



ROADWAY ASSET MANAGEMENT PLAN CITY OF LAPEER

UPDATED: DECEMBER 2018

2018 Roadway Asset Management Update

In 2015, Wade Trim completed an initial Roadway Asset Management Plan (Plan) for the City of Lapeer (City). In late 2017, the City retained Wade Trim to reevaluate their road system and update the Plan following two construction seasons of roadway improvements. The final Plan was published in April 2018. In the last year, the City has completed several additional road improvement projects that were outlined in the current five-year Capital Improvement Plan (CIP). The purpose of this 2018 update is to assess the impacts of the recent improvements on the overall road system rating and update the Plan and five-year CIP.

The Asset Management Plan is a dynamic, living document which will be updated on a routine basis since many aspects of the Plan will change as new information will become available. The Plan is a method for documenting the City's knowledge of their system and the maintenance necessary to keep it functioning. Therefore, it is essential for City staff to build upon their knowledge and create and update the Plan on an on-going basis resulting in a viable and usable program.

The following Asset Management Plan components have been updated in the 2018 Plan:

- 7.26 miles of crack seal comprised of 3.99 miles of overband crack seal and 3.27 miles of scrub seal roadway improvements were applied throughout the City
- 0.47 miles of Baldwin Road that was broken out into two projects. 0.19 miles of reconstruction to the City limits and 0.28 miles of pulverize and reshape from Taco Bell to M-24.
- Reconstruct 0.86 miles split between Mansfield street, Dewey street, and Lamoreaux street.
- A 2" overlay was applied to 0.71 miles of Hartley street, Saginaw Street, Court Street, and Cedar Street.
- Roadway improvement projects were input into Roadsoft software for analysis
- Five-Year Capital Improvement Plan was updated

PASER Road Ratings

An inventory and condition assessment for the City's 43.4 mile road system to determine the condition of each asset was completed in 2015 and updated in 2017. This was accomplished by visually inspecting each road segment and assigning a condition rating referred to as the PASER rating. PASER is an acronym which stands for pavement surface evaluation and rating. The system was developed for the Wisconsin Department of Transportation and local agencies in Wisconsin. This system has been adopted by Michigan and many other states to provide officials with consistent information on the roadway conditions within their jurisdiction.

PASER rates asphalt and concrete pavement condition for roads on a scale of 1 (very poor, failed) through 10 (excellent), based on physical distresses. PASER also has evaluation criteria for seal coat and gravel roads. The following table is a listing of the

PASER system for asphalt roads

Rating	Visible Distress*
Rating 10 - Excellent	None (New construction).
Rating 9 - Excellent	None (New construction that is one year old).
Rating 8 - Very Good	Occasional transverse cracks, transverse cracks spaced 40' or greater, all cracks sealed or tight (open less than 1/4").
Rating 7 - Good	Longitudinal cracks (open 1/4"), transverse cracks spaced 10' or more, very few patches in excellent condition.
Rating 6 - Good	Longitudinal cracks spaced less than 10', first signs of block cracking, occasional patching in good condition.
Rating 5 - Fair	Longitudinal and transverse cracks (open 1/2"), block cracking up to 50%, some patching in good condition.
Rating 4 - Fair	Multiple longitudinal and transverse cracking, block cracking over 50%, patching in fair condition, slight rutting.
Rating 3 - Poor	Closely spaced longitudinal and transverse cracks, severe block cracking, some alligator cracking (less than 25%).
Rating 2 - Very Poor	Alligator cracking (over 25%), extensive patching in poor condition, potholes.
Rating 1 – Failed	Severe distress with extensive loss of surface integrity.

The PASER ratings are used to determine appropriate maintenance and repair strategies. The recommended maintenance/repair for each PASER rating is summarized in the following table.

PASER Rating	Recommended Fix
9-10	No maintenance required
8	Crack filling
7	Slurry Seal
6	Microseal
5	Thin overlay (two-inch)
3-4	Crush and reshape with two-inch overlay
1-2	Reconstruction

The ratings have been analyzed to produce the results in this report using the Roadsoft software.

Paved Roads

During 2018, the City completed approximately 3.27 miles of scrub seal roadway improvements on City streets. A scrub seal, similar to a chip seal, is a treatment in which asphalt emulsion and crushed rock are placed on an asphalt pavement surface.

In a scrub seal application the asphalt emulsion is applied to the road surface through a series of brooms placed at different angles.

In addition to the scrub sealing; 1.05 miles of reconstruction, 0.28 miles of pulverize and reshape, and 0.71 miles of 2" overlay, and 3.99 miles of overband crack seal were also completed.

The projects completed in 2018 were manually input into the Roadsoft software program. Each treatment in Roadsoft has a "reset" PASER number based on the type of treatment. For a scrub seal, the reset number is a PASER 8. Reconstructed roads reset to a PASER 10. Overlaid roads reset to a PASER 9. Pulverized and reshaped roads reset to a PASER 10. All the road segments in the above-mentioned projects are now at the respective reset numbers. Field ratings were not completed for this report update. The 2017 field ratings are still considered valid and have been combined with the known projects completed in 2018 for this update.

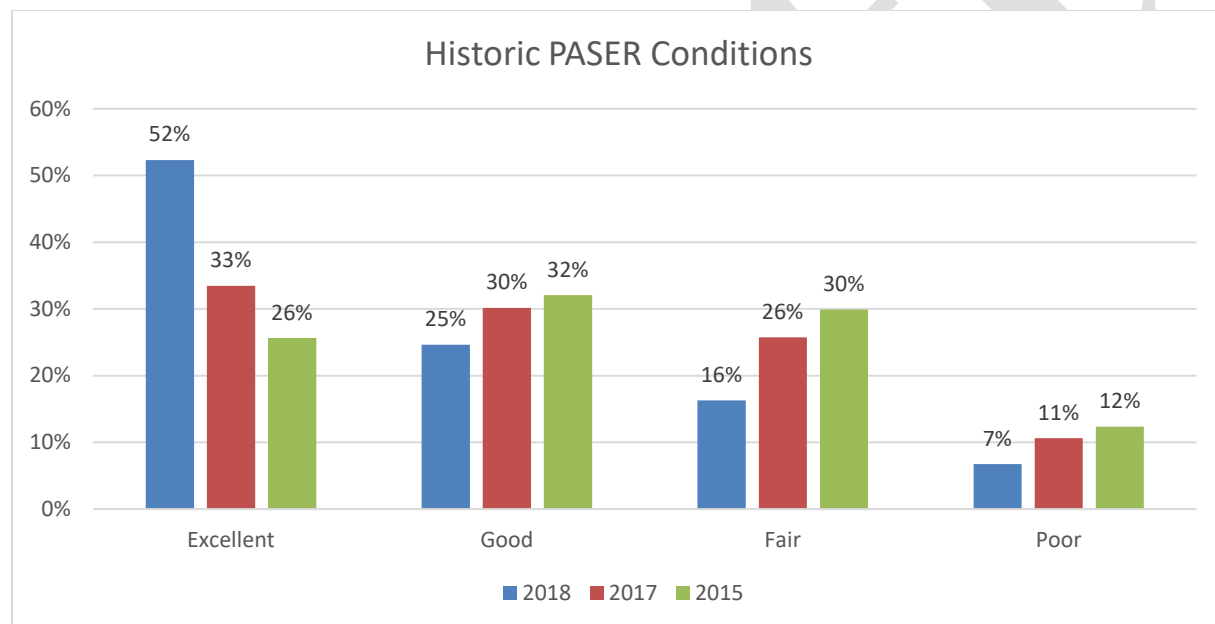
The following table represents the mileage of paved roads for each PASER rating at the conclusion of the 2018 construction season. The table is used to calculate the Surface Quality Index (SQI), which is an indication of the overall condition of the road network. Based on the 2017 PASER data updated with the 2018 completed projects, the average SQI for the City of Lapeer is 6.38. This is a SQI increase of 0.23 (3.7%) from 2017 and an overall increase of 0.47 (8.0%) from 2015. These results indicate that the City's annual investment and on-going CIP priorities for roadway improvements is contributing to a sustainable roadway system.

Existing Surface Quality Index for 2018 Paved Roads

PASER Rating	Miles	Composite SQI
1	0.05	0.05
2	0.54	1.08
3	2.34	7.02
4	3.06	12.26
5	4.02	20.12
6	5.26	31.58
7	5.43	38.04
8	17.95	143.61
9	3.43	30.84
10	1.35	13.53
Total	43.40	298.12
Average SQI		6.86

Since 2015, the City has invested close to 11 million dollars in their roadway system and completed projects on approximately 14.5 miles of roadway which has resulted in a 0.95 (14%) rating increase in the overall Surface Quality Index. Similarly, the cumulative PASER ratings in each condition category is reflected in the graph below. The analysis suggests that the City's investment in road improvements in recent years has led to an overall improvement in the road system with more roads included in the "excellent" category and less overall roads in the "poor" category.

To continue with a sustainable CIP and investment into the road system, the City must continue to invest in the road system at a rate equal to or greater than the past few years. On-going preventative maintenance and increased investment with improvements in the road system is necessary to sustain or increase the conditions of the City's overall road system.



Funding Analysis

A two-mill road millage proposal was narrowly defeated in the November 2017 election. For the purposes of this report, a 2.0-mil funding source projection, generating approximately \$486,000 annually, will be used for analysis for funding availability in establishing an updated five-year CIP. In the meantime, the City will rely on the Major Street Fund 202 and Local Street Fund 203 to continue the Street Preventative Maintenance Program. Further, the City should continue to pursue other funding sources including grant dollars for future CIP projects.

Report Updates (2015 to 2018)

The types of roadway improvements or “mix of fixes” outlined in the 2015 final report remain similar, with a few minor adjustments. The depth of the aggregate base was defined at 12 inches for roadway reconstruction.

The estimated unit costs were increased by 1.5% from the last update in 2017 to account for inflation. The following table summarizes the per mile cost to implement the various treatment options on a typical 27-foot wide roadway.

Mix of Fixes Updates: Overband crack sealing has recently been proven to be a more effective treatment option than flush-filled crack sealing because it provides a larger surface area for bonding and has proven to have a longer life expectancy for this repair option. Slurry seal and scrub seal are more tools available for preventative maintenance repair options that have been added to the Mix of Fixes in this report based on the 2018 improvements completed. The following unit costs have been utilized for this 2018 analysis. The following page provides a graphic summary for a 20-year planning period utilizing a 2.0 Mill funding scenario.

Asphalt Treatment Options

Treatment	Unit Cost	Estimated Cost per Mile*
Reconstruct Aggregate 8-12" Base, 5" HMA Course with Edge Drain	\$125.00 / syd	\$1,773,205
Crush and Shape w/Overlay	\$45.00/ syd	\$912,678
2" Mill and Overlay	\$39.00 / syd	\$832,700
Microseal	\$5.81 / syd	\$117,613
Scrub Seal with Micro Top Coat	\$4.99 / syd	\$79,045
Overband Crack Seal	\$1.30 / lb **	\$14,114
Slurry Seal	\$0.70 / syd	\$14,114

*Assumes 27 ft wide two-lane road (one lane in each direction)

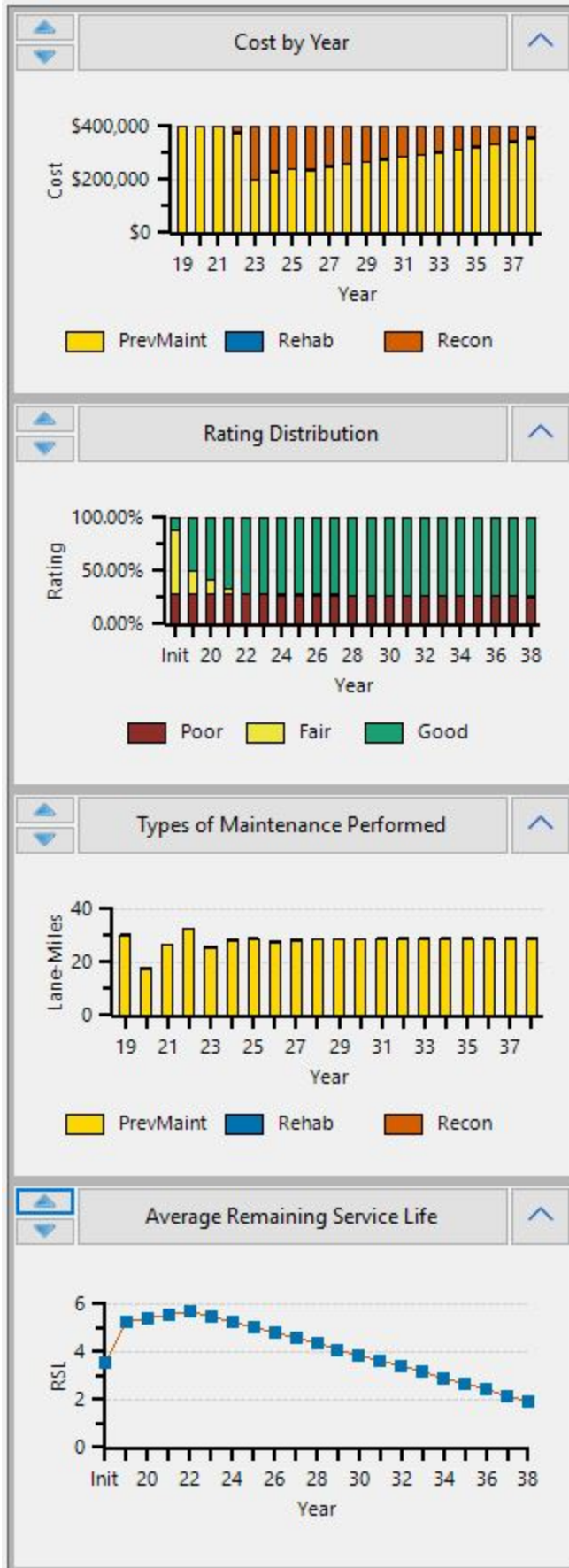
** Assume 3-4 lb of overband per pound

Concrete Treatment Options

Treatment	Unit Cost	Estimated Cost per Mile*
Concrete Reconstruction	\$122.5 / syd	\$2,479,285
Full Depth/Slab Replacement w/ Joint Repairs	\$49.65 / syd	\$1,005,200
Overband Crack Seal	\$6.12 / syd	\$123,886

*Assumes 27 ft wide two-lane road (one lane in each direction)

**2.0 Mil Scenario
(Maintain Existing Average Rating)
20-Year Planning Period
(2019-2039)**



Annual Street Preventative Maintenance Program

We recommend the City continue their Preventative Maintenance Program as it has improved the overall quality of the road system in the past three years based on the current road rating results.

City Infrastructure (Underground Utilities) Considerations

The City should continue to evaluate the age and condition of underground utilities when planning future road projects. Such planning will ensure that the City gets the full life expectancy out of each road repair.

Capital Improvement Process

The updated five-year roadway capital improvement recommendations generated from Roadsoft are in the sections below. It is understood that the City has established a committee to evaluate the annual Capital Improvement Program (CIP) and available data, along with use of their local knowledge of the underground infrastructure and various political influences to annually define the individual road improvement projects.

As previously recommended, once the CIP list is updated for a five-year period, it is recommended that project scopes and detailed cost estimates be developed for the defined road improvement projects to evaluate current funding sources and current expected unit pricing. This process is recommended to be completed as a part of the fiscal year budgeting process, or when additional funding sources are being sought. It should be noted that this Plan is intended to be a dynamic document updated on a periodic basis over the 20-year planning period.

Next Steps

The actions resulting from this updated Roadway Asset Management Plan are as follows:

- Continue to utilize the money generated for the Street Preventative Maintenance Program, as well as work to get a millage passed so that there is a long-term and consistent source of funding for future local roadway projects, taking into consideration priorities for improvements and underground utility upgrades and needs;
- Work closely with the CIP Committee to ensure goals are aligned with the City and improvements for their roadway system are coordinated with other capital needs, especially any underground infrastructure improvements;
- Continue to review the Roadway Asset Management Plan on a periodic basis as assumptions forming the basis of the plan are tested and better data becomes available;
- Continue to undertake improvements to the road system annually to sustain a rating of fair to good or above; and,

- Consider initiating a public awareness program to educate the general public of the importance of investing in the City's road system prior to the next millage election.

Five-Year Capital Improvement Recommendations

Based on the Roadsoft program results, including a potential two-mill roadway millage, a five-year roadway CIP has been developed to highlight the various maintenance repairs. This CIP should be reviewed annually as the Surface Quality Index of the overall road network will change when improvements to the road segments, including the preventative maintenance repairs, are completed.

The following table summarizes the Roadsoft software's output for the CIP roadway improvements for the 2.0 mil funding scenario.

2.0 mil Scenario Recommended Improvements			
Year 1 (2019)	Lane Miles	Paser Rating	Improves To
Crack Filling	12.46	7	8
Microseal	0.89	6	8
Scrub Seal	5.64	5	8
Mill and Overlay	0.00	4	9
Crush and Reshape	0.00	3	10
Reconstruction	0.00	1 & 2	10

2.0 mil Scenario Recommended Improvements			
Year 2 (2020)	Lane Miles	Paser Rating	Improves To
Crack Filling	10.13	7	8
Microseal	0.50	6	8
Scrub Seal	7.31	5	8
Mill and Overlay	0.00	4	9
Crush and Reshape	0.00	3	10
Reconstruction	0.00	1 & 2	10

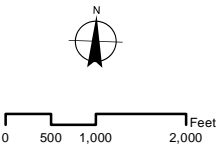
Conclusions

With the various roadway improvements completed over the last three years, the City has increased its overall rating for their road system. With a commitment in investing in the roads, the City is making continued strides to maintain a sustainable system. However, the City should continue to pursue additional funding sources through a road millage and seek alternative transportation grant sources to increase the level of funding available for future road improvements.

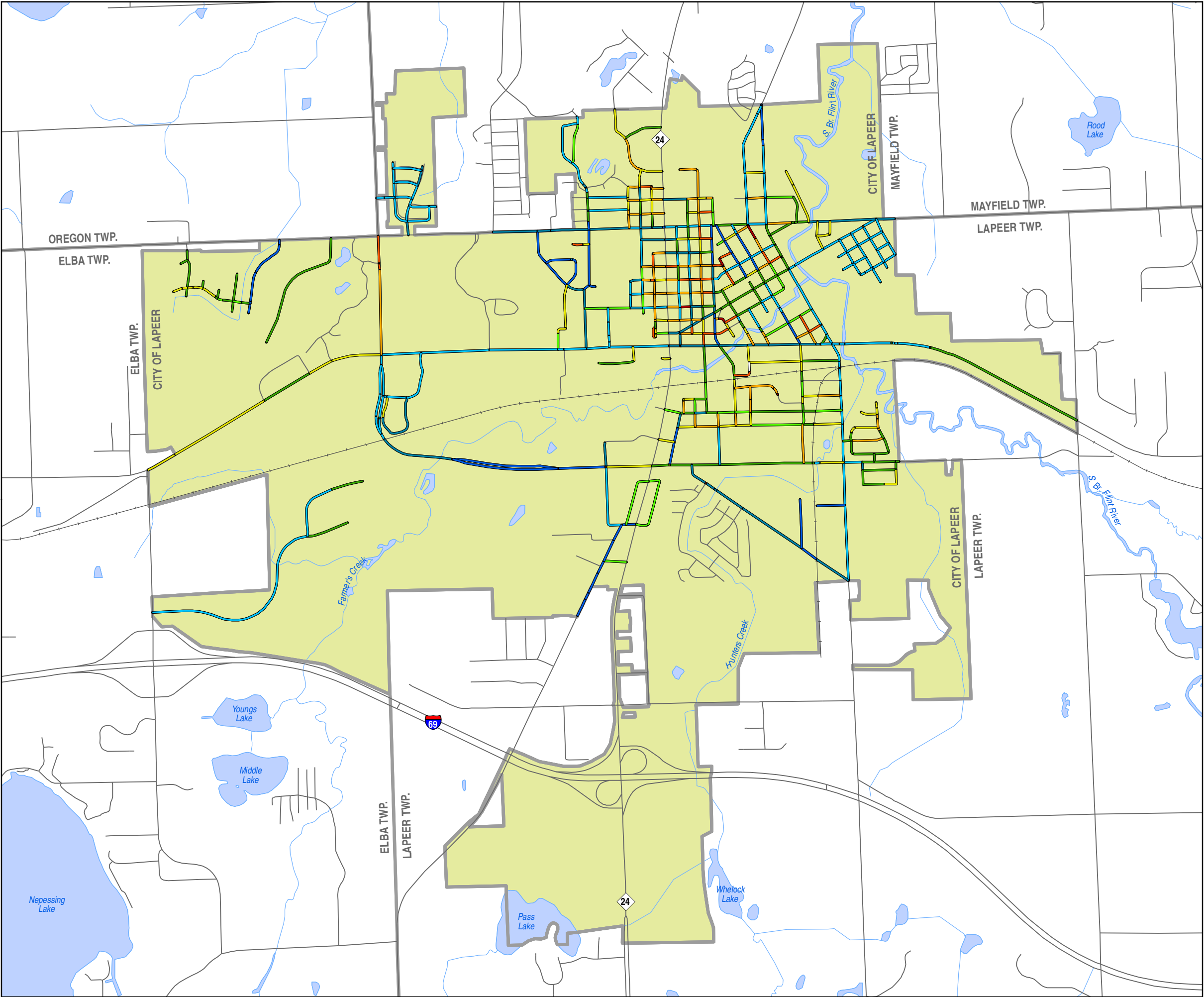
2017 PASER Ratings
with 2018 Project Update

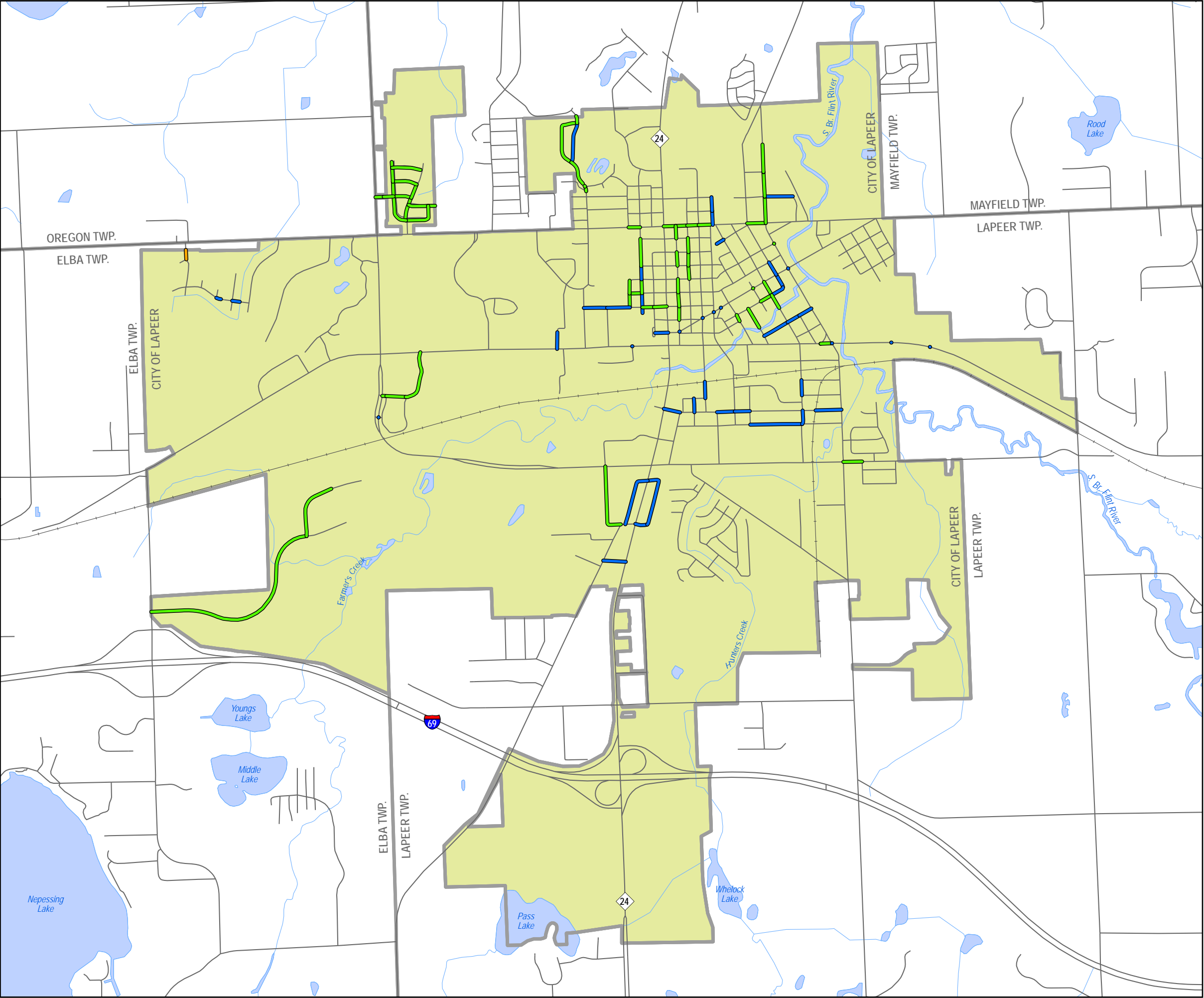
- Road Not Classified
- 1 - Failed
- 2 - Very Poor
- 3 - Poor
- 4 - Fair
- 5 - Fair
- 6 - Good
- 7 - Good
- 8 - Very Good
- 9 - Excellent
- 10 - Excellent

Source: Wade Trim, December 2018



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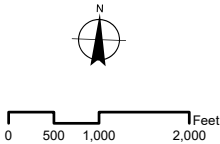


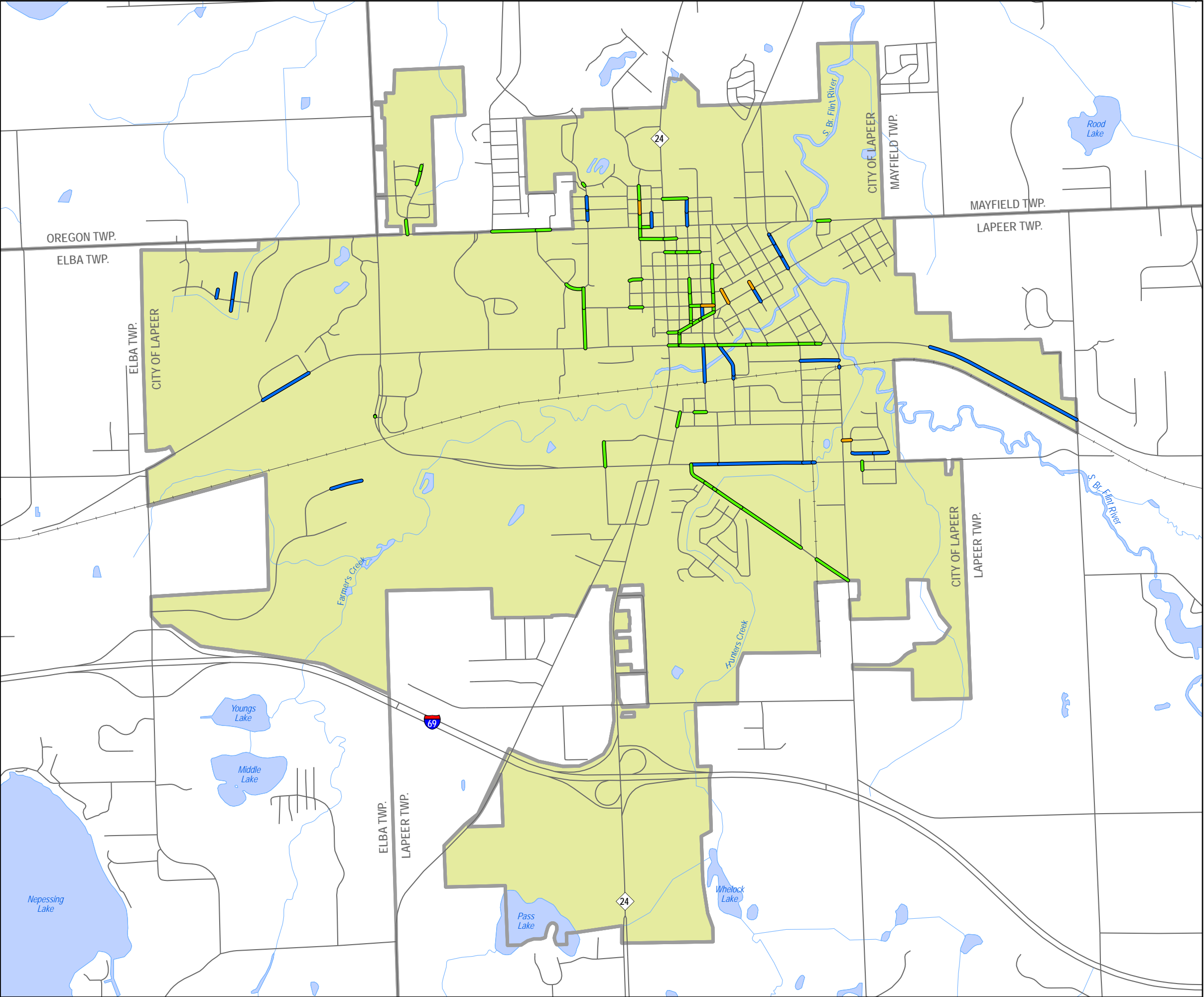


**Year 1 (2019)
CIP Improvements**

- Microseal
- Scrub Seal w/ Micro Top Coat
- Overband Crack Seal
- Crush & Shape/ Resurface

Source: Wade Trim, December 2018

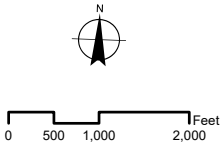


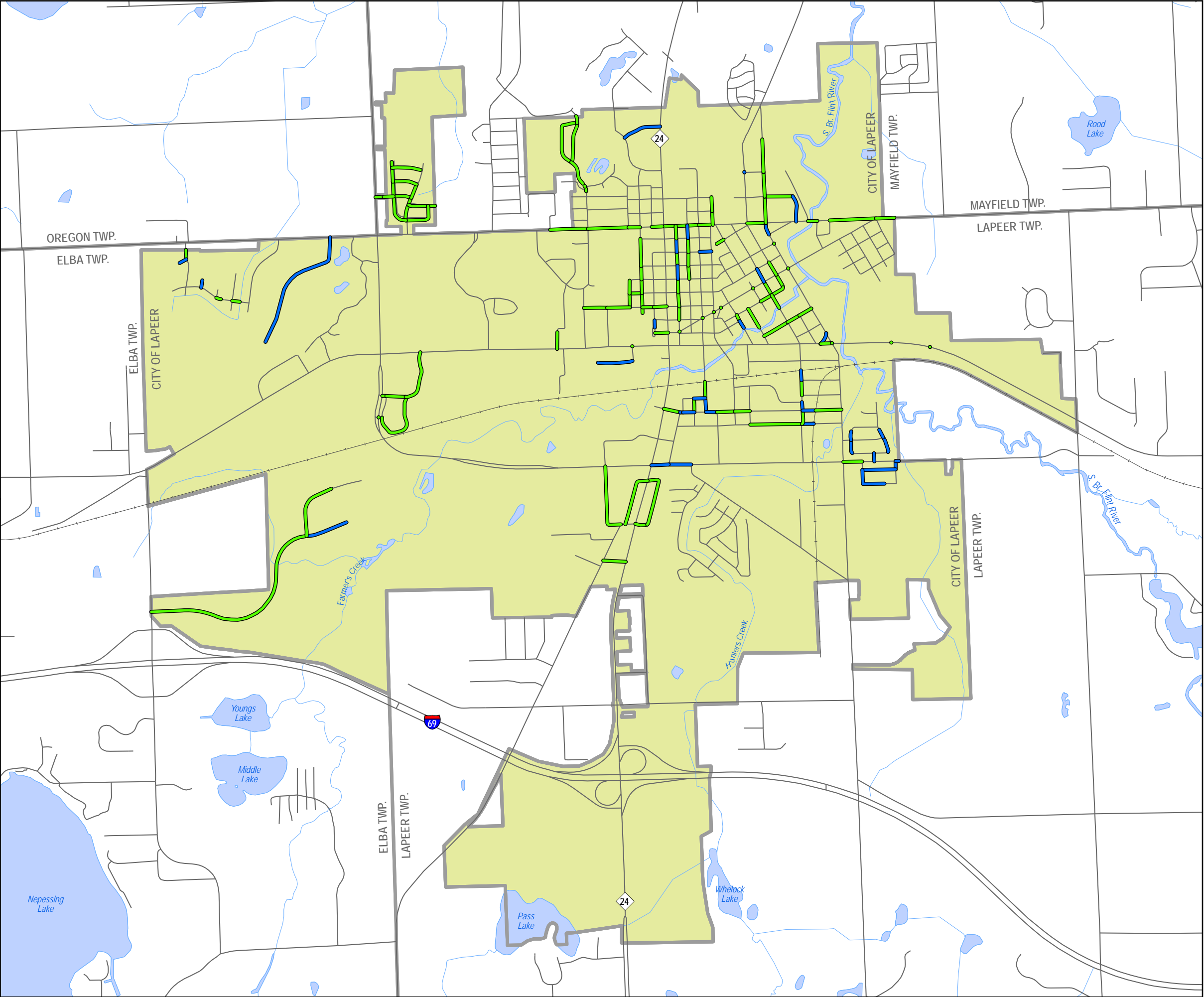


Year 2 (2020)
CIP Improvements

- Microseal
- Scrub Seal w/ Micro Top Coat
- Overband Crack Seal
- Crush & Shape/ Resurface

Source: Wade Trim, December 2018



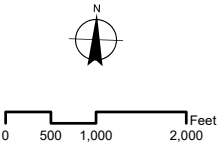


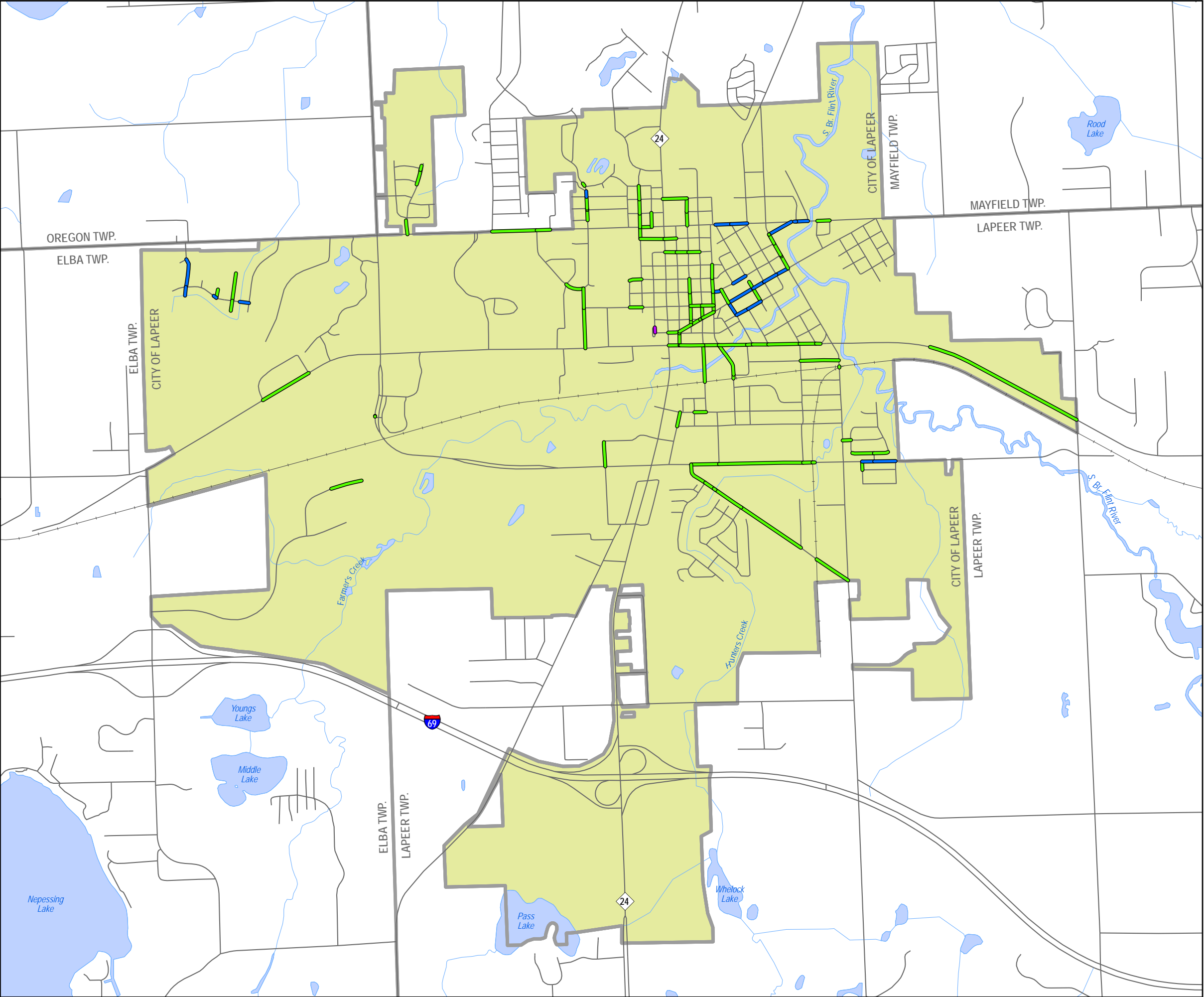
Year 3 (2021)

CIP Improvements

- Microseal
- Scrub Seal w/ Micro Top Coat
- Overband Crack Seal
- Crush & Shape/ Resurface

Source: Wade Trim, December 2018

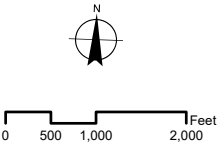


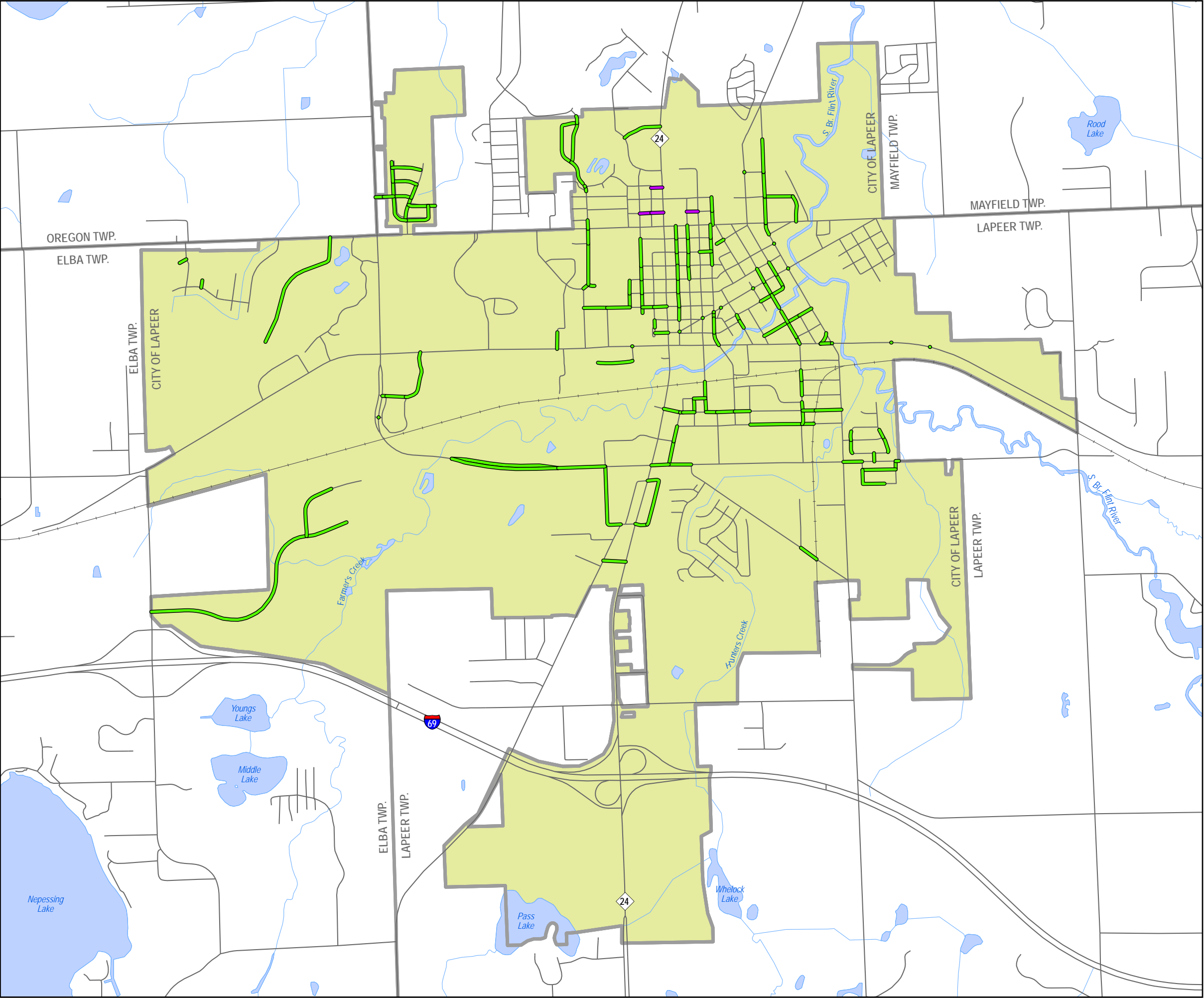


**Year 4 (2022)
CIP Improvements**

- Microseal
- Scrub Seal w/ Micro Top Coat
- Overband Crack Seal
- Crush & Shape/ Resurface

Source: Wade Trim, December 2018

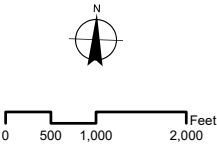




**Year 5 (2023)
CIP Improvements**

- Microseal
- Scrub Seal w/ Micro Top Coat
- Overband Crack Seal
- Crush & Shape/ Resurface

Source: Wade Trim, December 2018





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