

Office of the Auditor General
Performance Audit Report

Traffic and Safety Section
Michigan Department of Transportation

June 2020

The auditor general shall conduct post audits of financial transactions and accounts of the state and of all branches, departments, offices, boards, commissions, agencies, authorities and institutions of the state established by this constitution or by law, and performance post audits thereof.

The auditor general may make investigations pertinent to the conduct of audits.

Article IV, Section 53 of the Michigan Constitution



Performance Audit

Traffic and Safety Section

Michigan Department of Transportation (MDOT)

Report Number:
591-0162-19

Released:
June 2020

The Traffic and Safety Section, Transportation Systems Management and Operations Division, participates in all phases of MDOT's efforts to reduce traffic crashes, fatalities, and serious injuries; vehicle delays; fuel consumption; pollution; and operating costs by increasing the safety, efficiency, and capacity of the State trunkline system. The Section is composed of four units: Safety Programs Unit, Geometric Design Unit, Traffic Signing Unit, and Pavement Markings Unit. As of July 22, 2019, the Section was working on 44 active contractual projects totaling \$6.8 million. The Section expended \$71.3 million on projects in fiscal year 2018 and obligated \$69.6 million of expenditures in fiscal year 2019. As of June 1, 2019, the Section had 26 full-time equated employees.

Audit Objective			Conclusion
Objective #1: To assess the effectiveness of the Section's efforts to track and analyze traffic crash trends.			Effective
Findings Related to This Audit Objective	Material Condition	Reportable Condition	Agency Preliminary Response
Three of the seven MDOT regional offices did not conduct at least one road safety audit for a proposed project for one or more of the fiscal years between 2017 and 2019 (<u>Finding #1</u>).		X	Agrees

Audit Objective			Conclusion
Objective #2: To assess the sufficiency of the Section's efforts to carry out its responsibilities for highway construction design plans for the proper geometric features, pavement markings, and traffic signing.			Sufficient, with exceptions
Findings Related to This Audit Objective	Material Condition	Reportable Condition	Agency Preliminary Response
MDOT's Michigan Traffic Sign Inventory System (MTSIS) database did not contain all applicable signs that are on the roadway, including 16 (32%) of 50 sampled speed limit signs. MTSIS also did not contain the accurate sign codes, number of sign supports, and correct location for 12%, 3%, and 2% of the signs, respectively (<u>Finding #2</u>).		X	Agrees

Findings Related to This Audit Objective (Continued)	Material Condition	Reportable Condition	Agency Preliminary Response
For 10 traffic survey reports sampled, MDOT could not provide documentation that it conducted all of the required tests related to speed and engineering studies. For example, documentation of horizontal and vertical curve tests was not provided for any of the 10 reports (<u>Finding #3</u>).		X	Partially agrees
Observations Related to This Audit Objective	Material Condition	Reportable Condition	Agency Preliminary Response
MDOT did not establish guidelines for the number of vehicles to be counted and the length of time a speed study should occur (<u>Observation #1</u>).	Not applicable for observations.		

Audit Objective			Conclusion
Objective #3: To assess the effectiveness of the Section's efforts to administer traffic and safety-related construction and design contracts.			Effective
Findings Related to This Audit Objective	Material Condition	Reportable Condition	Agency Preliminary Response
None reported.	Not applicable.		

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Office of the Auditor General
201 N. Washington Square, Sixth Floor
Lansing, Michigan 48913

Doug A. Ringler, CPA, CIA
Auditor General

Laura J. Hirst, CPA
Deputy Auditor General



OAG

Office of the Auditor General

201 N. Washington Square, Sixth Floor • Lansing, Michigan 48913 • Phone: (517) 334-8050 • audgen.michigan.gov

Doug A. Ringler, CPA, CIA
Auditor General

June 11, 2020

Mr. Todd Wyett, Chair
State Transportation Commission
and
Paul C. Ajegba, PE, Director
Michigan Department of Transportation
Murray D. Van Wagoner Building
Lansing, Michigan

Dear Mr. Wyett and Mr. Ajegba:

This is our performance audit report on the Traffic and Safety Section, Michigan Department of Transportation.

We organize our findings and observations by audit objective. Your agency provided preliminary responses to the recommendations at the end of our fieldwork. The *Michigan Compiled Laws* and administrative procedures require an audited agency to develop a plan to comply with the recommendations and to submit it to the State Budget Office upon completion of an audit. Within 30 days of receipt, the Office of Internal Audit Services, State Budget Office, is required to review the plan and either accept the plan as final or contact the agency to take additional steps to finalize the plan.

We appreciate the courtesy and cooperation extended to us during this audit.

Sincerely,

A handwritten signature in black ink that reads "Doug Ringler". The signature is written in a cursive, slightly slanted style.

Doug Ringler
Auditor General

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AUDIT OBJECTIVES, CONCLUSIONS, FINDINGS, AND OBSERVATIONS

TRACKING AND ANALYSIS OF TRAFFIC CRASH TRENDS

BACKGROUND

The Traffic and Safety Section acts as a support and resource for Michigan Department of Transportation (MDOT) regional offices (see Exhibit #1 for the map of MDOT regions) and transportation service centers (TSCs) by providing expertise on traffic-related concerns.

MDOT conducts an annual Call for Projects* to identify, select, and approve highway safety projects that address safety concerns that align with MDOT's goals and the Strategic Highway Safety Plan (SHSP) and safety concerns highlighted in the high-crash data. The purpose of a road safety audit (RSA) is to ensure that appropriate safety fixes are incorporated into the overall design of the proposed projects.

AUDIT OBJECTIVE

To assess the effectiveness* of the Section's efforts to track and analyze traffic crash trends.

CONCLUSION

Effective.

FACTORS IMPACTING CONCLUSION

- The Section provided satisfactory services, including training, policy guidance, and timely communication to the 3 regional offices and TSCs that we reviewed.
- MDOT statistics showed an overall decrease or no change in the number of crashes in the years after conducting local safety initiatives (LSIs) for 15 (75%) of the 20 high-crash locations that we reviewed.
- MDOT completed investigations for 21 (95%) of the 22 high-crash locations that we reviewed.
- MDOT appropriately allocated the funding split for the 7 regional offices based on the number of high-crash locations.
- Reportable condition* related to conducting all required RSAs (Finding #1).

* See glossary at end of report for definition.

FINDING #1

Additional RSAs needed.

MDOT did not ensure that it conducted all required RSAs. RSAs help ensure that a proposed safety improvement project incorporates all appropriate and necessary safety fixes.

MDOT's annual Call for Projects criteria specifies that each regional office should conduct an RSA for one or more of the proposed improvements within each fiscal year and for all proposals exceeding \$750,000 in programmed construction costs. RSAs should be completed prior to 30% completion of the proposed project.

For fiscal years 2017 through 2019, we identified 19 projects proposed by the 7 MDOT regional offices that required an RSA. Three of the 19 projects were abandoned before the project was 30% complete. The regional offices appropriately conducted an RSA for the remaining 16 projects.

However, 3 of the 7 MDOT regional offices did not conduct at least one RSA for a proposed project for one or more of the fiscal years between 2017 and 2019 as follows:

RSA Conducted

<u>Region</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>
Bay	Yes	Yes	Yes
Grand	Yes	Yes	Yes
Metro	Yes	No	Yes
North	Yes	Yes	Yes
Southwest	No	No	Yes
Superior	Yes	Yes	Yes
University	No	Yes	No

The regional offices did not conduct these RSAs because the proposed projects over the \$750,000 threshold either were abandoned or spanned multiple regions. However, the regional offices neglected to replace the RSAs with another project as required.

RECOMMENDATION

We recommend that MDOT conduct all required RSAs to help ensure that proposed safety improvement projects incorporate all appropriate and necessary safety fixes.

AGENCY PRELIMINARY RESPONSE

MDOT provided us with the following response:

MDOT concurs with the recommendation and will work with the Regions to ensure that all required RSAs are conducted on an annual basis.

RESPONSIBILITIES FOR DESIGN PLANS

BACKGROUND

The Section has three units that evaluate highway construction design plans for compliance with standards related to proper geometric features, traffic signing, and pavement markings:

1. Geometric Design Unit

The Geometric Design Unit provides guidance related to a variety of traffic safety and operational issues, including traffic volume criteria, geometric design guidance, and review and submission of various analysis and reports. Regional offices and TSCs submit design plans to the Unit for review and make recommendations in accordance with federal and State engineering standards. Once finalized, the Unit signs off on the plans. The Unit reviews traffic impact studies* (TISs) to determine the impact of changes to a roadway.

2. Traffic Signing Unit

The Traffic Signing Unit identifies projects for traffic sign upgrades on the State trunkline* system. The Unit uses the Michigan Traffic Sign Inventory System (MTSIS) to assist in building and maintaining MDOT's sign inventory in order to project the cost of future projects and upgrades. The Unit is responsible for reviewing and approving speed studies and traffic control orders* (TCOs) to ensure completeness and filing with the appropriate county clerks. Also, the Unit is responsible for estimating the overall cost of fabricating and installing memorial highway* signs.

3. Pavement Markings Unit

The Pavement Markings Unit combines data received from the regional offices to determine the annual re-striping projects that are needed in each region and contracts for the installation of a variety of pavement marking materials to complete these projects.

AUDIT OBJECTIVE

To assess the sufficiency of the Section's efforts to carry out its responsibilities for highway construction design plans for the proper geometric features, pavement markings, and traffic signing.

CONCLUSION

Sufficient, with exceptions.

* See glossary at end of report for definition.

**FACTORS
IMPACTING
CONCLUSION**

- MDOT appropriately completed the 7 TISs that we reviewed.
- MDOT's traffic signing projects for construction and design contained reasonable material and labor costs for the 9 projects that we reviewed.
- MDOT's pavement marking database contained substantially complete and accurate data for the 180 markings that we reviewed.
- The Geometric Design Unit identified and resolved the issues noted in the 7 TISs that we reviewed.
- Reportable conditions related to more complete and accurate traffic sign information and completing or documenting the completion of required elements of speed limit changes (Findings #2 and #3).

FINDING #2

More complete and accurate traffic sign information needed.

MDOT did not ensure that MTSIS contained complete and accurate traffic sign information to readily identify traffic signs in need of replacement or upgrade.

The Federal Highway Administration's (FHWA's) Maintenance of Signs and Sign Supports guide states that a comprehensive sign management system should be developed and followed to ensure that road signs are functional and meet the needs of the road users. FHWA's Standard Highway Signs (SHS) Manual also identifies the required characteristics of federal highway signs, including size, color, and identification code. A sign support is a vertical post, usually made of wood or steel, used to display the sign. Our review of MTSIS data disclosed:

- a. MDOT did not record all freeway and non-freeway signs in MTSIS.

We sampled 55 signs in MTSIS and drove to their specified locations to observe whether those signs existed at those locations (see Exhibit #2). While conducting our observations, we also randomly selected 30 signs on the roadway to determine whether they were accurately recorded in MTSIS. In addition, we counted 50 speed limit signs on a section of State highway between Gaylord and St. Johns where MDOT had increased the speed limit to 75 mph to determine whether the signs were recorded in MTSIS (see Exhibit #2). Further, we reviewed MTSIS data for memorial highway signs installed during our audit period for 3 sampled regional offices and TSCs.

We determined that MTSIS contained signs that were not on the roadway or contained inaccurate sign information. We also observed signs on the roadway that were not recorded in MTSIS. The following chart summarizes the discrepancies noted:

	Sample Size	Signs Not Found ¹	Inaccurate		
			Color	Message	Number of Supports
Signs in MTSIS	55	6 (11%)	0/49 ² (0%)	1/49 ² (2%)	3/46 ³ (7%)
Signs on the roadway	30	5 (17%)	2/25 ⁴ (8%)	0/25 ⁴ (0%)	1/19 ⁵ (5%)
Speed limit signs	50	16 (32%)	N/A ⁶	N/A ⁶	N/A ⁶
Memorial highway signs	3	1 (33%)	1/2 ⁷ (50%)	0/2 ⁷ (0%)	N/A ⁶

¹ Sign in MTSIS but not found on the roadway, or sign on the roadway but not found in MTSIS.

²Total population reduced from 55 to 49 because 6 signs were not found on the roadway.

³Total population reduced from 49 to 46 because 3 signs did not have a sign support.

⁴Total population reduced from 30 to 25 because 5 signs were not found in MTSIS.

⁵Total population reduced from 25 to 19 because, for 6 signs, the auditors were unable to determine the total number of sign supports during our field testing.

⁶Population not tested for these attributes.

⁷Total population reduced from 3 to 2 because 1 sign was not found in MTSIS.

- b. MDOT did not always ensure the accuracy of MTSIS data. MTSIS did not contain:
- (1) Proper sign codes, as identified in the SHS Manual, for a projected 46,187 (12%) of the 384,031 signs. A sign code is a unique identifier that MDOT uses to classify the type, shape, size, and color of a sign in MTSIS.
 - (2) The appropriate number of sign supports for 10,404 (3%) signs. MDOT informed us that signs should not have less than 1 or more than 20 sign supports. Our review of 373,415 signs with a support disclosed:
 - (a) For 2,233 (1%) signs, MTSIS inaccurately identified the number of supports as a letter rather than a numerical value.
 - (b) For 8,171 (2%) signs, MTSIS indicated that the number of supports was zero or more than 20 or the field was left blank.
 - (3) Accurate location information for 320 (2%) of the 19,965 signs from 5 randomly selected counties. MDOT has unique route identification numbers that identify the freeways and non-freeways throughout Michigan, and these signs had route identification numbers that were not accurate or did not exist within MTSIS.

MDOT uses sign information when creating roadway projects that involve the replacement of outdated signs. Complete and accurate MTSIS information is needed for MDOT to create accurate cost estimates for the projects.

MDOT indicated that MTSIS data was incomplete and inaccurate because MTSIS is outdated and difficult to use.

RECOMMENDATION

We recommend that MDOT ensure that MTSIS contains complete and accurate traffic sign information to readily identify traffic signs in need of replacement or upgrade.

AGENCY PRELIMINARY RESPONSE

MDOT provided us with the following response:

MDOT agrees with the finding and recommendation.

For context, MDOT's sign inventory consists of nearly 390,000 traffic control signs over the entire trunkline system, plus adjoining local roadways where signs (e.g., Stop Ahead, target arrows) are located that support the operation of the State system.

In 2019, MDOT initiated the design of a sign design computer system, identified as MiSigns, to replace the aging MTSIS computer system. MiSigns will contain validation checks to help ensure that traffic sign inventory contains appropriate sign codes and sign characteristics such as color, material type, and number of supports. MDOT will also assess the accuracy of the existing MTSIS inventory as it pertains to locations of signs, to help ensure the accuracy of MiSigns during the migration of the data to the new system.

FINDING #3

Additional documentation for speed limit changes needed.

MDOT did not always complete or document that it completed all required elements of traffic safety reports (TSRs) when making a speed limit change. Incomplete TSRs could result in an increase to the maximum speed limit that could impact driver safety.

Effective January 2017, Public Act 445 of 2016 required an increased speed limit to 75 mph on a minimum of 600 freeway miles and to 65 mph on a minimum of 900 non-freeway miles, no later than one year from the effective date, based on an engineering and safety study (see Exhibit #3). The Section is responsible for preparing TCOs that update the speed limits and for identifying and assessing related safety concerns. MDOT's recent increases to the speed limit as a result of the Act were:

	Calendar Year		
	2016	2017	2018
Number of miles increased	15.35	1,542.29	2.36

As a result of Public Act 445 of 2016, MDOT created implementation plans to outline FHWA considerations and the steps that should be completed to determine on which roads the speed limit should be increased. For freeways, the implementation plan consists of processes for validating corridors, new TCOs, and field implementation. One additional process (traffic signal clearance interval modifications) is included for non-freeways.

To increase a speed limit on a section of freeway or non-freeway, employees from MDOT and the Michigan Department of State Police (MSP) jointly initiate a TSR, which includes contacting local agencies to explain the need for speed studies and conducting an on-site review of the roadway, travel conditions, and other safety considerations. MSP completes the studies after MDOT collects the data, coordinates the studies, and documents the findings. After all of the information for the TSR is obtained, MDOT prepares a TCO that is reviewed and signed by MDOT and MSP.

During our audit period, 34 TSRs were initiated, finalized, and approved, consisting of 8 that did not relate to Public Act 445 of 2016, 20 that increased the speed limit from 55 mph to 65 mph, and 6 that increased the speed limit from 70 mph to 75 mph.

Our random sample of 10 of the 34 TSRs disclosed:

- a. MDOT did not maintain documentation that the following required tests were performed:

	Public Act 445 of 2016			Total
	Non-Related	Increase to 65 mph	Increase to 75 mph	
TSRs sampled	2	6	2	10
TSR documentation exceptions:				
Horizontal and vertical curve tests	2 (100%)	6 (100%)	2 (100%)	10 (100%)
Crash data analysis	2 (100%)	0 (0%)	0 (0%)	2 (20%)
Passing opportunity percentage	0 (0%)	6 (100%)	0 (0%)	6 (60%)
Stopping sight distance	0 (0%)	6 (100%)	2 (100%)	8 (80%)
Passing sight distance	0 (0%)	6 (100%)	0 (0%)	6 (60%)
Speed studies to calculate 85 th percentile	0 (0%)	1 (17%)	0 (0%)	1 (10%)
Number of access points or access points per mile	0 (0%)	5 (83%)	0 (0%)	5 (50%)

The test results should be documented to validate that the speed limit changes are safe for the public and will not increase the severity or number of crashes. In addition, documentation of these variables will ensure that MDOT has complied with the standards set by the FHWA in its Manual on Uniform Traffic Control Devices and Title 23, Part 655, section 603(a) of the *Code of Federal Regulations*.

- b. A total of 92 speed studies were completed for the 10 sampled TSRs. Nine (10%) of the 92 speed studies did not support the increased speed limit because the 85th percentile was outside of the 5 mph requirement.

The Michigan Manual on Uniform Traffic Control Devices recommends that speed studies be conducted to determine whether speed limits are within 5 mph of the 85th percentile of free-flowing traffic. Also, Section 257.627(17) of the *Michigan Compiled Laws* (Public Act 445 of 2016) states that speed limit changes should occur only in areas supported by the 85th percentile speed. The 85th percentile is the speed at which 85% of free-flowing traffic is traveling at or below, and the results of the speed studies should be within 5 mph of the posted speed limit.

MDOT did not establish a clear policy to define the required documentation when conducting a TSR, resulting in the lack of standard practices among the regional offices and TSCs. Also, MDOT did not always follow the standards related to the 85th percentile to meet the deadline of the unique situation presented to MDOT as a result of Public Act 445 of 2016.

RECOMMENDATION

We recommend that MDOT complete and document that it completed all required elements of TSRs when considering a speed limit change.

AGENCY PRELIMINARY RESPONSE

MDOT provided us with the following response:

MDOT partially agrees with the finding and recommendation. MDOT agrees that it did not have a clear and concise policy to define the documentation requirement when conducting a TSR. MDOT does not agree that it did not perform the geometric/safety review for all TSRs sampled (curve reviews, crash analysis, access points, etc.). These were completed for the segments and logged into a worksheet but, as there were no guidelines for what to include in a TSR, reviews were not included in the final documentation. MDOT will enhance procedures in cooperation with MSP.

In response to PA 445 of 2017, MDOT created a "Speed Implementation Plan" outlining the sections of the review and the steps that should be completed to determine the roads for which the speed limit should be increased as a result of the speed limit modifications. As stated in the finding, the public act required that, no later than one year after the effective date of the amendatory act, MDOT and MSP increase the speed limits on at least 600 miles of limited access freeway to 75 mph and 900 miles of trunk line highway to 65 mph based on an engineering and safety study.

The plan considered several roadway geometric characteristics, as noted in the finding, to be evaluated for impact of raising the speed limit on the various corridors. These characteristics are similar to those provided in the 2012 FHWA Methods and Practices for Setting Speed Limits: An Information Report. MDOT evaluated these roadway geometric characteristics on all proposed corridors to ensure that the speed limit could be raised on a candidate corridor with minimal or no impact on operations with only minor improvements required. While geometric features were evaluated for each segment, the review data was not included in the formal TSR submittal and instead only a check box that it had been reviewed.

Regarding safety, all roadways agreed upon with MSP for an increased speed limit were evaluated as being lower in risk per Highway Safety Manual methods based on their existing crash experience. It is through this analysis that both MDOT and MSP were able to comply with this legislation.

The collection and verification of roadway factors, as spelled out in the "Speed Implementation Plan," was done and can be verified by field notes, spreadsheets and emails. The plan called for the factors to be analyzed but did not identify the documentation process in relation to the TSR.

**AUDITOR'S
COMMENTS TO
AGENCY
PRELIMINARY
RESPONSE***

MDOT indicated that it did perform the geometric/safety reviews for all TSRs but did not include evidence of the reviews in its final documentation. For audit purposes, because the documentation to support the reviews did not exist, we must presume that they did not occur. Therefore, the finding to complete and document all required elements stands as written.

** See glossary at end of report for definition.*

OBSERVATION #1

Additional guidelines for speed studies needed.

To increase a speed limit on a section of freeway or non-freeway, employees from MDOT and MSP jointly complete a speed study along the section of roadway being considered. MDOT's knowledge of road design and MSP's ability to determine driver speed allow both departments a partnership to provide a unique expertise to accurately conduct a speed study.

Although FHWA had not established guidelines for conducting speed studies or required states to do so, guidelines should be established for conducting speed studies, including the number of vehicles to be counted and the length of time that a study should occur.

In the absence of federal criteria, we reviewed the guidelines established by 15 states and determined that 15 had established guidelines for the minimum number of vehicles to be counted and 13 had established guidelines for the minimum amount of time that traffic should be observed (in both directions) during a speed study. MDOT had established neither vehicle nor time requirements. The following table illustrates the guidelines for the number of vehicles and amount of time studied by the 15 states:

State	Minimum	
	Number of Vehicles	Amount of Time
Alabama	100	2 hours
Florida	100	2 hours
Illinois	100	3 hours
Indiana	100	1 hour
Kansas	100	1 hour
Louisiana	100	2 hours
Massachusetts	100	2 hours
New Mexico	100	2 hours
North Carolina	100	1 hour
Ohio	100	1 hour
Oregon	75	3 hours
Texas	125	2 hours
Vermont	100	Not available
Wisconsin	100	1 hour
Wyoming	100	Not available

Applying these guidelines, we reviewed a sample of 10 MDOT TSRs that contained 50 speed study locations. Our review disclosed:

- MDOT conducted a speed study for only one direction of traffic at 8 (16%) of the 50 speed study locations, rather than in both directions like the 15 other states.

- Of the 92 speed studies conducted:
 - 78 (85%) studies did not include the minimum number of vehicles or minimum length of time that was used by the 15 states. MDOT's studies ranged from 10 to 75 vehicles and 4 to 40 minutes. The following tables summarize the number of vehicles counted and number of minutes studied for these 78 studies:

Number of		Percent
Vehicles	Studies	
0 - 10	1	1%
11 - 20	8	10%
21 - 30	10	13%
31 - 40	14	18%
41 - 50	10	13%
51 - 60	22	28%
61 - 70	7	9%
71 - 80	6	8%
81 - 90	0	0%
91 - 99	0	0%
Total	78	100%

Length of Time (Minutes)	Number of Studies	Percent
0 - 10	4	5%
11 - 20	31	40%
21 - 30	33	42%
31 - 40	2	3%
41 - 50	0	0%
51 - 60	0	0%
N/A - Not listed	8	10%
	78	100%

- In addition, the data collected for the 9 speed studies noted in Finding #3 (with an 85th percentile that did not support the increased speed limit) ranged from only 31 to 68 vehicles and 13 to 30 minutes.

In the absence of federal guidance, MDOT should consider using its expertise, and that of other states, to establish its own guidelines to help ensure that MDOT consistently conducts TSR reviews throughout the State.

ADMINISTRATION OF TRAFFIC AND SAFETY-RELATED CONTRACTS

BACKGROUND

The Section contracts with several vendors for projects related to traffic safety, traffic signing, and pavement markings. MDOT issues a request for proposal* (RFP) and vendors submit their proposals for consideration. After an RFP is closed, a contract selection committee uses a qualifications-based selection* (QBS) method to analyze and score the proposals using criteria related to the understanding of service, team qualifications, quality control process, location, and bid presentation.

AUDIT OBJECTIVE

To assess the effectiveness of the Section's efforts to administer traffic and safety-related construction and design contracts.

CONCLUSION

Effective.

FACTORS IMPACTING CONCLUSION

- MDOT completed all 56 QBS scoring sheets for the 9 traffic and safety RFPs that we reviewed.
- MDOT provided reasonable QBS criteria scores and explanations for the three vendors that we reviewed.
- All (100%) of the 3 vendors that we contacted were pleased with the business relationship that they share with the Section.

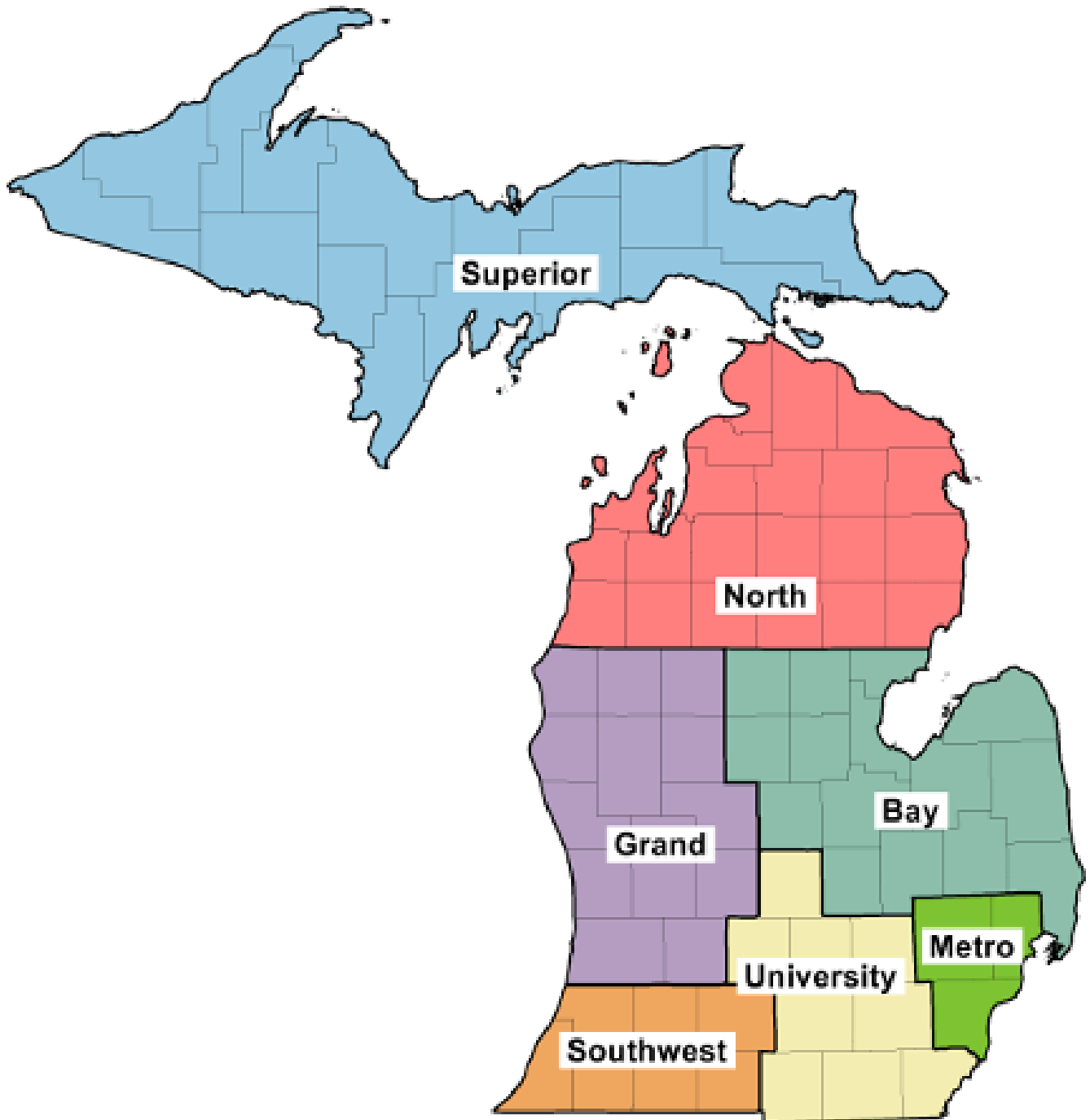
* See glossary at end of report for definition.

SUPPLEMENTAL INFORMATION

UNAUDITED
Exhibit #1

TRAFFIC AND SAFETY SECTION
Michigan Department of Transportation

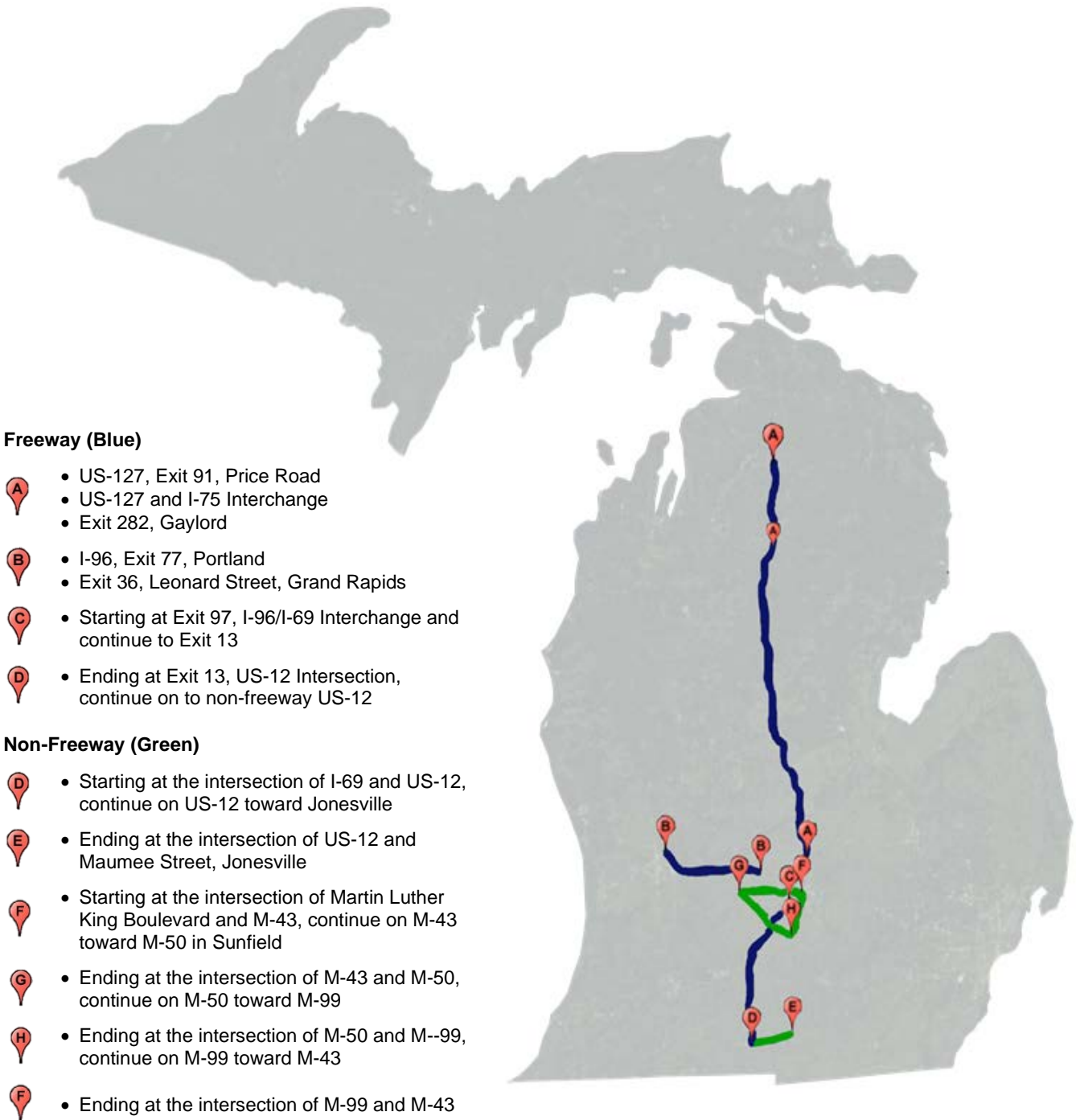
Map of MDOT Regions



Source: MDOT Web site.

TRAFFIC AND SAFETY SECTION
Michigan Department of Transportation

Map of Sampled Sign Locations

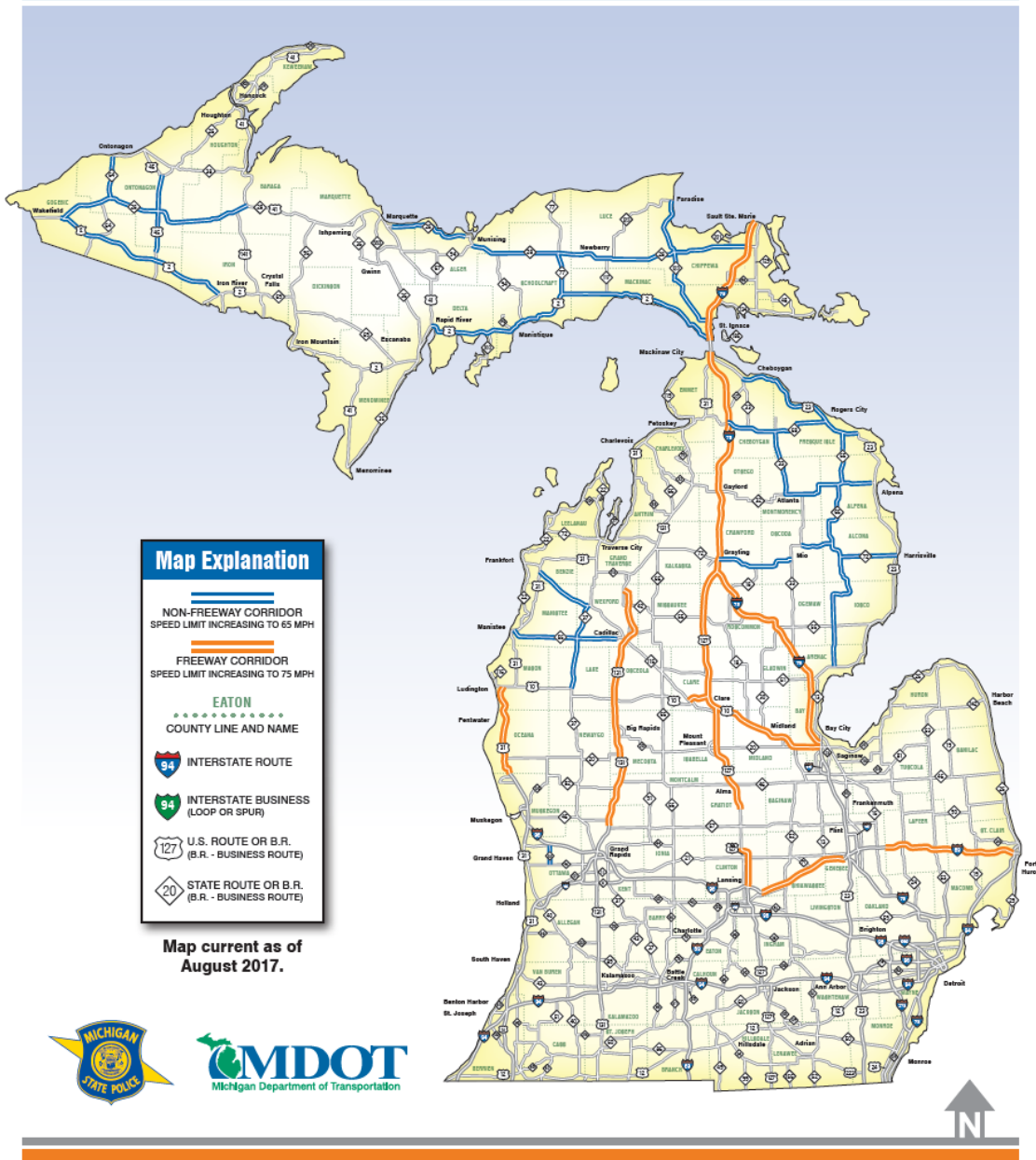


Source: The OAG created this map using Google Earth and data from our audit sample.

TRAFFIC AND SAFETY SECTION
Michigan Department of Transportation

Map of Speed Limit Increases

Speed Limit Increases on Michigan Freeways and Non-freeways in 2017



Source: MDOT Web site.

TRAFFIC AND SAFETY SECTION
Michigan Department of Transportation

Number and Type of Crashes Before and After the Speed Limit Increases of
Public Act 445 of 2016
As of April 13, 2020

15 Selected Michigan Non-Freeways¹

Type of Crash	2016	2018	Difference
Killed	6	7	1
No Injury	301	380	79
Non-Serious Injury	49	31	(18)
Possible Injury	64	69	5
Serious Injury	22	28	6
Total	442	515	73

6 Michigan Freeways²

Type of Crash	2016	2018	Difference
Killed	12	17	5
No Injury	1,546	1,748	202
Non-Serious Injury	138	184	46
Possible Injury	287	255	(32)
Serious Injury	70	61	(9)
Total	2,053	2,265	212

¹ Non-Freeways include US-2, US-23, US-45, M-28, M-32, M-33, M-37, M-64, M-65, M-68, M-72, M-77, M-115, M-123, and M-231.

² Freeways include I-75, I-69, US-10, US-31, US-127, and US-131.

Source: The OAG prepared this exhibit based on data from the Michigan Traffic Crash Facts Website: <https://www.michigantrafficcrashfacts.org/>.

DESCRIPTION

The Section, within the Transportation Systems Management and Operations Division, participates in all phases of MDOT's efforts to reduce traffic crashes, fatalities, and serious injuries; vehicle delays; fuel consumption; pollution; and operating costs by increasing the safety, efficiency*, and capacity of the State trunkline system.

The Section is composed of four units:

1. Safety Programs Unit

- Is responsible for the delivery of the Highway Safety Improvement Program.
- Tracks and analyzes traffic crash trends to determine opportunities for improvement on the State trunkline and local road systems.
- Supports development and delivery of the Strategic Highway Safety Plan.
- Develops, operates, and maintains safety-related software programs.

2. Geometric Design Unit

- Reviews all 3R/4R* design plans prepared by MDOT and its consultants for geometric features.
- Provides technical expertise in roadside safety, including training.
- Assists the Highway Field Services regarding field issues during construction.
- Performs capacity and operational analyses on proposed roadway improvements, including capacity and expansion projects.
- Reviews TISs with respect to capacity analysis and access management.

3. Traffic Signing Unit

- Develops and implements a five-year freeway and non-freeway sign upgrading program.

* See glossary at end of report for definition.

- Reviews all 3R/4R design plans prepared by MDOT and its consultants for conformance to traffic signing standards.
- Provides technical expertise concerning freeway and non-freeway signing.
- Reviews, establishes, or modifies speed limits, parking restrictions, and stop determinations.
- Provides technical expertise concerning traffic regulations, including TCOs.

4. Pavement Markings Unit

- Coordinates an annual pavement markings program.
- Reviews all 3R/4R design plans prepared by MDOT and its consultants for conformance to pavement marking and delineation standards.
- Reviews existing pavement markings and delineation for adequacy.
- Provides technical expertise concerning pavement markings and delineation.

The Section plays a major role in helping to implement MDOT's overall safety programs that support the development and delivery of SHSP and strive to achieve the national goal of eliminating serious injuries and deaths on roadways.

The Section obtains traffic crash data from MSP's Traffic Crash Reporting System, a central repository for all traffic crash data in the State. The data is used to track and analyze traffic crashes and trends to determine improvement opportunities for the State trunkline and local road systems. The Section provides an LSI, which is a service offered to local agencies to help identify roadway issues and improve local road safety.

In fiscal year 2018, the Section expended \$71.3 million on projects related to delineators, safety programs, signs, and pavement markings. For fiscal year 2019, the Section obligated \$69.6 million of expenditures. As of July 22, 2019, the Section was working on 44 active contractual projects totaling \$6.8 million. As of June 1, 2019, the Section had 26 full-time equated employees.

AUDIT SCOPE, METHODOLOGY, AND OTHER INFORMATION

AUDIT SCOPE

To examine the program and other records of the Traffic and Safety Section. We conducted this performance audit* in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Our audit was not directed toward reaching a conclusion regarding the accuracy of information in MSP's Traffic Crash Reporting System database and, accordingly, we provide no such conclusion.

PERIOD

Our audit procedures, which included a preliminary survey, audit fieldwork, report preparation, analysis of agency responses, and quality assurance, generally covered October 1, 2016 through May 31, 2019.

METHODOLOGY

We conducted a preliminary survey to gain an understanding of the Section's activities, responsibilities, and procedures to establish our audit objectives and methodology. During our preliminary survey, we:

- Met with Section staff to gain an understanding of the processes related to traffic safety, geometric design, traffic signing, and pavement markings.
- Reviewed applicable laws and regulations related to the Section, including Public Act 445 of 2016 which allowed for an increased speed limit for 1,500 miles of Michigan's freeway and non-freeway roads. We analyzed FHWA and other studies related to the effects of speed limit increases.
- Reviewed FHWA and MDOT guidance related to traffic safety, geometric design, traffic signing, and pavement markings.
- Obtained and reviewed a list of current traffic and safety contracts.
- Conducted site visits at 2 regional offices and 1 TSC to obtain an understanding of their roles related to traffic and safety and their relationship with the Section.

* See glossary at end of report for definition.

- Reviewed expenditures incurred between fiscal years 2017 and 2019.

OBJECTIVE #1

To assess the effectiveness of the Section's efforts to track and analyze traffic crash trends.

To accomplish this objective, we:

- Judgmentally selected 2 regional offices and 1 TSC and randomly sampled 22 (10%) of the 201 locations where high-crash rates occurred in 2017 to assess whether each location was investigated and received the proper approvals by the regional office or TSC. Because we judgmentally selected our sample, we could not project the results to the entire population.
- Randomly sampled 5 of 42 counties/municipalities for which the Section had conducted an LSI during our audit period, and then judgmentally and randomly sampled 2 intersection locations and 2 segment locations from these counties/municipalities for a total of 20 locations to assess whether traffic incidents had decreased in the years after the LSI was conducted. Because of the varying degrees of traffic and sizes of counties and municipalities, we could not project the results to the entire population.
- Identified 19 proposed safety projects from fiscal years 2017 through 2019 that required an RSA to assess whether an RSA was conducted.
- Compared the number and types of crashes before and after speed limit increases and noted immaterial differences for the 6 freeways increased to 75 mph and the 15 non-freeways increased to 65 mph from Public Act 445 of 2016 (see Exhibit #4).

OBJECTIVE #2

To assess the sufficiency of the Section's efforts to carry out its responsibilities for highway construction design plans for the proper geometric features, pavement markings, and traffic signing.

To accomplish this objective, we:

- Judgmentally selected 2 regional offices and 1 TSC and conducted the following audit procedures:
 - Judgmentally and randomly selected 7 traffic and safety TISs conducted during our audit period for our review of completion and completeness.

- Randomly selected 6 of the 17 memorial highways where a payment was received during our audit period and assessed whether the payment was received after the legislation was passed and the accuracy of the payment amount.
- Judgmentally selected 4 sections of freeway and 4 sections of non-freeway for review of MTSIS and the road signage to test the completeness and accuracy of the data in MTSIS.
- Randomly sampled 10 of the 34 TSRs completed during our audit period. We reviewed the variables considered for these speed limit changes, obtained speed study data, and recalculated the 85th percentile speeds.
- Compared crash data for the 6 freeways increased to 75 mph and the 15 non-freeways increased to 65 mph before and after the speed limit increases occurred due to Public Act 445 of 2016 (see Exhibit #4).
- Randomly and judgmentally sampled 9 of the 32 traffic signing projects completed during our audit period. We reviewed the supporting documentation, including construction pay estimate reports, consultant invoices, and MDOT payroll data for accuracy and reasonableness.
- Randomly sampled 180 of the 34,133 pavement marking data points for fiscal years 2017 through 2019 from the regional offices to evaluate the accuracy and completeness of the data.

Our random samples were selected to eliminate bias and enable us to project the results to the entire population. We selected other samples judgmentally and, therefore, could not project those results to the respective populations.

OBJECTIVE #3

To assess the effectiveness of the Section's efforts to administer traffic and safety-related construction and design contracts.

To accomplish this objective, we:

- Randomly sampled 9 of the 70 RFPs awarded during our audit period and the 56 corresponding vendor scoring forms for completeness.
- Analyzed the 22 vendors who submitted a proposal for our sample of RFPs for scoring variances between projects. We judgmentally sampled 3 vendors with the largest variances between highest and lowest scores to review for reasonableness.

- Randomly and judgmentally sampled 3 of 19 vendors that contracted with the Section during the audit period. We interviewed the 3 vendors to assess their satisfaction with the QBS selection process and their working relationship with MDOT.

Our random samples were selected to eliminate bias and enable us to project the results to the entire population. We selected other samples judgmentally and, therefore, could not project those results to the respective populations.

CONCLUSIONS

We base our conclusions on our audit efforts and any resulting material conditions* or reportable conditions.

When selecting activities or programs for audit, we direct our efforts based on risk and opportunities to improve State government operations. Consequently, we prepare our performance audit reports on an exception basis.

AGENCY RESPONSES

Our audit report contains 3 findings and 3 corresponding recommendations. MDOT's preliminary response indicates that it agrees with 2 of the recommendations and partially agrees with 1 recommendation.

The agency preliminary response that follows each recommendation in our report was taken from the agency's written comments and oral discussion at the end of our fieldwork. Section 18.1462 of the *Michigan Compiled Laws* and the State of Michigan Financial Management Guide (Part VII, Chapter 4, Section 100) require an audited agency to develop a plan to comply with the recommendations and to submit it to the State Budget Office upon completion of an audit. Within 30 days of receipt, the Office of Internal Audit Services, State Budget Office, is required to review the plan and either accept the plan as final or contact the agency to take additional steps to finalize the plan.

* See glossary at end of report for definition.

PRIOR AUDIT FOLLOW-UP

Following is the status of the reported findings from our December 2015 performance audit of the Traffic and Safety Section, Michigan Department of Transportation (591-0162-15):

<u>Prior Audit Finding Number</u>	<u>Topic Area</u>	<u>Current Status</u>	<u>Current Finding Number</u>
1	All required RSAs need completion.	Rewritten*	1
2	Guardrail and traffic sign inventory databases need updating.	Rewritten	2

SUPPLEMENTAL INFORMATION

Our audit report includes supplemental information presented as Exhibits #1 through #4. Our audit was not directed toward expressing a conclusion on this information.

* See glossary at end of report for definition.

GLOSSARY OF ABBREVIATIONS AND TERMS

3R/4R	Freeway resurfacing, restoration, rehabilitation, and reconstruction and new construction projects.
auditor's comments to agency preliminary response	Comments that the OAG includes in an audit report to comply with <i>Government Auditing Standards</i> . Auditors are required to evaluate the validity of the audited entity's response when it is inconsistent or in conflict with the findings, conclusions, or recommendations. If the auditors disagree with the response, they should explain in the report their reasons for disagreement.
Call for Projects	The process by which highway projects are identified, selected, and approved.
effectiveness	Success in achieving mission and goals.
efficiency	Achieving the most outputs and the most outcomes practical with the minimum amount of resources.
FHWA	Federal Highway Administration.
LSI	local safety initiative.
material condition	A matter that, in the auditor's judgment, is more severe than a reportable condition and could impair the ability of management to operate a program in an effective and efficient manner and/or could adversely affect the judgment of an interested person concerning the effectiveness and efficiency of the program. Our assessment of materiality is in relation to the respective audit objective.
MDOT	Michigan Department of Transportation.
memorial highways	Highways or portions of highways that have been named in memory of individuals and groups having historical prominence in their communities.
mph	miles per hour.
MSP	Michigan Department of State Police.

MTSIS	Michigan Traffic Sign Inventory System.
observation	A commentary that highlights certain details or events that may be of interest to users of the report. An observation may not include all of the attributes (condition, effect, criteria, cause, and recommendation) that are presented in an audit finding.
performance audit	An audit that provides findings or conclusions based on an evaluation of sufficient, appropriate evidence against criteria. Performance audits provide objective analysis to assist management and those charged with governance and oversight in using the information to improve program performance and operations, reduce costs, facilitate decision-making by parties with responsibility to oversee or initiate corrective action, and contribute to public accountability.
qualifications-based selection (QBS)	A selection process that enables a consultant or vendor to be selected based on the qualifications set forth in an RFP rather than by lowest bid.
reportable condition	A matter that, in the auditor's judgment, is less severe than a material condition and falls within any of the following categories: an opportunity for improvement within the context of the audit objectives; a deficiency in internal control that is significant within the context of the audit objectives; all instances of fraud; illegal acts unless they are inconsequential within the context of the audit objectives; significant violations of provisions of contracts or grant agreements; and significant abuse that has occurred or is likely to have occurred.
request for proposal (RFP)	A document intended to solicit proposals for services.
rewritten	The recurrence of similar conditions reported in a prior audit in combination with current conditions that warrant the prior audit recommendation to be revised for the circumstances.
RSA	road safety audit.
SHS	Standard Highway Signs.
SHSP	Strategic Highway Safety Plan.
State trunkline	All roads under MDOT jurisdiction, including Michigan routes, interstate routes, U.S. routes, interstate business loops and spurs, U.S. business routes, Michigan business routes, connector routes, and unsigned State trunkline.

traffic control order (TCO)	Documents that provide the legal basis for modified speed limits and parking restrictions instituted on State trunkline highways.
traffic impact study (TIS)	A complete analysis and assessment of traffic generated by a proposed development and of the impact a proposed development would have on a surrounding transportation system.
traffic survey report (TSR)	A research study conducted to determine the speed limit of a particular area.
TSC	transportation service center.



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