and townships in Van Buren County with federal aid eligible roads, 8 have had the percentage of road segments in good condition increase. The amount of roads in poor condition have grown more quickly. Every jurisdiction has had the percentage of road segments in poor condition increase over the fourteen years of analysis.

As can be seen from the trends overall, the average PASER ratings per year have worsened. Within this trend, there has been a disproportionate decrease in roads in fair condition. Asset management principles advocate for preventative maintenance on fair roads to improve their current condition and extend their life. For roads in poor condition, even resurfacing without a full reconstruction is still only a partial solution. As a road rated a 4 can be resurfaced to a 9 but without the necessary structural repairs with drainage, the road will deteriorate and quickly back to fair condition. Total reconstruction which turns the road into a rating of 10 is the costliest solution and thus should be minimized, but once a road reaches a condition of 1 or 2, it is the only available option (see Appendix B). Further, once a road reaches a rating of 2 there is the possibility that it could degrade to a 1 which indicates complete failure and a major safety risk for drivers. Part of the SWMPC purpose in compiling the PASER ratings and publishing an annual report is to promote planning that emphasizes a balance of structural improvements, preventative maintenance, and routine maintenance as a coordinated strategy for achieving and sustaining high-quality infrastructure.

Table 4. Percentage of Federal Aid Eligible Roads in Each PASER Category by Jurisdiction

Jurisdictions	2 0 0 3				2 0 0 4			
	Poor	Fair	Good	Miles Rated	Poor	Fair	Good	Miles Rated
Almena Twp	0.0%	54.2%	45.8%	24.6	0.0%	12.9%	87.1%	21.3
Antwerp Twp	0.0%	71.9%	28.1%	32.5	0.0%	65.6%	34.4%	34.5
Arlington Twp	0.0%	39.1%	60.9%	21.4	0.0%	41.5%	58.5%	23.5
Bangor	3.6%	78.0%	18.4%	3.5	0.0%	72.3%	27.7%	1.8
Bangor Twp	5.3%	94.7%	0.0%	18.7	10.9%	71.1%	17.9%	18.1
Bloomingtondale	0.0%	66.8%	33.2%	2.3	0.0%	100.0%	0.0%	0.6
Bloomingtondale Twp	0.0%	82.5%	17.5%	19.1	0.0%	70.9%	29.1%	10.0
Breedsville	6.2%	93.8%	0.0%	1.8	N/A	N/A	N/A	0.0
Columbia Twp	0.0%	69.4%	30.6%	22.0	0.0%	20.3%	79.7%	10.7
Covert Twp	0.0%	97.4%	2.6%	38.7	2.6%	89.7%	7.7%	38.7
Decatur	0.0%	81.2%	18.8%	1.6	0.0%	73.8%	26.2%	1.6
Decatur Twp	0.0%	81.5%	18.5%	13.2	16.9%	73.4%	9.7%	19.4
Geneva Twp	0.0%	57.5%	42.5%	24.8	0.0%	73.9%	26.1%	11.1
Gobles	11.1%	72.5%	16.4%	2.2	0.0%	24.2%	75.8%	2.2
Hamilton Twp	0.0%	77.4%	22.6%	26.5	0.0%	75.6%	24.4%	26.5
Hartford	0.0%	91.2%	8.8%	2.5	0.0%	100.0%	0.0%	2.5
Hartford Twp	0.1%	46.3%	53.6%	28.8	0.0%	55.0%	45.0%	28.8
Keeler Twp	0.0%	73.2%	26.8%	24.5	0.0%	70.1%	29.9%	24.5
Lawrence	47.3%	51.9%	0.8%	3.3	25.0%	46.9%	28.1%	3.3
Lawrence Twp	0.0%	46.6%	53.4%	36.6	0.0%	58.5%	41.5%	37.4
Lawton	7.1%	92.9%	0.0%	2.7	21.8%	64.1%	14.0%	2.7
Mattawan	0.0%	43.8%	56.2%	3.8	14.7%	65.4%	19.9%	3.8
Paw Paw	10.4%	76.7%	13.0%	2.8	0.0%	73.8%	26.2%	2.8
Paw Paw Twp	1.3%	53.0%	45.8%	40.0	1.3%	63.6%	35.0%	40.1
Pine Grove Twp	0.0%	61.7%	38.3%	21.0	0.0%	37.6%	62.4%	21.0
Porter Twp	0.0%	88.6%	11.4%	25.7	5.6%	90.6%	3.8%	26.7
South Haven	5.3%	91.2%	3.5%	19.7	14.7%	79.7%	5.7%	20.2
South Haven Twp	4.7%	84.2%	11.2%	34.1	0.2%	87.2%	12.5%	34.6
Waverly Twp	0.0%	22.6%	77.4%	12.7	0.0%	17.7%	82.3%	12.9

Jurisdictions	2 0 0 5				2 0 0 6			
	Poor	Fair	Good	Miles Rated	Poor	Fair	Good	Miles Rated
Almena Twp	0.0%	38.2%	61.8%	23.8	0.6%	69.8%	29.6%	27.7
Antwerp Twp	1.4%	69.8%	28.8%	38.4	0.0%	72.0%	28.0%	38.7
Arlington Twp	4.2%	92.4%	3.5%	23.5	10.1%	78.8%	11.1%	23.5
Bangor	7.6%	67.0%	25.4%	3.7	0.0%	65.3%	34.7%	3.7
Bangor Twp	17.7%	58.2%	24.1%	19.7	9.3%	82.6%	8.0%	21.1
Bloomingtondale	0.0%	100.0%	0.0%	2.3	0.0%	94.4%	5.6%	2.3
Bloomingtondale Twp	0.0%	88.9%	11.1%	23.6	0.0%	71.3%	28.7%	23.6
Breedsville	N/A	N/A	N/A	1.8	N/A	N/A	N/A	1.8
Columbia Twp	10.4%	70.2%	19.5%	28.0	0.0%	75.2%	24.8%	28.3
Covert Twp	9.5%	64.5%	26.1%	40.1	19.9%	30.1%	50.0%	40.1
Decatur	0.0%	64.0%	36.0%	1.6	8.3%	59.2%	32.5%	1.6
Decatur Twp	5.2%	53.2%	41.7%	19.4	29.3%	59.9%	10.8%	19.4
Geneva Twp	0.0%	71.0%	29.0%	30.0	3.6%	52.2%	44.2%	30.0
Gobles	0.0%	100.0%	0.0%	2.2	0.0%	91.2%	8.8%	2.2
Hamilton Twp	0.0%	70.1%	29.9%	26.5	3.4%	57.2%	39.4%	26.5
Hartford	0.0%	100.0%	0.0%	2.5	0.0%	79.9%	20.1%	2.5
Hartford Twp	0.0%	45.1%	54.9%	28.8	0.0%	43.1%	56.9%	28.7
Keeler Twp	0.0%	62.5%	37.5%	24.5	0.0%	67.3%	32.7%	24.6
Lawrence	25.0%	46.9%	28.1%	3.3	33.9%	55.1%	11.0%	3.3
Lawrence Twp	0.0%	54.0%	46.0%	37.3	10.2%	53.9%	35.9%	37.3
Lawton	0.0%	78.2%	21.8%	2.7	0.0%	74.6%	25.4%	3.4
Mattawan	15.9%	59.5%	24.6%	3.8	8.2%	88.8%	3.0%	6.7
Paw Paw	0.0%	79.6%	20.4%	2.8	0.0%	74.9%	25.1%	3.6
Paw Paw Twp	6.9%	63.9%	29.2%	40.1	6.3%	49.1%	44.6%	42.6
Pine Grove Twp	1.8%	91.0%	7.2%	21.0	4.0%	96.0%	0.0%	21.0
Porter Twp	10.5%	75.1%	14.4%	26.7	18.2%	31.2%	50.5%	26.7
South Haven	26.8%	61.8%	11.4%	20.4	34.4%	49.6%	16.0%	20.6
South Haven Twp	10.2%	84.3%	5.5%	35.1	24.2%	59.3%	16.5%	37.3
Waverly Twp	0.0%	84.2%	15.8%	12.9	0.0%	100.0%	0.0%	15.0

	2 0 0 7			
Jurisdictions	Poor	Fair	Good	Miles Rated
Almena Twp	35.3%	43.8%	20.9%	29.4
Antwerp Twp	20.8%	45.0%	34.2%	40.2
Arlington Twp	26.5%	44.9%	28.5%	23.4
Bangor	18.1%	31.5%	50.3%	3.7
Bangor Twp	33.1%	33.8%	33.1%	20.9
Bloomingtondale	0.0%	55.4%	44.6%	2.3
Bloomingtondale Twp	26.8%	55.8%	17.4%	23.6
Breedsville	N/A	N/A	N/A	1.8
Columbia Twp	50.7%	25.6%	23.8%	28.2
Covert Twp	29.7%	40.0%	30.4%	40.1
Decatur	4.7%	70.8%	24.5%	1.6
Decatur Twp	58.5%	32.5%	9.0%	19.4
Geneva Twp	28.5%	43.5%	28.1%	29.0
Gobles	9.6%	90.4%	0.0%	2.2
Hamilton Twp	33.7%	62.7%	3.6%	27.0
Hartford	47.7%	34.0%	18.3%	2.5
Hartford Twp	23.7%	36.1%	40.2%	31.3
Keeler Twp	30.7%	45.8%	23.5%	24.6
Lawrence	62.7%	26.3%	11.0%	3.3
Lawrence Twp	25.8%	37.2%	37.0%	39.3
Lawton	37.5%	33.5%	28.9%	3.4
Mattawan	18.1%	78.5%	3.4%	5.9
Paw Paw	26.2%	33.0%	40.9%	3.6
Paw Paw Twp	9.9%	49.4%	40.7%	42.6
Pine Grove Twp	24.6%	59.0%	16.4%	21.0
Porter Twp	17.2%	43.9%	39.0%	26.7
South Haven	45.2%	33.0%	21.8%	20.6
South Haven Twp	25.2%	40.3%	34.4%	37.0
Waverly Twp	38.5%	46.1%	15.4%	15.0

Jurisdictions	2 0 0 8				2 0 0 9			
	Poor	Fair	Good	Miles Rated	Poor	Fair	Good	Miles Rated
Almena Twp	53.9%	46.1%	0.0%	29.4	N/A	N/A	N/A	0.0
Antwerp Twp	59.9%	31.6%	8.5%	20.8	30.7%	45.0%	24.2%	41.1
Arlington Twp	61.5%	38.5%	0.0%	23.6	N/A	N/A	N/A	0.0
Bangor	32.1%	67.9%	0.0%	3.7	N/A	N/A	N/A	0.0
Bangor Twp	34.4%	58.6%	7.1%	21.1	N/A	N/A	N/A	0.0
Bloomingtondale	0.0%	100.0%	0.0%	2.3	N/A	N/A	N/A	0.0
Bloomingtondale Twp	50.7%	48.8%	0.5%	23.6	N/A	N/A	N/A	0.0
Breedsville	N/A	N/A	N/A	1.8	N/A	N/A	N/A	0.0
Columbia Twp	68.4%	31.6%	0.0%	28.3	N/A	N/A	N/A	0.0
Covert Twp	22.5%	59.5%	18.0%	40.1	N/A	N/A	N/A	0.0
Decatur	N/A	N/A	N/A	0.0	52.1%	35.7%	12.2%	1.6
Decatur Twp	95.5%	4.5%	0.0%	14.6	58.5%	41.5%	0.0%	20.8
Geneva Twp	30.1%	65.5%	4.5%	30.0	N/A	N/A	N/A	0.0
Gobles	27.6%	33.0%	39.5%	2.2	N/A	N/A	N/A	0.0
Hamilton Twp	35.7%	60.0%	4.3%	19.6	46.0%	54.0%	0.0%	27.0
Hartford	44.2%	55.8%	0.0%	2.3	68.2%	29.3%	2.5%	2.5
Hartford Twp	37.8%	56.8%	5.4%	18.4	14.9%	57.2%	27.9%	31.3
Keeler Twp	36.0%	48.9%	15.2%	21.7	19.3%	80.7%	0.0%	24.6
Lawrence	66.7%	28.3%	5.0%	3.3	38.2%	45.9%	15.9%	3.3
Lawrence Twp	62.8%	36.3%	0.9%	26.3	27.7%	41.7%	30.6%	39.3
Lawton	100.0%	0.0%	0.0%	0.9	62.3%	19.0%	18.7%	3.1
Mattawan	59.6%	40.4%	0.0%	2.4	16.5%	83.5%	0.0%	6.8
Paw Paw	N/A	N/A	N/A	0.0	66.0%	29.1%	5.0%	3.6
Paw Paw Twp	37.0%	51.1%	11.9%	19.2	19.7%	47.9%	32.4%	42.7
Pine Grove Twp	65.0%	34.4%	0.6%	21.0	N/A	N/A	N/A	0.0
Porter Twp	63.3%	36.7%	0.0%	20.1	43.1%	56.9%	0.0%	26.7
South Haven	37.2%	45.4%	17.3%	20.6	N/A	N/A	N/A	0.0
South Haven Twp	19.5%	50.8%	29.7%	37.3	N/A	N/A	N/A	0.0
Waverly Twp	39.2%	60.8%	0.0%	15.0	N/A	N/A	N/A	0.0

Jurisdictions	2 0 1 0				2 0 1 1			
	Poor	Fair	Good	Miles Rated	Poor	Fair	Good	Miles Rated
Almena Twp	44.2%	55.8%	0.0%	29.3	N/A	N/A	N/A	0.0
Antwerp Twp	N/A	N/A	N/A	0.0	53.1%	19.6%	27.3%	39.0
Arlington Twp	46.6%	24.2%	29.2%	23.6	N/A	N/A	N/A	0.0
Bangor	28.6%	71.4%	0.0%	3.7	N/A	N/A	N/A	0.0
Bangor Twp	40.0%	42.3%	17.7%	21.1	N/A	N/A	N/A	0.0
Bloomington	0.0%	100.0%	0.0%	2.3	N/A	N/A	N/A	0.0
Bloomington Twp	49.5%	32.1%	18.4%	23.6	N/A	N/A	N/A	0.0
Breedsville	100.0%	0.0%	0.0%	1.8	N/A	N/A	N/A	0.0
Columbia Twp	57.4%	39.9%	2.6%	28.2	N/A	N/A	N/A	0.0
Covert Twp	19.2%	62.8%	18.0%	40.1	N/A	N/A	N/A	0.0
Decatur	N/A	N/A	N/A	0.0	55.0%	45.0%	0.0%	1.6
Decatur Twp	N/A	N/A	N/A	0.0	79.8%	20.2%	0.0%	12.3
Geneva Twp	40.7%	59.3%	0.0%	29.9	N/A	N/A	N/A	0.0
Gobles	41.0%	19.5%	39.5%	2.2	N/A	N/A	N/A	0.0
Hamilton Twp	N/A	N/A	N/A	0.0	98.1%	1.9%	0.0%	24.9
Hartford	N/A	N/A	N/A	0.0	82.3%	17.7%	0.0%	2.5
Hartford Twp	100.0%	0.0%	0.0%	2.7	24.7%	72.9%	2.4%	25.4
Keeler Twp	100.0%	0.0%	0.0%	3.3	98.3%	1.7%	0.0%	17.5
Lawrence	N/A	N/A	N/A	0.0	46.1%	53.9%	0.0%	2.7
Lawrence Twp	N/A	N/A	N/A	0.0	40.0%	60.0%	0.0%	34.6
Lawton	0.0%	0.0%	100.0%	0.3	69.0%	24.9%	6.0%	3.1
Mattawan	N/A	N/A	N/A	0.0	70.4%	29.3%	0.3%	6.7
Paw Paw	N/A	N/A	N/A	0.0	33.3%	66.7%	0.0%	3.5
Paw Paw Twp	N/A	N/A	N/A	0.0	42.5%	29.9%	27.6%	35.0
Pine Grove Twp	82.2%	17.2%	0.6%	21.0	N/A	N/A	N/A	0.0
Porter Twp	100.0%	0.0%	0.0%	0.3	78.8%	21.2%	0.0%	18.8
South Haven	24.8%	54.6%	20.6%	20.6	N/A	N/A	N/A	0.0
South Haven Twp	13.2%	56.3%	30.5%	37.8	N/A	N/A	N/A	0.0
Waverly Twp	14.1%	32.7%	53.2%	15.0	N/A	N/A	N/A	0.0

Jurisdictions	2 0 1 2				2 0 1 3			
	Poor	Fair	Good	Miles Rated	Poor	Fair	Good	Miles Rated
Almena Twp	9.0%	80.6%	10.4%	26.7	9.5%	76.6%	13.9%	15.2
Antwerp Twp	N/A	N/A	N/A	0.0	49.9%	23.5%	26.6%	39.2
Arlington Twp	26.8%	48.3%	24.9%	16.7	56.9%	34.2%	8.9%	11.0
Bangor	47.2%	42.4%	10.4%	3.7	N/A	N/A	N/A	0.0
Bangor Twp	33.0%	54.2%	12.8%	12.7	48.4%	35.0%	16.5%	9.9
Bloomingtondale	0.0%	100.0%	0.0%	2.3	N/A	N/A	N/A	0.0
Bloomingtondale Twp	10.1%	89.9%	0.0%	13.0	7.8%	60.2%	32.0%	12.9
Breedsville	100.0%	0.0%	0.0%	1.3	N/A	N/A	N/A	0.0
Columbia Twp	51.0%	46.7%	2.3%	18.5	54.4%	44.4%	1.2%	18.4
Covert Twp	7.2%	77.6%	15.2%	37.1	4.2%	95.7%	0.1%	16.0
Decatur	N/A	N/A	N/A	0.0	55.0%	45.0%	0.0%	1.6
Decatur Twp	N/A	N/A	N/A	0.0	30.7%	62.8%	6.5%	12.4
Geneva Twp	14.1%	77.9%	8.1%	18.2	31.6%	67.9%	0.5%	14.8
Gobles	14.0%	59.3%	26.7%	2.2	N/A	N/A	N/A	0.0
Hamilton Twp	N/A	N/A	N/A	0.0	53.8%	46.2%	0.0%	24.6
Hartford	N/A	N/A	N/A	0.0	34.7%	34.7%	30.6%	3.2
Hartford Twp	N/A	N/A	NA	0.0	23.8%	55.1%	21.1%	25.4
Keeler Twp	N/A	N/A	N/A	0.0	33.0%	67.0%	0.0%	17.5
Lawrence	N/A	N/A	N/A	0.0	38.8%	52.7%	8.5%	2.7
Lawrence Twp	N/A	N/A	N/A	0.0	37.8%	62.2%	0.0%	34.7
Lawton	0.0%	0.0%	100.0%	0.3	N/A	N/A	N/A	N/A
Mattawan	N/A	N/A	N/A	0.0	47.5%	37.1%	15.4%	7.0
Paw Paw	N/A	N/A	N/A	0.0	14.7%	74.9%	10.4%	3.5
Paw Paw Twp	N/A	N/A	N/A	0.0	37.6%	36.3%	26.1%	35.0
Pine Grove Twp	41.5%	58.5%	0.0%	18.3	73.5%	26.5%	0.0%	12.9
Porter Twp	N/A	N/A	N/A	0.0	67.3%	20.5%	12.2%	18.8
South Haven	16.5%	55.9%	27.7%	20.0	31.3%	35.1%	33.6%	14.9
South Haven Twp	7.6%	66.1%	26.3%	35.2	32.4%	54.2%	13.4%	14.7
Waverly Twp	0.7%	69.7%	29.7%	15.0	26.1%	49.8%	24.1%	8.5

Jurisdictions	2 0 1 4				2 0 1 5			
	Poor	Fair	Good	Miles Rated	Poor	Fair	Good	Miles Rated
Almena Twp	49.3%	50.7%	0.0%	26.7	26.6%	59.5%	13.9%	15.2
Antwerp Twp	N/A	N/A	N/A	0.0	37.1%	27.1%	35.9%	39.2
Arlington Twp	37.0%	61.1%	1.9%	16.7	56.1%	43.9%	0.0%	11.0
Bangor	48.4%	45.0%	6.6%	3.7	N/A	N/A	N/A	0.0
Bangor Twp	76.4%	23.6%	0.0%	12.7	73.4%	26.6%	0.0%	9.9
Bloomingtondale	36.0%	64.0%	0.0%	2.3	49.2%	50.8%	0.0%	2.3
Bloomingtondale Twp	48.8%	51.2%	0.0%	13.0	61.9%	38.1%	0.0%	12.9
Breedsville	100.0%	0.0%	0.0%	1.3	N/A	N/A	N/A	0.0
Columbia Twp	86.6%	13.4%	0.0%	18.5	90.5%	9.5%	0.0%	18.4
Covert Twp	25.9%	55.1%	19.0%	37.1	24.4%	75.5%	0.1%	16.0
Decatur	N/A	N/A	N/A	0.0	8.6%	82.9%	8.5%	2.1
Decatur Twp	N/A	N/A	N/A	0.0	92.4%	2.3%	5.3%	11.7
Geneva Twp	49.1%	50.9%	0.0%	18.2	64.0%	36.0%	0.0%	14.8
Gobles	0.0%	100%	0.0%	2.3	89.2%	6.0%	4.8%	0.0
Hamilton Twp	N/A	N/A	N/A	0.0	89.2%	6.0%	4.8%	24.9
Hartford	N/A	N/A	N/A	0.0	33.4%	60.4%	6.3%	3.2
Hartford Twp	N/A	N/A	N/A	0.0	35.6%	26.3%	38.1%	26.2
Keeler Twp	N/A	N/A	N/A	0.0	52.4%	47.6%	0.0%	17.5
Lawrence	N/A	N/A	N/A	0.0	27.5%	72.5%	0.0%	2.7
Lawrence Twp	N/A	N/A	N/A	0.0	38.7%	41.4%	19.9%	34.7
Lawton	N/A	N/A	N/A	0.0	36.9%	40.6%	22.5%	3.1
Mattawan	N/A	N/A	N/A	0.0	58.7%	24.5%	16.8%	7.0
Paw Paw	N/A	N/A	N/A	0.0	19.0%	38.9%	42.1%	3.5
Paw Paw Twp	N/A	N/A	N/A	0.0	27.7%	37.1%	35.2%	35.0
Pine Grove Twp	56.0%	35.9%	8.1%	18.3	66.6%	21.8%	11.5%	12.9
Porter Twp	N/A	N/A	N/A	0.0	60.8%	13.4%	25.8%	18.8
South Haven	21.1%	58.2%	20.7%	20.3	N/A	N/A	N/A	0.0
South Haven Twp	29.5%	45.6%	24.9%	35.2	25.4%	52.4%	22.1%	15.2
Waverly Twp	32.5%	67.5%	0.0%	15.2	62.2%	37.8%	0.0%	8.5

Jurisdictions	2 0 1 6				2 0 1 7			
	Poor	Fair	Good	Miles Rated	Poor	Fair	Good	Miles Rated
Almena Twp	37.8%	19.8%	42.4%	26.69	NA	NA	NA	0.0
Antwerp Twp	NA	NA	NA	0.0	64.7%	18.1%	17.2%	32.94
Arlington Twp	56.3%	34.8%	9.0%	16.73	NA	NA	NA	0.0
Bangor	34.1%	54.8%	11.2%	3.67	NA	NA	NA	0.0
Bangor Twp	65.7%	34.3%	0.0%	12.73	NA	NA	NA	0.0
Bloomingtondale	72.5%	27.5%	0.0%	2.29	NA	NA	NA	0.0
Bloomingtondale Twp	75.4%	24.6%	0.0%	13.03	NA	NA	NA	0.0
Breedsville	100.0%	0.0%	0.0%	1.25	NA	NA	NA	0.0
Columbia Twp	82.4%	17.6%	0.0%	18.46	NA	NA	NA	0.0
Covert Twp	28.7%	35.8%	35.5%	37.12	NA	NA	NA	0.0
Decatur	NA	NA	NA	0.0	28.3%	62.7%	8.9%	3.02
Decatur Twp	NA	NA	NA	0.0	NA	NA	NA	0.0
Geneva Twp	32.5%	64.8%	2.7%	18.17	NA	NA	NA	0.0
Gobles	16.7%	83.3%	0.0%	2.21	NA	NA	NA	0.0
Hamilton Twp	NA	NA	NA	0.0	50.5%	34.0%	15.6%	24.64
Hartford	NA	NA	NA	0.0	63.1%	16.5%	20.5%	3.21
Hartford Twp	NA	NA	NA	0.0	49.7%	39.6%	10.7%	26.26
Keeler Twp	NA	NA	NA	0.0	90.9%	2.8%	6.3%	17.54
Lawrence	NA	NA	NA	0.0	72.9%	27.1%	0.0%	2.73
Lawrence Twp	NA	NA	NA	0.0	58.3%	20.5%	21.2%	34.69
Lawton	NA	NA	NA	0.0	52.5%	22.1%	25.4%	4.71
Mattawan	NA	NA	NA	0.0	44.6%	18.8%	36.6%	11.69
Paw Paw	NA	NA	NA	0.0	31.7%	46.9%	21.4%	10.38
Paw Paw Twp	NA	NA	NA	0.0	44.3%	26.0%	29.7%	28.16
Pine Grove Twp	76.2%	23.8%	0.0%	18.34	NA	NA	NA	0.0
Porter Twp	NA	NA	NA	0.0	11.4%	20.9%	67.6%	18.84
South Haven	21.2%	55.4%	23.4%	20.49	NA	NA	NA	0.0
South Haven Twp	25.7%	41.9%	32.4%	35.67	NA	NA	NA	0.0
Waverly Twp	69.7%	20.7%	9.7%	14.96	NA	NA	NA	0.0

Change from 2003 to 2016-2017			
Jurisdictions	Poor	Fair	Good
Almena Twp	37.81%	-34.36%	-3.45%
Antwerp Twp	64.66%	-53.80%	-10.87%
Arlington Twp	56.26%	-4.31%	-51.95%
Bangor	30.45%	-23.24%	-7.21%
Bangor Twp	60.40%	-60.40%	0.00%
Bloomington	72.48%	-39.28%	-33.20%
Bloomington Twp	75.44%	-57.94%	-17.50%
Breedsville	93.80%	-93.80%	0.00%
Columbia Twp	82.40%	-51.80%	-30.60%
Covert Twp	28.69%	-61.56%	32.87%
Decatur	28.34%	-18.49%	-9.85%
Decatur Twp	52.57%	-63.53%	10.96%
Geneva Twp	32.51%	7.25%	-39.76%
Gobles	5.60%	10.80%	-16.40%
Hamilton Twp	50.48%	-43.44%	-7.03%
Hartford	63.05%	-74.72%	11.67%
Hartford Twp	49.63%	-6.72%	-42.91%
Keeler Twp	90.89%	-70.35%	-20.54%
Lawrence	25.56%	-24.76%	-0.80%
Lawrence Twp	58.27%	-26.05%	-32.22%
Lawton	45.42%	-70.84%	25.41%
Mattawan	44.63%	-24.98%	-19.65%
Paw Paw	21.35%	-29.80%	8.35%
Paw Paw Twp	43.05%	-27.03%	-16.11%
Pine Grove Twp	76.17%	-37.87%	-38.30%
Porter Twp	11.44%	-67.66%	56.21%
South Haven	15.88%	-35.76%	19.88%
South Haven Twp	20.96%	-42.26%	21.21%
Waverly Twp	69.68%	-1.94%	-67.74%

PASER Asphalt Rating Chart		
Surface Rating	Visible Distress *	General Condition/ Treatment Measures
10	None	New construction.
9	None	Recent overlay, like new.
8	<ul style="list-style-type: none"> • No longitudinal cracks except reflection of paving joints. • Occasional transverse cracks, widely spaced (40' or greater). 	Recent sealcoat or new road mix. Little or no maintenance required.
7	<ul style="list-style-type: none"> • Very slight or no raveling, surface shows some traffic wear. • Longitudinal cracks (open ¼") due to reflection or paving joints. • Transverse cracks (open ¼") spaced 10 feet or more apart, little or slight crack raveling. • No patching or very few patches in excellent condition. 	First signs of aging. Maintain with routine crack filling.
6	<ul style="list-style-type: none"> • Slight raveling (loss of lines) and traffic wear. • Longitudinal cracks (open ¼" – ½") due to reflection and paving joints. • Transverse cracking (open ¼" to ½") some spaced less than 10 feet. • First sign of block cracking • Slight to moderate flushing or polishing. • Occasional patching in good condition. 	Shows signs of aging, sound structural condition. Could extend life with sealcoat.
5	<ul style="list-style-type: none"> • Moderate to severe ravelling (loss of fine and coarse aggregate). • Longitudinal and transverse cracks (open ½") show first signs of slight raveling and secondary cracks. First signs of longitudinal cracks near pavement edge. • Block cracking up to 50% of surface. • Extensive to severe flushing or polishing. • Some patching or edge wedging in good condition. 	Surface aging, sound structural condition. Needs sealcoat or nonstructural overlay.
4	<ul style="list-style-type: none"> • Severe surface ravelling. • Multiple longitudinal and transverse cracking with slight ravelling. • Longitudinal cracking in wheel path. • Block cracking (over 50% of surface). • Patching in fair condition. • Slight rutting or distortions (½" deep or less). 	Significant aging and first signs of need for strengthening. Would benefit from recycling or overlay.
3	<ul style="list-style-type: none"> • Closely spaced longitudinal and transverse cracks often showing ravelling and crack erosion. • Severe block cracking. • Some alligator cracking (less than 25 % of surface). • Patches in fair to poor condition. Moderate rutting or distortion (1" or 2" deep). • Occasional potholes. 	Needs patching and major overlay or complete recycling.
2	<ul style="list-style-type: none"> • Alligator cracking (over 25 % of surface). • Severe distortions (over 2" deep). • Extensive patching in poor condition. • Potholes. 	Severe deterioration. Needs reconstruction with extensive base repair.
1	Severe distress with extensive loss of surface integrity.	Failed. Needs total reconstruction.

*** Note: Individual pavements will not have all of the types of distress listed for any particular rating. They may have only one or two types.**

PASER Concrete Rating Chart

Surface Rating	Visible Distress *	General Condition/ Treatment Measures
10	None	New construction.
9	<ul style="list-style-type: none"> • Traffic wear in wheelpath. • Slight map cracking or pop-outs. 	Recent concrete overlay or joint rehabilitation, like new
8	<ul style="list-style-type: none"> • Pop-outs, map cracking, or minor surface defects. • Slight surface scaling. • Partial loss of joint sealant. • Isolated meander cracks and cracks at manholes, tight or well sealed. 	More surface wear or slight defects. Recent asphalt overlay. Little or no maintenance required.
7	<ul style="list-style-type: none"> • More extensive surface scaling. • Some open joints. • Isolated transverse or longitudinal cracks, tight or well sealed. • Some manhole displacement and cracking. • First utility patch, in good condition. • First noticeable settlement or heave area. 	First sign of transverse cracks (all tight) or utility patch. More extensive surface scaling. Seal open joints and other routine maintenance.
6	<ul style="list-style-type: none"> • Moderate scaling in several locations. • A few isolated surface spalls. • Shallow reinforcement causing cracks. • Several corner cracks, tight or well sealed. • Open (1/4" wide) longitudinal or transverse joints and more frequent transverse cracks (some open 1/4"). 	First signs of shallow reinforcement or corner cracking. Needs general joint and crack sealing. Scaled areas could be overlaid.
5	<ul style="list-style-type: none"> • Moderate to severe polishing or scaling over 25% of the surface. • High reinforcing steel causing surface spalling. • Some joints and cracks have begun spalling. • First signs of joint or crack faulting (1/4"). • Multiple corner cracks with broken pieces. • Moderate settlement or frost heave areas. • Patching showing distress. 	First signs of joint or crack spalling or faulting. Grind to repair surface defects. Some partial depth joint repairs needed.
4	<ul style="list-style-type: none"> • Severe polishing, scaling, map cracking or spalling, over 50% of the area. • Joints and cracks show moderate to severe spalling. • Pumping and faulting of joints (1/2") with fair ride. • Several slabs have multiple transverse or meander cracks with moderate spalling. Spalled area broken into several pieces. • Corner cracks with missing pieces or patches. • Pavement blowups. 	Needs some full depth repairs, grinding, and/or asphalt overlay to correct surface defects.
3	<ul style="list-style-type: none"> • Most joints and cracks are open, with multiple parallel cracks, severe spalling or faulting. • D-cracking is evident. • Severe faulting (1") giving poor ride. • Extensive patching in fair to poor condition. • Many transverse and meander cracks, open and severely spalled. 	Needs extensive full depth patching plus some full slab replacement.
2	<ul style="list-style-type: none"> • Extensive slab cracking, severely spalled and patched. • Joints failed. • Patching in very poor condition. • Severe and extensive settlements or front heaves. 	Recycle and/or rebuild pavement.
1	<ul style="list-style-type: none"> • Restricted speed. • Extensive potholes. • Almost total loss of pavement integrity. 	Total reconstruction.

APPENDIX B: TREATMENT OPTIONS

Treatment	Life Extension (Average Years)	PASER Rating	Cost per Mile	Average Cost per Additional Year
Overband Crack Filling	4	7 to 9	\$5,000	\$1,250
Fog Seal Coat	0	8	\$5,000	N/A
One Course Non-Structural Overlay	10	5 to 6	\$75,000	\$7,500
Milling and One Course Non-Structural Overlay	10	4 to 5	\$95,000	\$9,500
Single Course Chip Seal	7	6 to 7	\$23,000	\$3,286
Double Course Chip Seal	9	5 to 6	\$46,000	\$5,111
Structural Crush & Shape	25	2 to 3	\$200,000	\$8,000
Full-Depth Reconstruction	30	1 to 2	\$400,000	\$13,333

Costs are included for comparison purposes. Actual costs for Van Buren County will differ.

APPENDIX C: MAP

