

Midland Area Transportation Study



MATS 2018 PASER Data

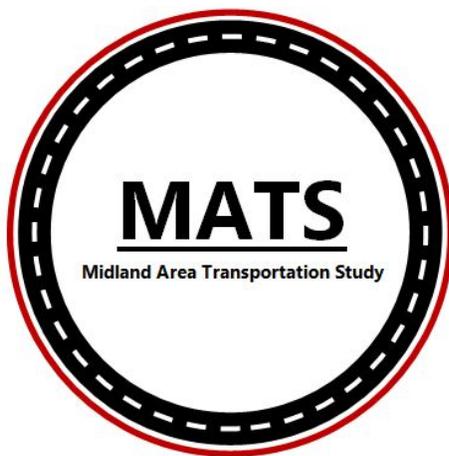
Report and Analysis

This brief report is intended to fulfil the requirements of the FY 2019 MATS Unified Work Program, work item 3, work product 4:

Create an Annual Report of Asset Management program activities as well as a summary of 2018 PASER condition data by local agency, functional classification, and Act 51 Legal System; provide links to the Regional Annual Report on agency website and submit copies to TAMC Coordinator.

The Midland Area Transportation Study is the designated Metropolitan Planning Organization for the Midland Urbanized Area. Preparation of this document was funded in part by the U.S. Department of Transportation, the Michigan Department of Transportation, and local contributions.

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MATS 2018 PASER Data

Report and Analysis

01 Rationale and Methodology

On an annual basis, since its inception in 2013, MATS has worked with local road agencies to conduct an assessment of the condition of the urbanized area'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 at least tri-annual road assessments for governmental units receiving federal aid, doing so with minimal staff over short time periods.

MATS uses the data gathered to assist member agencies in developing plans for the effective management of their pavement networks, and publicizes this data through posting on the MATS website at www.midlandmpo.org and through submission to TAMC.

PASER Overview

Although there are numerous systems that can be used to gather roadway condition data. Some common examples include the Distress Index, Pavement Condition Index, the Pavement Quality Index, and the PASER rating system. The TAMC requires the PASER rating system to ensure uniform results from municipality to municipality for the State of Michigan. The system is easily understood and repeatable, and can be completed in a relatively quick and cost effective manner. One of the key benefits of the PASER system for use in the MATS area is that it is applicable for a variety of roadway surfaces including asphalt, concrete, and gravel, all of which can be found here.

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 the MATS area (for a full rating scale see Appendix A). In addition, gravel roads are rated, where they are part of the Federal Aid network, utilizing an IBR scale (also included in Appendix A). The ratings are compiled by teams of three staffers who drive the roads and conduct visual surveys of its condition.

Process

According to Act 51 (P.A. 499 2002, P.A. 199 2007) each local road agency shall annually report the mileage and condition of the road and bridge system under their jurisdiction to the TAMC. To fulfill the requirement of this Act each year TAMC sets requirements for road condition data collection and submission by road-owning agencies in Michigan. Road condition rating is eligible for reimbursement from TAMC if the required training is attended and proper documentation is submitted at the end of the collection process.

The rating team consists of three people made up of a representative from the Midland Area Transportation Study, the Midland County Road Commission or the City of Midland as appropriate, and the Michigan Department of Transportation (MDOT). The team collects data using a laptop computer with the Roadsoft Laptop Data Collector software. A USB GPS Receiver is connected to the laptop to track position and locate road segments. *Roadsoft* 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, MATS loads the data into the overall Roadsoft database and generates reports for submission.

Asset Management strives to gather road ratings that are accurate and consistent. To help ensure consistency, raters are required to attend annual training provided by Michigan Technological University's Center for Technology and sponsored by MDOT.

Each rated road requires four categories of data:

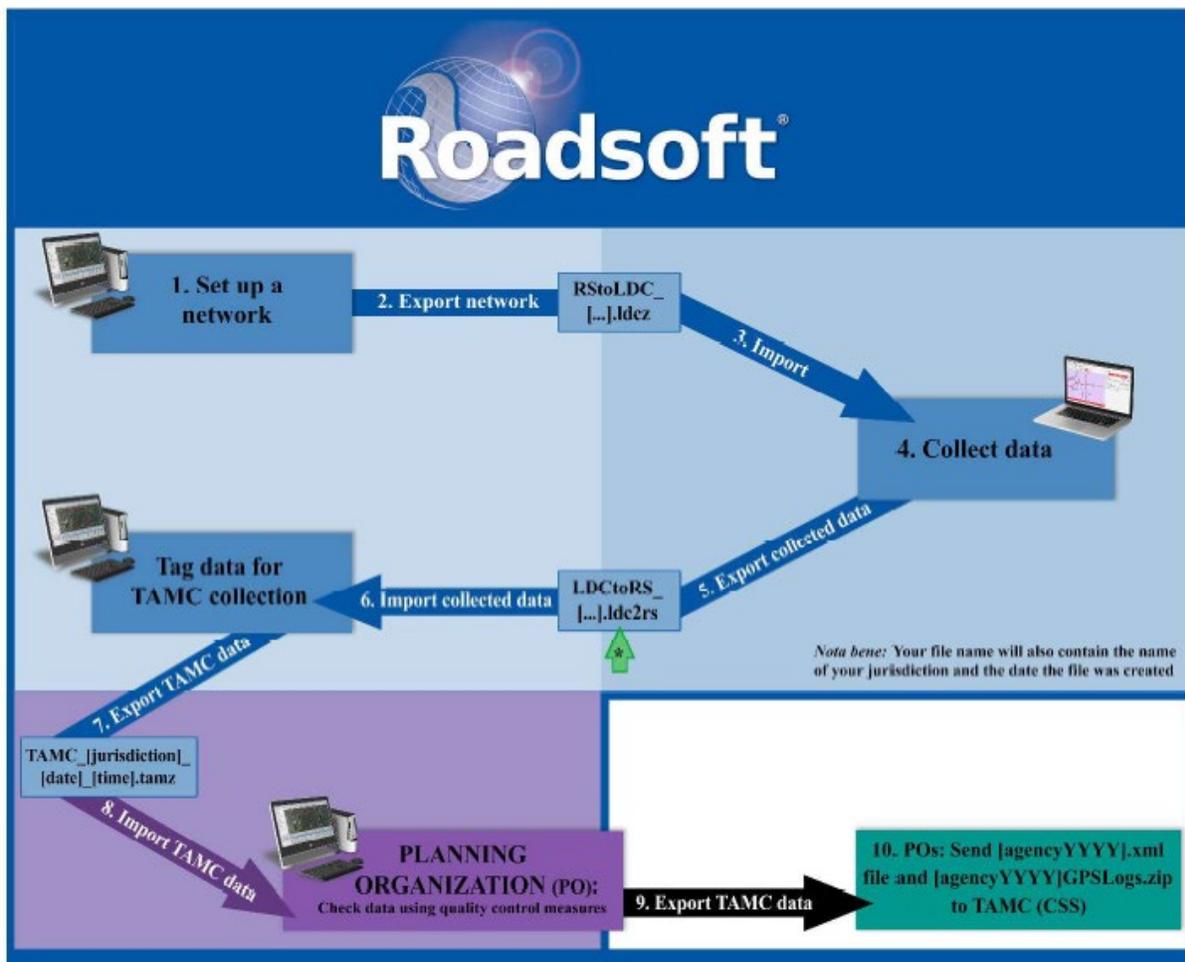
| Assessment Parameter Category | How Parameter is Evaluated |
|-------------------------------|---|
| Surface type | Asphalt, concrete , sealcoat, composite , brick, unpaved |
| PASER or IBR score | PASER: 1-10 IBR: G, F, P on width , drainage, structure |
| Number of lanes | Number of through lanes and continuous left-turn lanes only |
| Crew | Crew members' names (first and last name) |

Rating can only be done during the period between April 1 and the last Friday in November of each year. This is largely because ratings done when the road is wet, or when visibility is impaired, are inherently unreliable, and hence would greatly skew the overall results. In addition, there are specific procedures for rating Federal aid roads that differ from non-Federal aid segments, with the added requirement that the MPO review the data prior to submission to the Center for Shared Solutions, and that the data undergo a quality control procedure at the MPO office.

Lastly, MDOT has the responsibility during this time to coordinate with the MPO to schedule the rating days, and to provide both a PASER trained driver and an appropriate MDOT vehicle. The vehicle must be equipped with lights and indicators to signify that it is an official MDOT vehicle conducting official business.

According to Title 23 of the United States Code¹ Federal-aid-eligible roads are "highways on the Federal-aid highway systems and all other public roads not classified as local roads or rural minor collectors." This definition can be stated in terms of national functional classification (NFC), where the NFC is 1, 2, 3, 4, or 5 for rural/urban or 6 for urban only where one or both sides of the road are on or within an urban boundary (RU_L > 1 or RU_R > 1).

TAMC DATA COLLECTION FLOW



02 Data and Analysis

Although this report is a presentation of 2018 data, MATS has been collecting PASER ratings for Midland County and the City of Midland since 2013. Some of this data will also be presented in this report, to better represent and analyze trends, where appropriate. Ideally, these trends will represent areas where investment has taken place, as well as those areas where condition is rapidly declining.

In 2018, staff from MATS, the Midland County Road Commission, the City of Midland, and the Michigan Department of Transportation rated federal aid roads during the months of July and August. During that time, 491.822 miles were rated, and the results are shown in the table below, which do not include Williams and Tittabawassee townships (in the MATS area but rated by other MPOs):

2018 Federal Aid PASER Ratings - MATS Area

| Rating | Miles | Percent | TAMC |
|--------------------|----------------|----------------|------|
| 10 <i>New</i> | | | |
| 9 <i>Very Good</i> | | | |
| 8 <i>Good</i> | | | Good |
| 7 <i>Adequate</i> | | | |
| 6 <i>Fair</i> | | | Fair |
| 5 <i>Average</i> | | | |
| 4 <i>Subpar</i> | | | Poor |
| 3 <i>Poor</i> | | | |
| 2 <i>Very Poor</i> | | | |
| 1 <i>Failed</i> | | | |
| Total | 491.822 | 100.00% | |

Another way of looking at this is to summarize the individual numerical ratings (1-10) into the TAMC standard of Good, Fair, and Poor. Viewed this way, 29.68% of federal aid roadways in the MATS area are in Good condition, 52.56% are in Fair condition, and only 17.76% are in Poor condition. This seems to be a continuation of an overall trend. For example, in 2017 the respective percentages were 31.19% Good, 43.21% Fair, and 25.6% Poor. These numbers reflect a certain number of segments which were previously good having deteriorated into the Fair category, while local agency investments have elevated some segments from Poor to Good, or to Fair depending on the treatment. Similarly, if we go back to 2013, nearly 48% of roads rated Good (47.62%), 29.11% rated Fair, and 23.24% rated Poor, with no miles being rated as 1, i.e. failed. In general, the number of miles rated Poor is being held steady, while the Fair category continues to increase.

This mileage, broken down by Township and presented herein, shows us that as might be expected, County Primary accounts for a large majority of the Federal Aid road system in the MATS area, at 58.3%. State Trunkline accounts for 22.69% that in itself consists of portions of US-10, US-10BR, M-30, M-20, and M-18, as well as M-47 in Saginaw County (not included in the above totals).

As can be seen as well, the municipality with the single largest share of this mileage is the City of Midland, with 116.034, while the Village of Sanford, with 2.955 miles, has the smallest. Typically, miles in the City of Midland are rated at a slightly different time than the remainder of the county, due primarily to schedules. This also assists in spreading out the work load for MPO and MDOT staff.

| Legal System Mileage By Jurisdiction | | | | | | | |
|---|---------------|-----------------|----------------|--------------|---------------|--------------|--------------------------|
| Code | Jurisdiction | State Trunkline | County Primary | County Local | City Major | City Minor | Total Centerline Mileage |
| 17100 | Coleman | 0.000 | 0.085 | 0.000 | 5.089 | 0.000 | 5.174 |
| 24830 | Edenville Twp | 9.147 | 11.726 | 0.000 | 0.000 | 0.000 | 20.873 |
| 31820 | Geneva Twp | 0.000 | 14.297 | 0.000 | 0.000 | 0.000 | 14.297 |
| 34860 | Greendale Twp | 6.002 | 14.817 | 0.000 | 0.000 | 0.000 | 20.819 |
| 38980 | Homer Twp | 6.365 | 12.962 | 0.000 | 0.335 | 0.000 | 19.662 |
| 39160 | Hope Twp | 3.892 | 13.822 | 0.000 | 0.000 | 0.000 | 17.714 |
| 40620 | Ingersoll Twp | 0.000 | 31.978 | 0.000 | 0.000 | 0.000 | 31.978 |
| 41560 | Jasper Twp | 0.000 | 23.720 | 0.000 | 0.000 | 0.000 | 23.720 |
| 41760 | Jerome Twp | 14.271 | 18.757 | 0.000 | 0.000 | 0.000 | 33.028 |
| 46160 | Larkin Twp | 0.037 | 22.520 | 0.000 | 1.361 | 0.000 | 23.918 |
| 46640 | Lee Twp | 5.986 | 14.011 | 0.000 | 0.000 | 0.000 | 19.997 |
| 47680 | Lincoln Twp | 14.226 | 9.791 | 0.000 | 0.065 | 0.000 | 24.082 |
| 53780 | Midland | 32.962 | 1.089 | 0.000 | 81.983 | 0.000 | 116.034 |
| 53800 | Midland Twp | 2.917 | 4.623 | 0.000 | 1.039 | 0.000 | 8.579 |
| 54320 | Mills Twp | 0.000 | 23.026 | 0.000 | 0.000 | 0.000 | 23.026 |
| 55940 | Mt Haley Twp | 0.000 | 25.035 | 0.000 | 0.000 | 0.000 | 25.035 |
| 0 | Other | 0.000 | 1.201 | 0.000 | 0.583 | 0.000 | 1.784 |
| 65740 | Porter Twp | 0.000 | 23.681 | 0.000 | 0.000 | 0.000 | 23.681 |
| 71560 | Sanford | 0.000 | 0.000 | 0.000 | 2.955 | 0.000 | 2.955 |
| 84020 | Warren Twp | 15.818 | 19.648 | 0.000 | 0.000 | 0.000 | 35.466 |
| Legal System Total Centerline Mileage: | | 111.623 | 286.789 | 0.000 | 93.410 | 0.000 | 491.822 |

Combining the two, we can see the mileage by surface type per Township as well:

| Miles Rated (PASER) By City/Twp | | | | | | | | | | | |
|---------------------------------|---------------|--------------|-------|-------|--------|-----------|---------|----------|---------|--------------------------|---------|
| City/Twp No. and Name | Year Rated | Surface Type | | | | | | | | Total Centerline Mileage | |
| | | Undefined | Earth | Brick | Gravel | Seal Coat | Asphalt | Concrete | | | |
| 17100 | Coleman | 2018 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 5.174 | 0.000 | 5.174 |
| 24830 | Edenville Twp | 2018 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 20.077 | 0.796 | 20.873 |
| 31820 | Geneva Twp | 2018 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 14.297 | 0.000 | 14.297 |
| 34860 | Greendale Twp | 2018 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 20.819 | 0.000 | 20.819 |
| 38980 | Homer Twp | 2018 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 19.662 | 0.000 | 19.662 |
| 39160 | Hope Twp | 2018 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 17.714 | 0.000 | 17.714 |
| 40620 | Ingersoll Twp | 2018 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 31.978 | 0.000 | 31.978 |
| 41560 | Jasper Twp | 2018 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 23.720 | 0.000 | 23.720 |
| 41760 | Jerome Twp | 2018 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 26.445 | 6.583 | 33.028 |
| 46160 | Larkin Twp | 2018 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 23.918 | 0.000 | 23.918 |
| 46640 | Lee Twp | 2018 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 19.997 | 0.000 | 19.997 |
| 47680 | Lincoln Twp | 2018 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 23.751 | 0.331 | 24.082 |
| 53780 | Midland | 2018 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 108.830 | 7.204 | 116.034 |
| 53800 | Midland Twp | 2018 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 8.548 | 0.031 | 8.579 |
| 54320 | Mills Twp | 2018 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 23.026 | 0.000 | 23.026 |
| 55940 | Mt Haley Twp | 2018 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 25.035 | 0.000 | 25.035 |
| 0 | Other | 2018 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.784 | 0.000 | 1.784 |
| 65740 | Porter Twp | 2018 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 23.681 | 0.000 | 23.681 |
| 71560 | Sanford | 2018 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 2.955 | 0.000 | 2.955 |
| 84020 | Warren Twp | 2018 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 21.673 | 13.793 | 35.466 |

An interesting observation is that in the City of Midland for example, nearly 1/3 of the rated miles are State trunkline, while only 11 jurisdictions in total have such mileage. Also note that, of the total 491.822 rated miles, over 94%, or 463.084 is asphalt, while 28.738 miles, or 5.8%, is concrete. Remarkably, over 39% of the miles rated in Warren Township are classified as concrete, the single largest percentage of all the

municipalities. This is clearly due to the presence of US-10 compared to the relatively small number of other miles found in the township.

In addition, this can be viewed by ratings per pavement type:

| Latest PASER Rating Mileage Summary | | | | | | | | | | | | | |
|-------------------------------------|--------------|---------------|---------------|----------------|---------------|---------------|---------------|---------------|--------------|--------------|--------------|----------------|--------------|
| Surface Subtype | Paser Rating | | | | | | | | | | | TOTAL | APR* |
| | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | Not Rated | | |
| Asphalt-Standard | 7.084 | 44.310 | 53.294 | 108.520 | 67.727 | 65.408 | 58.152 | 13.526 | 7.596 | 1.393 | 0.000 | 427.010 | 6.273 |
| Composite | 0.000 | 8.650 | 10.939 | 8.035 | 1.337 | 1.803 | 4.625 | 0.000 | 0.685 | 0.000 | 0.000 | 36.074 | 7.166 |
| Concrete-Standard | 0.000 | 2.465 | 19.247 | 2.773 | 0.806 | 2.087 | 0.902 | 0.380 | 0.078 | 0.000 | 0.000 | 28.738 | 7.507 |
| Total Centerline Mileage | 7.084 | 55.425 | 83.480 | 119.328 | 69.870 | 69.298 | 63.679 | 13.906 | 8.359 | 1.393 | 0.000 | 491.822 | 6.411 |

*APR=Average Paser Rating calculated by weighting the mileage with the paser value

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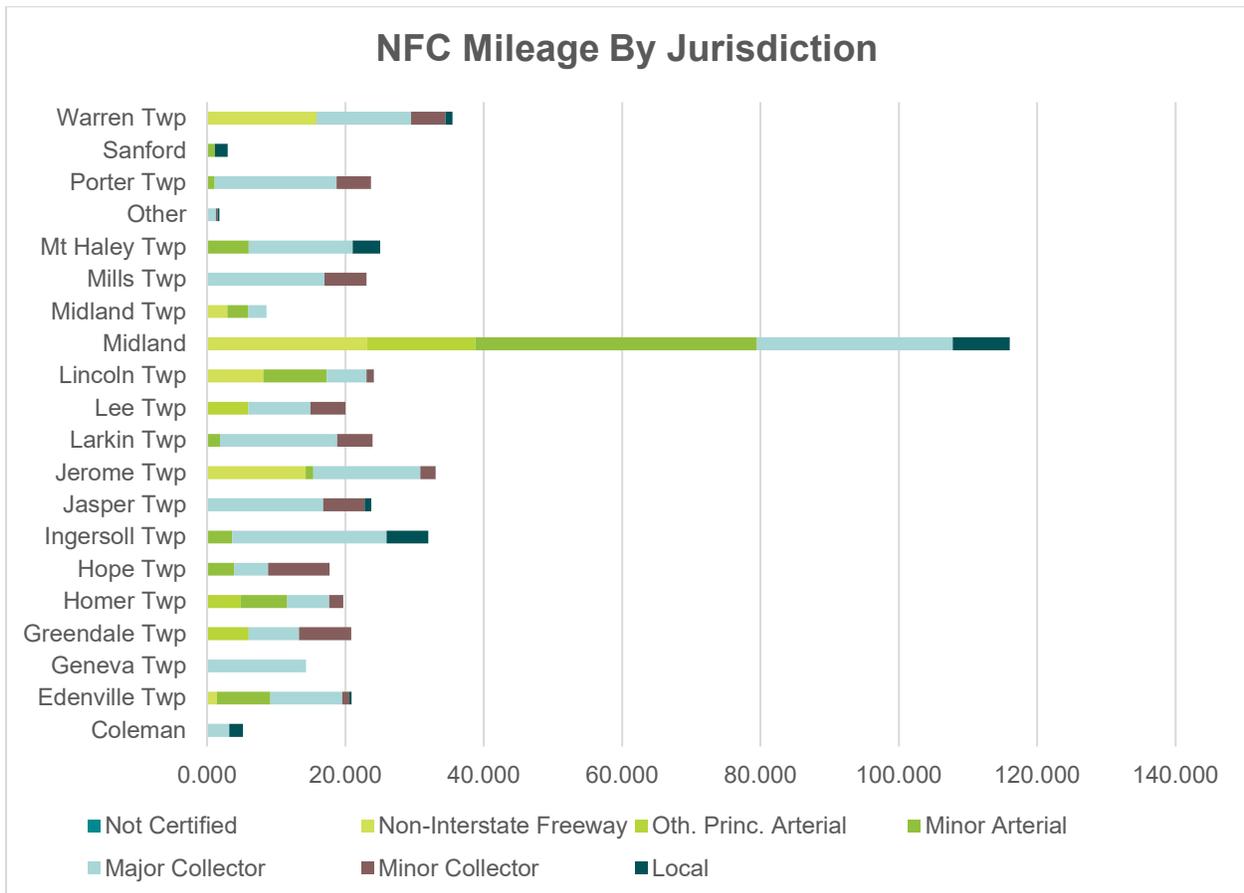
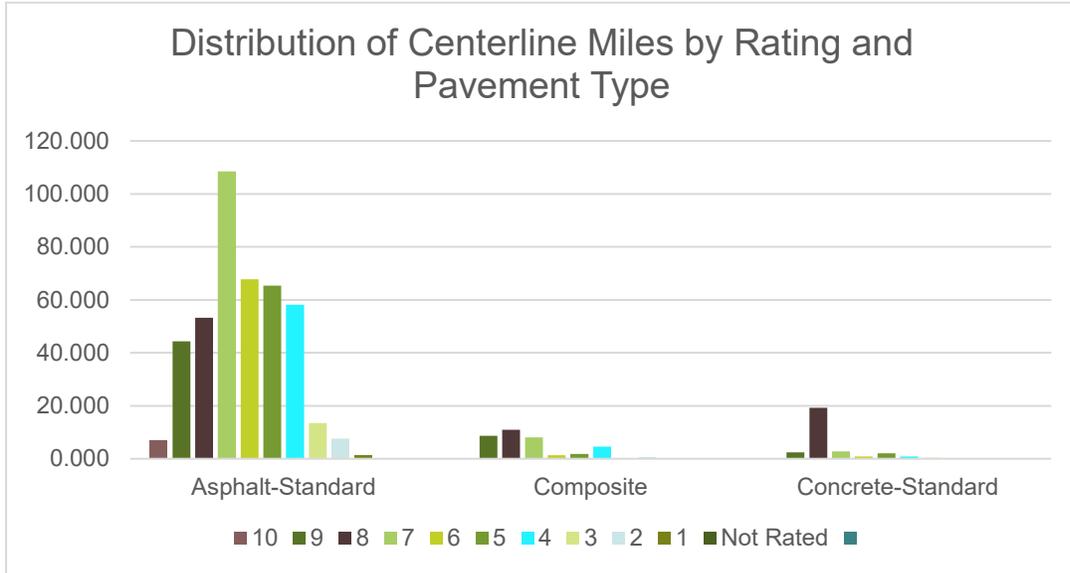
As can be seen above, ratings for asphalt segments are distributed roughly in a typical bell-curve alignment, while concrete, though distorted by the low number of miles, appears to be more consistent in terms of distress. The high number of miles rated 8 is due to recent improvements to US-10. The majority of miles appear to be in the fair category though.

National Functional Classification mileage is as follows:

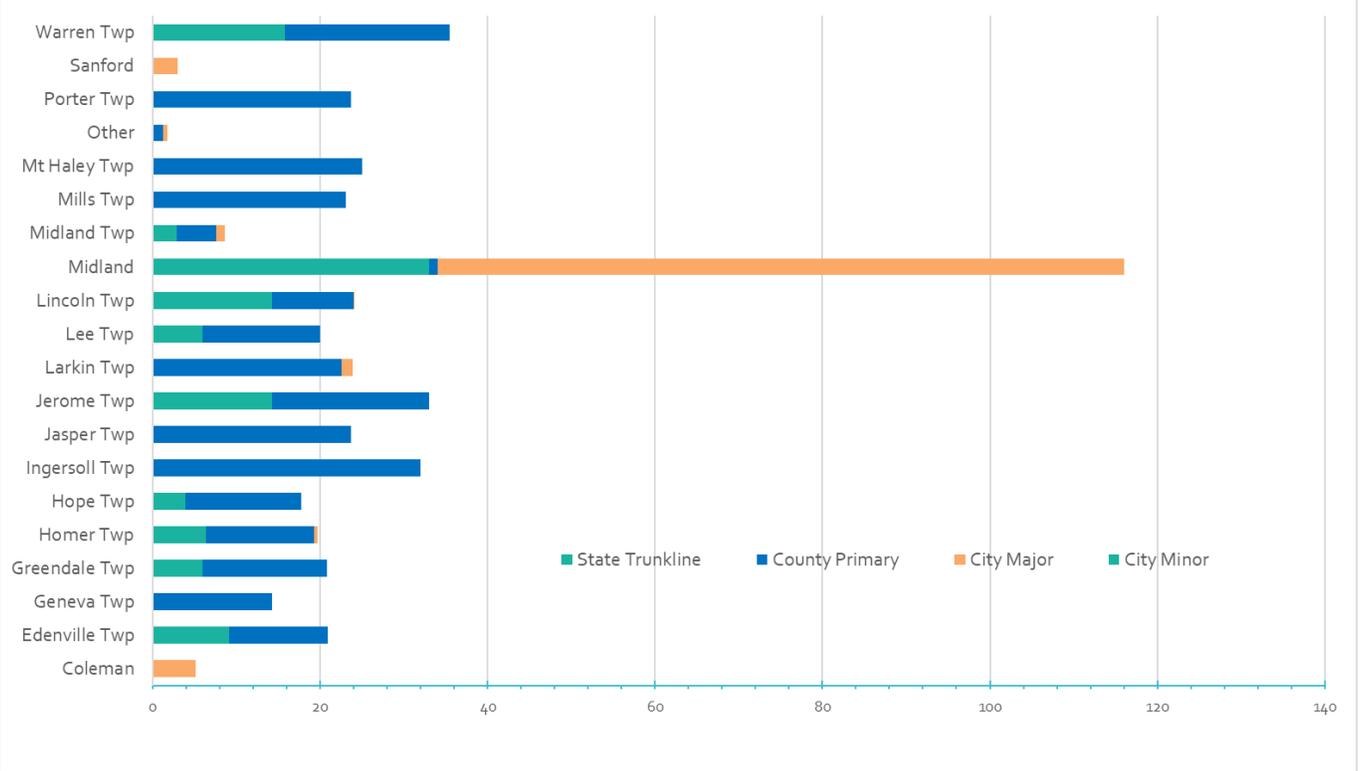
| City/Township No. and Name | Not Certified | Non-Interstate Freeway | Oth. Princ. Arterial | Minor Arterial | Major Collector | Minor Collector | Local | Total Centerline Mileage |
|--------------------------------------|---------------|------------------------|----------------------|----------------|-----------------|-----------------|---------------|--------------------------|
| Coleman | 0.000 | 0.000 | 0.000 | 0.000 | 3.214 | 0.000 | 1.960 | 5.174 |
| Edenville Tw p | 0.016 | 1.393 | 0.000 | 7.738 | 10.410 | 0.996 | 0.320 | 20.873 |
| Geneva Tw p | 0.000 | 0.000 | 0.000 | 0.000 | 14.297 | 0.000 | 0.000 | 14.297 |
| Greendale Tw p | 0.000 | 0.000 | 6.002 | 0.000 | 7.269 | 7.548 | 0.000 | 20.819 |
| Homer Tw p | 0.000 | 0.100 | 4.774 | 6.704 | 6.074 | 2.010 | 0.000 | 19.662 |
| Hope Tw p | 0.000 | 0.000 | 0.000 | 3.892 | 4.946 | 8.876 | 0.000 | 17.714 |
| Ingersoll Tw p | 0.000 | 0.000 | 0.000 | 3.620 | 22.300 | 0.000 | 6.058 | 31.978 |
| Jasper Tw p | 0.000 | 0.000 | 0.000 | 0.000 | 16.782 | 5.963 | 0.975 | 23.720 |
| Jerome Tw p | 0.128 | 14.143 | 0.000 | 1.097 | 15.458 | 2.202 | 0.000 | 33.028 |
| Larkin Tw p | 0.000 | 0.037 | 0.000 | 1.835 | 16.941 | 5.105 | 0.000 | 23.918 |
| Lee Tw p | 0.000 | 0.000 | 5.986 | 0.000 | 8.951 | 5.060 | 0.000 | 19.997 |
| Lincoln Tw p | 0.033 | 8.118 | 0.000 | 9.160 | 5.743 | 1.003 | 0.025 | 24.082 |
| Midland | 0.089 | 23.047 | 15.628 | 40.718 | 28.291 | 0.000 | 8.261 | 116.034 |
| Midland Tw p | 0.014 | 2.903 | 0.000 | 3.064 | 2.598 | 0.000 | 0.000 | 8.579 |
| Mills Tw p | 0.000 | 0.000 | 0.000 | 0.000 | 16.953 | 6.073 | 0.000 | 23.026 |
| Mt Haley Tw p | 0.000 | 0.000 | 0.000 | 6.018 | 15.043 | 0.008 | 3.966 | 25.035 |
| Other | 0.000 | 0.000 | 0.000 | 0.010 | 1.260 | 0.240 | 0.274 | 1.784 |
| Porter Tw p | 0.000 | 0.000 | 0.000 | 1.072 | 17.639 | 4.970 | 0.000 | 23.681 |
| Sanford | 0.000 | 0.000 | 0.000 | 1.145 | 0.000 | 0.000 | 1.810 | 2.955 |
| Warren Tw p | 0.055 | 15.763 | 0.000 | 0.000 | 13.650 | 5.005 | 0.993 | 35.466 |
| NFC Total Centerline Mileage: | 0.335 | 65.504 | 32.390 | 86.073 | 227.819 | 55.059 | 24.642 | 491.822 |

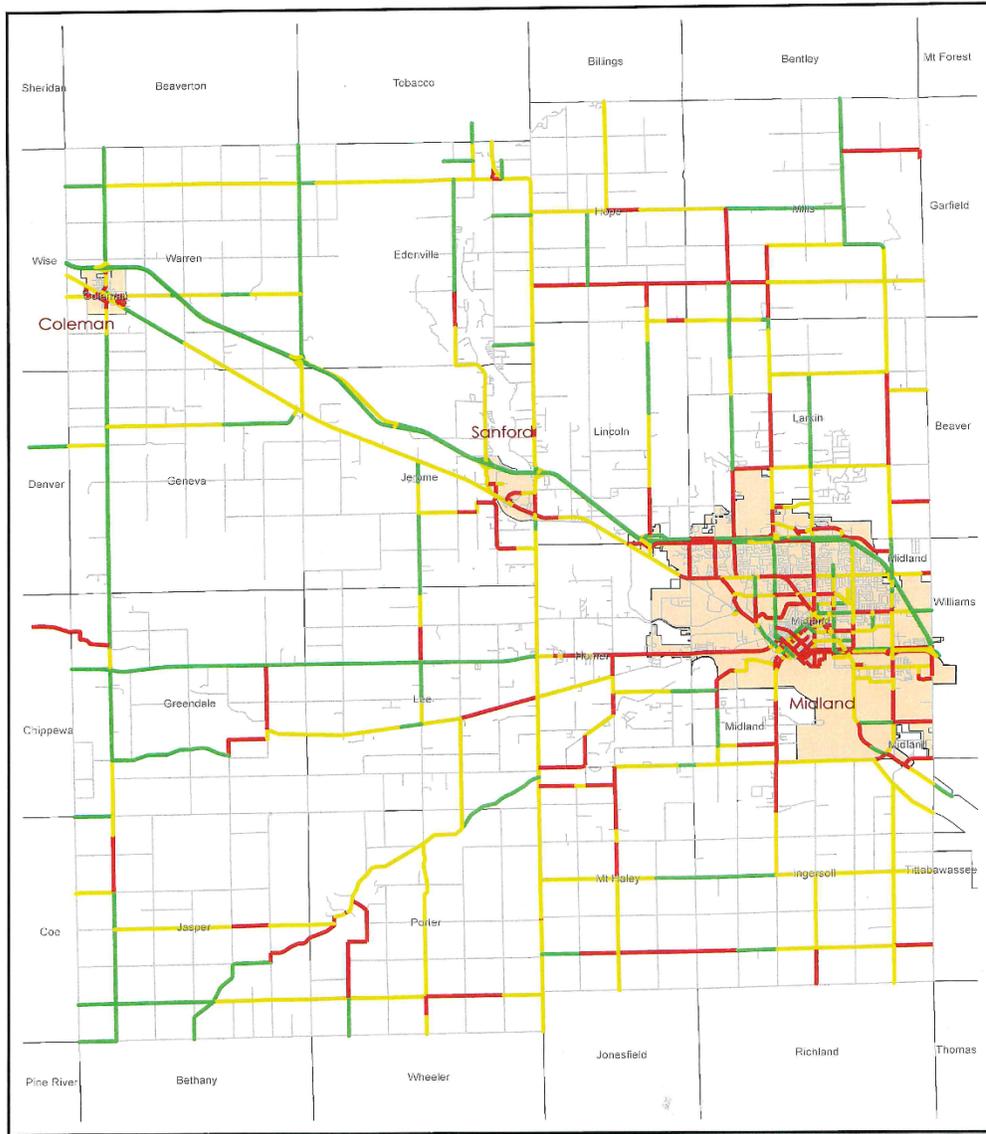
03 Maps and Graphics

The data presented above can also be represented graphically, and with maps.



Legal System Mileage By Jurisdiction





2017 PASER Ratings w/TAMC Good, Fair, Poor scale



Midland County 2017 Road Surface Conditions



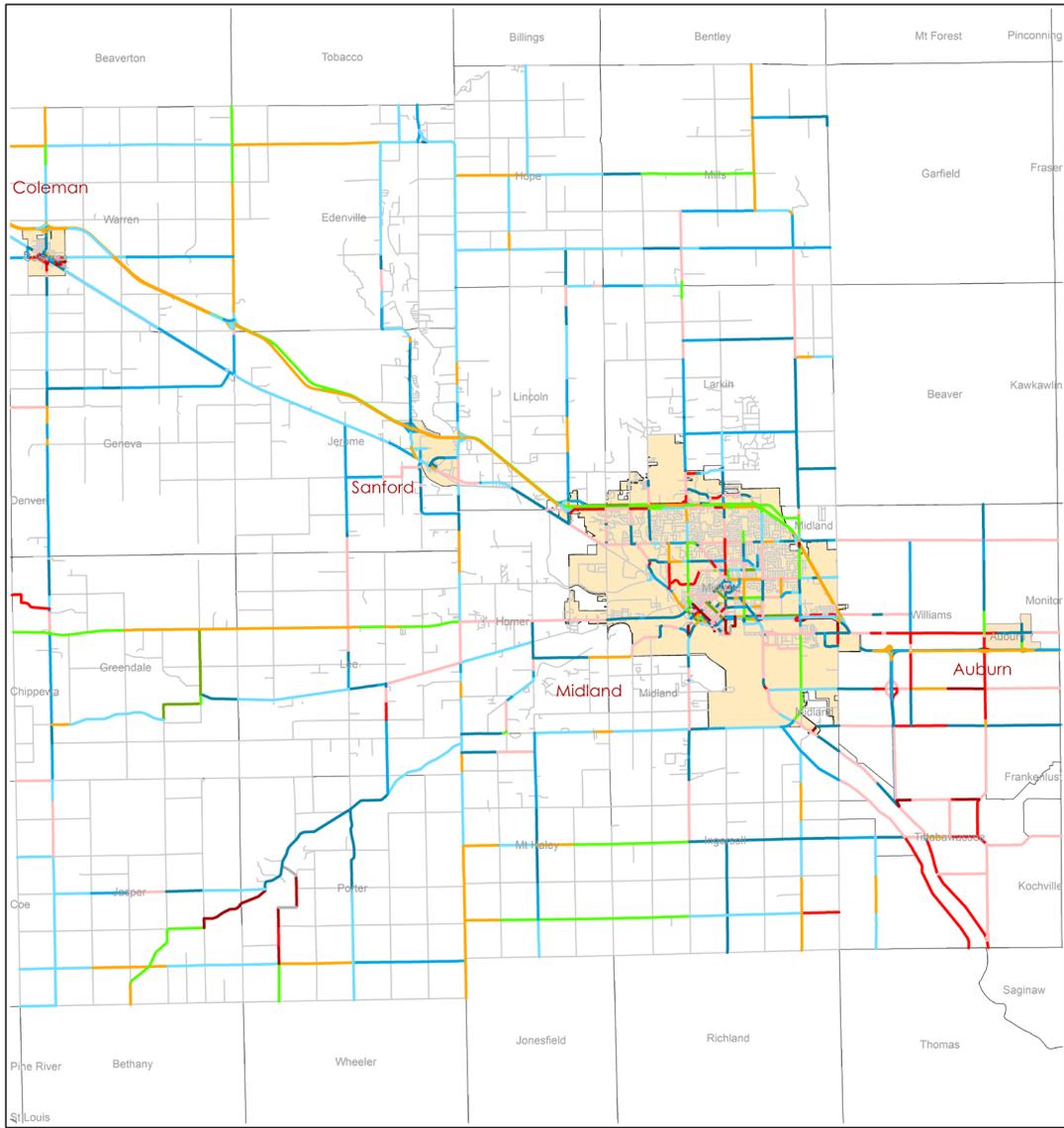
Produced by the Midland Area Transportation Study
2017 PASER Ratings data. For planning purposes only.
GCS North American 1983 Geo. Coordinate System



| Rating | Miles | Percent | TAMC |
|--------------|----------------|----------------|------|
| 10 | 6.433 | 1.26% | Good |
| 9 | 65.516 | 12.82% | |
| 8 | 87.424 | 17.11% | |
| 7 | 102.092 | 19.98% | Fair |
| 6 | 67.276 | 13.17% | |
| 5 | 51.397 | 10.06% | |
| 4 | 71.976 | 14.09% | Poor |
| 3 | 28.676 | 5.61% | |
| 2 | 29.366 | 5.75% | |
| 1 | 0.758 | 0.15% | |
| Total | 510.914 | 100.00% | |



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Midland Area Transportation Study 2018 Road Surface Conditions



Produced by the Midland Area Transportation Study
2018 Data. For planning purposes only.

2018 Federal Aid PASER Ratings - MATS Area

- 10 New
- 9 Very Good
- 8 Good
- 7 Adequate
- 6 Fair
- 5 Average
- 4 Subpar
- 3 Poor
- 2 Very Poor
- 1 Failed

| Rating | Miles | Percent | TAMC |
|--------------|----------------|----------------|------|
| 10 | 7.084 | 1.44% | Good |
| 9 | 55.425 | 11.27% | |
| 8 | 83.480 | 16.97% | |
| 7 | 119.328 | 24.26% | Fair |
| 6 | 69.870 | 14.21% | |
| 5 | 69.298 | 14.09% | Poor |
| 4 | 63.679 | 12.95% | |
| 3 | 13.906 | 2.83% | |
| 2 | 8.359 | 1.70% | |
| 1 | 1.393 | 0.28% | |
| Total | 491.822 | 100.00% | |

