

2019 Michigan County Road Investment Plan:

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

County Road Association of Michigan
by L.W. Brown Consulting, LLC

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County Road Association
OF MICHIGAN

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Author Credentials



The author of this study is Larry W. Brown, licensed Michigan Professional Engineer (PE) since 1977, expert consultant and owner of L.W. Brown Consulting, LLC. Larry Brown worked for 40 years (1977-2017) for the Allegan County Road Commission, including six years as its managing director. He was responsible for managing preventative maintenance and road construction projects on nearly 1,800 miles of paved and unpaved roads, along with 154 bridges on a \$32 million budget. He retired in early 2017, and was appointed by the Allegan County Board of Commissioners to a full six-year term on the Allegan County Road Commission Board in December 2018.

Brown also served on the 16-member Board of Directors for the County Road Association (CRA) of Michigan from 2015-2018, representing the Association of Southern Michigan County Road Agencies, for which he has also served as president. He is a graduate of Michigan Technological University.

County Road Investment Plan Work Group

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

Douglas J. Mills, PE, Engineer-Manager of Baraga County Road Commission (26 years with road commission, 17 years on statewide Local Bridge Advisory Board, 9 years on the Critical Bridge Committee, 29 years as PE)

Dennis G. Kolar, PE, Managing Director of the Road Commission for Oakland County (34 years with road commission, 30 years as PE)

Bradley S. Lamberg, PE, Managing Director of Barry County Road Commission (23 years with road commission, 21 years as PE)

Steven Puuri, PE, CRA Engineering Specialist and retired Managing Director of the Washtenaw County Road Commission (25 years with road commission, 36 years as PE)

Steven A. Warren, Managing Director of Kent County Road Commission (31 years with road commission, founding member and 10 years with TAMC)

Denise Donohue, Executive Director, County Road Association of Michigan

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

With support by Dustin Earley, CRA Engagement Specialist, and Jeff Bleiler, CRA Communications Specialist.

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, Michigan Technological University;
- Data and reports from the Michigan Department of Transportation (MDOT);
- Data and reports from the Transportation Asset Management Council (TAMC);
- Annual Public Act 51 Reports of 2017;
- and the Michigan County Road Commission Self-Insurance Pool.

Survey timeframe

Survey information was collected from December 2018 through April 2019.

2019 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 first quarter of 2019 the County Road Association (CRA) of Michigan and its engineer-consultant L.W. Brown Engineering utilized multiple primary and published data and sources to compile the 2019 Michigan County Road Investment Plan, described in this Report. Countywide data on paved roads has been available only in piecemeal fashion since 1984 when the state's last Highway Needs Study was published. This Investment Plan has monetized needs on the county system and finds that an **additional \$2.05 billion annually** should be invested in the county road and bridge system to work toward 90% good/fair ratings on counties' 22,744 miles of federal aid-eligible roads by 2029; and to achieve 60% good/fair ratings on counties' 30,716 miles of nonfederal aid-eligible local and primary roads by 2029. The counties' 36,540 miles of unpaved roads are not rated; however, the report includes the cost of grading and adding gravel to them. The Investment Plan addresses only investments to preserve and upgrade the current system, and does not contemplate system improvements (e.g., additional lanes, roundabouts or paving gravel roads).

2019 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 on all three road jurisdictional entities: County road commissions (75% of road miles), municipal agencies (17%) and the Michigan Department of State Highways (8%). Each entity had seats on the coordinating committee that produced a periodic **Michigan Highway Needs Study** under the direction of consultant Wilbur Smith and Associates.

The Needs Studies 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. The final Highway Needs Study in the series was released in 1985.

Getting a Comprehensive Overview Today.

Identifying the needs of Michigan's local road system today – in the absence of the Highway Needs Study – is challenging. This Plan provides significant, new and actionable information on the restoration of roads, bridges and public rights-of-way under county jurisdiction. Succinctly, 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 81 of 83 county road agencies were totaled to determine a statewide target for funding the county road, bridge and right-of-way system; data for the two others was extrapolated from road agencies with similar-sized and comparable Pavement Surface Evaluation and Rating (PASER) systems.

State Trunkline System. With a centralized and smaller system, the Michigan Department of Transportation (MDOT) has kept track of its needs and characterizes its total current funding deficit as \$1.5 billion annually to achieve a goal of 90% good-/fair-rated federal aid-eligible roads.

County Road System. With 83 county road systems of primary roads (usually federal aid-eligible) and local roads (usually not eligible for federal funds), and a typical 40% decline in staff in the last 15 years, county roads (and likely municipal roads) no longer have a centralized needs assessment. Some outside the county road system have characterized the need of the entire local system – counties plus municipalities – as requiring \$100 million! This is a significant understatement.

When the Michigan Legislature and Governor Whitmer began contemplating the magnitude of the state's road challenges and Phase II of a funding solution (the 2015 Transportation Package being Phase I), CRA realized the state was no longer looking comprehensively at the needs of the system. Consequently, the CRA board commissioned L. W. Brown Consulting, LLC, to compile and publish an accurate, high-level overview of needs on the county road system for inclusion in the 2019 legislative, gubernatorial and media dialogue on restoring Michigan's entire infrastructure system.

Contents of the County Road Investment Plan.

The County Road Investment Plan compiled numerous published, third-party data sources and vetted them with interviews and correspondence with all 83 county road agencies. The plan looks at the current financial needs of maintenance and capital investment on 90,000 miles of paved and unpaved county roads (federal aid-eligible and nonfederal aid-eligible); 5,700 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 report; the Investment Plan and 900-plus pages of individual county data will remain the proprietary intellectual property of CRA.

The County Road Investment 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 travelling public will tolerate insofar as roadwork; and a realistic funding level.

Outcome Goals. That said, goal setting is important to ensure Michigan is aiming for appropriate restoration of the county road system.

The CRA Board of Directors has established the same restoration goal for county roads as MDOT is utilizing:

- **90% good/fair on federal aid-eligible roads by 2029.** These roads currently have an average rating of 45% good/fair across all counties. (Appendix A)

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

- **60% good/fair on local, nonfederal aid-eligible roads by 2029.** These roads currently have an average rating of 36% across all counties. (Appendix A)

Additional assumptions are noted on pages 8-10.

This Investment Plan identifies the appropriate level of new investment into the county road system to meet its restoration goals to be \$2,050,500,000 annually to be distributed across 83 county road agencies.

Condition of Nonfederal-aid Local Roads Released.

Significantly, this Investment Plan marks the first release of complete statewide ratings for nonfederal aid-eligible roads across all 83 counties. Federal aid requirements mandate a specific protocol for rating this portion of the county road system. Ratings *are not required* for nonfederal aid-eligible roads and generally do not appear in the online Michigan Transportation Asset Management Council (TAMC) “dashboards.” A three-person, annually-certified panel is required to drive all roads and agree on PASER levels; these are published by TAMC. The three entities include a county road agency official, regional planning official and a MDOT official.

Getting PASER levels on the vast miles of county nonfederal roads is not required by TAMC. Although some dollars are set aside for agencies for this effort. The County Road Investment Plan has compiled this information for 74 county road agencies, and used that average for the nine others. This data is shown in Appendix A.



Investment Plan Definitions and Baseline Assumptions

The analysis for the 2019 County Road Investment Plan was based on the best available data in the first quarter of 2019. 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 MDOT. The list included the structure number, county and deck area. For the purpose of this report a straight-line depreciation method was used to determine the required annual investment.

A 50-year lifespan was used, as specified in the “Uniform Accounting Procedures” for concrete bridges. The estimated cost of demolition (\$46/sq. ft.) and concrete replacement (\$300/sq. ft.) were obtained from the 2019 MDOT Local Agency Programs Bridge Cost Estimate Worksheet (Appendix A). Approach work for each structure was estimated at \$200,000/bridge for rural counties and \$400,000/bridge for urban counties. Replacement deck areas were assumed to increase by 20 percent above the existing structures. The approach estimates and deck area increases for replacement were based on experience and conversations with several county engineers.

- 2) **Buildings, Maintenance Facilities** – A county road agency’s existing buildings and facilities were listed for each county. Straight-line depreciation on these items was used to determine the required annual investment. Replacement costs for buildings for administration (\$190/sq. ft.); equipment maintenance and heated storage (\$190/sq. ft.); cold storage (\$50/sq. ft.); and salt storage (\$50/sq. ft.), all with a life span of 40 years were used. These values were based on conversations with architects and county road agencies who have recently had experience with these structures.

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 based on experience from county road agencies.

- 3) **Maintenance** – The best data available for the current level of maintenance funding for county road agencies is the annual Public Act 51 (PA 51) report, line 116, of 2017. An increase of 20 percent was used for the target investment, which was the assumption used in the last Needs Study performed by the State of Michigan in 1983.

Work considered to be maintenance includes snow removal and ice control, pothole patching, guardrail replacement, tree and vegetation removal, culvert replacement,

drainage, sign replacement and related tasks. These are types of work that all county road agencies have fallen behind on in recent years, as they put limited funds toward the road surfaces and bridges. An increase of 20% is a step forward and is what counties can reasonably expect to achieve with the current workforce. It should be noted that this will not fully cover the cost of culvert replacement and dead tree removal.

- 4) **Equipment** – Straight-line depreciation was used to determine the annual target investment for equipment. Equipment and life span values were established directly from county road agency communications in the first quarter of 2019.
- 5) **Federal Aid-Eligible Road Investment** – The level of investment for this category was determined by using the number of centerline miles of gravel 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.

A gravel road requires an average of 1,000 cubic yards (cu.yds.) of aggregate per mile every seven years (approximately equal to the 15% per year used), based on our experience. The annual investment level required on the paved 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 developed and maintained by a team of software and civil engineers at the Center for Technology & Training (CTT) at Michigan Technological University (MTU); 81 of 83 road agencies utilize Roadsoft. Arenac and Wexford counties were unable to access their Roadsoft program; therefore, the study author used information from the TAMC for those two counties.

The cost per mile for the treatments listed for hot mix asphalt (HMA), seal coat/chip seal and composite surfaces were obtained from a statewide survey conducted by MTU's LTAP, and completed in 2015. Those figures were increased by 7% for inflation. The cost per mile for treatments listed for concrete surfaces were established by the Road Commission for Oakland County.

- 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 gravel and paved road ineligible. Again, it was assumed only a maximum of 15% of this work could be addressed in each year due to limitations on contractor capacities and traffic disruptions.

Based on our experience, a gravel road requires an average of 1,000 cu. yds. of aggregate every seven years (approximately equal to the 15% per year used). The nonfederal aid-eligible system's PASER ratings were established by having each county road agency computing its current PASER rating by centerline mile through Roadsoft. Nine counties that did not have nonfederal aid-eligible paved system ratings were: Arenac, Baraga, Crawford, Gladwin, Lake, Montmorency, Ontonagon, Otsego and Wexford. To estimate the PASER ratings for those counties, data from the other 74 counties' nonfederal aid-eligible paved system was averaged and applied to the local paved mileage in those counties. It was assumed that all nonfederal roads in those counties were asphalt.

The cost per mile for the treatments listed for the nonfederal paved (HMA, seal coat/chip seal and composite surfaces) system were obtained from a statewide survey conducted by the MTU Local Technical Assistance Program (LTAP) and completed in 2017. Those figures were increased by 7% for inflation.

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 currently allows and is in keeping with county road agencies' historical administrative overhead, according to PA 51 annual reports.

This County Road Investment Plan does not include funding for new construction or capacity improvements. The intent of this Report is to show the required investment to make significant progress in restoring the existing county road system at this point in time.

Chart 1-1: Fiscal Summary Sheet for 2019 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 2019 County Road Investment Plan, come from data for paved and unpaved county primary and local roads in the first quarter of 2019.

Need Category	Annual Cost
Bridges	\$ 145,427,303
Buildings, Maintenance Facilities	\$ 41,737,681
Maintenance	\$ 754,409,986
Equipment	\$ 149,650,422
Federal Aid-Eligible Roads	\$ 858,004,437
Nonfederal Aid-Eligible Roads	\$1,629,061,719
Annual County Road Investment Needs	\$3,578,291,548
Less county road revenue documented in 2017 PA 51 Report	- \$1,410,774,333
Less new county revenue fr. 2015 Transpo. Pkg. thru FY 2019	- <u>\$ 117,400,000</u>
Outstanding Annual Funds Needed for County System	\$2,050,520,117

Outcomes of future funding of the county road system

BARAGA COUNTY ROAD COMMISSION

Total paved miles: 180

Total unpaved miles: 316

Bridges (over 20 feet): 46



In rural Baraga County in the western part of the Upper Peninsula, engineer-manager **Doug Mills, PE**, (*pictured*) says the increased funding level would have an immediate impact of allowing his road commission to improve emergency response capability. For a county that gets an average of 240 inches of snow each year, winter maintenance and snow plowing are critical functions.

“We’ve made major investments in bridges in previous years, and our federal aid system are near the state average, while our local roads on the nonfederal aid system are not,” Mills said. “Investments are needed now in facilities and equipment to provide appropriate emergency response and deliver our most critical service: winter maintenance and snow plowing. That’s our biggest safety concern and our primary focus, and the sorely needed improvements on the local road system will be in addition to that.”

Over the course of the next decade, Mills said he plans to propose addressing the backlog that’s accumulated from years of underfunding for road surfaces, bridge maintenance, facilities and equipment. “It will also help our ability to match and leverage other funds that we have the capability to obtain for projects, like federal and state grant programs, locally generated dollars and Bureau of Indian Affairs funds. Leveraging and multiple funding sources are important and remain important,” Mills said.

GLADWIN COUNTY ROAD COMMISSION

Total paved miles: 372

Total unpaved miles: 508

Bridges (over 20 feet): 46



Gladwin County Road Commission (GCRC) is responsible for 880 total miles of primary and local roads and 46 bridges. GCRC Managing Director and 2019-2020 CRA President **David Pettersch** (*pictured*) said service and road improvements will increase in tandem with more funding.

“Additional funding would provide opportunities to tackle projects that we are unable to right now, as well as perform longer lasting, more meaningful repairs on the projects we currently have,” said Pettersch. “In our county, the last several times we have received additional dollars from the Legislature, it’s been 100% toward the roads.

“We had several projects waiting, and as soon as we heard the additional funds were released, we bid the projects. It was a great feeling. We made several meaningful, well-needed improvements to our roads,” Pettersch said.

ROAD COMMISSION FOR OAKLAND COUNTY

Total paved miles: 1,986

Total unpaved miles: 756

Bridges (over 20 feet): 106



Located in southeast Michigan, with 1,986 paved miles, 756 unpaved miles and 106 bridges, the Road Commission for Oakland County (RCOC) oversees the largest county road system in Michigan. Despite utilizing innovative funding mechanisms like the CRA-developed Local Federal Fund exchange program, RCOE Managing Director and Professional Engineer **Dennis Kolar** (*pictured*) isn’t always able to invest in the right fixes at the right time.

“In addition to major road improvement projects such as road reconstructions and substantial resurfacing projects, there are many routine road maintenance activities that we should be doing a lot more of and which would help to extend the life of our roads,” Kolar said.

“These include crack sealing, overlays, joint repair, concrete slab replacement and so on. While we need to replace much of our agency equipment, and some of the new funding would have to go toward that, the vast majority would go right into the road surfaces. It is the rough roads that residents are most aware of.”

County Road Association of Michigan Board of Directors



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Gladwin



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