

2023 Michigan County Road Investment Plan:

A comprehensive 83-county overview of investment requirements to restore Michigan's county road system

County Road Association of Michigan
by JI Squared, LLC

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County Road Association
OF MICHIGAN

TABLE OF CONTENTS

- Pg. 2** | Author Credentials
- Pg. 3** | *County Road Investment Plan* Work Group
- Pg. 3** | Information Sources Utilized
- Pg. 3** | Survey Timeframe
- Pg. 4** | Executive Summary
- Pg. 4** | *2023 County Road Investment Plan Report*
- Pg. 11** | Chart 1-1: Fiscal Summary Sheet for *2023 County Road Investment Plan*

Author Credentials



The author of the study utilized in this *Plan* is JI Squared, LLC, co-principals Jim Iwanicki, PE, and Joshua Iwanicki.

James M. Iwanicki, a licensed Michigan professional engineer (PE) since 1995, is the engineering partner for JI Squared, LLC. He worked 25 years (1998-2023) for the Marquette County Road Commission (MCRC), including 20 years as managing director. He was responsible for managing preventative maintenance and road construction projects on 1,300 miles of paved and unpaved roads, along with 94 bridges on a \$20 million budget. He retired from MCRC in June 2023 and is currently transportation program manager for the Town of Hilton Head Island, SC, in addition to his JI Squared consultant role.

Jim served on the 16-member Board of Directors for the County Road Association (CRA) of Michigan from 2008-2023, representing Upper Peninsula road agencies, and was president in 2016-2017. He is a graduate of Michigan Technological University.

Joshua Iwanicki, is president and data lead for JI Squared, LLC. Graduating *Summa Cum Laude* with a B.S. in business analytics from Northern Michigan University (NMU), his undergraduate studies focused on extensive research in the realm of data and analytics. He received the prestigious NMU Business Analytics Scholar Award in 2023.

Joshua is currently pursuing a master's degree at The University of Michigan in data science. Parallel to his academic pursuits, he serves as a data engineer, actively contributing to the maintenance, expansion and innovation of the General Motors service software analytics solution, which tracks dealership performance in retaining customers in the service lane.

County Road Investment Plan Work Group

The CRA *County Road Investment Plan* Work Group guided creation of this report and included:

Larry Brown, PE, Commissioner of Allegan County Road Commission (ACRC) (40 years at ACRC, 46 years as PE)

Dirk Heckman, PE, Engineer-Manager of Mackinac County Road Commission (22 years with road commissions, 20 years as a PE)

Joanna Johnson, PWE, Managing Director of the Road Commission of Kalamazoo County and Chair of the Michigan Transportation Asset Management Council (TAMC). (22 years with a road commission, 11 years on TAMC)

Dennis G. Kolar, PE, Managing Director of the Road Commission for Oakland County (38 years with road commission, 34 years as PE)

Douglas J. Mills, PE, Engineer-Manager of Baraga County Road Commission (30 years with road commission, 21 years on statewide Local Bridge Advisory Board, 13 years on the Critical Bridge Committee, 33 years as PE)

Steven Puuri, PE, CRA Engineering Specialist and retired Managing Director of the Washtenaw County Road Commission (25 years with road commission, 9 years at CRA, 40 years as PE)

Denise Donohue, Chief Executive Officer, County Road Association of Michigan

Ed Noyola, Deputy Director and Legislative Liaison, County Road Association of Michigan

Information Sources Utilized

The study and data included in the Executive Report were compiled from numerous sources:

- Interviews and correspondence with all 83 Michigan county road commissions and departments (collectively: “road agencies”);
- Reports from the Local Technical Assistance Program (LTAP) and the Center for Technology & Training, both at Michigan Technological University;
- Data and reports from the Michigan Department of Transportation (MDOT) and the Michigan Transportation Asset Management Council (TAMC);
- Annual Public Act 51 Reports of 2021;
- and the Michigan County Road Commission Self-Insurance Pool.

Survey timeframe

Survey information was collected from August through October 2023; analyzed November to December 2023. It was adopted by the CRA Board in February 2024.

2023 Michigan County Road Investment Plan Report:

A comprehensive 83-county overview of appropriate investment requirements to restore Michigan's county road system

EXECUTIVE SUMMARY

During the third and fourth quarters of 2023, the County Road Association (CRA) of Michigan and its engineer-consultant JI Squared compiled multiple primary and published data, sources and surveys of all 83 Michigan county road agencies into the *2023 Michigan County Road Investment Plan*. This is an update of the *Michigan County Road Investment Plan* that was first released in May 2019, and updated in May 2021. Countywide data on paved roads has been available only in piecemeal fashion since 1984 when the MDOT-commissioned *Highway Needs Study* was last published.

This study has monetized needs on the county system and finds that nearly **\$2.4 billion (B) additional dollars annually** should be invested in the county road and bridge system to work toward 90% good/fair ratings on counties' 22,744 centerline miles of federal aid-eligible roads; and to achieve 60% good/fair ratings on counties' 30,716 miles of paved nonfederal aid-eligible (primary and local) roads. The counties' 37,024 miles of unpaved roads are not rated; however, the report includes the cost of gravel road surface replenishment. The study addresses only investments to preserve and restore the current system, and does not contemplate system improvements (e.g., additional lanes, roundabouts or paving unpaved roads).

The total statewide county road Outstanding Annual Funds Needed identified in this 2023 report, which utilizes the same methodology and sources as the 2019 and 2021 *County Road Investment Plans*, have increased more than \$509 million (M) – a 28% increase in the last two years.

2023 Michigan County Road Investment Plan Report

Tracking Needs on the Michigan's County Road System.

From 1948 through 1985, the State of Michigan looked formally and comprehensively at the needs of all three road jurisdictional entities: County road agencies (75% of road miles), municipal agencies (17%) and the Michigan Department of State Highways, later MDOT (8%). Each entity had seats on the coordinating committee that produced a periodic *Michigan Highway Needs Study* under the direction of consultant Wilbur Smith & Associates.

The *Needs Study* summarized and monetized needs of road surfaces, bridge conditions, road agency facilities and equipment. The 1972 Study (4th in the series) reported a \$30 billion plan over 20 years “to improve all highways, roads and streets in Michigan to tolerable standards.” The studies were funded off-the-top of the Michigan Transportation Fund (MTF). The final *Highway Needs Study* in the series was released in 1985.

Getting a Comprehensive Overview Today.

In 2018, CRA undertook its own study of the financial needs to preserve, maintain and restore Michigan’s county road system – part of the fourth-largest local road and bridge network in the US. This *2023 Investment Plan* provides new, actionable peer-reviewed information drawn from primary data sources to ensure the needs of the county road and bridge system are accurately depicted and considered in legislative, gubernatorial and media discussions of properly funding and restoring Michigan’s transportation infrastructure for the benefit of Michigan residents and industries.

Our intent is to establish a level of annual revenue for the 83 county road agencies in Michigan that allows meaningful progress toward restoring Michigan to a safe, efficient system of local roads – which is the statutory mandate of county road agencies.

This study is a “snapshot” of the current target investment for each county road commission and road department in the state. Data from all 83 county road agencies were totaled to determine a statewide target for funding the county road, bridge and right-of-way system. The study addresses bridges, federal aid-eligible roads (typically primary roads) and nonfederal aid-eligible roads (typically local roads) separately, as each of these assets are in very different condition.

State Trunkline System. A word about the state trunkline system: With a centralized engineering staff and fewer lane miles to track, the Michigan Department of Transportation (MDOT) has historically done a good job of tracking its needs and in 2019 characterized its total current funding deficit as \$1.5B annually to achieve a goal of 90% good/fair federal aid-eligible roads rating within the next 10 years. All MDOT roads and bridges are federal aid-eligible and by Michigan law MDOT receives 75% of Michigan’s annual federal aid allocation.

Bridge bundling. It should be noted that local bridges (county, municipal) represent a \$1B challenge, according to MDOT data from 2021. This figure is imprecise due to significant recent cost increases and results of the state’s two local bridge bundles, one completed (\$25M) and one in process (\$92M). Bringing \$1B of closed, critical and serious local bridges up to the appropriate standard is in addition to normal maintenance/replacement costs calculated here.

Contents of the 2023 County Road Investment Plan.

This study compiled numerous published, third-party data sources and vetted them with interviews and correspondence with all 83 county road agencies. The study looked at the current financial needs of maintenance and capital investment on 90,484 miles of paved and unpaved county and local roads (federal aid-eligible and nonfederal aid-eligible); routine preservation/replacement costs for 5,868 bridges; as well as buildings, facilities and equipment needed to run an efficient county road agency that provides a safe, efficient local road system. The comprehensive analysis is contained in this *Plan*; the survey and individual county data will remain the proprietary intellectual property of CRA.

The *Plan* recognizes that there is a backlog of demands on time, funds and resources to restore county road infrastructure, and further recognizes that there are real limits to improvements imposed by available roadwork material and human resources; what the traveling public will tolerate insofar as roadwork; and a realistic funding level.

Performance Goals. That said, goal setting is important to ensure Michigan is aiming for appropriate restoration of the county road and bridge system. Each county road agency per PA 325 of 2018 provides its agency performance goals in an ongoing process of maintaining, preserving, upgrading and operating physical assets cost effectively, based on a continuous physical inventory and condition assessment and investment to achieve established performance goals. For this study, the CRA Board of Directors has established the same restoration goal for federal aid-eligible county roads as MDOT is utilizing:

- **90% good/fair for federal aid-eligible roads.** These roads currently have an average rating of 65% good/fair across all counties. (*good/fair = PASER 5-10*)

For the local road system CRA has set the following goal:

- **60% good/fair for local, nonfederal aid-eligible roads.** These roads currently have an average rating of 44% across all counties.

Additional assumptions are noted on pages 8-10.

The 2023 County Road Investment Plan identifies that the necessary level of investment into the county road and bridge system to meet its performance goals is \$4,104,689,000 annually to be distributed across 83 county road agencies according to PA 51 provisions. This is an increase from the \$3,625,366,945 identified in the *2021 County Road Investment Plan*. Subtracting the 2021 annual PA 51-documented dollars (\$1,751,115,000) spent in all 83 counties on road improvements

in the six categories, the **Outstanding Annual Funds Needed** has grown by **\$509,389,000 (28%)** to reach **\$2.4B** since the *2021 County Road Investment Plan*.

It is clear that due to the exponential deterioration of the county road network, loss of purchasing power and very minimal growth in MTF (+1%) in the two years since our *2021 Investment Plan*, that Michigan's county road and bridge system is not on the path to 90% and 60% good roads.

Ratings on Nonfederal Aid-eligible Roads.

Michigan has a specific protocol for rating roads: The Pavement Surface Evaluation & Rating system (PASER). PASER ratings *are currently not required* for nonfederal aid-eligible roads (local roads) and only appear in the online Michigan TAMC "dashboards" as submitted. However, a majority of county road agencies are rating their paved local roads to better manage these transportation assets. The *2023 County Road Investment Plan* and its 2021 counterpart considered these ratings for nonfederal aid-eligible paved roads. The *Plan* notes that close to a quarter of the counties' paved nonfederal aid roads are not rated and were estimated again this year. Because very poor roads are often viewed as unworthy of rating efforts, the good/fair/poor ratio may be even worse than shown in the *2023 County Road Investment Plan*.



Investment Plan Definitions and Baseline Assumptions

The analysis for this study was based on the best available data in the third quarter of 2023. The target level of investment for each county was based on the following six categories:

1) Bridges – A list of all county road agency bridges was obtained from that TAMC and is identical in composition to the MDOT bridge data used in 2021. The list included the structure number, county and deck area. For this report, a straight-line depreciation method was used to determine the required annual investment for replacement.

A 50-year lifespan was used, as specified in the “Uniform Accounting Procedures” for concrete bridges. The estimated cost of demolition and replacement were obtained from the MDOT FY 2023 Local Agency Programs Bridge Scoping Cost Estimate Worksheet. Demolition and replacement cost was set at \$500/sq. ft. of deck and approach work was estimated at \$450,000 per structure. Replacement deck areas were assumed to increase by 20% of the existing structures. Based on this 2023 Bridge Worksheet, costs of 10% contingency + 10% mobilization + 15% engineering were added to each structure.

2) Buildings, Maintenance Facilities – All existing county road agency buildings and facilities were listed. Straight-line depreciation on these items was used to determine the required annual investment. Replacement costs for buildings for administration (\$245/sq. ft.); equipment maintenance and heated storage (\$245/sq. ft.); cold storage (\$65/sq. ft.); and salt storage (\$65/sq. ft.), all with a life span of 40 years were used. These values were based on conversations with the Michigan County Road Commission Self-Insurance Pool (MCRCSIP), which has experience with structural replacement costs for most county road agencies.

Fuel, brine and emulsion storage facilities were assigned a replacement value established by insurance companies. A life span of 20 years was assumed for these types of facilities.

3) Total Maintenance – The best data available for the current level of maintenance funding for county road agencies is the annual PA 51 report, line 116, of 2021. An increase of 20% was used for the target investment, which was the assumption used in CRA’s *2021 County Road Investment Plan*, and in the last *Needs Study* performed by the State of Michigan in 1983. It is standard practice.

Work considered to be “maintenance” includes winter maintenance, pothole patching, guardrail replacement, tree/brush removal, culvert replacement, grading unpaved roads, drainage, sign replacement and related tasks. These are types of work that all county road

agencies have fallen behind on, as they put limited funds toward road surfaces and bridges. The increase noted above of 20% is a step forward, and will not fully cover the cost of tree removal and culvert replacement.

4) Equipment – Equipment values for 2023 were established using information from county road agencies, equipment dealers, MCRCSIP and the *2021 County Road Investment Plan*. Straight-line depreciation was used to determine the annual target investment for equipment. Equipment life span values from the 2019 and 2021 *Plans* were used again in this study and adjusted for inflation.

5) Federal Aid-Eligible Road Investment – The level of investment for this category was determined by using the number of centerline miles of unpaved and paved roads eligible for federal aid. The work group limited the project to assuming that only 15% of this investment could be done each year due to limitations on funding, county road agency capacity, contractor capacities and traffic disruptions. *[Note: In all cases, this Plan cites centerline miles rather than lane miles.]*

The annual investment level required on a **paved road** was determined using the PASER system. The federal-aid eligible system current PASER ratings were established by having each county road agency compute their current PASER rating by centerline mile through the Roadsoft Program, maintained at the Michigan Technological University (MTU) Center for Technology & Training. (Two counties were unable to provide current PASER data for this study; TAMC information was used for those counties.)

The annual investment level required on an **unpaved (gravel) road** is an average of 1,000 cu. yds. of aggregate per mile every seven years (approx. equal to the 15% per year goal established).

The cost per mile for road improvement treatments. To arrive at improvement costs, construction cost information was obtained from a representative sample of counties: Allegan, Kent, Marquette, Oakland and Wexford.

6) Nonfederal Aid-Eligible Road Investment – Like the federal aid-eligible roads, the level of investment for nonfederal aid-eligible roads was determined by using the number of centerline miles of unpaved and paved road ineligible for federal funds. Again, it was assumed a maximum of 15% of this work could be addressed in each year due to limitations on contractor capacities and traffic disruptions.

The annual investment level required on a **paved road** was determined using the PASER system. The nonfederal-aid eligible PASER ratings were established by having each county road agency compute its current PASER rating by centerline mile through the Roadsoft® program. Construction costs for nonfederal aid roads were assumed to be the same as for the federal aid system roads.

The annual investment level required on an **unpaved (gravel) road** is an average of 1,000 cu. yds. of aggregate per mile every seven years (approx. equal to the 15% per year goal established).

The cost per mile for road improvement. To arrive at improvement costs, construction cost information was obtained from a representative sample of counties: Allegan, Kent, Marquette, Oakland and Wexford.

These six categories cover the majority of the required annual investment for the county road agencies. Totals for each category are shown in Chart 1-1. Each category had an 8% administrative charge applied, which is slightly less than the 8.5% administrative charge MDOT allows.

The *2023 County Road Investment Plan* does not include funding for new construction or capacity improvements. The intent of this *Plan* is to show the required investment to make significant progress in restoring the existing county road system as of Fall 2023, when the data harvest was completed.

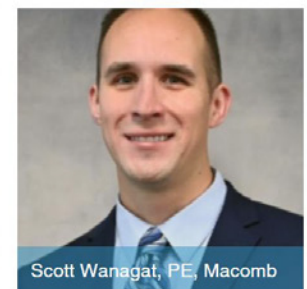
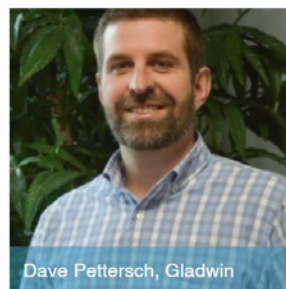
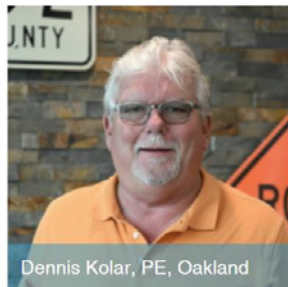
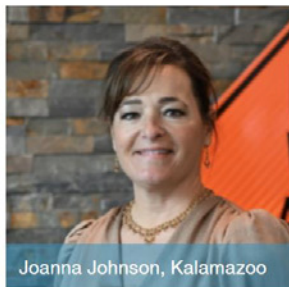
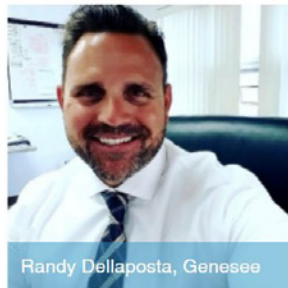
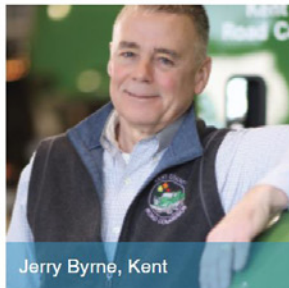
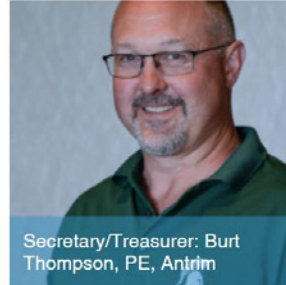
Chart 1-1: Fiscal Summary Sheet for 2023 County Road Investment Plan

Following is the summary of fiscal needs for the six categories that are critical to improving Michigan's county road system. Annual costs for these categories used in compiling the 2023 *County Road Investment Plan*, come from data for paved and unpaved county primary and local roads in the third quarter of 2023.

Need Category	Annual Cost
Bridges	\$ 265,180,000 ↑
Buildings, Maintenance Facilities	\$ 50,032,000 ↑
Maintenance	\$ 818,861,000 ↓
Equipment	\$ 174,963,000 ↑
Federal Aid-Eligible Roads	\$ 792,612,000 ↑
Nonfederal Aid-Eligible Roads	\$2,003,040,000 ↑
Annual County Road Investment Needs	\$4,104,689,000 ↑
Less county road revenue documented in 2021 PA 51 Report	- <u>\$1,751,115,000*</u> ↑
<small>*Total revenue is Line 97 minutes Lines 77 & 78 from PA 51 Reports of 2021.</small>	
Total Statewide County Road Agency Additional Needs	\$2,353,574,000 ↑

Note: All Annual Costs in this table have been rounded to the nearest \$1,000.

County Road Association of Michigan Board of Directors 2023-2024



Questions on the *2023 County Road Investment Plan* should be directed to:

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