



# ***Roadway Asset Management Plan Summary***

**City of Lapeer**

**August 2015**

Prepared by:

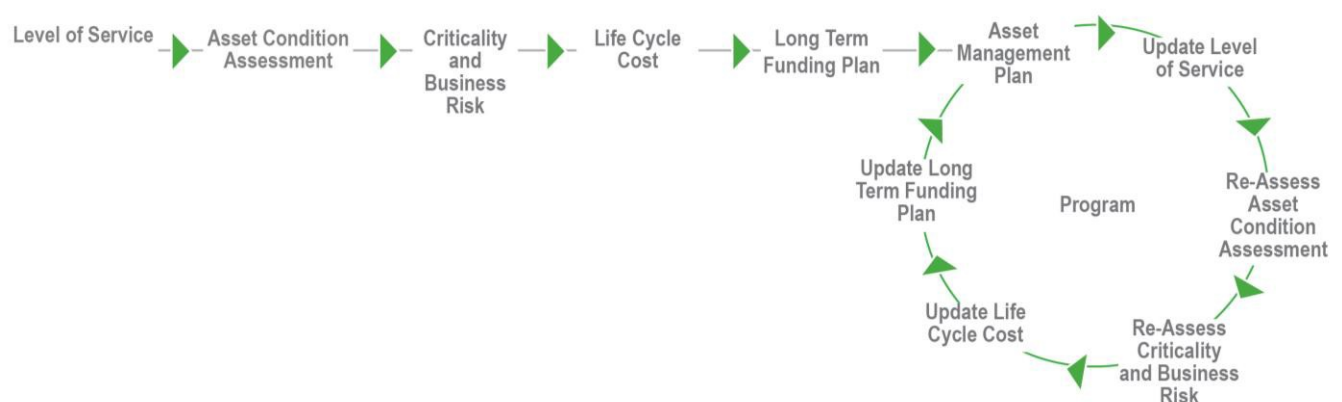


# *Executive Summary*

The City of Lapeer commissioned Wade Trim to complete an Asset Management Plan for the City's road network in 2015. The road network consists of approximately 43.4 miles of City-owned local streets, including 43.0 miles of hard surfaced roads and 0.4 miles of gravel roads, as well as 1.4 miles of public alleys, excluding Michigan Department of Transportation (MDOT) routes and private roads. The purpose of the Plan is to assess the current condition of the road network and evaluate the level of improvement that can be achieved by implementing a road improvement millage. The City's goal is to determine the improvements that can be made with the revenue generated from the most achievable millage rate.

A Roadway Asset Management Plan is a tool that will help the City make decisions on how to manage the network of local roads. These roads represent the millions of dollars of infrastructure investment that have been made over a period of decades. As with most types of infrastructure, roads deteriorate over time due to use and weather and; therefore, require an appropriate level of repair in order to maintain the investment the community has made.

Asset Management, according to Public Act 199 of 2007, means an “ongoing process of maintaining, upgrading, and operating physical assets cost-effectively, based on a continuous physical inventory and condition assessment.” The implementation of asset management decisions processes allows an agency to make the best decisions for their transportation network with the best information they can collect. The process enables good stewardship, transparent decision processes, and measureable performance. The following figure provides an overview of the asset management process.



Source: Asset Management Plan for Pavements: A Template for End Users

The Asset Management Plan is a dynamic, living document which will be updated on a routine basis as all aspects of the Plan will change and new information will become available. The Plan is a method for documenting the City's knowledge of their system and what it will take to keep it functioning. Therefore, it is not only efficient but also 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 Asset Management Plan will define repair strategies that range from minor preventative maintenance to major reconstruction. The plan will also help the City determine the most cost effective manner in which to apply these repairs given certain investment levels. For example, if the City had \$300,000 to invest in the road system each year, the Asset Management Plan can help make decisions on whether it is best to use those funds to crack seal several miles of roads, to overlay a few miles of roads, or to reconstruct a few blocks. The Asset Management Plan can also help to determine if a \$300,000 annual investment in road maintenance is enough to keep the roads in good condition, or if they will become worse over time.

The basic components of an Asset Management Plan are:

- Inventory
- Condition Assessment
- Funding Analysis
- Capital Improvement Plan

The components of the plan are primarily formulated to document:

- The road assets that the City owns.
- The current condition of each of the road assets.
- The funding required to maintain or improve the road network.
- The process for prioritizing and implementing capital improvements.

## **PASER Road Ratings**

An inventory and condition assessment was completed for the City's 43.4 mile road system to determine the current condition of each asset. This is completed by visually inspecting each road segment and assigning a condition rating referred to as the PASER rating. The City has conducted pavement condition ratings since 2002. Each year condition ratings were done for either all of or a portion of the City streets. 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 1 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
7-8	Crack filling
6	Microseal
5	Thin overlay (2-inch)
3-4	Crush and reshape with 2-inch overlay
1-2	Reconstruction

The ratings have been analyzed to produce the results in this report using the Roadsoft software. The PASER ratings have also been uploaded to the State of Michigan Transportation Asset Management Council (TAMC) database, which qualifies the City of Lapeer to be reimbursed for a portion of the cost to obtain the ratings.

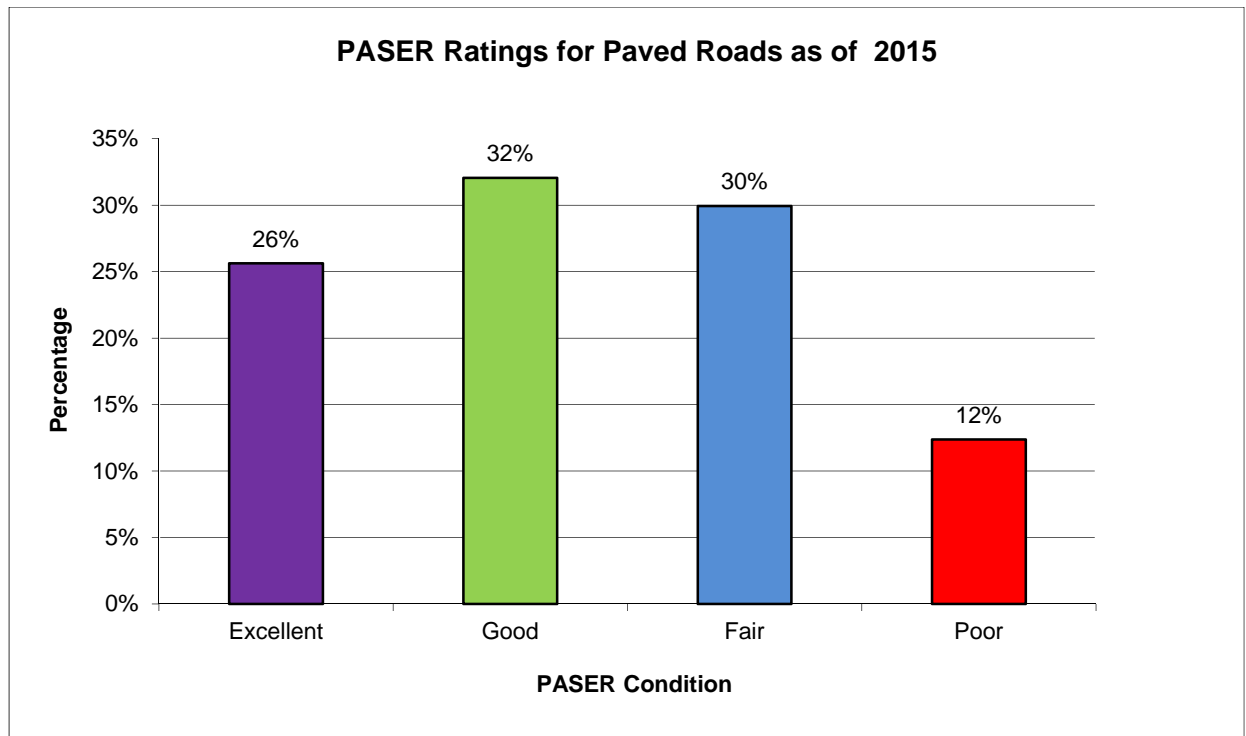
## Paved Roads

The miles of each PASER rating are used to calculate the Surface Quality Index (SQI), which is an indication of the overall condition of the road network. Based on the PASER data obtained in 2015, the average SQI for the City of Lapeer is 5.91. This indicates that overall the roads are in good condition. The SQI will be used as a measure to determine the effectiveness of various levels of investment in the system in the financial analysis.

The following tables represent the mileage of paved roads at each PASER rating and the summary of PASER conditions for the City's road network. Overall, the City's current average SQI is 5.91, generally classified as a system in fair to good condition.

### Existing Surface Quality Index for Paved Roads

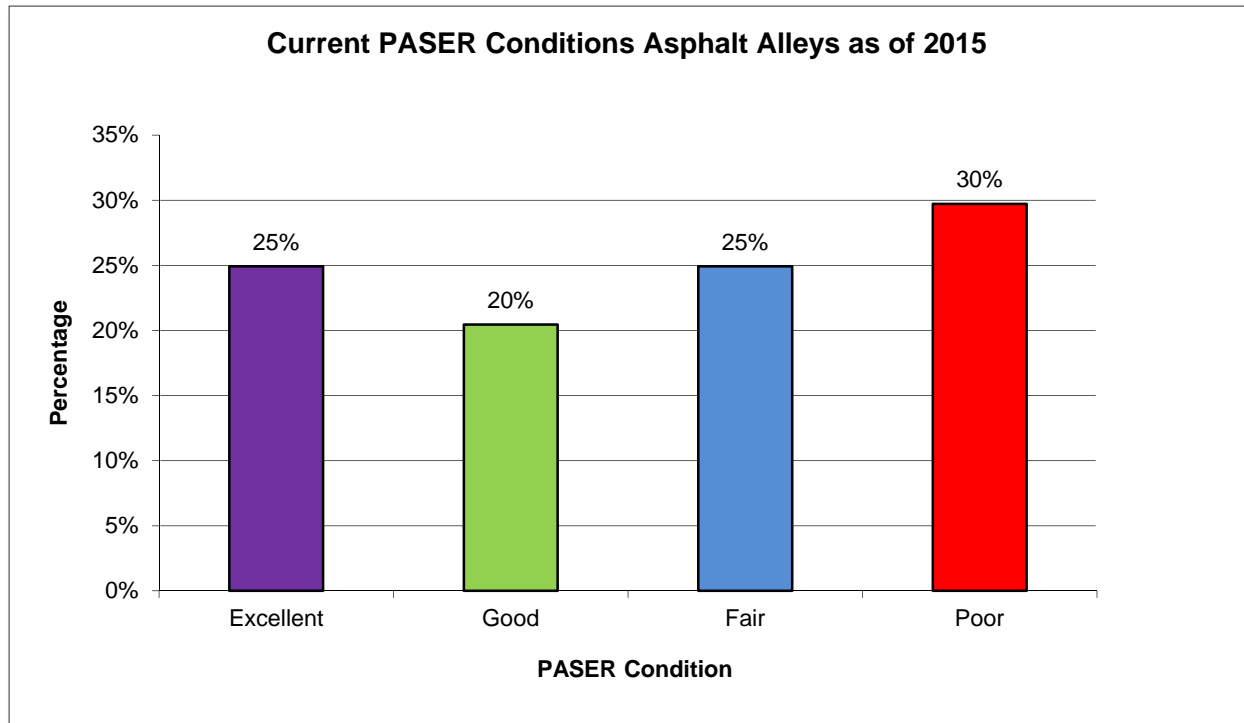
PASER Rating	Miles	Composite SQI
1	0.20	0.20
2	2.60	5.20
3	2.52	7.57
4	5.32	21.29
5	7.55	37.76
6	7.15	42.92
7	6.63	46.43
8	7.00	55.99
9	3.58	32.22
10	0.44	4.41
Total	43.01	253.99
Average SQI		<b>5.91</b>



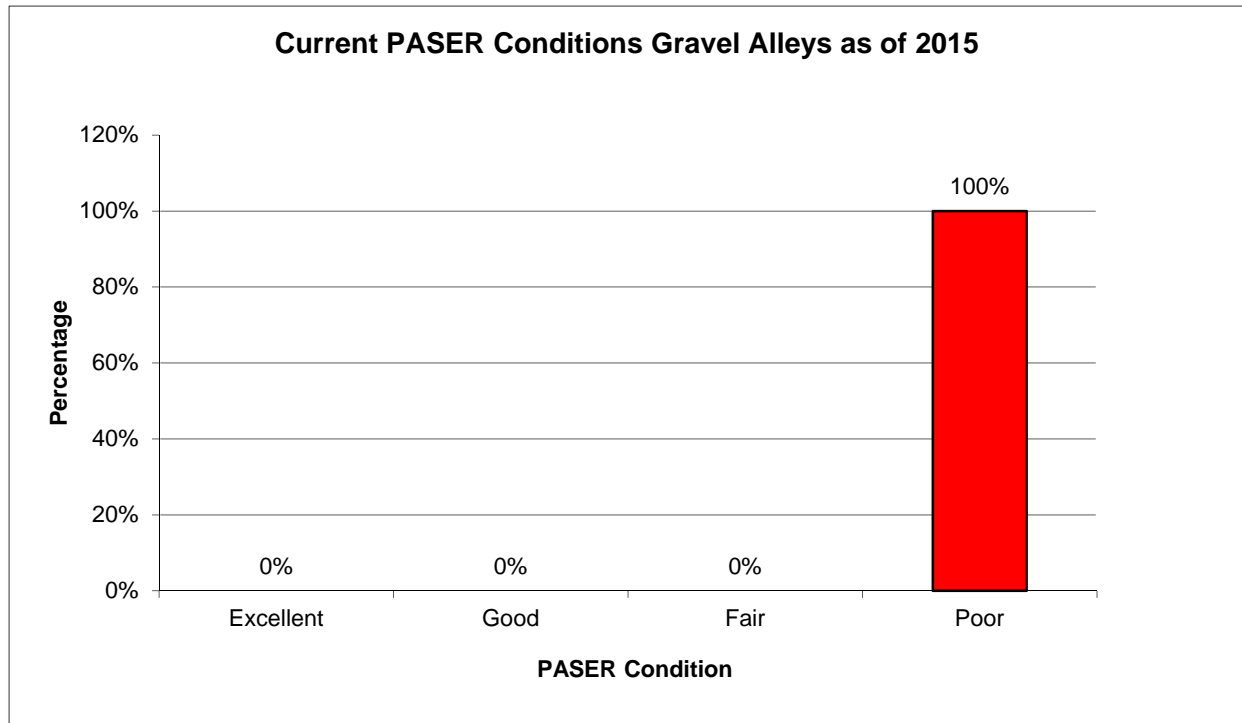
## Alleys

An evaluation of the City alley segments was also completed as part of the analysis. However, alley segments are not public roads and; therefore, are not part of the designated TAMC road system or included in the Roadsoft software and its resulting analyses. The 1.4 miles of alley consisted of various surface types including approximately 0.6 miles of asphalt, 0.4 miles of gravel, and 0.4 miles of undefined surface.

Asphalt alleys were rated using the PASER scale indicated in below for the existing SQI for asphalt alleys. As stated above, the asphalt alleys are not included in the analyses and millage rates provided for public asphalt roads. Since the surface type is the same and the existing SQI is similar, we would recommend the same asphalt mix of fixes for the alleys at the discretion of the City and alternative funding options.



The estimated 0.8 miles of gravel/undefined alleys were rated using a historical PASER 1-5 rating scale, which differs from the 1-10 scale for paved roads and alleys. Since the gravel/undefined segments vary so greatly, it is difficult to provide analyses or recommendations for these alleys. Several segments will need complete reconstruction at the discretion of the City to qualify as gravel roads. Overall, the ratings of the gravel alleys were considered to be in poor condition as denoted in the table below

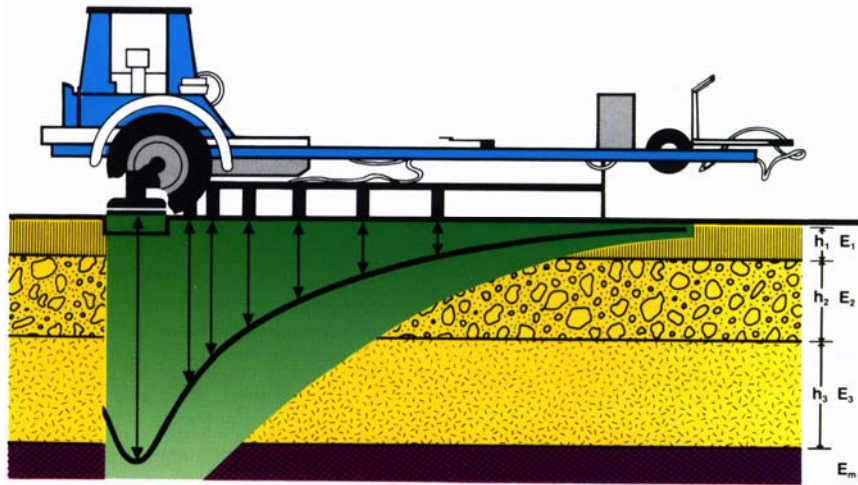


## Field Testing

To supplement the PASER road rating visual evaluation of the road network, non-destructive testing (NDT) was performed utilizing a heavy-weight Falling Weight Deflectometer (FWD). The NDT data was analyzed and included development of the pavement structural number and pavement subgrade modulus. Additionally, the FWD data and the visual condition survey data (PASER ratings) were used to locate pavement core locations to further evaluate the pavement cross-section and subgrade soil conditions. The pavement coring program (destructive testing) was utilized to validate the pavement and subgrade characteristics from the FWD data and further can enhance the capabilities of a Pavement Management System (PMS) by providing more accurate estimates of the pavement structural cross-section and life expectancy of the pavement.

FWD testing was conducted at three load levels to simulate the axle load of vehicles. The load levels included a 9,000 lbf seating load followed by three drops consisting of two 9,000 lbf and one 12,000 lbf to represent typically axle loading. The applied load is measured by a load cell, while the deflections at the pavement surface are measured by high-speed velocity transducers as shown in the graphic below. All operations are computer-controlled from the tow vehicle.

## Typical FWD Load and Sensor Configuration



The NDT measurements were used to evaluate the pavement structural capacity (Structural Number - SN) and the subgrade stiffness (Resilient Modulus – Mr). The subgrade stiffness results are used to judge if subgrade undercutting is anticipated (estimate undercutting quantities), or to provide guidance on when to employ more sophisticated subgrade improvement techniques such as chemical stabilization. This information is valuable in budgeting for construction contingencies.

## Field Testing Results

The field testing will result in a Structural Number (SN) and a Subgrade Modulus (SM) being generated for most PASER road segments. The structural number is indicative of the resilience of the existing pavement and aggregate base section which is applicable to pavement preservation projects such as crack sealing, microsealing, and mill and overlay. The structural number is used to verify that a particular pavement preservation technique is appropriate for a given pavement and can also provide insight into the amount of full depth patching that may be required for mill and overlay projects.

The subgrade modulus is a measure of the stability of the earth below the pavement section. This factor is taken into account when considering pavement rehabilitation or reconstruction that will expose the subgrade such as crush and shape or total reconstruction. The subgrade modulus will help to verify that a particular rehabilitation or reconstruction technique is appropriate and can also provide insight into the amount of subgrade stabilization or replacement that may be necessary to properly support a new pavement section.

## Funding Analysis

The funding analysis is a key component in the Asset Management Plan. This analysis will determine how much investment is required to maintain an asset in its current condition, or at a condition that is deemed to be acceptable to the community. Based on the PASER ratings, an average SQI is determined which indicates the overall condition of the roadway network. The funding analysis will then evaluate various levels of investment in the system and determine the SQI that results for each level of investment. This analysis will show if the current road maintenance funding is resulting in an overall improvement in the road conditions, or is resulting in disinvestment in the system. Funding analysis is typically done for a 10-year or 20-year planning period.

The City of Lapeer is considering assessing a road millage to fund road improvement projects throughout the City. Based on current taxable value, it is estimated that 1 mil could generate approximately \$243,245.00 of revenue. The table below lists all the funding options being considered for this analysis.

### Funding Options

Millage Rate	Estimated Annual Revenue	Estimated 20-Year Revenue
1.0 Mils	\$243,245	\$4,864,900
1.5 Mils	\$364,865	\$7,297,300
2.0 Mils	\$486,490	\$9,729,800
3.0 Mils	\$729,735	\$14,594,700
4.0 Mils	\$972,980	\$19,459,600
4.5 Mils	\$1,094,605	\$21,892,100
5.0 Mils	\$1,216,225	\$24,324,500

The final piece of data necessary for analysis is to develop what treatments, or mix of fixes, shall be applied to the road network. The mix of fixes should be a blend of full reconstruction (RC), rehabilitation (RH), and capital preventative maintenance (CPM). A majority of the roads in the City are asphalt, and the table below lists commonly used treatments for asphalt roads. The minimal portions of concrete roads in the system are located across bridge decks. The following table below lists commonly used treatments for concrete roads.

The associated project costs per mile long road segment (including all travel lanes) are based on estimates generated by Wade Trim and based on input and recent project costs provided by the City, a review of MDOT average costs, and input from Lapeer and Genesee Counties. These costs are likely conservative, but representative of costs that the City would expect on local road projects.

### Asphalt Treatment Options

Treatment	Cost per Mile*
Reconstruct 6" base, 5" top	\$1,747,000
Crush & Shape w/ Overlay	\$873,000
2" Mill & Overlay	\$796,500
Microseal	\$112,500
Crack Filling	\$13,500

\* Assumes two lane road (one lane in each direction)

### Concrete Treatment Options

Treatment	Cost per Mile*
Concrete Reconstruction	\$2,371,500
Full Depth / Slab Replacement w/ Joint repairs	\$961,500
Crack Filling	\$118,500

\* Assumes two lane road (one lane in each direction)

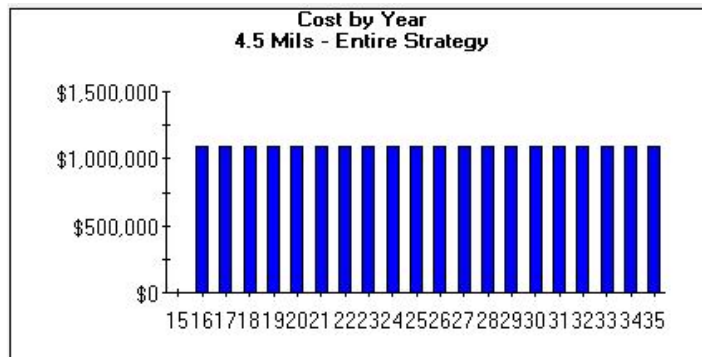
## Funding Scenarios

The report includes a complete evaluation that represents the optimal use of the available funding based on the selected rehabilitation strategies. Some trends can be identified by comparing the before and after average SQL rating and by reviewing the graphs showing the percentage of good, fair, and poor (green, blue, and red respectively).

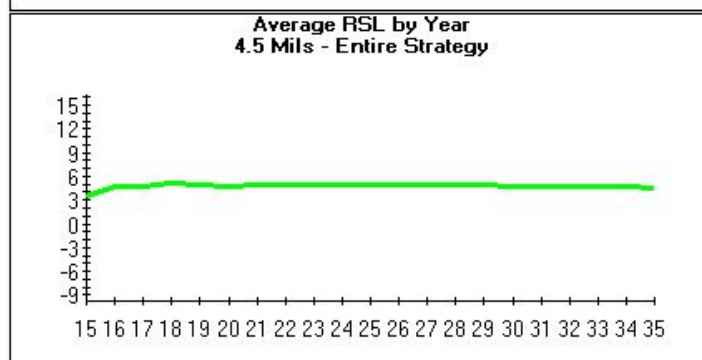
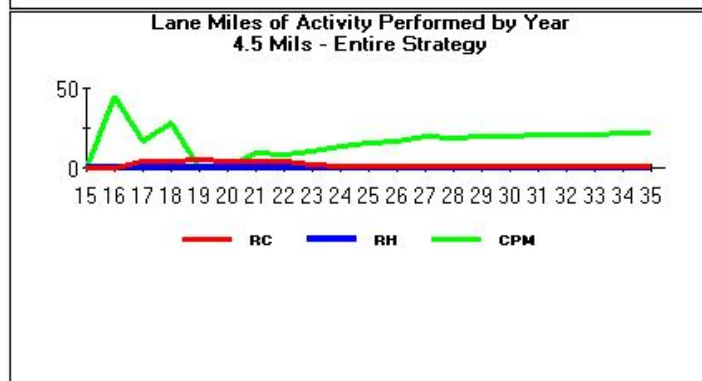
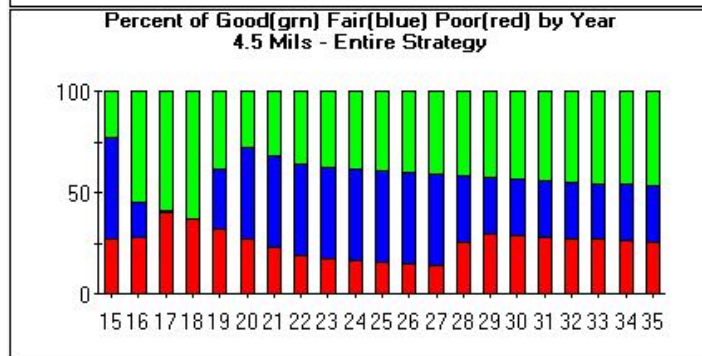
Multiple funding scenarios were evaluated ranging from 1.0 Mills to 5.0 Mills. The first scenario, the “do nothing” scenario, shows what would happen to the road system if no money for maintenance or improvements were invested over the next 20 years. It is estimated that by approximately 2029, all of the roads would be rated in “poor” condition.

Although investments ranging from 1.0 to 4.0 mil scenarios provide a level of improvement into the road network, these levels do not provide adequate funding to sustain or increase the average road rating. This essentially means that the City is dis-investing in the road system. Any of these scenarios provide a slight reduction in the amount of “poor” condition roads, and a slight increase in the amount of “good” condition roads.

The evaluation indicates that it would take approximately a 4.5 mil funding source to maintain the average road rating of 6 for a 20-year program. A sample output from the evaluation software, Roadsoft, for the 4.5 mil scenarios is reflected below. Results of all the funding scenarios can be found in the complete report. It is noted that the software was used to also calculate that the cost of fixing all roads in one year (estimated at \$7,719,155), which would result in an average rating of 6.85.



**4.5 Mil Scenario (Maintain Existing Average Rating)  
20-Year Planning Period  
(2015-2035)**



Each funding scenario has associated with it a recommended Capital Improvement Plan that specified the amount of preventative maintenance, rehabilitation, and reconstruction projects that should be completed each year in order to maximize the return on investment. The capital component for each scenario is included in the complete report.

## **Annual Street Preventative Maintenance Program**

The Department of Public Works has established a comprehensive Street Preventive Maintenance Program working within the funding boundaries established in the Major Street fund 202 and the Local Street fund 203. This plan has been developed over the last four years and is under constant scrutiny for improvements.

Street preventive maintenance components included the following, but are not limited to only these items:

1. Crack Seal all new pavement projects; this includes all seam and around all utility structures and blemishes to seal water from entering the new pavement.
2. Inspection of City streets each year in creating a crack seal plan. As a result of this a majority of the majors Street have had crack seal applied twice.
3. Large pothole locations are reviewed each year. Once a list is created the damaged asphalt area is removed by milling or excavation then replaced with new asphalt. Once completed the seams are sealed with crack seal.
4. Directional symbols are being changed out from painted on symbols to 3M highly reflective material.
5. Street Construction Specification has been changed to include edge drain, increased base material depth and the use of modified HMA.

The Department of Public Works efforts have made visible improvements to the street surface and prevented additional damage and increasing the length of life of the streets. A review of the past decade of street and utility improvements invested in the City through grants and local funding have assisted in the overall condition and average ratings of the road network.

Since 2007, over eight miles of City streets have been improved with road related project costs estimated to be over \$4.4 million. The City's success in capturing grant dollars to assist in funding many of these projects leads to an increased overall road rating and a tremendous cost sharing investment into the City's road and utility systems alike.

## City Infrastructure (Underground Utilities) Considerations

As planning and provisions are made to address the City's aging road system through the capital improvement process, it is imperative to also consider the condition of the underground utilities located within the right of way, especially those utilities such as public water transmission, sanitary sewer and storm sewer systems, that typically are located below the roadway. Planning, budgeting and designing for underground improvement prior to or coinciding with the road improvements will protect the investments through the long term. The City's current proactive approach to updating and improving underground utilities have allowed for many upgrades throughout the City over the past decade. City maps of the various utility improvements can be found in the Appendices.

## Capital Improvement Process

The last component of the Asset Management Plan is development of a Capital Improvement Plan (CIP). The CIP is a listing of projects that are planned based on the needs of the system and available funding. The State-enabling legislation for planning and zoning requires that the local Planning Commission review the proposed CIP to determine if it supports the goals and objectives of the community Master Plan.

The Roadsoft program provides almost all of the information necessary for the City to prepare a CIP for roads. The two missing components are an understanding of local preference when establishing priorities for improvements and incorporating any required underground utility improvements. These component cannot be computer generated; it requires input from local road and DPW staff, elected officials, and residents that can help to reflect the values and priorities of the community. This plan's reports will lay out the process for completing the CIP based on the output from Roadsoft.

It is recommended that a committee of City officials or the use of an current acting board be established that can provide the community input in establishing the priorities for selection of the annual road improvement projects that are part of the CIP. Development of priorities must take into consideration other needed infrastructure (underground utility) improvements, traffic volumes, and other impacts. The data and recommended mix of fixes for the road repairs provided in this Roadway Asset Management report can then be used as the basis for identifying and prioritizing annual projects by the committee.

Once the CIP list is developed for a three to five-year period, it is recommended that defined scope and detailed project cost estimate be developed for the specific road improvement projects in order to refine the costs and planned funding sources. This process is recommended to be completed during the fiscal year budgeting period, or when additional funding sources are being sought. It should be noted that this report is intended to be a fluid document to be revisited and updated on a periodic basis over the 20-year planning period.

## Next Steps

The actions resulting from this Roadway Asset Management Plan are:

- Develop long-term financial plans to plan for enabling annual roadway improvements to the City's road network taking into consideration priorities for improvements and underground utility upgrades and needs;
- Establish a City Committee (or assign to a current acting City Board) to develop upcoming capital road improvement priorities based on fiscal year funding and other decision making factors;
- Review the Roadway Asset Management Plan on an ongoing basis as assumptions forming the basis of the plan are tested and better data becomes available; and,
- Undertake improvements to the road system annually to sustain a rating of fair to good or above.

## Five Year Capital Improvement Recommendations

Based on the Roadsoft program results, as well as the anticipated funding that may be available (2.0 mils), a five year roadway capital improvement plan (CIP) has been developed. It should be noted that the CIP must be reviewed annually as the conditions of each of the roads will change, specifically when improvements to the road segments including the preventative maintenance repairs are completed.

The following table summarizes the Roadsoft software's output for the 2.0 mil funding scenario. Segments of roadways have been selected for improvements based on the evaluation as well as with input from City Staff. A City street map highlighting the recommendations for each of the Five Year CIP is attached to this Executive Summary.

## 2.0 mil Scenario Recommended Improvements

Year 1	Lane Miles	Paser rating	Improves to
Crack filling	28.19	7 & 8	8
Microseal	5.98	6	8
Mill & overlay	0.00	5	9
Crush & reshape	0.00	3 & 4	10
Reconstruction	0.00	1 & 2	10

Year 2	Lane Miles	Paser rating	Improves to
Crack filling	12.88	7 & 8	8
Microseal	7.46	6	8
Mill & overlay	0.00	5	9
Crush & reshape	0.00	3 & 4	10
Reconstruction	0.00	1 & 2	10

Year 3	Lane Miles	Paser rating	Improves to
Crack filling	26.17	7 & 8	8
Microseal	0.73	6	8
Mill & overlay	0.00	5	9
Crush & reshape	1.21	3 & 4	10
Reconstruction	0.00	1 & 2	10

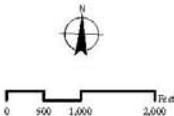
Year 4	Lane Miles	Paser rating	Improves to
Crack filling	0.00	7 & 8	8
Microseal	0.00	6	8
Mill & overlay	0.00	5	9
Crush & reshape	2.10	3 & 4	10
Reconstruction	0.00	1 & 2	10

Year 5	Lane Miles	Paser rating	Improves to
Crack filling	0.00	7 & 8	8
Microseal	0.00	6	8
Mill & overlay	0.00	5	9
Crush & reshape	2.02	3 & 4	10
Reconstruction	0.00	1 & 2	10

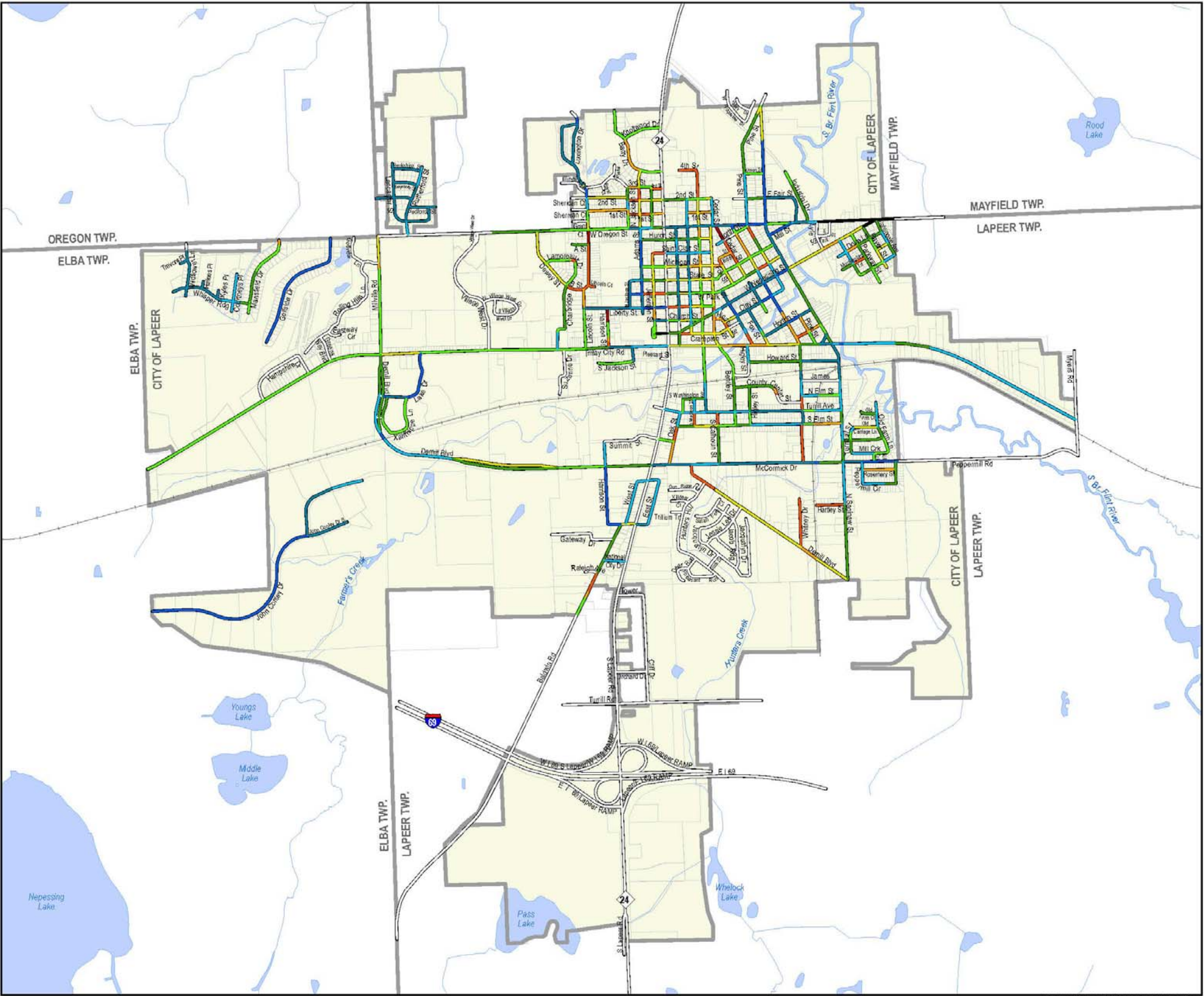
2015 PASER Ratings

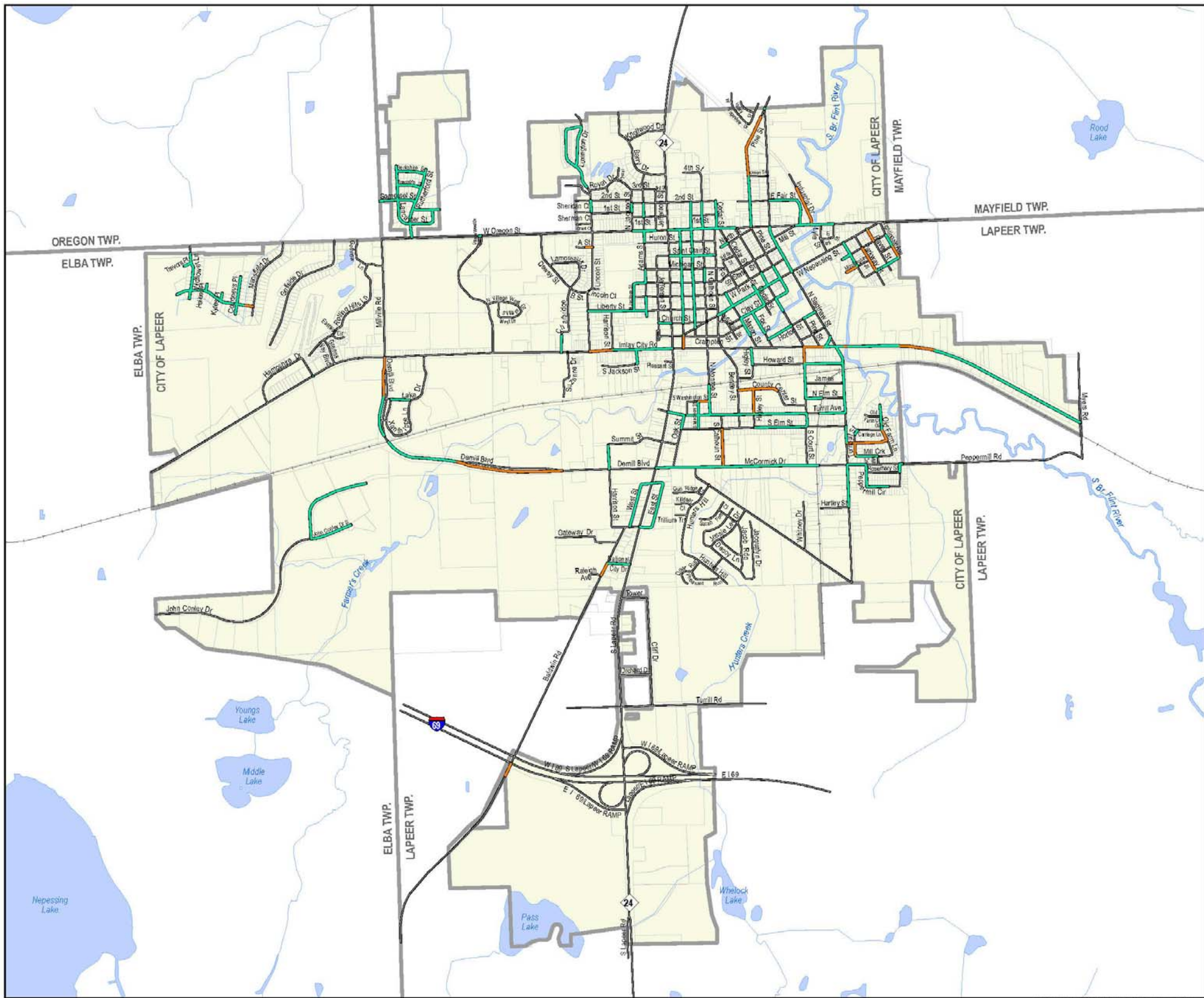
- Road Not Classified
- 1 - Failed
- 2 - Very Poor
- 3 - Poor
- 4 - Fair
- 5 - Fair
- 6 - Good
- 7 - Good
- 8 - Very Good
- 9 - Excellent
- 10 - Excellent

Source: Wade Trim, May 2015  
May 2015



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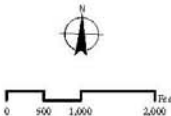
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## Year 1 CIP Improvements

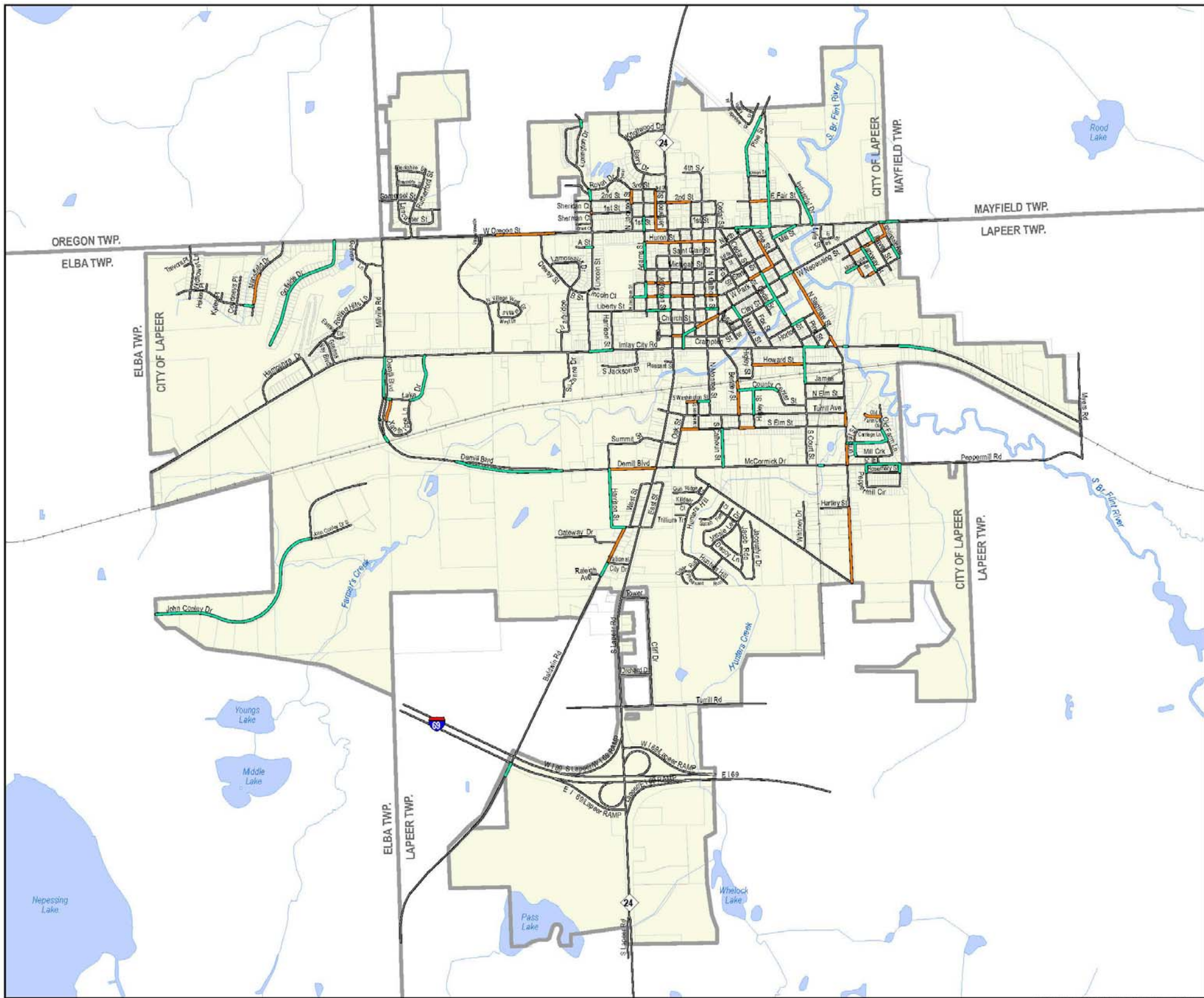
- Crack Filling
- Micro Seal
- Mill & Overlay
- Crush & Reshape
- Reconstruction

Source: Wade Trim, August 2015

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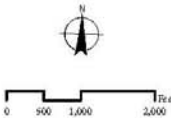
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## Year 2 CIP Improvements

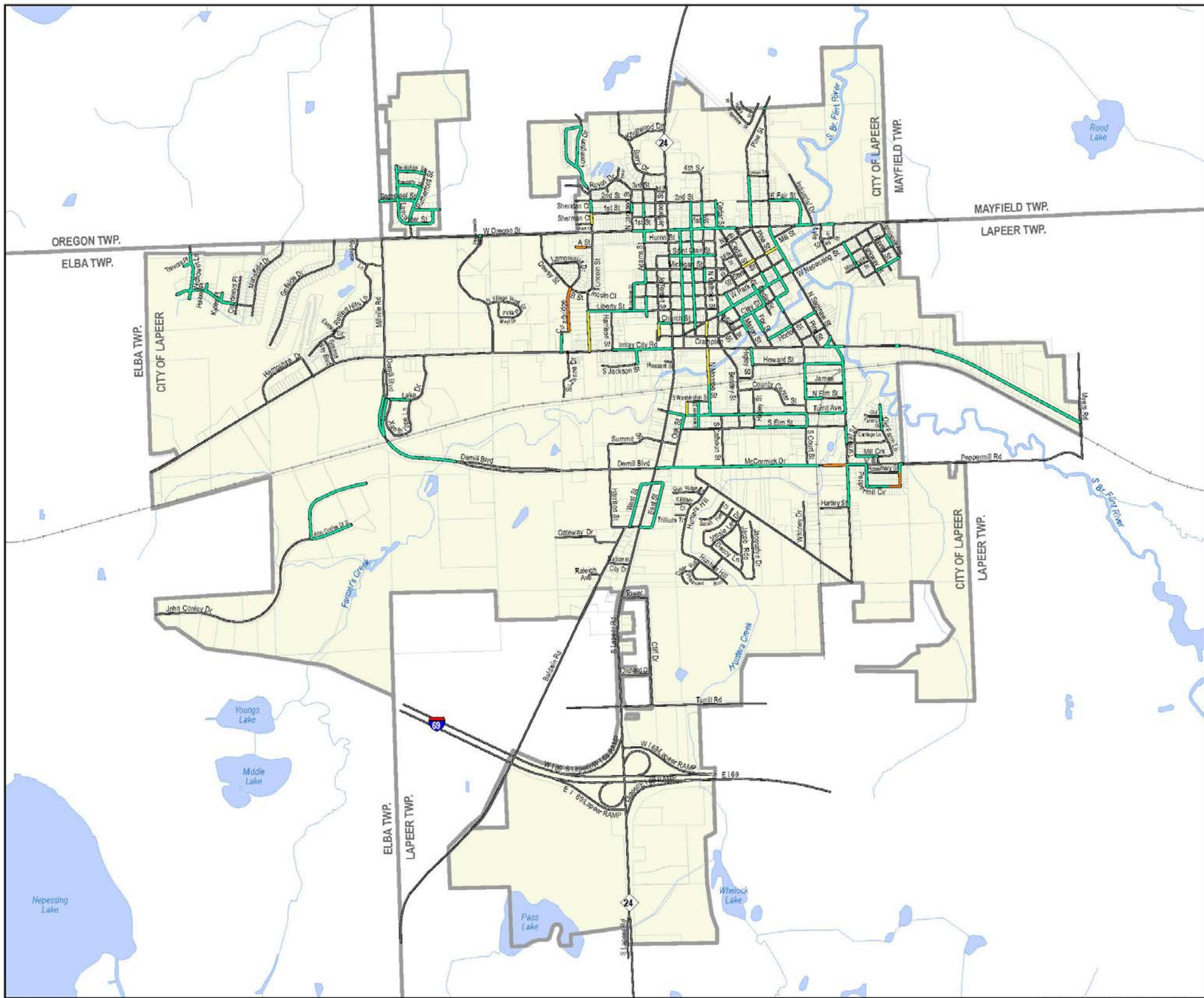
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- Micro Seal
- Mill & Overlay
- Crush & Reshape
- Reconstruction

Source: Wade Trim, August 2015

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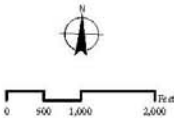
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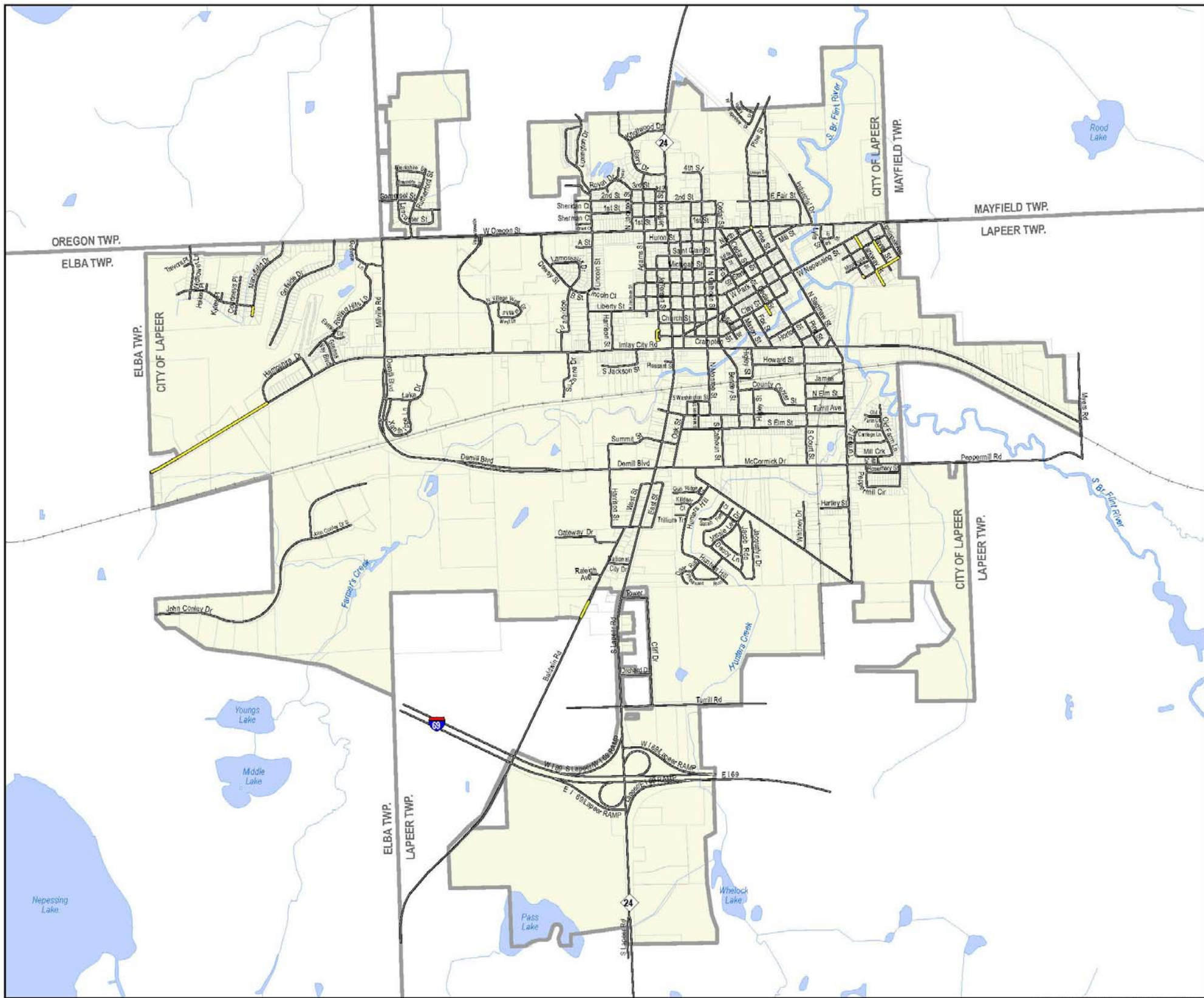
Year 3 CIP Improvements

- Crack Filling
- Micro Seal
- Mill & Overlay
- Crush & Reshape
- Reconstruction

Source: Wade Trim, August 2015  
August 2015



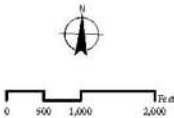
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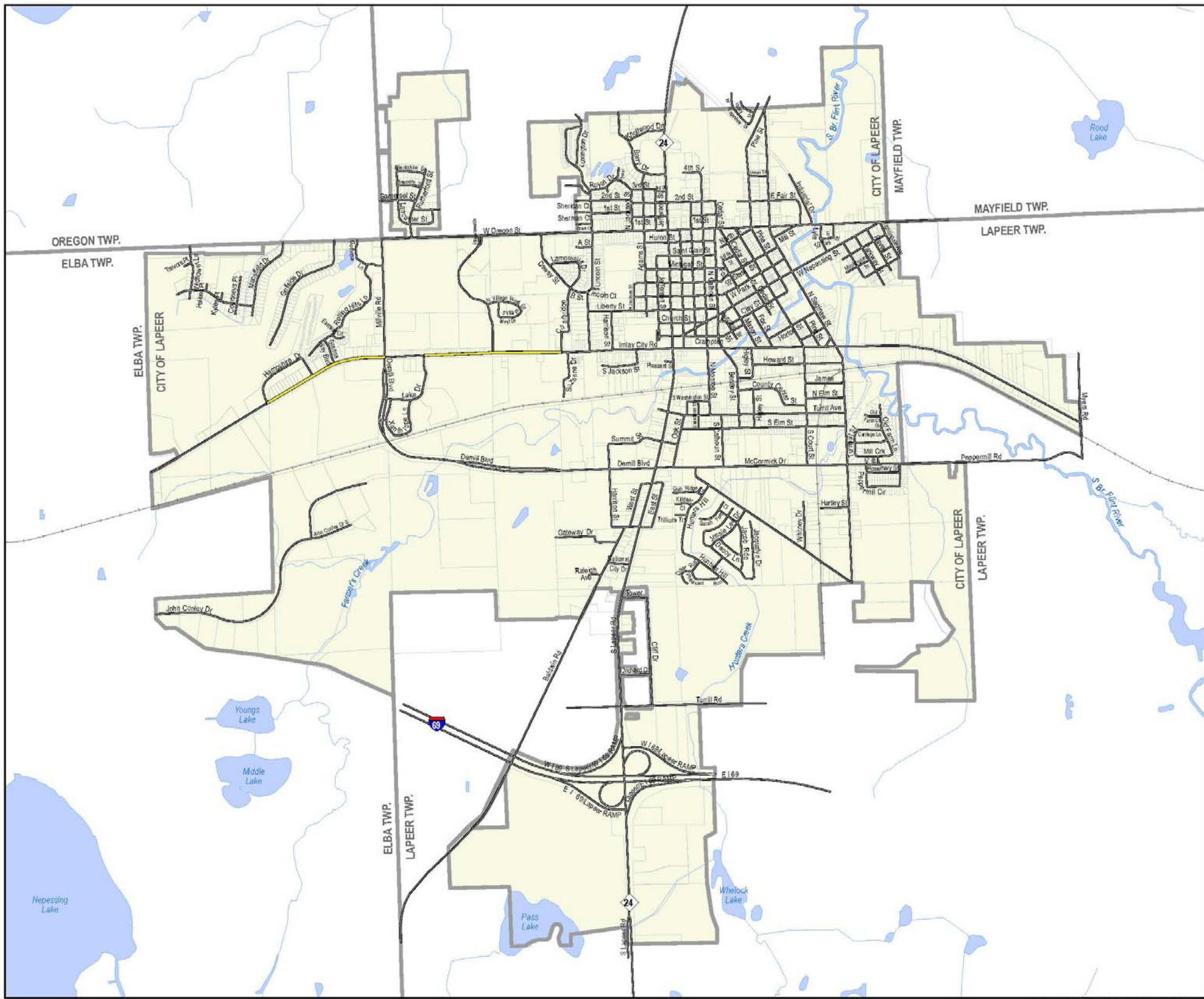
Year 4 CIP Improvements

- Crack Filling
- Micro Seal
- Mill & Overlay
- Crush & Reshape
- Reconstruction

Source: Wade Trim, August 2015  
August 2015



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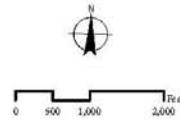


Year 5 CIP Improvements

- Crack Filling
- Micro Seal
- Mill & Overlay
- Crush & Reshape
- Reconstruction

Source: Wade Trim, August 2015

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Prepared by:



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## Roadway Asset Management Plan

The City of Lapeer has requested Wade Trim complete an Asset Management Plan for the City's road network in 2015. The purpose of this report is to assess the current condition of the road network and evaluate the level of improvement that can be achieved by implementing a road improvement millage. The City's goal is to determine the improvements that can be made with the revenue generated from the most achievable millage rate.

A Roadway Asset Management Plan is a tool that helps the City to make decisions on how to manage the network of local roads. These roads represent the millions of dollars of infrastructure investment that have been made over a period of decades. As with most types of infrastructure, roads deteriorate over time due to use and weather and; therefore, require an appropriate level of repair in order to maintain the investment the community has made.

The State of Michigan has been actively pursuing Asset Management since 1998 when the Michigan Legislature established the ACT 51 Transportation Funding Committee. Continued support of Asset Management has occurred as the Legislature established the Transportation Asset Management Council in Act 499 of 2002, encouraged the use of Asset Management in decision processes through Act 338 of 2006, and continued to refine Asset Management in Michigan through Act 199 of 2007.

Asset Management, according to Public Act 199 of 2007, means an "ongoing process of maintaining, upgrading, and operating physical assets cost-effectively, based on a continuous physical inventory and condition assessment." The implementation of asset management decisions processes allows an agency to make the best decisions for their transportation network with the best information they can collect. The process enables good stewardship, transparent decision processes, and measureable performance.

The Asset Management Plan is a dynamic, living document which will be updated on a routine basis as all aspects of the Plan will change and new information will become available. The Plan is a method for documenting the City's knowledge of their system and what it will take to keep it functioning. Therefore, it is not only efficient but also 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 Asset Management Plan will define repair strategies that range from minor preventative maintenance to major reconstruction. The plan will also help the City determine the most cost effective manner in which to apply these repairs given certain investment levels.

For example, if the City had \$300,000 to invest in the road system each year, the Asset Management Plan can help make decisions on whether it is best to use those funds to crack seal several miles of roads, to overlay a few miles of roads, or to reconstruct a few blocks. The Asset Management Plan can also help to determine if a \$300,000 annual investment in road maintenance is enough to keep the roads in good condition, or will they become worse over time.

The basic components of an Asset Management Plan are:

- Inventory
- Condition Assessment
- Funding Analysis
- Capital Improvement Plan

The first step in preparing an Asset Management Plan is to know what assets exist that need to be managed. An inventory of assets in the road network is the backbone for the Asset Management Plan. This inventory data is collected and stored in a software package called Roadsoft. Roadsoft was developed by Michigan Technological University and has been adopted by the State of Michigan as the preferred method of inventorying local, county, and state roadways. The City of Lapeer has conducted an inventory of the local streets dating back to 2002.

Once the assets to be managed are identified, the next step is to determine the current condition of each asset. This is done by visually inspecting each road segment and assigning a condition rating referred to as the PASER rating. The City has conducted pavement condition ratings since 2002. Each year condition ratings were done for either all of or a portion of the City streets. 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. Table 1 is a listing of the PASER system for asphalt roads.

**Table 1. Asphalt PASER Descriptions**

Rating	Visible Distress*
Rating 10 - Excellent	None (New construction).
Rating 9 - Excellent	None (New construction that is 1 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.

(Individual pavements will not have all of the types of distress listed for any particular rating. They may have only one or two types.)

The PASER ratings are used to determine appropriate maintenance and repair strategies. The recommended maintenance/repair for each PASER rating is summarized in Table 2.

**Table 2. Recommended Maintenance and Repairs  
Based on PASER Rating**

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

The next step in preparing the Asset Management Plan is to determine if any of the assets can be considered as critical in the roadway network. Critical assets are either highly subject to failure, or the results of failure would be severe. Examples of critical roadway assets are bridges (severe consequences of failure) or high traffic areas that may be subject to high levels of wear and tear. By their nature road networks tend to have fewer critical assets that would a sanitary sewer or water main asset.

The funding analysis is a key component in the Asset Management Plan. This analysis will determine how much investment is required to maintain an asset in its current condition, or at a condition that is deemed to be acceptable to the community.

Based on the PASER ratings, an average surface quality index (SQI) is determined which indicates the overall condition of the roadway network. The funding analysis will then evaluate various levels of investment in the system and determine the SQI that results for each level of investment. This analysis will show if the current road maintenance funding is resulting in an overall improvement in the road conditions or is resulting in disinvestment in the system. Funding analysis is typically done for a 10-year or 20-year planning period.

The last component of the Asset Management Plan is the Capital Improvement Plan (CIP). The CIP is a listing of projects that are planned based on the needs of the system and the available funding. The State enabling legislation for planning and zoning requires that the local Planning Commission review the proposed CIP to determine if it supports the goals and objectives of the community Master Plan.

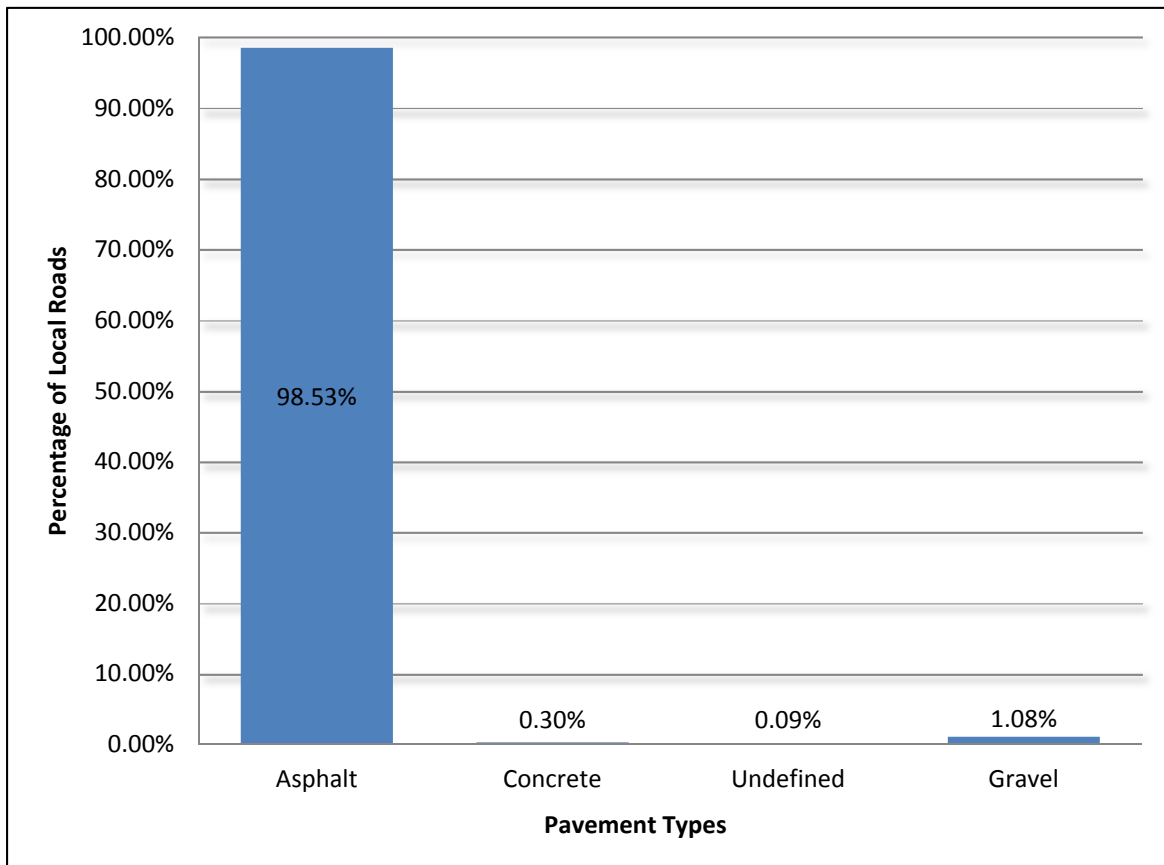
The following sections of the report go into detail on how each component of the Asset Management Plan was prepared and the results of each analysis.

The ratings have been analyzed to produce the results in this report using the Roadsoft software. The PASER ratings have also been uploaded to the State of Michigan Transportation Asset Management Council (TAMC) database, which qualifies the City of Lapeer to be reimbursed for a portion of the cost to obtain the ratings.

## **PASER Ratings**

In order to effectively evaluate the City of Lapeer's transportation system, the existing pavement type must be determined for each of the local roads. The pavement type is identified when the PASER rating is assigned in the field. Figure 1 shows the breakout of pavement types for the local roads. As shown, most of the local roads are asphalt pavement. However, there are also concrete, gravel, and undefined sections of road within the City. The 0.30% of concrete pavement is located at bridge decks. The 0.09% of undefined road references a small portion of dirt road that continues at the end of "A St" (approximately 0.04 miles). The road type will become important when developing a mix of fixes later in the analysis.

**Figure 1. Local Pavement Types**



A visual inspection of all the City road segments was completed by certified Wade Trim personnel in April and June of 2015. The rating team consisted of a driver and technician with a laptop who visually inspected each road segment and determined the PASER rating according to standardized criteria. The PASER ratings have also been uploaded to the State of Michigan Transportation Asset Management Council (TAMC) database, which qualifies the City of Lapeer to be reimbursed for a portion of the cost to obtain the ratings.

### **Paved Roads**

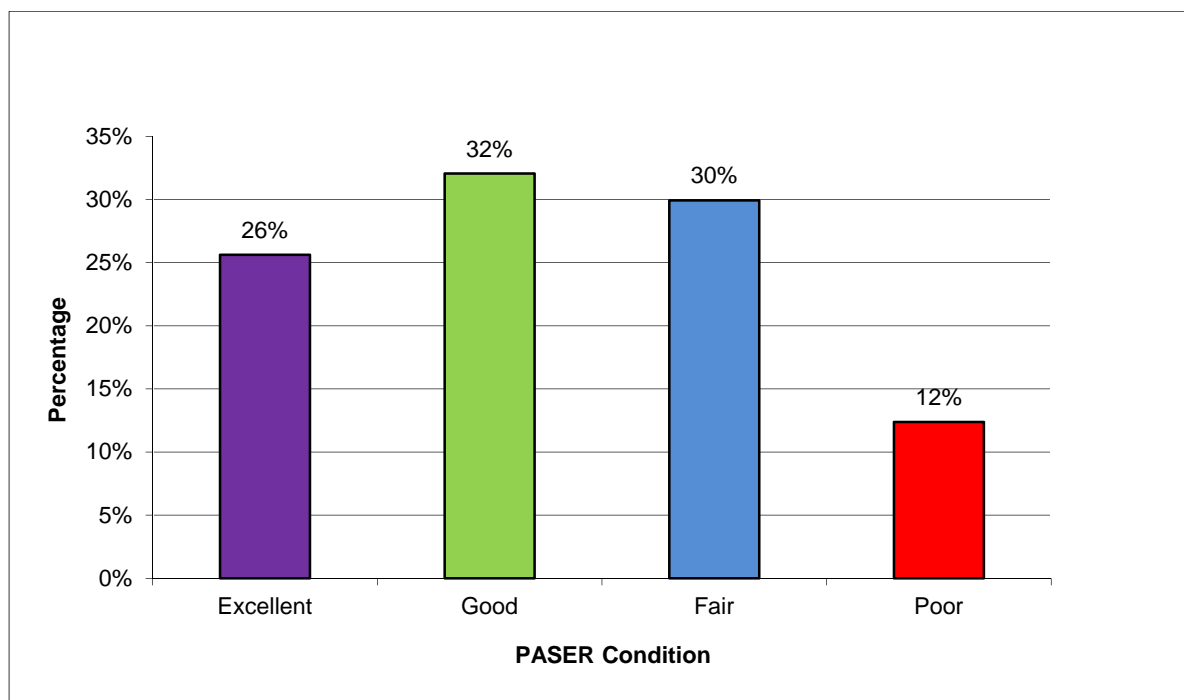
Table 3 lists the mileage of paved roads at each PASER rating. The miles of each PASER rating are used to calculate the SQI, which is an indication of the overall condition of the road network. Based on the PASER data obtained in 2015, the average SQI for the City of Lapeer is 5.91. This indicates that overall the roads are in good condition. The SQI will be used as a measure to determine the effectiveness of various levels of investment in the system in the financial analysis. The existing PASER ratings are broken down by percentage in Figure 2. The excellent category represents a PASER rating of 8 or above.

PASER ratings of 6 and 7 are classified as good, 4 and 5 are classified as fair, and ratings of 3 and below are poor. The ratings follow a normal distribution bell curve with a higher percentage of ratings in the middle and fewer to either extreme.

**Table 3. Existing Surface Quality Index for Paved Roads**

PASER Rating	Miles	Composite SQI
1	0.20	0.20
2	2.60	5.20
3	2.52	7.57
4	5.32	21.29
5	7.55	37.76
6	7.15	42.92
7	6.63	46.43
8	7.00	55.99
9	3.58	32.22
10	0.44	4.41
Total	43.01	253.99
Average SQI		<b>5.91</b>

**Figure 2. PASER Ratings for Paved Roads as of 2015**



## Gravel Roads

Gravel roads and gravel alleys were rated using a historical PASER 1-5 rating scale, which differs from the 1-10 scale for paved roads and paved alleys. Table 4 shows a listing of the PASER system for gravel roads. While it is a very small portion of the overall system (approximately 1.1%), the gravel roadways were evaluated and rated to be in the poor to fair condition.

**Table 4. Gravel PASER Descriptions**

Surface Rating	Visible Distress*
Rating 5 - Excellent	No distress, dust controlled, excellent surface condition and ride.
Rating 4 - Good	Dust under dry conditions, moderate loose aggregate, slight washboarding.
Rating 3 - Fair	Good crown (3"-6"), adequate ditches on more than 50%, moderate washboarding (1"-2" deep) over 10%-25% of the area, moderate dust, rutting less than 1" deep, occasional pothole less than 2" deep, some loose aggregate (2" deep).
Rating 2 - Poor	Little or no crown (less than 3"). Adequate ditches on less than 50%, some areas with little or no aggregate (25%), moderate to severe washboarding (over 3" deep) over 25% of area, moderate rutting (1"-3") over 10%-25% of area, moderate potholes (2"-4") over 10%-25% of area, severe loose aggregate (over 4").
Rating 1 - Failed	No roadway crown, extensive ponding, severe rutting (over 3" deep) over 25% of the area, severe potholes (over 4" deep) over 25% of area, many areas with little or no aggregate.

(Individual pavements will not have all of the types)

## Alleys

A visual inspection of 1.4 miles of alley segments was completed by certified Wade Trim personnel on July 6, 2015. Alley segments are not public roads and; therefore, are not part of the TAMC road system. The alleys are rated on a PASER scale. However, they are not included in the Roadsoft software and its resulting analyses. The 1.35 miles of alley consisted of various surface types including approximately 0.55 miles of asphalt, 0.4 miles of gravel, and 0.4 miles of undefined surface.

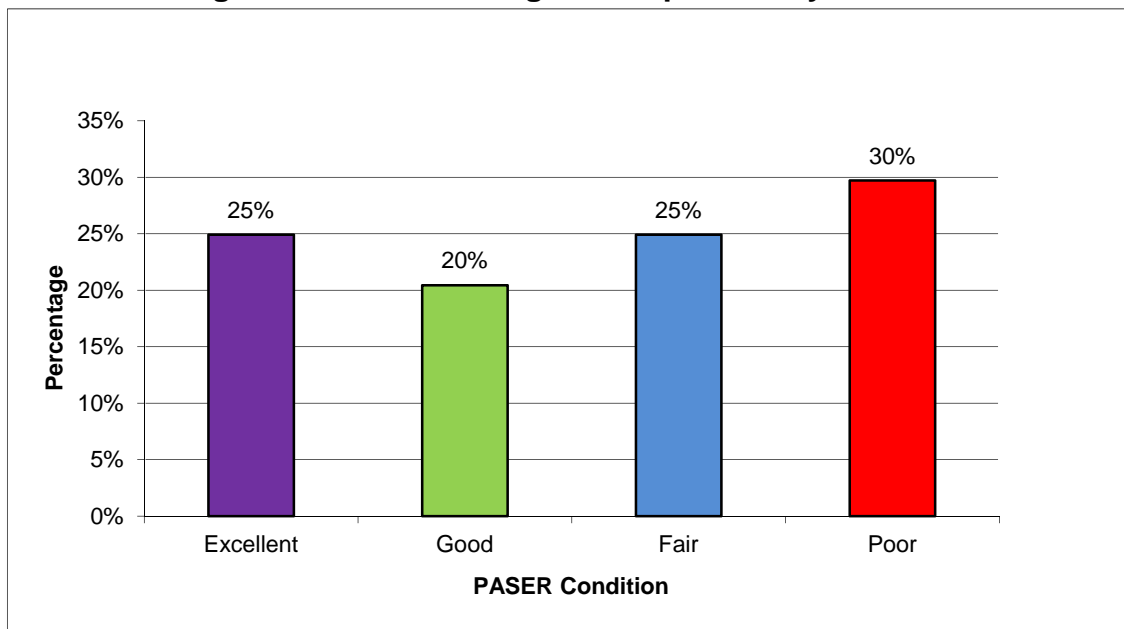
### Asphalt

Asphalt alleys were rated using the PASER scale indicated in Table 1. See Table 5 for the existing SQI for asphalt alleys. As stated above, the asphalt alleys are not included in the analyses and millage rates provided for public asphalt roads. Since the surface type is the same and the existing SQI is similar, we would recommend the same asphalt mix of fixes for the alleys at the discretion of the City and alternative funding options.

**Table 5. Existing Surface Quality Index for Asphalt Alleys**

Rating	Miles	Average SQI
1	0.05	0.05
2	0.00	0.00
3	0.08	0.23
4	0.17	0.69
5	0.00	0.00
6	0.00	0.00
7	0.12	0.85
8	0.05	0.39
9	0.10	0.89
10	0.00	0.00
Total	0.57	3.10
Average SQI		<b>5.46</b>

**Figure 3. PASER Ratings for Asphalt Alleys as of 2015**



## Gravel

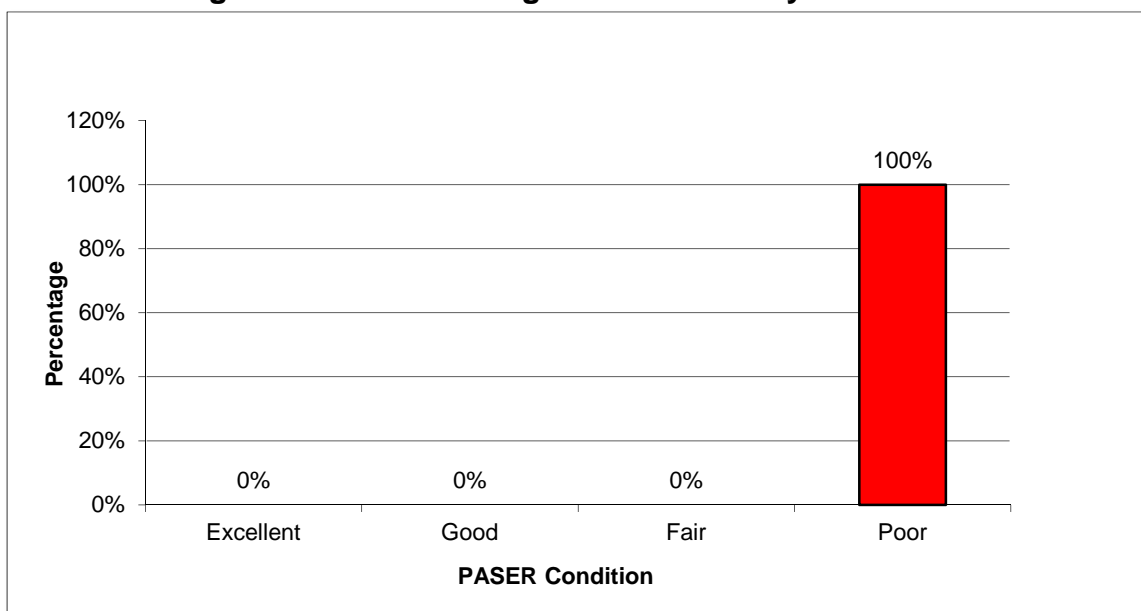
Gravel alleys were rated using a historical PASER 1-5 rating scale, as referenced above in the gravel road section. While all gravel roads were rated according to this scale, almost half of the gravel alleys (0.4 miles) resemble undefined two-tracks more similarly than gravel roads. These undefined surfaces were rated as a 1, as they have technically failed as gravel surfaces. Table 6 shows the existing SQI for gravel/undefined alley segments.

Since the gravel/undefined segments vary so greatly, it is difficult to provide analyses or recommendations for these alleys. Several segments will need complete reconstruction at the discretion of the City to qualify as gravel roads. Photos of all alley segments that do not fall under the asphalt surface type are provided in the Appendix for reference.

**Table 6. Existing Surface Quality Index for Gravel Alleys**

Rating	Miles	Average SQI
1	0.46	0.46
2	0.24	0.48
3	0.08	0.24
4	0.00	0.00
5	0.00	0.00
Total	0.78	1.19
Average SQI		1.51

**Figure 4. PASER Ratings for Gravel Alleys as of 2015**



## Field Testing

Based on a visual condition survey provided by Wade Trim, SME performed non-destructive testing (NDT) of the City street network utilizing a heavy-weight Falling Weight Deflectometer (FWD). FWD testing was conducted over a period of four (4) days by SME starting on May 18, 2015, and completed on May 21, 2015. SME FWD test equipment is shown in Figure 5.

**Figure 5. SME's Falling Weight Deflectometer (FWD)**

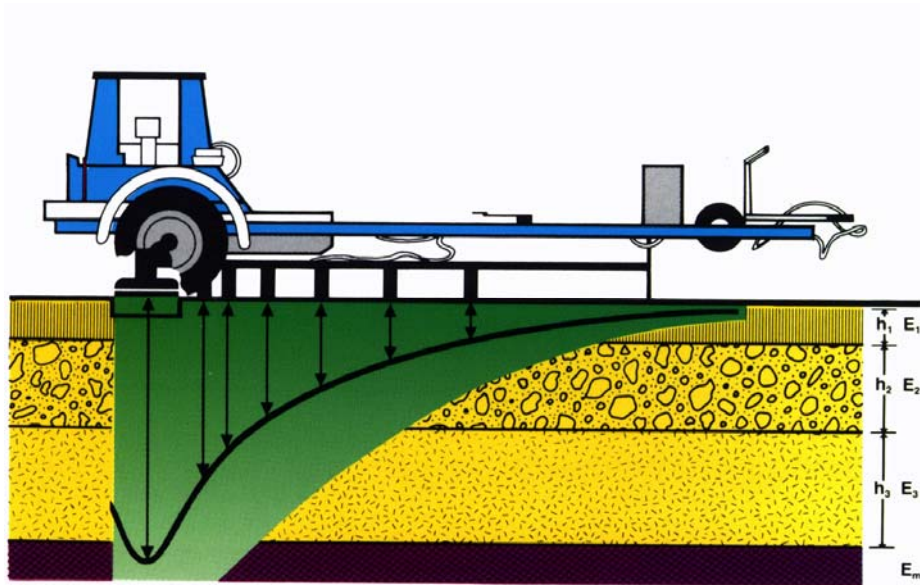


The FWD test program included the participation of a City of Lapeer representative operating a truck with arrow board which provided localized traffic control. The NDT data was analyzed by an experienced Pavement Engineer and included development of the pavement structural number and pavement subgrade modulus. The FWD data and visual condition survey data (PASER ratings) were used to locate pavement core locations to further evaluate the pavement cross-section and subgrade soil conditions. The pavement coring program (destructive testing) is required to validate the pavement and subgrade characteristics from the FWD data and further can enhance the capabilities of a Pavement Management System (PMS) by providing more accurate estimates of the pavement structural cross-section and life expectancy of the pavement.

SME conducted the FWD testing at three load levels to simulate the axle load of vehicles. The load levels included a 9,000 lbf seating load followed by three drops consisting of two 9,000 lbf and one 12,000 lbf to represent typically axle loading.

The applied load is measured by a load cell, while the deflections at the pavement surface are measured by high-speed velocity transducers (Figure 6). All operations are computer controlled from the tow vehicle.

**Figure 6. Typical FWD Load and Sensor Configuration**



The surface deflections are then recorded with the sensors spaced at 0 (at load plate), 8, 12, 18, 24, 36, and 60 inches in front of the load plate. The NDT measurements were used to evaluate the pavement structural capacity (Structural Number - SN) and the subgrade stiffness (Resilient Modulus – Mr). The subgrade stiffness results are used to judge if subgrade undercutting is anticipated (estimate undercutting quantities), or to provide guidance on when to employ more sophisticated subgrade improvement techniques such as chemical stabilization. This information is valuable in budgeting for construction contingencies.

The results of the testing and analysis are graphically depicted as Figure SN-1 and MR-1, appended to this report. SN-1 graphically presents the calculated pavement Structural Number for the tested street network. MR-1, also appended, indicates the calculated subgrade stiffness. Each drawing presents the data points plotted in color by a range of values, which are also tabulated on each sheet. The analytic output of the FWD software is included as a spreadsheet, prepared by street name and distance. Test coordinates are also provided in the tabulation.

## Field Testing Results

The field testing will result in a Structural Number (SN) and a Subgrade Modulus (SM) being generated for most PASER road segments. The structural number is indicative of the resilience of the existing pavement and aggregate base section which is applicable to pavement preservation projects such as crack sealing, microsealing, and mill and overlay. The structural number is used to verify that a particular pavement preservation technique is appropriate for a given pavement and can also provide insight into the amount of full depth patching that may be required for mill and overlay projects.

The subgrade modulus is a measure of the stability of the earth below the pavement section. This factor is taken into account when considering pavement rehabilitation or reconstruction that will expose the subgrade such as crush and shape or total reconstruction. The subgrade modulus will help to verify that a particular rehabilitation or reconstruction technique is appropriate and can also provide insight into the amount of subgrade stabilization or replacement that may be necessary to properly support a new pavement section.

Tables 7 and 8 give parameters for classifying the results of the structural number and subgrade modulus testing in relation to the PASER recommended improvements. These tables are based on a medium duty pavement (such as would be found on local roads) and AASHTO 1993 layer coefficients.

**Table 7. Structural Number Pavement Condition**

SN Range	HMA Pavement Condition	Pavement Rehabilitation Program	Cost Factor
SN < 2	Very Poor	<b>Major Rehabilitation:</b> Full reconstruction; Full depth reclamation	Add 15%
2 < SN < 3	Poor	<b>Major Rehabilitation:</b> Crush and Shape; Full depth HMA mill and overlay with base preparation	Add 10%
3 < SN < 4	Marginal	<b>Surface/Ride Quality Improvement:</b> Partial depth mill and overlay (may require full depth patching)	Add 5%
SN > 4	Good	<b>Routine Maintenance:</b> Crack filling, Microsealing	

**Table 8. Subgrade Modulus Condition**

Subgrade Modulus (psi)	Subgrade Condition	Subgrade Rehabilitation Program	Cost Factor
1,800 – 5,400	Very Poor	Likely to include subgrade stabilization with geosynthetics or chemical process, or engineered soil replacement. Anticipate drainage improvements. <b>Dependent on type and condition of subgrade soils. Requires further evaluation and testing prior to design process.</b>	Add 15%
5,400 – 9,000	Poor	Likely to include subgrade stabilization with geosynthetics or chemical process, or engineered soil replacement. Anticipate drainage improvements. <b>Dependent on type and condition of subgrade soils. Requires further evaluation and testing prior to design process.</b>	Add 10%

9,000 – 18,000	Marginal	May require subgrade stabilization with geosynthetics or chemical process at lower end values as identified during proof roll, especially for heavy duty pavement sections. Anticipate some subgrade drainage improvements.	Add 5%
> 18,000	Good	May require subgrade drainage enhancement.	

Incremental cost factors are recommended to be applied to the unit costs for various pavement rehabilitation and reconstruction to account for subsurface conditions. For pavement rehabilitation such as mill and overlay, the unit cost factor should be applied so that the cost of any full depth pavement patching is planned for in the budgeting process. Likewise, for projects that involve replacement of the pavement section including crush and reshape, full depth mill and overlay and reconstruction, the cost factor should be applied to the unit cost as a budgetary estimate of necessary subgrade corrections.

In addition to the FWD non-destructive testing, the City also requested soil borings on selected roadways that had a PASER rating of 4 or less. The soil boring logs are included in the appendix of the report and can be used for project-level design and decision making for specific projects.

## Roadsoft Analysis

The Roadsoft program is capable of performing analysis on the road network to determine the most cost effective maintenance and rehabilitation strategy for a given set of roadway segments. The basis of the analysis is defining a deterioration curve that describes and predicts how a pavement will change over time. A brand new pavement is given a rating of 10. Over time the pavement deteriorates and the rating goes down. When maintenance is applied to the roadway, the rating goes up again and the cycle starts over. The program is capable of tracking the current condition of each segment in the roadway network and can predict, based on the deterioration curve, how those pavements will perform in the future.

The program requires several data inputs to complete the analysis. These include the PASER ratings, a definition of the deterioration curve, the maintenance and rehabilitation strategies that are to be considered in the analysis (often referred to as the “mix of fixes”), and a level of investment that will be analyzed. The program considers whether it is more cost effective to allow a good pavement to age and fail before it is repaired, or to apply maintenance and strive to keep the good pavement in good condition. For example, a road segment that is assigned a PASER rating of 7 is a candidate for crack sealing, a maintenance activity that will increase the condition rating from 7 to 9. The pavement will slowly decrease from 9 to 7 over a period of years, then a second crack sealing application can again increase the rating back to 9. This cycle of routine maintenance has a cost associated with it. A second alternative would be to allow the pavement rated at a 7 to continue to wear over time until it is rated at a 5 and a candidate for a mill and overlay treatment.

This activity would also increase the pavement rating to a 9, but at a different level of investment and over a different period of time. The Roadsoft program considers all possible combinations of maintenance and cost to arrive at an optimized solution for pavement management.

Often the recommended maintenance program will be impacted or limited by the available funding that can be invested into the road network and necessary underground utility improvements. The program can be run at several different levels of investment and will maximize the return on investment for each funding scenario.

## Funding Source Evaluation

The City of Lapeer is considering assessing a road millage to fund road improvement projects throughout the City. Based on current taxable value, it is estimated that 1 mil could generate \$243,245.00. Table 9 lists all the funding options being considered for this analysis.

**Table 9. Funding Options**

Millage Rate	Estimated Annual Revenue	Estimated 20-Year Revenue
1.0 Mils	\$243,245	\$4,864,900
1.5 Mils	\$364,865	\$7,297,300
2.0 Mils	\$486,490	\$9,729,800
3.0 Mils	\$729,735	\$14,594,700
4.0 Mils	\$972,980	\$19,459,600
4.5 Mils	\$1,094,605	\$21,892,100
5.0 Mils	\$1,216,225	\$24,324,500

The final piece of data necessary for analysis is to develop what treatments, or mix of fixes, shall be applied to the road network. The mix of fixes should be a blend of full reconstruction (RC), rehabilitation (RH), and capital preventative maintenance (CPM). A majority of the roads in the City are asphalt, and Table 10 lists commonly used treatments for asphalt roads. The minimal portions of concrete roads in the system are located across bridge decks. Table 11 lists commonly used treatments for concrete roads. The associated costs per mile long road segment (including all travel lanes) are based on estimated generated by Wade Trim and based on input and recent project costs provided by the City, a review of MDOT average costs, and input from Lapeer and Genesee Counties. These costs are felt to be conservative, but representative of costs that the City would expect on local road projects. Supporting cost data for each of the roadway treatment options can be found in the Appendices.

**Table 10. Asphalt Treatment Options**

<b>Treatment</b>	<b>Cost per Mile*</b>
Reconstruct 6" base, 5" top	\$1,747,000
Crush & Shape w/ Overlay	\$873,000
2" Mill & Overlay	\$796,500
Microseal	\$112,500
Crack Filling	\$13,500

\*Assumes two lane road (one lane in each direction)

**Table 11. Concrete Treatment Options**

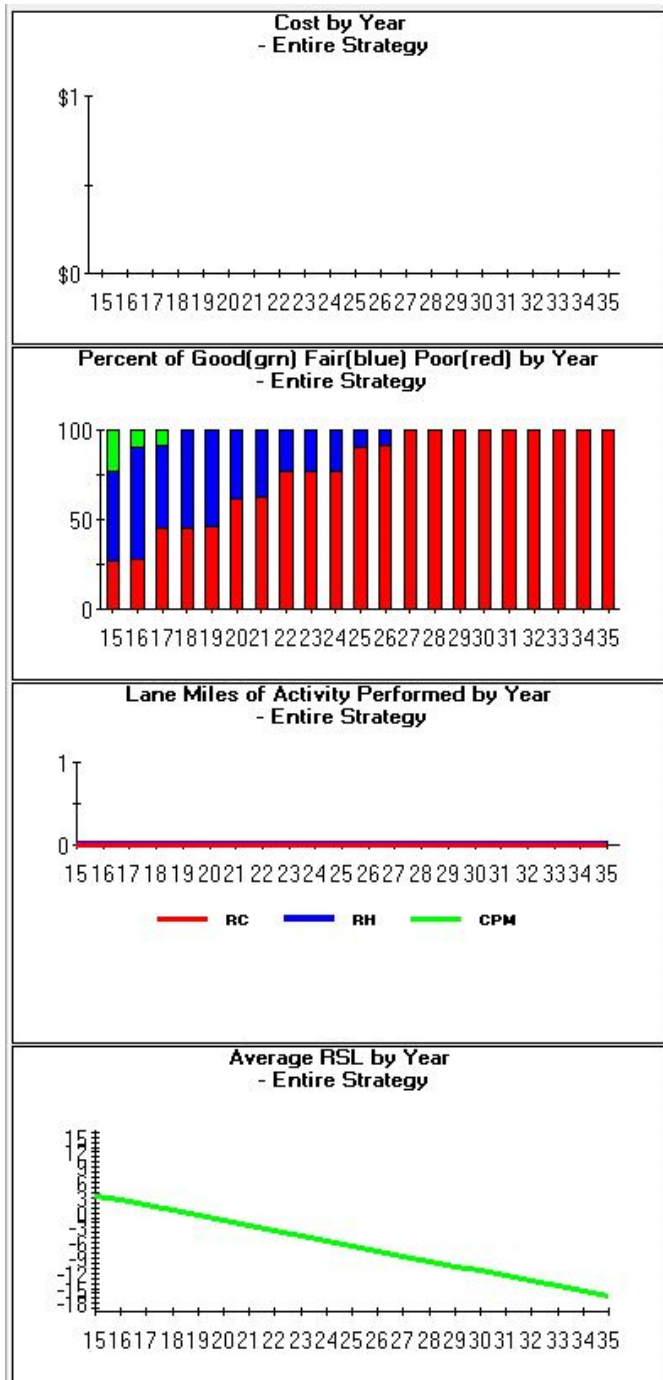
<b>Treatment</b>	<b>Cost per Mile*</b>
Concrete Reconstruction	\$2,371,500
Full Depth / Slab Replacement w/ Joint repairs	\$961,500
Crack Filling	\$118,500

\*Assumes two lane road (one lane in each direction)

## **Base Level Investment**

The following pages are the results from running the Roadsoft analysis using the different funding levels and the treatments listed above. The analysis was performed by using the Strategy Evaluation and Optimization module within Roadsoft. The graphs below will show the cost per year, road condition based on percentage, lane miles of activity broken down by RC, RH, and CPM, and the final graph represents the average remaining service life of the pavements. The estimated SQI was also calculated at the end of the 20-year period to better show how the pavement conditions are changing. An important note to add about the following analysis is that it does not address any of the gravel roads within the City. Only the hard surfaces were used to show how, after applying treatments, the surface rating improves and slows the rate of deterioration.

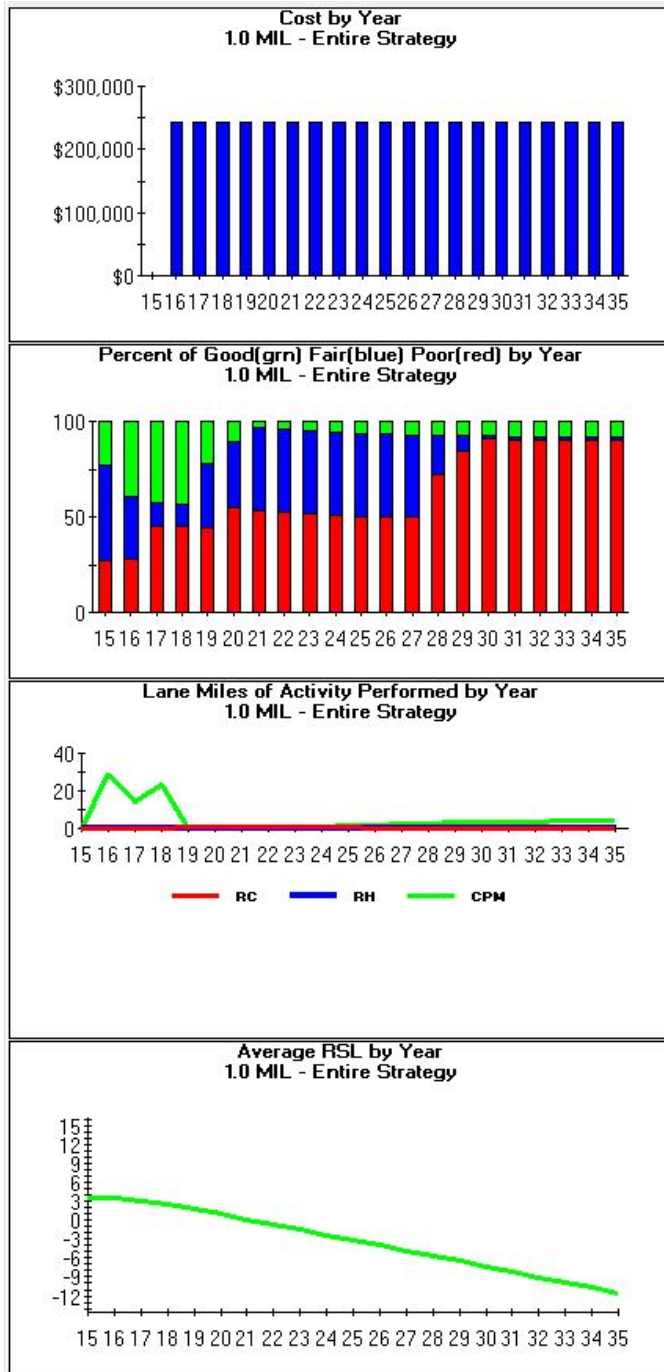
**“Do Nothing” Scenario  
20-Year Planning Period (2015-2035)**



Rating	Miles	Average SQI
1	33.01	33.01
2	9.92	19.85
3	0.10	0.29
4	0.00	0.00
5	0.00	0.00
6	0.00	0.00
7	0.00	0.00
8	0.00	0.00
9	0.00	0.00
10	0.00	0.00
	43.03	53.14
		1.24



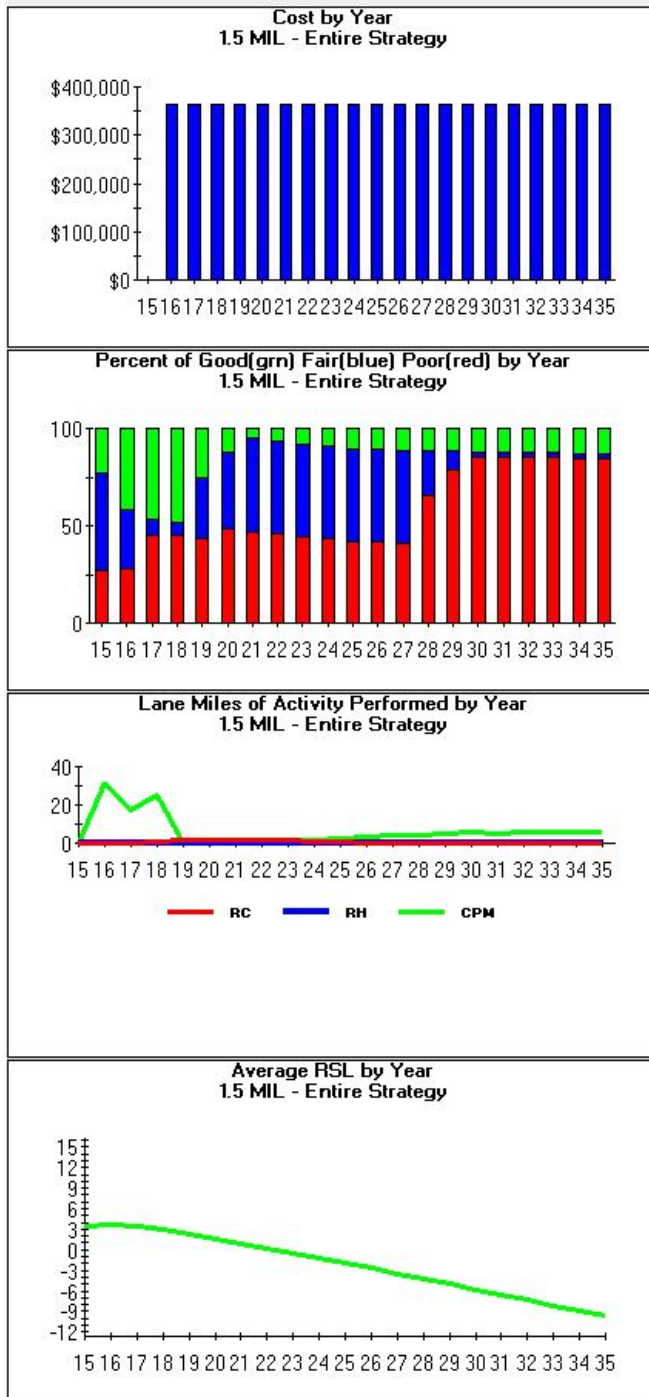
## 1.0 Mil Scenario 20-Year Planning Period (2015-2035)



Rating	Miles	Average SQI
1	20.62	20.62
2	15.12	30.24
3	2.89	8.68
4	0.00	0.00
5	0.00	0.00
6	0.00	0.00
7	0.59	4.11
8	3.65	29.17
9	0.09	0.85
10	0.07	0.69
	43.03	94.36
		<b>2.19</b>



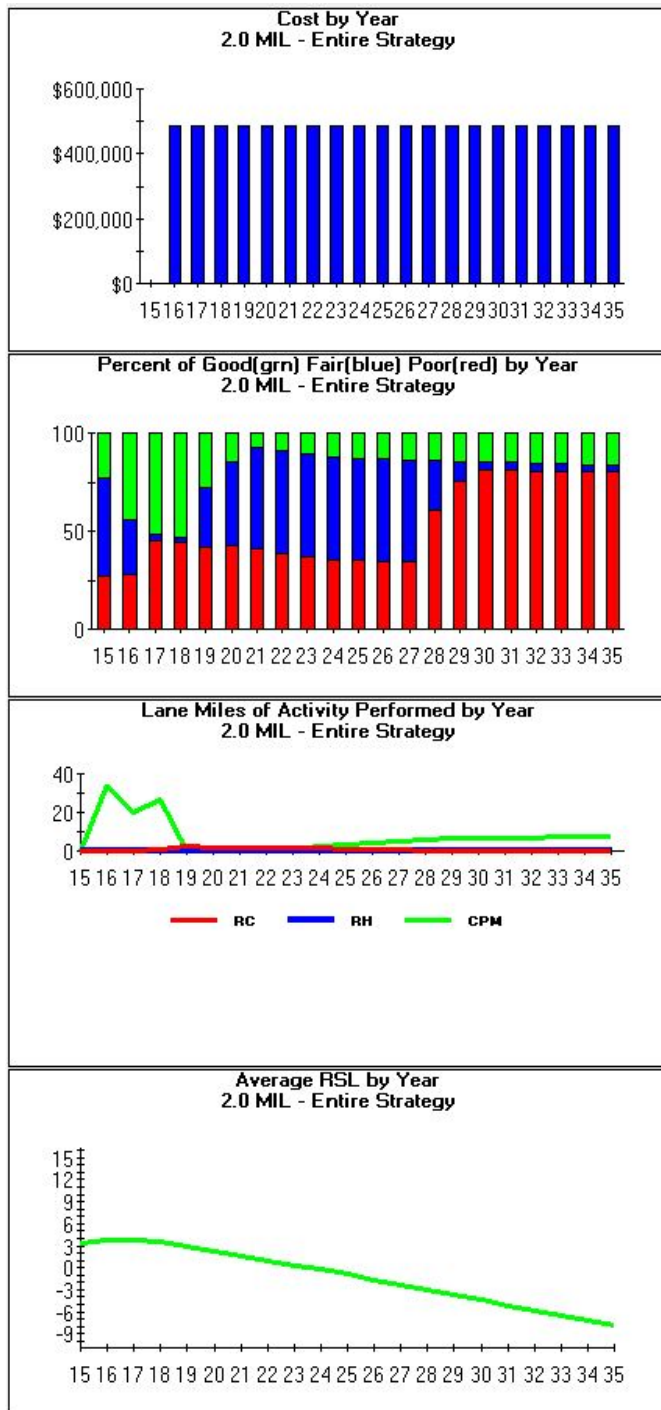
## 1.5 Mil Scenario 20-Year Planning Period (2015-2035)



Rating	Miles	Average SQI
1	16.68	16.68
2	16.60	33.21
3	2.85	8.54
4	0.00	0.00
5	0.00	0.00
6	0.00	0.00
7	1.10	7.71
8	5.57	44.58
9	0.12	1.12
10	0.10	0.97
	43.03	112.82
		<b>2.62</b>



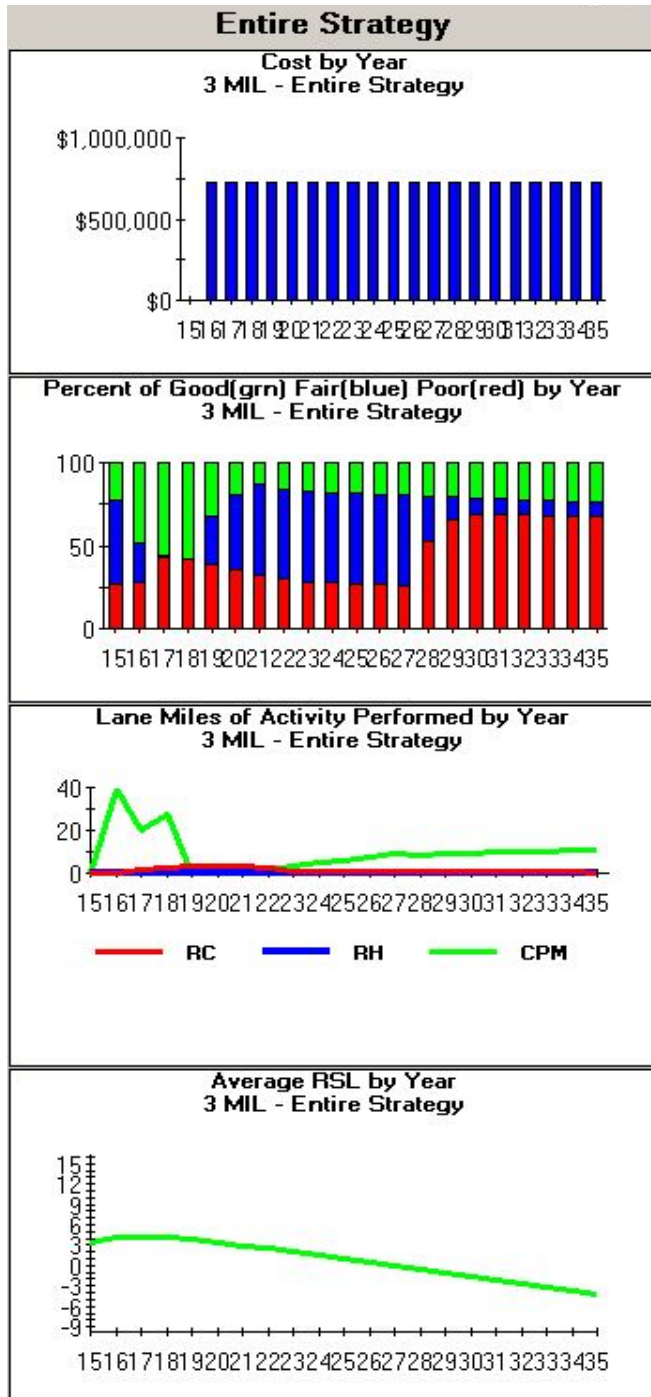
## 2.0 Mil Scenario 20-Year Planning Period (2015-2035)



Rating	Miles	Average SQI
1	13.31	13.31
2	18.09	36.17
3	2.80	8.41
4	0.00	0.00
5	0.00	0.00
6	0.00	0.00
7	1.62	11.31
8	6.93	55.41
9	0.16	1.42
10	0.13	1.28
	43.03	127.31
		<b>2.96</b>



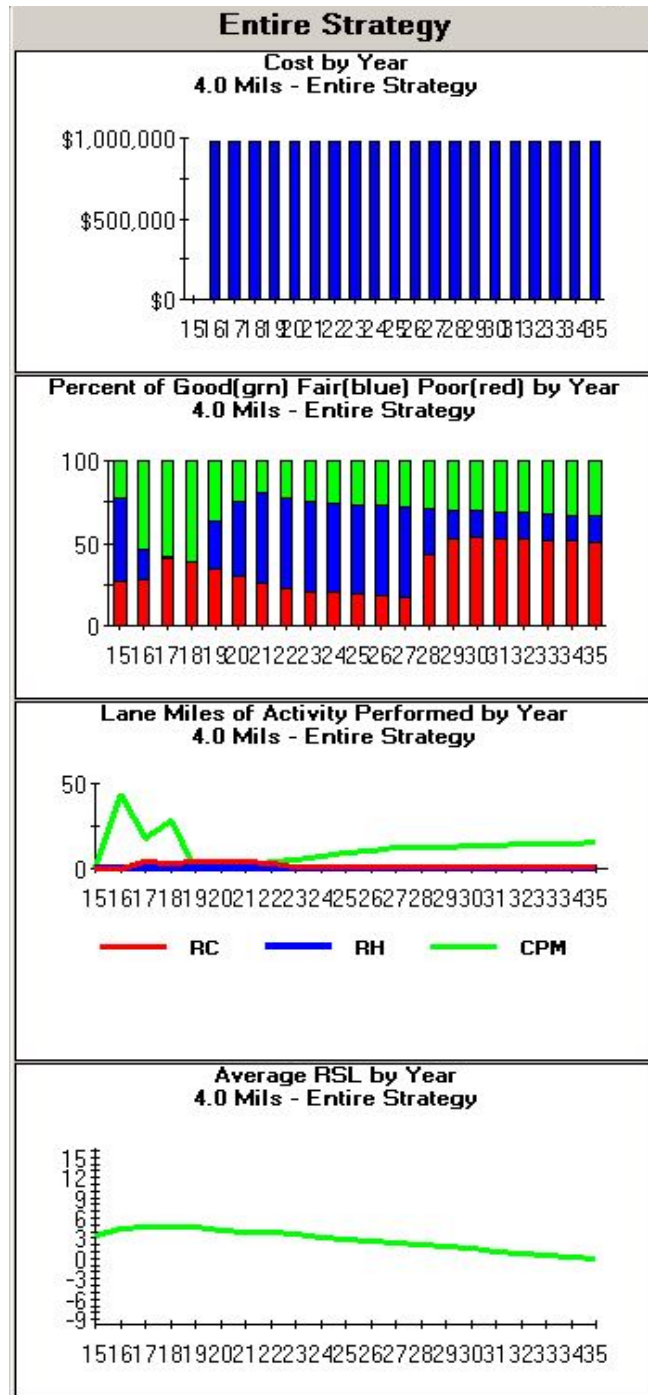
### 3.0 Mil Scenario 20-Year Planning Period (2015-2035)



Rating	Miles	Average SQI
1	9.03	9.03
2	17.62	35.24
3	2.00	6.01
4	0.00	0.00
5	0.00	0.00
6	0.00	0.00
7	3.93	27.50
8	10.03	80.27
9	0.22	1.99
10	0.19	1.89
	43.03	161.93
		<b>3.76</b>



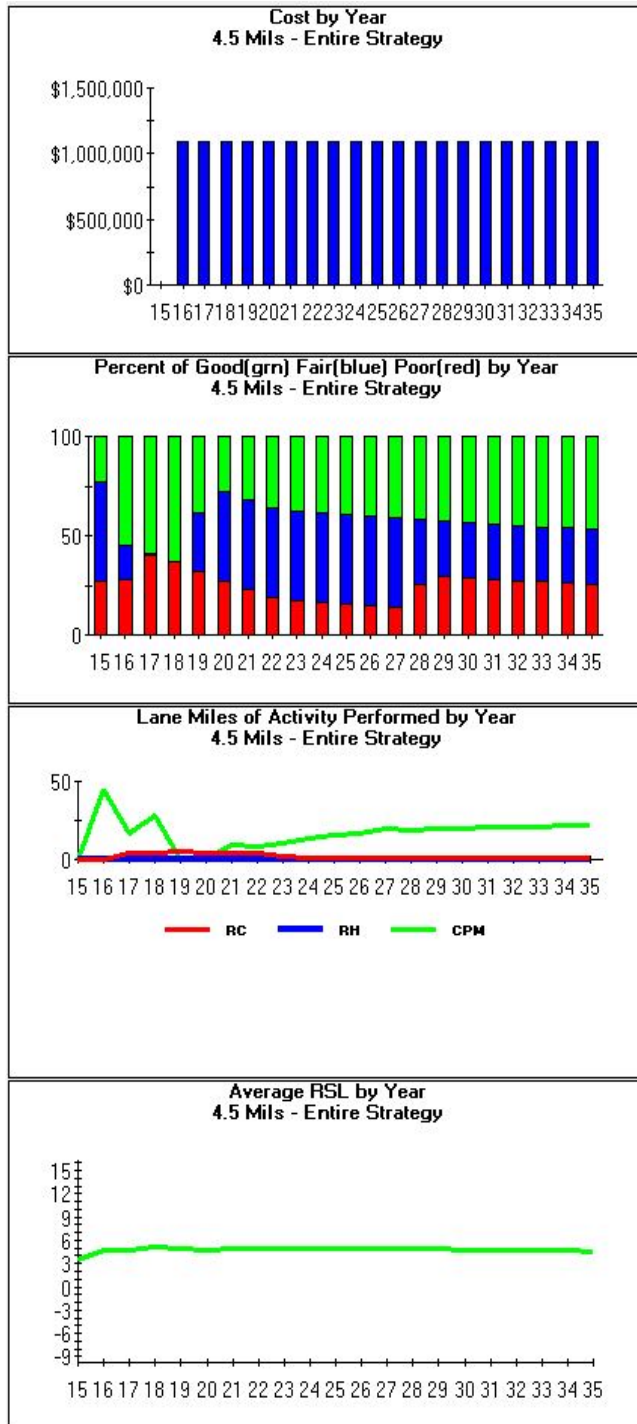
# **4.0 Mil Scenario** **20-Year Planning Period (2015-2035)**



Rating	Miles	Average SQI
1	4.85	4.85
2	15.76	31.52
3	1.03	3.08
4	0.00	0.00
5	0.00	0.00
6	0.00	0.00
7	6.77	47.36
8	14.11	112.86
9	0.28	2.52
10	0.24	2.45
	43.03	204.64
		<b>4.76</b>



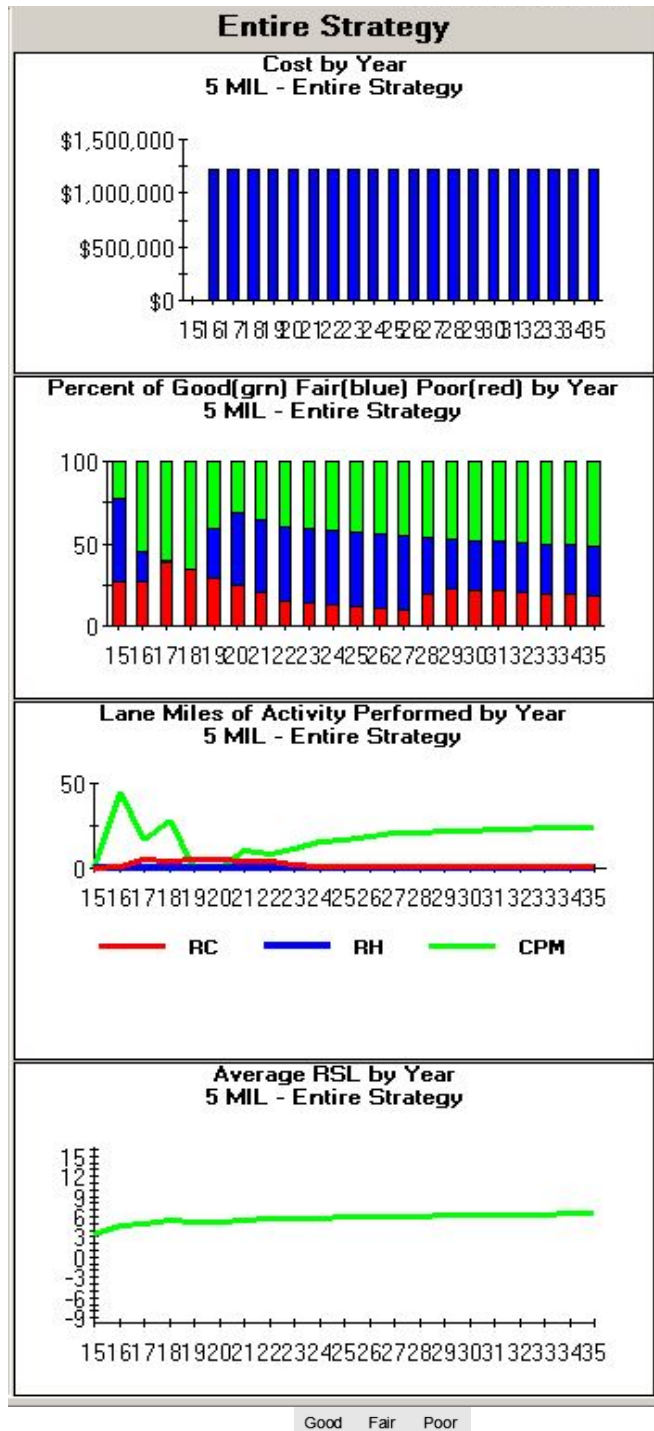
**4.5 Mil Scenario (Maintain Existing  
Average Rating)  
20-Year Planning Period (2015-2035)**



Rating	Miles	Average SQI
1	3.15	3.15
2	7.48	14.96
3	0.00	0.00
4	0.00	0.00
5	0.00	0.00
6	0.00	0.00
7	11.96	83.74
8	19.89	159.14
9	0.29	2.63
10	0.26	2.55
	43.03	266.17
		<b>6.19</b>



## 5.0 Mil Scenario 20-Year Planning Period (2015-2035)



Rating	Miles	Average SQI
1	1.04	1.04
2	6.46	12.91
3	0.00	0.00
4	0.00	0.00
5	0.00	0.00
6	0.00	0.00
7	12.99	90.91
8	21.94	175.51
9	0.32	2.90
10	0.28	2.83
	43.03	286.11
		<b>6.65</b>



## Funding Scenarios

The graphs on the previous pages represent the optimal use of the available funding based on the selected rehabilitation strategies. Some trends can be identified by comparing the before and after average SQL rating and by looking at the graph showing the percentage of good, fair, and poor (green, blue, and red respectively).

Multiple funding scenarios were evaluated ranging from 1.0 Mills to 5.0 Mills. The first scenario, the “do nothing” scenario, shows what would happen to the road system if no money for maintenance or improvements were invested over the next 20 years. It is estimated that by approximately 2029, all of the roads would be rated in “poor” condition.

Although investments ranging from 1.0 to 4.0 mil scenarios provide a level of improvement into the road network, these levels do not provide adequate funding to sustain or increase the average road rating. This essentially means that the City is dis-investing in the road system. Any of these scenarios provide a slight reduction in the amount of “poor” condition roads, and a slight increase in the amount of “good” condition roads.

The analysis indicates that it would take approximately a 4.5 mil funding source to maintain the average road rating of 6 for a 20-year program. We have also used Roadsoft to calculate that the cost of fixing all roads in one year is \$7,719,155, which would result in an average rating of 6.85.

Each funding scenario has associated with it a recommended Capital Improvement Plan that specified the amount of preventative maintenance, rehabilitation, and reconstruction projects that should be completed each year in order to maximize the return on investment. The capital component for each scenario is included in the appendix of this report.

## Annual Street Preventative Maintenance Program

The Department of Public Works has established a comprehensive Street Preventive Maintenance Program working within the funding boundaries established in the Major Street fund 202 and the Local Street fund 203. This plan has been developed over the last four years and is under constant scrutiny for improvements.

Street preventive maintenance components included the following, but are not limited to only these items:

1. Crack Seal all new pavement projects; this includes all seam and around all utility structures and blemishes to seal water from entering the new pavement.
2. Inspection of City streets each year in creating a crack seal plan. As a result of this a majority of the majors Street have had crack seal applied twice.

3. Large pothole locations are reviewed each year. Once a list is created the damaged asphalt area is removed by milling or excavation then replaced with new asphalt. Once completed the seams are sealed with crack seal.
4. Directional symbols are being changed out from painted on symbols to 3M highly reflective material.
5. Street Construction Specification has been changed to include edge drain, increased base material depth and the use of modified HMA.

The Department of Public Works efforts have made visible improvements to the street surface and prevented additional damage and increasing the length of life of the streets. A review of the past decade of street and utility improvements invested in the City through grants and local funding have assisted in the overall condition and average ratings of the road network.

Since 2007, over eight miles of City streets have been improved with road related project costs estimated to be over \$4.4 million. The City's success in capturing grant dollars to assist in funding many of these projects leads to an increased overall road rating and a tremendous cost sharing investment into the City's road and utility systems alike. A summary of the City's road and utility improvements from 2007-2015 can be found in the Appendices.

## **City Infrastructure (Underground Utilities) Considerations**

As planning and provisions are made to address the City's aging road system through the capital improvement process, it is imperative to also consider the condition of the underground utilities located within the right of way, especially those utilities such as public water transmission, sanitary sewer and storm sewer systems, that typically are located below the roadway. Planning, budgeting and designing for underground improvement prior to or coinciding with the road improvements will protect the investments through the long term. The City's current proactive approach to updating and improving underground utilities have allowed for many upgrades throughout the City over the past decade. City maps of the various utility improvements can be found in the Appendices.

## **Capital Improvement Process**

The Roadsoft program provides almost all of the information necessary for the City to prepare a CIP for roads. The two missing components are an understanding of local preference when establishing priorities for improvements and incorporating any required underground utility improvements. These component cannot be computer generated; it requires input from local road and DPW staff, elected officials, and residents that can help to reflect the values and priorities of the community. This plan's reports will lay out the process for completing the CIP based on the output from Roadsoft.

It is recommended that a committee of City officials or the use of an current acting board be established that can provide the community input in establishing the priorities for selection of the annual road improvement projects that are part of the CIP. Development of priorities must take into consideration other needed infrastructure (underground utility) improvements, traffic volumes, and other impacts. The data and recommended mix of fixes for the road repairs provided in this Roadway Asset Management report can then be used as the basis for identifying and prioritizing annual projects by the committee.

Once the CIP list is developed for a 3-5 year period, it is recommended that defined scope and detailed project cost estimate be developed for the specific road improvement projects in order to refine the costs and planned funding sources. This process is recommended to be completed during the fiscal year budgeting period or when additional funding sources are being sought. It should be noted that this report is intended to be a fluid document to be revisited and updated on a periodic basis over the 20 year planning period.

The capital improvement process involves five steps as follows:

- Step 1 – Select the funding level the community can commit to for the duration of the 20-year program. This report includes funding levels of 1.0 mil, 1.5 mil, 2.0 mil, 3.0 mil, 4.0 mil, 4.5 mil, and 5.0 mil. The funding level selected should reflect all available roadway improvement funds including tax revenues, Act 51 funds, and other sources of roadway funding.
- Step 2 – Reference the recommended improvements in the Appendix that correspond to the selected level of funding and required utility improvements. Each funding example also includes a detailed recommendation on what improvements should be done each and every year of the 20-year program. For this example, we have selected the 4.5 mil scenario. Based on the 4.5 mil funding scenario, a summary of the recommended improvements are shown in Table 12 below. Likewise, based on an anticipated 2.0 mil funding option, an alternative table (Table 13) provides the summation of various improvements (i.e. “mix of fixes”) for comparison purposed.

**Table 12. Recommended Improvements  
Based on 4.5 Mil Investment**

Year	Crack Sealing	Microseal	Overlay	Crush & Shape	Reconstruct
1	28.2	16.6		0.3	
2	16.4			4.6	
3	28.4			4.1	
4				4.7	
5				4.6	
6	9.7			4.1	
7	7.9			4.0	
8	9.9			0.6	0.9

Year	Crack Sealing	Microseal	Overlay	Crush & Shape	Reconstruct
9	13.9				1.1
10	15.1				1.0
11	17.0				0.9
12	19.4				0.9
13	18.8				0.9
14	19.5				0.8
15	20.2				0.7
16	20.4				0.7
17	20.9				0.7
18	21.3				0.6
19	21.7				0.6
20	22.0				0.6
<b>Total</b>	<b>330.7</b>	<b>16.6</b>	<b>0</b>	<b>27.0</b>	<b>10.4</b>

**Table 13. Recommended Improvements  
Based on 2.0 Mil Investment**

Year	Crack Sealing	Microseal	Overlay	Crush & Shape	Reconstruct
1	28.2	6.0			
2	12.9	7.5			
3	26.2	0.7		1.2	
4				2.1	
5				2.0	
6				1.9	
7				1.9	
8	1.2			1.8	
9	2.5			1.3	0.1
10	3.3				0.5
11	4.3				0.5
12	5.2				0.4
13	6.0				0.4
14	6.6				0.4
15	6.4				0.4
16	6.8				0.3
17	7.0				0.3
18	7.1				0.3
19	7.3				0.3
20	7.5				0.3
<b>Total</b>	<b>139.5</b>	<b>14.3</b>		<b>12.2</b>	<b>4.2</b>

- Step 3 – Select the roads to be improved each year. This is where a committee can help bring the values and priorities of the community into the capital improvement planning process. For the 4.5 mil funding scenario example, the Roadsoft recommendations for year 2 include 16.4 miles of crack sealing, and 4.6 miles of crush and shape rehabilitation. Crack sealing is appropriate for roads with a PASER rating of 8 or higher and crush and shape is appropriate for roads with a PASER rating of 3 or 4. The committee should review the list of roads by

PASER rating located in the appendix of the report. There are 79 road segments totaling 5.32 miles that are rated as a 4, and 44 road segments totaling 2.52 miles that are rated as a 3. The committee can choose any combination of these road segments that total up to 4.6 miles of roads that can be improved with crush and reshape in year 2.

- Step 4 – The roads that have been selected for improvement should now be reviewed to see if there are any significant subgrade problems that were discovered through the non-destructive testing process. Roads with a subgrade modulus of 4,500 or less are likely to cost 15% more to repair and; therefore, either the budget for year 2 should be increased by 15%, or the total mileage that will be improved by crush and reshape should be reduced by 15% to account for the above-average cost to repair these roads. Roads with a subgrade modulus between 4,500 and 9,000 are likely to cost an additional 10% and those above 9,000 are likely to cost 5% more. By applying these cost factors to the year 2 proposed improvements, we can provide a more accurate estimate of what the actual cost to repair these roads will be.

Other cost factors such as utility replacement and traffic volumes shall also be considered when prioritizing and selecting roads to be improved. Typically, cities have dedicated utility funds that can pay the cost for necessary utility improvements. This work should be coordinated with the road replacement program so that new utilities are installed prior to or at the same time as the new road is built.

- Step 5 – Publish the plan and re-visit the plan periodically. We recommend selecting projects on a three to five-year basis, or on a rotating basis so that the plan is a living document that is always being updated and applied to the current conditions of the roads within the City.

## Five Year Capital Improvement Recommendations

Based on the Roadsoft program results, as well as the anticipated funding that may be available (2.0 mills), a five year roadway capital improvement plan (CIP) has been developed. It should be noted that the CIP must be reviewed annually as the conditions of each of the roads will change, specifically when improvements to the road segments including the preventative maintenance repairs are completed.

The following summarizes the Roadsoft software's output for the 2.0 mil funding scenario. Segments of roadways have been selected based on the evaluation as well as with input from City Staff. A City street map highlighting the recommendations for each of the Five Year CIP can be found in the Appendices.

**2.0 mil Scenario Recommended Improvements**

Year 1	Lane Miles	Paser rating	Improves to
Crack filling	28.19	7 & 8	8
Microseal	5.98	6	8
Mill & overlay	0.00	5	9
Crush & reshape	0.00	3 & 4	10
Reconstruction	0.00	1 & 2	10

Year 2	Lane Miles	Paser rating	Improves to
Crack filling	12.88	7 & 8	8
Microseal	7.46	6	8
Mill & overlay	0.00	5	9
Crush & reshape	0.00	3 & 4	10
Reconstruction	0.00	1 & 2	10

Year 3	Lane Miles	Paser rating	Improves to
Crack filling	26.17	7 & 8	8
Microseal	0.73	6	8
Mill & overlay	0.00	5	9
Crush & reshape	1.21	3 & 4	10
Reconstruction	0.00	1 & 2	10

Year 4	Lane Miles	Paser rating	Improves to
Crack filling	0.00	7 & 8	8
Microseal	0.00	6	8
Mill & overlay	0.00	5	9
Crush & reshape	2.10	3 & 4	10
Reconstruction	0.00	1 & 2	10

Year 5	Lane Miles	Paser rating	Improves to
Crack filling	0.00	7 & 8	8
Microseal	0.00	6	8
Mill & overlay	0.00	5	9
Crush & reshape	2.02	3 & 4	10
Reconstruction	0.00	1 & 2	10



## Appendix 1

### PASER Rating Summary Tables and Street Maps



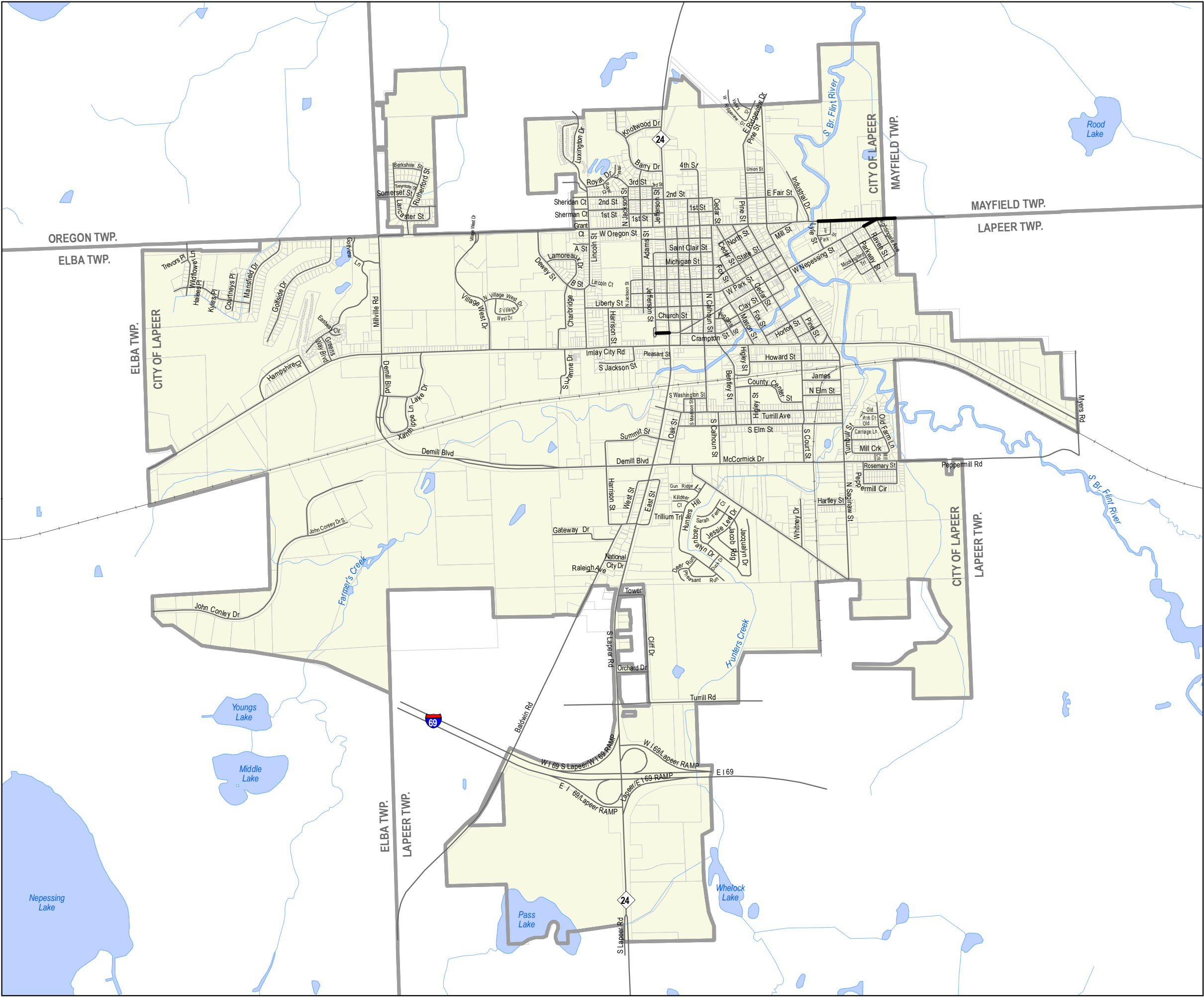
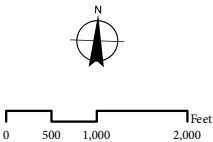
Description	PASER Rating										Gravel	Total Mileage
	1 (Failed)	2 (VeryPoor)	3 (Poor)	4 (Fair)	5 (Fair)	6 (Good)	7 (Good)	8 (VeryGood)	9 (Excellent)	10 (Excellent)		
City Local	0.204	2.599	2.522	5.322	7.552	7.153	6.633	6.999	3.58	0.441	0.436	43.441
Total Mileage:	0.204	2.599	2.522	5.322	7.552	7.153	6.633	6.999	3.58	0.441	0.436	43.441

Number	Road Name	Length Mile	2015 PASER Rating	PASER Recommendation	Average SN	Average SM
760809	W Nepessing St	0.06	10	crackfill or microseal	6.37	5544
760809	W Nepessing St	0.06	10	crackfill or microseal	6.37	5544
761301	W Oregon St	0.05	10	crackfill or microseal	4.36	4774
761301	W Oregon St	0.20	10	crackfill or microseal	4.36	4774
761301	W Oregon St	0.08	10	crackfill or microseal	4.36	4774
Total		0.45				

2015 PASER Ratings

- 10 - Excellent
- Other Roads

Source: Wade Trim, May 2015

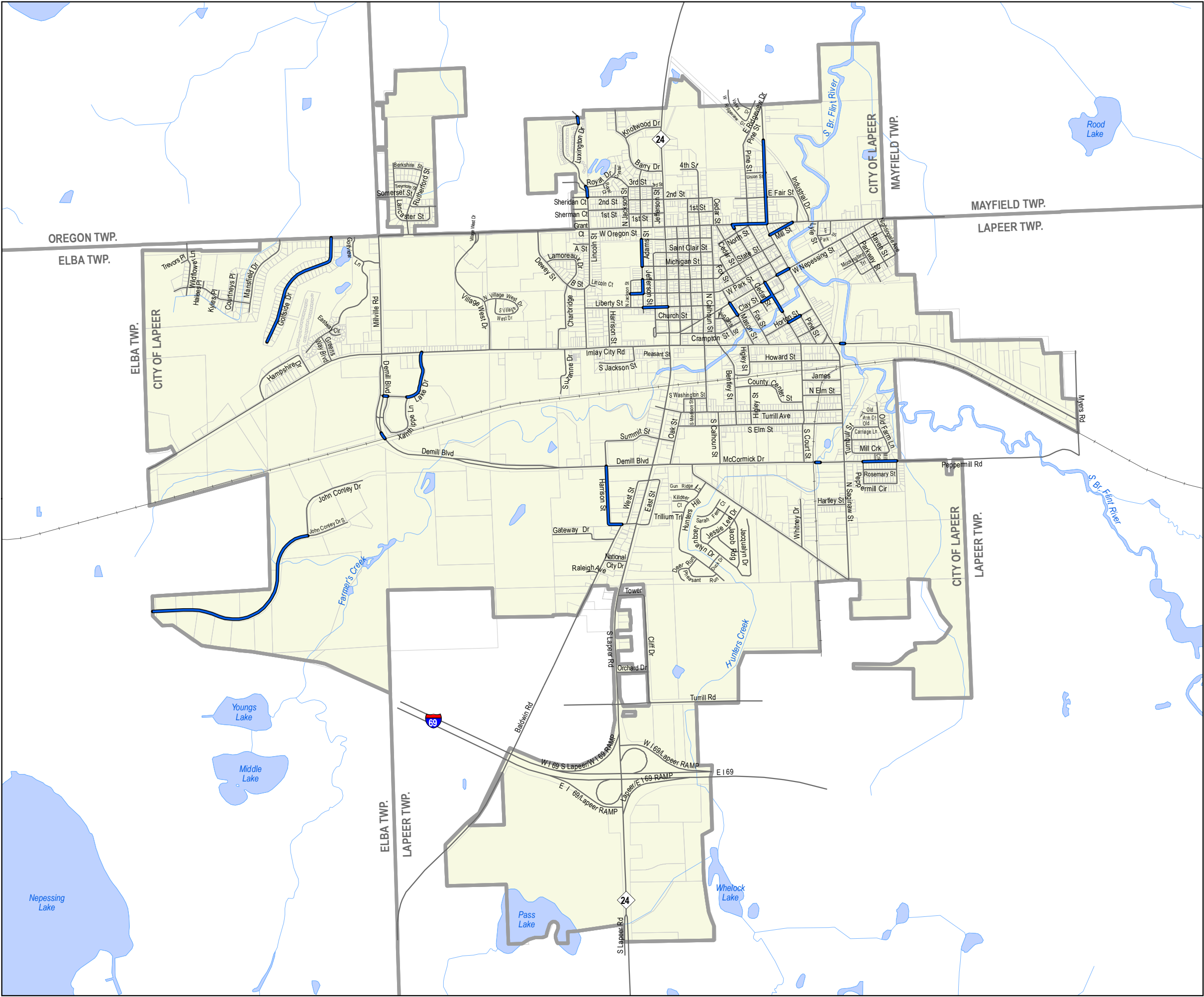
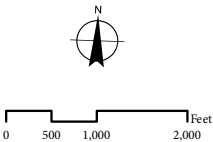


Number	Road Name	Length Mile	2015 PASER Rating	PASER Recommendation	Average SN	Average SM
760801	Adams St	0.11	9	crackfill or microseal	3.18	4103
760801	Adams St	0.06	9	crackfill or microseal	3.18	4103
3440040	Clay St	0.05	9	crackfill or microseal	2.47	3078
3440043	Demill Blvd	0.03	9	crackfill or microseal	4.73	4720
3441158	Golfside Dr	0.56	9	crackfill or microseal	2.66	4486
3440854	Harrison St	0.30	9	crackfill or microseal	8.33	6279
761004	Horton St	0.06	9	crackfill or microseal	2.67	4142
3251545	Imlay City Rd	0.02	9	crackfill or microseal	7.91	6817
3440887	John Conley Dr	0.88	9	crackfill or microseal	3.14	4775
3440049	Lake Dr	0.02	9	crackfill or microseal	3.61	5218
3440049	Lake Dr	0.22	9	crackfill or microseal	3.61	5218
754502	Liberty St	0.05	9	crackfill or microseal	2.67	4641
754502	Liberty St	0.05	9	crackfill or microseal	2.67	4641
755103	Lincoln St	0.02	9	crackfill or microseal	3.1	3594
755103	Lincoln St	0.02	9	crackfill or microseal	3.1	3594
755103	Lincoln St	0.00	9	crackfill or microseal	3.1	3594
3441595	Luxington Dr	0.03	9	crackfill or microseal	4.92	5069
755201	Mason St	0.06	9	crackfill or microseal	2.99	3869
761009	McCormick Dr	0.02	9	crackfill or microseal	8.54	6161
761003	Mill St	0.11	9	crackfill or microseal	2.52	5491
754210	N Saginaw St	0.11	9	crackfill or microseal	5.68	5171
754210	N Saginaw St	0.00	9	crackfill or microseal	5.68	5171
754210	N Saginaw St	0.10	9	crackfill or microseal	5.68	5171
754210	N Saginaw St	0.00	9	crackfill or microseal	5.68	5171
754210	N Saginaw St	0.14	9	crackfill or microseal	5.68	5171
761210	Peppermill Rd	0.09	9	crackfill or microseal	4.17	4326
761210	Peppermill Rd	0.05	9	crackfill or microseal	4.17	4326
3440100	S Court St	0.07	9	crackfill or microseal	5.79	4747
3440100	S Court St	0.06	9	crackfill or microseal	5.79	4747
3440100	S Court St	0.02	9	crackfill or microseal	5.79	4747
3440100	S Court St	0.02	9	crackfill or microseal	5.79	4747
760809	W Nepessing St	0.06	9	crackfill or microseal	6.37	5544
761301	W Oregon St	0.07	9	crackfill or microseal	4.36	4774
761301	W Oregon St	0.08	9	crackfill or microseal	4.36	4774
754503	W Park St	0.05	9	crackfill or microseal	2.66	3394
Total		3.58	35			

2015 PASER Ratings

- 9 - Excellent
- Other Roads

Source: Wade Trim, May 2015



Number	Road Name	Length	2015 PASER		Average	Average
		Mile	Rating	PASER Recommendation	SN	SM
760801	Adams St	0.02	8	crackfill or microseal	3.18	4103
760801	Adams St	0.06	8	crackfill or microseal	3.18	4103
760801	Adams St	0.06	8	crackfill or microseal	3.18	4103
754403	Baldwin Rd	0.05	8	crackfill or microseal	3.54	4125
3441218	Bedford St	0.08	8	crackfill or microseal	2.05	3037
3441218	Bedford St	0.03	8	crackfill or microseal	2.05	3037
3441217	Berkshire St	0.12	8	crackfill or microseal	2.36	2722
3441219	Cedar St	0.06	8	crackfill or microseal	2.7	3641
3441219	Cedar St	0.03	8	crackfill or microseal	2.7	3641
754501	Church St	0.06	8	crackfill or microseal	1.49	2427
3440040	Clay St	0.06	8	crackfill or microseal	2.47	3078
3440040	Clay St	0.06	8	crackfill or microseal	2.47	3078
3440043	Demill Blvd	0.07	8	crackfill or microseal	4.73	4720
3440043	Demill Blvd	0.09	8	crackfill or microseal	4.73	4720
760907	E Fair St	0.12	8	crackfill or microseal	3.21	4735
760907	E Fair St	0.11	8	crackfill or microseal	3.21	4735
755202	Fox St	0.09	8	crackfill or microseal	2.2	2938
3441162	Hailees Pl	0.03	8	crackfill or microseal	1.76	3274
761004	Horton St	0.11	8	crackfill or microseal	2.67	4142
761004	Horton St	0.06	8	crackfill or microseal	2.67	4142
761006	Howard St	0.16	8	crackfill or microseal	4.19	4097
3251545	Imlay City Rd	0.10	8	crackfill or microseal	7.91	6817
3251545	Imlay City Rd	0.00	8	crackfill or microseal	7.91	6817
3251545	Imlay City Rd	0.05	8	crackfill or microseal	7.91	6817
3440887	John Conley Dr	0.26	8	crackfill or microseal	3.14	4775
3441142	John Conley Dr S	0.18	8	crackfill or microseal	3.14	4775
3441163	Kyles Pl	0.04	8	crackfill or microseal	1.76	2692
3440049	Lake Dr	0.08	8	crackfill or microseal	3.61	5218
3441213	Lancaster St	0.15	8	crackfill or microseal	2.24	3276
3441213	Lancaster St	0.13	8	crackfill or microseal	2.24	3276
3441213	Lancaster St	0.06	8	crackfill or microseal	2.24	3276
3441213	Lancaster St	0.06	8	crackfill or microseal	2.24	3276
3441213	Lancaster St	0.03	8	crackfill or microseal	2.24	3276
754502	Liberty St	0.10	8	crackfill or microseal	2.67	4641
754502	Liberty St	0.10	8	crackfill or microseal	2.67	4641
755103	Lincoln St	0.24	8	crackfill or microseal	3.1	3594
755103	Lincoln St	0.11	8	crackfill or microseal	3.1	3594
3441595	Luxington Dr	0.17	8	crackfill or microseal	4.92	5069
755201	Mason St	0.03	8	crackfill or microseal	2.99	3869
755201	Mason St	0.06	8	crackfill or microseal	2.99	3869
755201	Mason St	0.03	8	crackfill or microseal	2.99	3869
761009	McCormick Dr	0.04	8	crackfill or microseal	8.54	6161
761009	McCormick Dr	0.01	8	crackfill or microseal	8.54	6161
761009	McCormick Dr	0.35	8	crackfill or microseal	8.54	6161
760710	N Jackson St	0.06	8	crackfill or microseal	2.55	3276
760710	N Jackson St	0.05	8	crackfill or microseal	2.55	3276
760803	N Madison St	0.06	8	crackfill or microseal	4.33	3741
760803	N Madison St	0.06	8	crackfill or microseal	4.33	3741
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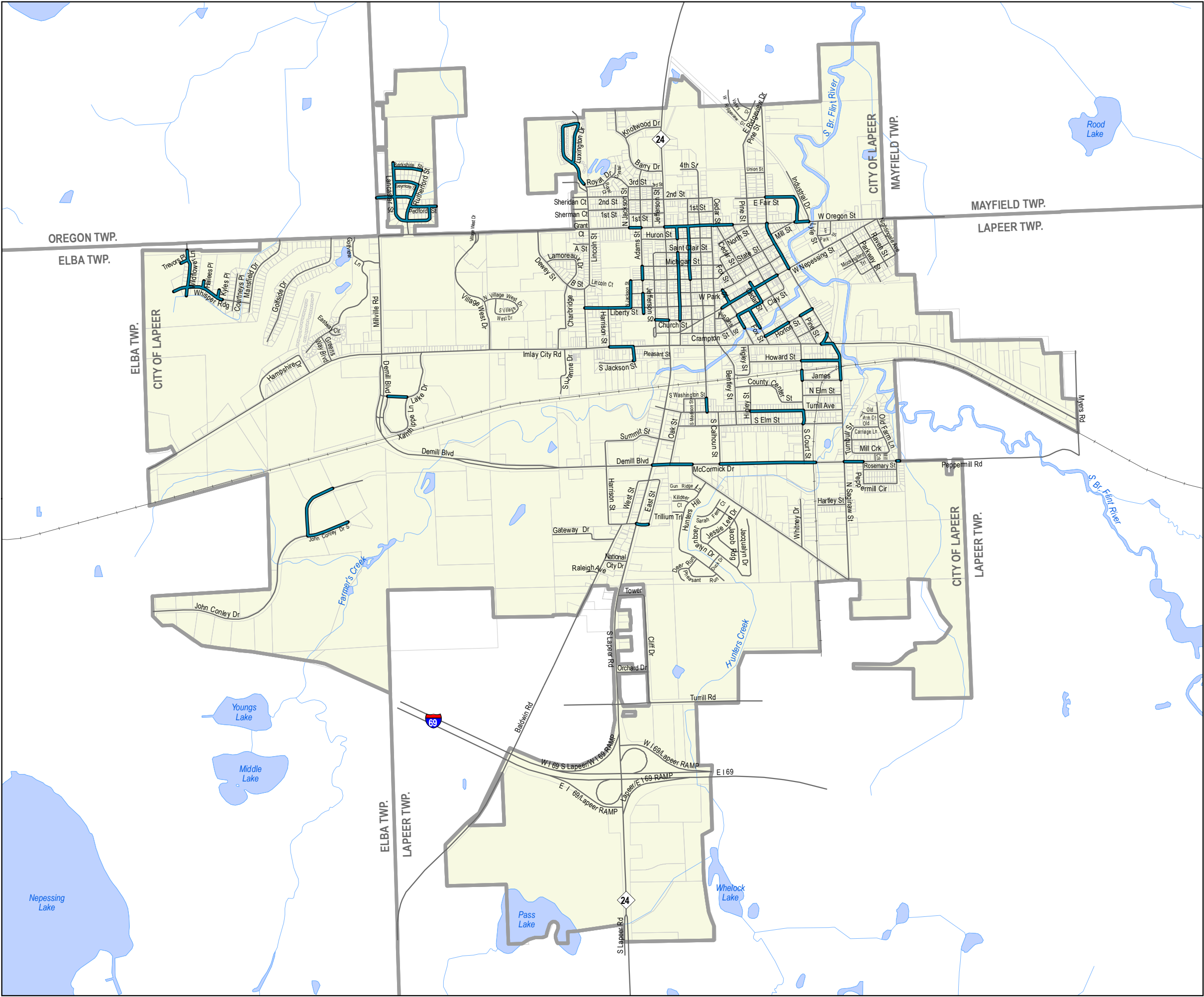
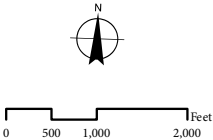
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755107 N Monroe St	0.06	8	crackfill or microseal	4.65	2860
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754210 N Saginaw St	0.01	8	crackfill or microseal	5.68	5171
754210 N Saginaw St	0.03	8	crackfill or microseal	5.68	5171
754210 N Saginaw St	0.08	8	crackfill or microseal	5.68	5171
754210 N Saginaw St	0.06	8	crackfill or microseal	5.68	5171
754210 N Saginaw St	0.01	8	crackfill or microseal	5.68	5171
754210 N Saginaw St	0.06	8	crackfill or microseal	5.68	5171
754210 N Saginaw St	0.00	8	crackfill or microseal	5.68	5171
754210 N Saginaw St	0.04	8	crackfill or microseal	5.68	5171
754210 N Saginaw St	0.00	8	crackfill or microseal	5.68	5171
754210 N Saginaw St	0.05	8	crackfill or microseal	5.68	5171
754210 N Saginaw St	0.00	8	crackfill or microseal	5.68	5171
755205 N Saginaw St	0.05	8	crackfill or microseal	5.68	5171
755106 N Washington St	0.06	8	crackfill or microseal	4.99	3798
755106 N Washington St	0.06	8	crackfill or microseal	4.99	3798
755106 N Washington St	0.06	8	crackfill or microseal	4.99	3798
755106 N Washington St	0.06	8	crackfill or microseal	4.99	3798
755106 N Washington St	0.06	8	crackfill or microseal	4.99	3798
755106 N Washington St	0.05	8	crackfill or microseal	4.99	3798
761210 Peppermill Rd	0.08	8	crackfill or microseal	4.17	4326
761210 Peppermill Rd	0.01	8	crackfill or microseal	4.17	4326
3441215 Rutherford	0.07	8	crackfill or microseal	2.52	4400
St 3441215 Rutherford	0.03	8	crackfill or microseal	2.52	4400
St 3441215 Rutherford	0.06	8	crackfill or microseal	2.52	4400
St 3440100 S Court St	0.06	8	crackfill or microseal	5.79	4747
3440100 S Court St	0.04	8	crackfill or microseal	5.79	4747
755115 S Jackson St	0.06	8	crackfill or microseal	2.11	3140
3441223 Somerset St	0.04	8	crackfill or microseal	2.11	3140
3441223 Somerset St	0.04	8	crackfill or microseal	2.11	3140
3441223 Somerset St	0.08	8	crackfill or microseal	1.62	2749
3441161 Trevors Pl	0.03	8	crackfill or microseal		
3441216 Treymore St	0.10	8	crackfill or microseal	3.86	3458
754407 Turrill Ave	0.22	8	crackfill or microseal	6.37	5544
760809 W Nepessing St	0.04	8	crackfill or microseal	6.37	5544
760809 W Nepessing St	0.12	8	crackfill or microseal	6.37	5544
760809 W Nepessing St	0.00	8	crackfill or microseal	6.37	5544
760809 W Nepessing St	0.05	8	crackfill or microseal	6.37	5544
760809 W Nepessing St	0.00	8	crackfill or microseal	6.37	5544
760809 W Nepessing St	0.06	8	crackfill or microseal	4.36	4774
761301 W Oregon St	0.05	8	crackfill or microseal	4.36	4774
761301 W Oregon St	0.05	8	crackfill or microseal	4.36	4774
761301 W Oregon St	0.05	8	crackfill or microseal	4.36	4774
761301 W Oregon St	0.05	8	crackfill or microseal	4.36	4774
761301 W Oregon St	0.05	8	crackfill or microseal	4.36	4774
761301 W Oregon St	0.01	8	crackfill or microseal	4.36	4774
761301 W Oregon St	0.01	8	crackfill or microseal	4.36	4774
761301 W Oregon St	0.07	8	crackfill or microseal	4.36	4774
761301 W Oregon St	0.01	8	crackfill or microseal	4.36	4774
761301 W Oregon St	0.05	8	crackfill or microseal	4.36	4774

3440539 Whisper Rdg	0.02	8	crackfill or microseal	2.02	3311
3440539 Whisper Rdg	0.01	8	crackfill or microseal	2.02	3311
3440539 Whisper Rdg	0.06	8	crackfill or microseal	2.02	3311
3440539 Whisper Rdg	0.04	8	crackfill or microseal	2.02	3311
3440539 Whisper Rdg	0.02	8	crackfill or microseal	2.02	3311
3440539 Whisper Rdg	0.02	8	crackfill or microseal	2.02	3311
3440539 Whisper Rdg	0.04	8	crackfill or microseal	2.02	3311
3441160 Wildflower Ln	0.12	8	crackfill or microseal	2.48	3791
3441160 Wildflower Ln	0.04	8	crackfill or microseal	2.48	3791
3441220 Wildflower Ln	0.04	8	crackfill or microseal	2.48	3791
Total	7.10	111			

2015 PASER Ratings

- 8 - Very Good
- Other Roads

Source: Wade Trim, May 2015



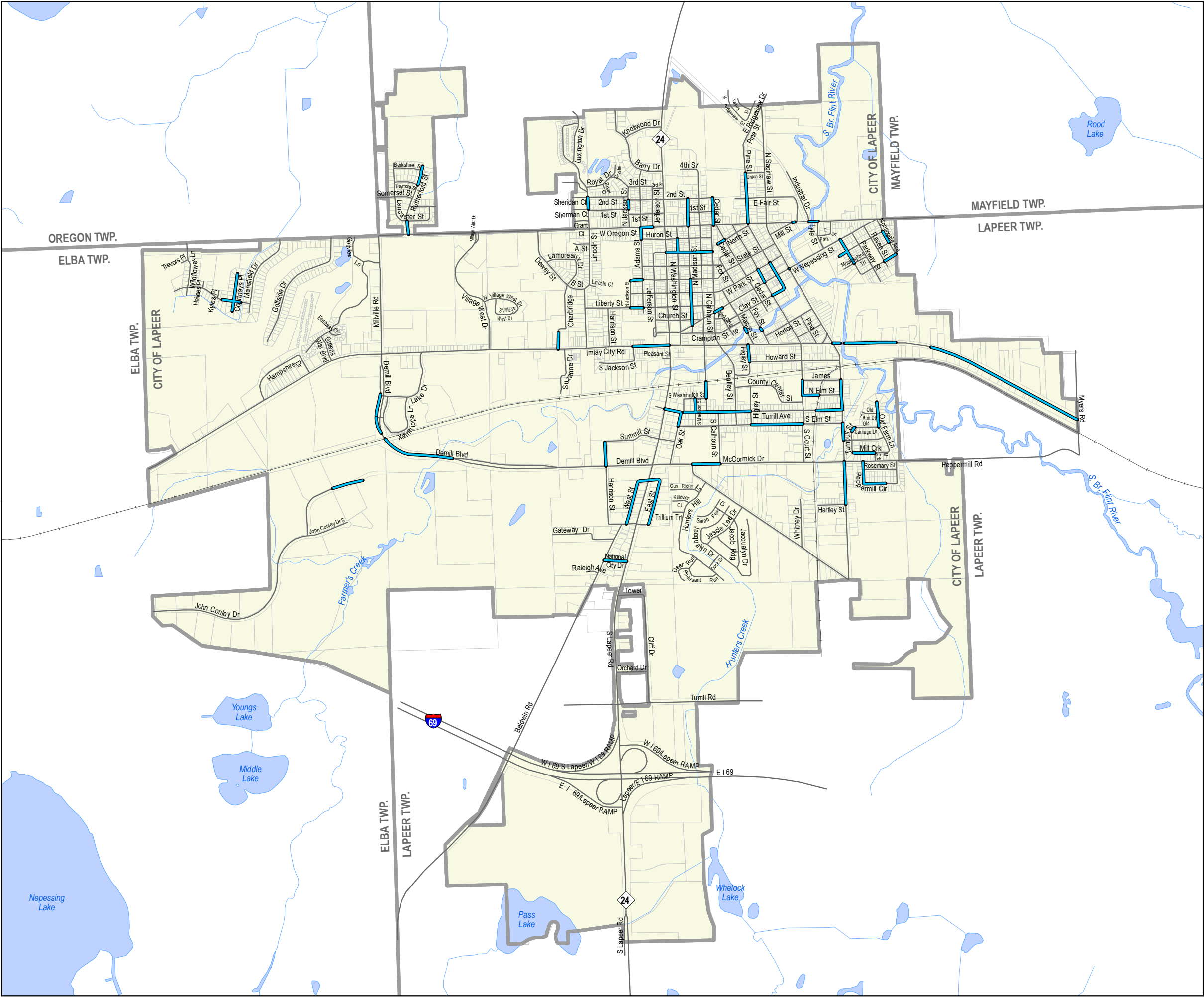
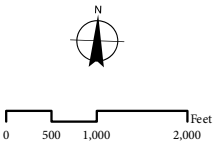
Number	Road Name	Length	2015 PASER	PASER Recommendation	Average	Average
		Mile	Rating		SN	SM
760801	Adams St	0.05	7	crackfill or microseal	3.18	4103
760905	Cedar St	0.06	7	crackfill or microseal	2.7	3641
760905	Cedar St	0.06	7	crackfill or microseal	2.7	3641
755102	Charbridge	0.07	7	crackfill or microseal	1.93	3049
3440040	Clay St	0.06	7	crackfill or microseal	2.47	3078
3441159	Courtneys Pl	0.12	7	crackfill or microseal	2.15	2709
3441164	Courtneys Pl	0.04	7	crackfill or microseal	2.15	2709
3440043	Demill Blvd	0.09	7	crackfill or microseal	4.73	4720
3440043	Demill Blvd	0.07	7	crackfill or microseal	4.73	4720
3440043	Demill Blvd	0.31	7	crackfill or microseal	4.73	4720
761106	Dove Ln	0.04	7	crackfill or microseal	2.51	2283
761107	Eagle Pass	0.06	7	crackfill or microseal	2.12	2367
754404	East St	0.24	7	crackfill or microseal	3.65	4406
755202	Fox St	0.02	7	crackfill or microseal	2.2	2938
755110	Higley St	0.07	7	crackfill or microseal	2.62	3219
3251545	Imlay City Rd	0.00	7	crackfill or microseal	7.91	6817
3251545	W Genesee St	0.15	7	crackfill or microseal	7.91	6817
3251545	Imlay City Rd	0.00	7	crackfill or microseal	7.91	6817
3251545	Imlay City Rd	0.03	7	crackfill or microseal	7.91	6817
3251545	Imlay City Rd	0.02	7	crackfill or microseal	7.91	6817
3251545	Imlay City Rd	0.69	7	crackfill or microseal	7.91	6817
3251545	Imlay City Rd	0.20	7	crackfill or microseal	7.91	6817
3440887	John Conley Dr	0.13	7	crackfill or microseal	3.14	4775
754502	Liberty St	0.05	7	crackfill or microseal	2.67	4641
755103	Lincoln St	0.05	7	crackfill or microseal	3.1	3594
755201	Mason St	0.02	7	crackfill or microseal	2.99	3869
761009	McCormick Dr	0.12	7	crackfill or microseal	8.54	6161
3440632	Mill Crk	0.09	7	crackfill or microseal	2.7	3063
3440047	N Elm St	0.07	7	crackfill or microseal	2.02	2639
760902	N Jackson St	0.04	7	crackfill or microseal	2.55	3276
760803	N Madison St	0.02	7	crackfill or microseal	4.33	3741
760803	N Madison St	0.06	7	crackfill or microseal	4.33	3741
760803	N Madison St	0.06	7	crackfill or microseal	4.33	3741
760803	N Madison St	0.06	7	crackfill or microseal	4.33	3741
760803	N Madison St	0.06	7	crackfill or microseal	4.33	3741
760803	N Madison St	0.06	7	crackfill or microseal	4.33	3741
760803	N Madison St	0.06	7	crackfill or microseal	4.33	3741
755107	N Monroe St	0.07	7	crackfill or microseal	4.65	2860
754210	N Saginaw St	0.18	7	crackfill or microseal	5.68	5171
754210	N Saginaw St	0.07	7	crackfill or microseal	5.68	5171
754210	N Saginaw St	0.06	7	crackfill or microseal	5.68	5171
754210	N Saginaw St	0.06	7	crackfill or microseal	5.68	5171
754210	N Saginaw St	0.00	7	crackfill or microseal	5.68	5171
755106	N Washington St	0.06	7	crackfill or microseal	4.99	3798

3441668 National City Dr	0.10	7	crackfill or microseal		
761105 Nightingale Ave	0.06	7	crackfill or microseal	2.35	2216
3440057 North St	0.03	7	crackfill or microseal	2.34	3673
3440045 Oak St	0.06	7	crackfill or microseal	3.92	3892
3440631 Old Farm Ln	0.04	7	crackfill or microseal	1.77	1802
3440631 Old Farm Ln	0.02	7	crackfill or microseal	1.77	1802
3440631 Old Farm Ln	0.03	7	crackfill or microseal	1.77	1802
3440631 Old Farm Ln	0.02	7	crackfill or microseal	1.77	1802
761101 Oriole St	0.06	7	crackfill or microseal	2.3	2420
761101 Oriole St	0.06	7	crackfill or microseal	2.3	2420
3440635 Peppermill Cir	0.04	7	crackfill or microseal	3.4	3333
3440635 Peppermill Cir	0.15	7	crackfill or microseal	3.4	3333
760806 Pine St	0.11	7	crackfill or microseal	2.73	3848
760806 Pine St	0.11	7	crackfill or microseal	2.73	3848
760806 Pine St	0.06	7	crackfill or microseal	2.73	3848
760806 Pine St	0.06	7	crackfill or microseal	2.73	3848
3441215 Rutherford St	0.06	7	crackfill or microseal	2.52	4400
3441215 Rutherford St	0.06	7	crackfill or microseal	2.52	4400
3441215 Rutherford St	0.02	7	crackfill or microseal	2.52	4400
3440100 S Court St	0.06	7	crackfill or microseal	5.79	4747
3440100 S Court St	0.06	7	crackfill or microseal	5.79	4747
760703 S Elm St	0.22	7	crackfill or microseal	2.25	3050
760705 S Madison St	0.06	7	crackfill or microseal	1.97	2380
754506 Saint Clair St	0.05	7	crackfill or microseal	2.88	2770
754506 Saint Clair St	0.05	7	crackfill or microseal	2.88	2770
754506 Saint Clair St	0.05	7	crackfill or microseal	2.88	2770
754506 Saint Clair St	0.05	7	crackfill or microseal	2.88	2770
754504 State St	0.05	7	crackfill or microseal	2.25	3184
3440044 Summit St	0.10	7	crackfill or microseal	2.79	3714
3440634 Turnbull St	0.02	7	crackfill or microseal	2.63	3108
754407 Turrill Ave	0.07	7	crackfill or microseal	3.86	3458
754407 Turrill Ave	0.07	7	crackfill or microseal	3.86	3458
754407 Turrill Ave	0.05	7	crackfill or microseal	3.86	3458
754407 Turrill Ave	0.05	7	crackfill or microseal	3.86	3458
754407 Turrill Ave	0.05	7	crackfill or microseal	3.86	3458
754407 Turrill Ave	0.06	7	crackfill or microseal	3.86	3458
754407 Turrill Ave	0.11	7	crackfill or microseal	3.86	3458
760809 W Nepessing St	0.00	7	crackfill or microseal	6.37	5544
760809 W Nepessing St	0.03	7	crackfill or microseal	6.37	5544
760809 W Nepessing St	0.00	7	crackfill or microseal	6.37	5544
761301 W Oregon St	0.05	7	crackfill or microseal	4.36	4774
761301 W Oregon St	0.01	7	crackfill or microseal	4.36	4774
761301 W Oregon St	0.04	7	crackfill or microseal	4.36	4774
761209 West St	0.23	7	crackfill or microseal	4.29	4343
3440539 Whisper Rdg	0.05	7	crackfill or microseal	2.02	3311
3440539 Whisper Rdg	0.03	7	crackfill or microseal	2.02	3311
Total	6.63	89			

2015 PASER Ratings

- 7 - Good
- Other Roads

Source: Wade Trim, May 2015



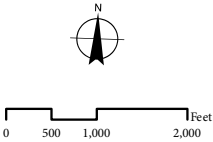
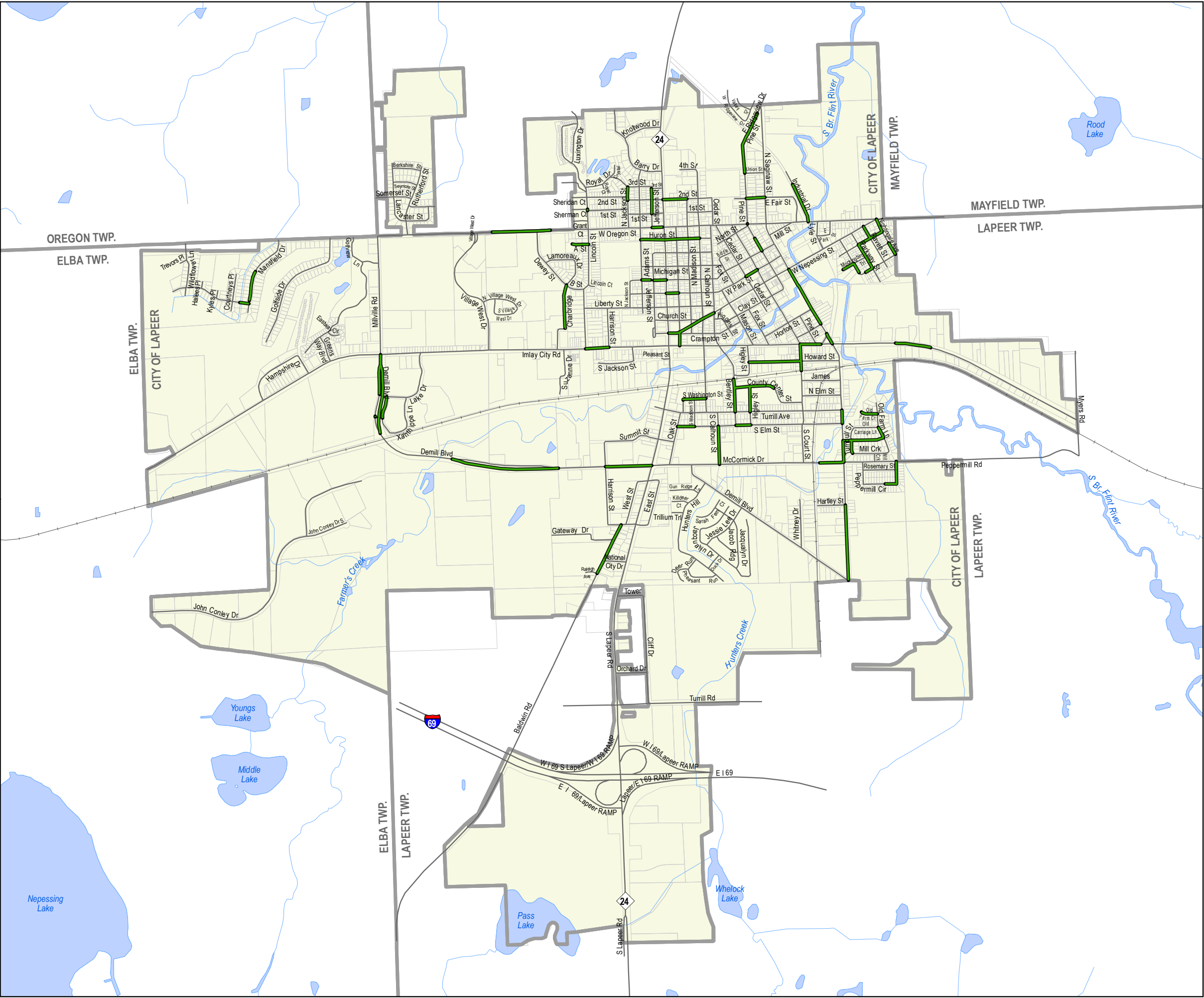
Number	Road Name	Length	2015 PASER		Average	Average
		Mile	Rating	PASER Recommendation	SN	SM
754510	2nd St	0.10	6	crackfill or microseal	2.23	2311
761213	A St	0.03	6	crackfill or microseal	1.94	2723
761213	A St	0.04	6	crackfill or microseal	1.94	2723
761305	Baldwin Rd	0.06	6	crackfill or microseal	3.54	4125
761305	Baldwin Rd	0.10	6	crackfill or microseal	3.54	4125
761305	Baldwin Rd	0.07	6	crackfill or microseal	3.54	4125
755109	Bentley St	0.10	6	crackfill or microseal	3.87	3820
755109	Bentley St	0.04	6	crackfill or microseal	3.87	3820
3440630	Brimingale Ave	0.04	6	crackfill or microseal	2.4	2648
3440630	Brimingale Ave	0.14	6	crackfill or microseal	2.4	2648
755102	Charbridge	0.18	6	crackfill or microseal	1.93	3049
761008	County Center St	0.07	6	crackfill or microseal	3.24	3007
761008	County Center St	0.10	6	crackfill or microseal	3.24	3007
3440043	Demill Blvd	0.04	6	crackfill or microseal	4.73	4720
3440043	Demill Blvd	0.13	6	crackfill or microseal	4.73	4720
3440043	Demill Blvd	0.00	6	crackfill or microseal	4.73	4720
3440043	Demill Blvd	0.00	6	crackfill or microseal	4.73	4720
3440043	Demill Blvd	0.45	6	crackfill or microseal	4.73	4720
3441167	Demill Blvd	0.13	6	crackfill or microseal	4.73	4720
3441167	Demill Blvd	0.09	6	crackfill or microseal	4.73	4720
3441167	Demill Blvd	0.00	6	crackfill or microseal	4.73	4720
3441167	Demill Blvd	0.07	6	crackfill or microseal	4.73	4720
3440043	Demill Blvd	0.19	6	crackfill or microseal	4.73	4720
761106	Dove Ln	0.06	6	crackfill or microseal	2.51	2283
761106	Dove Ln	0.06	6	crackfill or microseal	2.51	2283
760907	E Fair St	0.08	6	crackfill or microseal	3.21	4735
761107	Eagle Pass	0.03	6	crackfill or microseal	2.12	2367
755110	Higley St	0.08	6	crackfill or microseal	2.62	3219
761006	Howard St	0.22	6	crackfill or microseal	4.19	4097
754507	Huron St	0.10	6	crackfill or microseal	2.23	2859
754507	Huron St	0.05	6	crackfill or microseal	2.23	2859
754507	Huron St	0.05	6	crackfill or microseal	2.23	2859
754507	Huron St	0.05	6	crackfill or microseal	2.23	2859
3251545	W Genesee St	0.10	6	crackfill or microseal	7.91	6817
3251545	W Genesee St	0.07	6	crackfill or microseal	7.91	6817
3251545	W Genesee St	0.02	6	crackfill or microseal	7.91	6817
3251545	Imlay City Rd	0.15	6	crackfill or microseal		
761207	Industrial Dr	0.17	6	crackfill or microseal	7.91	6817
760904	Jefferson St	0.06	6	crackfill or microseal	1.9	2826
760904	Jefferson St	0.05	6	crackfill or microseal	1.9	2826
755103	Lincoln St	0.01	6	crackfill or microseal	3.1	3594
1901618	Mansfield Dr	0.13	6	crackfill or microseal	1.95	2531
761009	McCormick Dr	0.10	6	crackfill or microseal	8.54	6161

761020 Mockingbird Trl	0.05	6	crackfill or microseal	2.17	2313
760902 N Jackson St	0.02	6	crackfill or microseal	2.55	3276
760902 N Jackson St	0.04	6	crackfill or microseal	2.55	3276
754210 N Saginaw St	0.32	6	crackfill or microseal	5.68	5171
754210 N Saginaw St	0.09	6	crackfill or microseal	5.68	5171
754210 N Saginaw St	0.06	6	crackfill or microseal	5.68	5171
754210 N Saginaw St	0.05	6	crackfill or microseal	5.68	5171
754210 N Saginaw St	0.08	6	crackfill or microseal	5.68	5171
754210 N Saginaw St	0.19	6	crackfill or microseal	5.68	5171
755106 N Washington St	0.05	6	crackfill or microseal	4.99	3798
755106 N Washington St	0.01	6	crackfill or microseal	4.99	3798
761105 Nightingale Ave	0.06	6	crackfill or microseal	2.35	2216
761105 Nightingale Ave	0.06	6	crackfill or microseal	2.35	2216
3441175 Old Farm Ct	0.07	6	crackfill or microseal	1.8	1612
3440631 Old Farm Ln	0.04	6	crackfill or microseal	1.77	1802
3440631 Old Farm Ln	0.01	6	crackfill or microseal	1.77	1802
761101 Oriole St	0.05	6	crackfill or microseal	2.3	2420
761102 Parkway St	0.06	6	crackfill or microseal	2.28	2373
761102 Parkway St	0.06	6	crackfill or microseal	2.28	2373
3440635 Peppermill Cir	0.04	6	crackfill or microseal	3.4	3333
3440635 Peppermill Cir	0.11	6	crackfill or microseal	3.4	3333
760806 Pine St	0.00	6	crackfill or microseal	2.73	3848
760806 Pine St	0.00	6	crackfill or microseal	2.73	3848
760806 Pine St	0.26	6	crackfill or microseal	2.73	3848
760806 Pine St	0.06	6	crackfill or microseal	2.73	3848
761104 Raven St	0.06	6	crackfill or microseal	2.59	2270
760706 S Calhoun St	0.16	6	crackfill or microseal	3.88	3569
3440100 S Court St	0.04	6	crackfill or microseal	5.79	4747
3440100 S Court St	0.07	6	crackfill or microseal	5.79	4747
760703 S Elm St	0.07	6	crackfill or microseal	2.25	3050
760703 S Elm St	0.06	6	crackfill or microseal	2.25	3050
760709 S Washington St	0.05	6	crackfill or microseal		
760709 S Washington St	0.05	6	crackfill or microseal		
754504 State St	0.04	6	crackfill or microseal	2.25	3184
754504 State St	0.05	6	crackfill or microseal	2.25	3184
3440634 Turnbull St	0.06	6	crackfill or microseal	2.63	3108
760809 W Nepessing St	0.05	6	crackfill or microseal	6.37	5544
760809 W Nepessing St	0.00	6	crackfill or microseal	6.37	5544
760809 W Nepessing St	0.06	6	crackfill or microseal	6.37	5544
760809 W Nepessing St	0.04	6	crackfill or microseal	6.37	5544
760809 W Nepessing St	0.01	6	crackfill or microseal	6.37	5544
760809 W Nepessing St	0.00	6	crackfill or microseal	6.37	5544
760809 W Nepessing St	0.05	6	crackfill or microseal	6.37	5544
761301 W Oregon St	0.19	6	crackfill or microseal	4.36	4774
761301 W Oregon St	0.06	6	crackfill or microseal	4.36	4774
761301 W Oregon St	0.04	6	crackfill or microseal	4.36	4774
754503 W Park St	0.05	6	crackfill or microseal	2.66	3394
754503 W Park St	0.06	6	crackfill or microseal	2.66	3394
3440539 Whisper Rdg	0.04	6	crackfill or microseal	2.02	3311
3441594 Xanthippe Ln	0.09	6	crackfill or microseal		
Total	7.15	95			

2015 PASER Ratings

- 6 - Good
- Other Roads

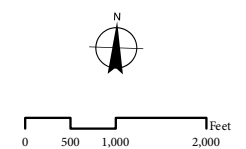
Source: Wade Trim, May 2015



Number	Road Name	Length	2015 PASER		Average	Average
		Mile	Rating	PASER Recommendation	SN	SM
754510	2nd St	0.05	5	Overlay	2.23	2311
754510	2nd St	0.04	5	Overlay	2.23	2311
760909	3rd St	0.05	5	Overlay	1.67	2354
761305	Baldwin Rd	0.08	5	Overlay	3.54	4125
3440027	Barry Dr	0.09	5	Overlay	2.08	2510
3440027	Barry Dr	0.14	5	Overlay	2.08	2510
755109	Bentley St	0.06	5	Overlay	3.87	3820
755109	Bentley St	0.02	5	Overlay	3.87	3820
755109	Bentley St	0.14	5	Overlay	3.87	3820
761119	Cedar St	0.05	5	Overlay	2.7	3641
755102	Charbridge	0.05	5	Overlay	1.93	3049
754501	Church St	0.05	5	Overlay	1.49	2427
754501	Church St	0.04	5	Overlay	1.49	2427
3440043	Demill Blvd	0.20	5	Overlay	4.73	4720
761107	Eagle Pass	0.06	5	Overlay	2.12	2367
761107	Eagle Pass	0.02	5	Overlay	2.12	2367
755202	Fox St	0.03	5	Overlay	2.2	2938
755104	Harrison St	0.06	5	Overlay	8.33	6279
3440046	Higley St	0.06	5	Overlay	2.62	3219
3251545	Davison Rd	0.13	5	Overlay	7.91	6817
3251545	Davison Rd	0.44	5	Overlay	7.91	6817
3251545	Davison Rd	0.22	5	Overlay	7.91	6817
3251545	Davison Rd	0.10	5	Overlay	7.91	6817
3251545	Davison Rd	0.21	5	Overlay	7.91	6817
3251545	Imlay City Rd	0.29	5	Overlay	7.91	6817
3251545	Imlay City Rd	0.29	5	Overlay	7.91	6817
3251545	Imlay City Rd	0.03	5	Overlay	7.91	6817
3251545	Imlay City Rd	0.09	5	Overlay	7.91	6817
761207	Industrial Dr	0.06	5	Overlay		
760802	Jefferson St	0.00	5	Overlay	1.9	2826
760802	Jefferson St	0.02	5	Overlay	1.9	2826
760802	Jefferson St	0.03	5	Overlay	1.9	2826
761201	Jefferson St	0.05	5	Overlay	1.9	2826
760802	Jefferson St	0.01	5	Overlay	1.9	2826
760904	Jefferson St	0.06	5	Overlay	1.9	2826
754603	Knollwood Dr	0.16	5	Overlay	2.9	3847
3440626	Lamoreaux Dr	0.11	5	Overlay	1.92	2103
3440626	Lamoreaux Dr	0.11	5	Overlay	1.92	2103
754502	Liberty St	0.05	5	Overlay	2.67	4641
755103	Lincoln St	0.17	5	Overlay	3.1	3594
755103	Lincoln St	0.04	5	Overlay	3.1	3594
1901618	Mansfield Dr	0.04	5	Overlay	1.95	2531
1901618	Mansfield Dr	0.01	5	Overlay	1.95	2531
1901618	Mansfield Dr	0.15	5	Overlay	1.95	2531
754505	Michigan St	0.05	5	Overlay	1.45	1807
754505	Michigan St	0.06	5	Overlay	1.45	1807
3440632	Mill Crk	0.06	5	Overlay	2.7	3063
3440633	Mill Crk	0.04	5	Overlay	2.7	3063
761304	Millville Rd	0.36	5	Overlay	2.84	3897

3440047 N Elm St	0.09	5	Overlay	2.02	2639
760902 N Jackson St	0.06	5	Overlay	2.55	3276
760803 N Madison St	0.00	5	Overlay	4.33	3741
755107 N Monroe St	0.15	5	Overlay	4.65	2860
755107 N Monroe St	0.06	5	Overlay	4.65	2860
755107 N Monroe St	0.06	5	Overlay	4.65	2860
755107 N Monroe St	0.06	5	Overlay	4.65	2860
755107 N Monroe St	0.06	5	Overlay	4.65	2860
754210 N Saginaw St	0.05	5	Overlay	5.68	5171
754210 N Saginaw St	0.01	5	Overlay	5.68	5171
3440057 North St	0.06	5	Overlay	2.34	3673
3440631 Old Farm Ln	0.07	5	Overlay	1.77	1802
761101 Oriole St	0.01	5	Overlay	2.3	2420
761102 Parkway St	0.07	5	Overlay	2.28	2373
761102 Parkway St	0.06	5	Overlay	2.28	2373
760806 Pine St	0.00	5	Overlay	2.73	3848
760806 Pine St	0.01	5	Overlay	2.73	3848
755204 Pine St	0.06	5	Overlay	2.73	3848
761104 Raven St	0.06	5	Overlay	2.59	2270
3440100 S Court St	0.02	5	Overlay	5.79	4747
760703 S Elm St	0.07	5	Overlay	2.25	3050
760703 S Elm St	0.05	5	Overlay	2.25	3050
755115 S Jackson St	0.15	5	Overlay		
760709 S Washington St	0.05	5	Overlay		
754504 State St	0.06	5	Overlay	2.25	3184
754504 State St	0.00	5	Overlay	2.25	3184
754504 State St	0.07	5	Overlay	2.25	3184
754504 State St	0.06	5	Overlay	2.25	3184
754504 State St	0.06	5	Overlay	2.25	3184
754504 State St	0.06	5	Overlay	2.25	3184
3440044 Summit St	0.07	5	Overlay	2.79	3714
3440634 Turnbull St	0.04	5	Overlay	2.63	3108
754407 Turrill Ave	0.01	5	Overlay	3.86	3458
754407 Turrill Ave	0.05	5	Overlay	3.86	3458
760908 Union St	0.08	5	Overlay	1.95	2522
760809 W Nepessing St	0.00	5	Overlay	6.37	5544
760809 W Nepessing St	0.01	5	Overlay	6.37	5544
760809 W Nepessing St	0.00	5	Overlay	6.37	5544
761301 W Oregon St	0.16	5	Overlay	4.36	4774
761301 W Oregon St	0.17	5	Overlay	4.36	4774
761301 W Oregon St	0.11	5	Overlay	4.36	4774
754503 W Park St	0.05	5	Overlay	2.66	3394
754503 W Park St	0.05	5	Overlay	2.66	3394
754503 W Park St	0.04	5	Overlay	2.66	3394
754503 W Park St	0.06	5	Overlay	2.66	3394
754503 W Park St	0.06	5	Overlay	2.66	3394
3441594 Xanthippe Ln	0.28	5	Overlay		
Total	7.55	96			

 5 - Fair  
 Other Roads



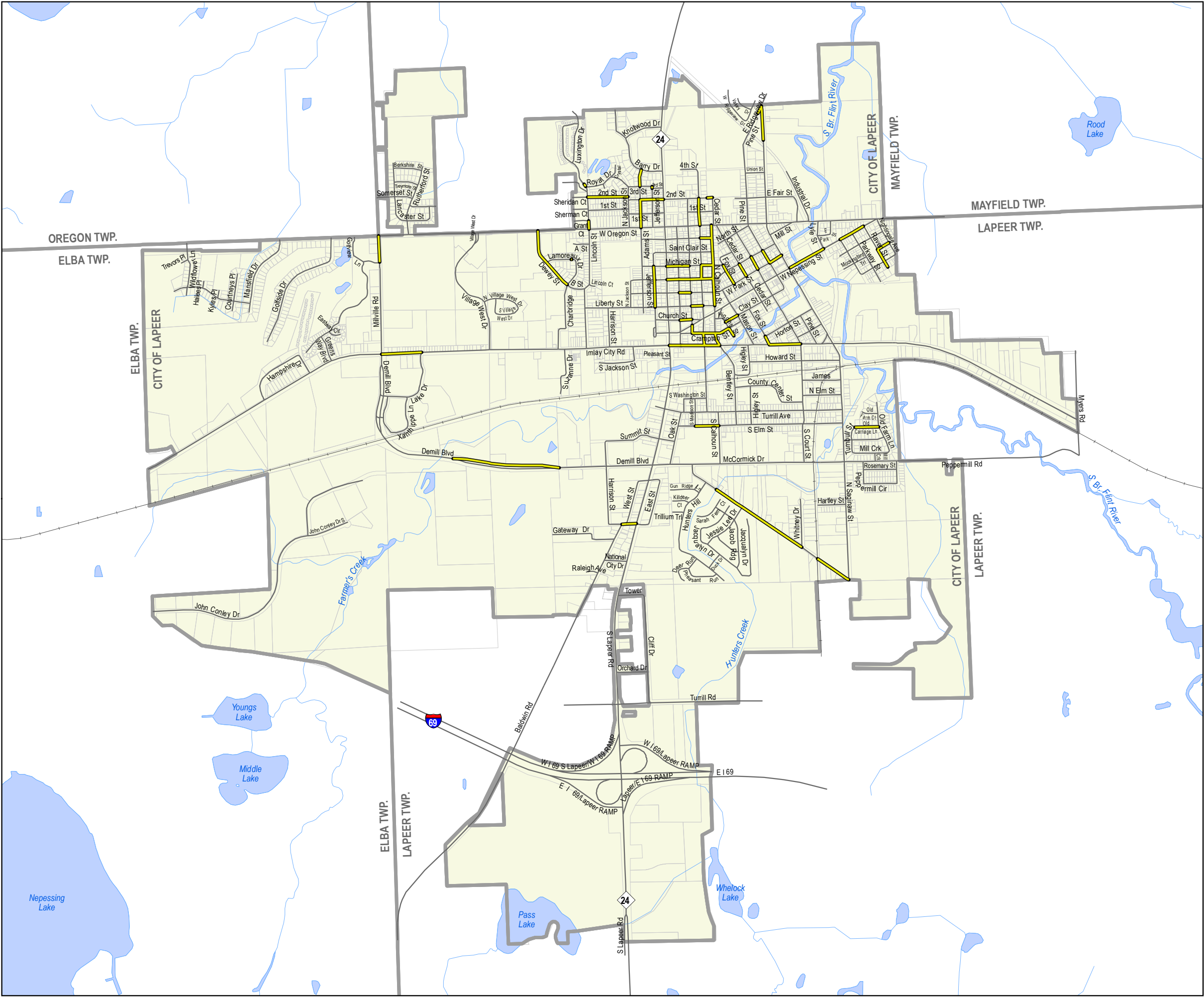
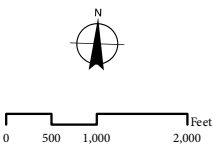
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754510	2nd St	0.05	4	Crush and shape or overlay	2.23	2311
754510	2nd St	0.05	4	Crush and shape or overlay	2.23	2311
760903	2nd St	0.17	4	Crush and shape or overlay	2.23	2311
754510	2nd St	0.02	4	Crush and shape or overlay	2.23	2311
760801	Adams St	0.06	4	Crush and shape or overlay	3.18	4103
760801	Adams St	0.06	4	Crush and shape or overlay	3.18	4103
760801	Adams St	0.07	4	Crush and shape or overlay	3.18	4103
754403	Baldwin Rd	0.02	4	Crush and shape or overlay	3.54	4125
754403	Baldwin Rd	0.04	4	Crush and shape or overlay	3.54	4125
760805	Cedar St	0.06	4	Crush and shape or overlay	2.7	3641
754501	Church St	0.05	4	Crush and shape or overlay	1.49	2427
3440040	Clay St	0.06	4	Crush and shape or overlay	2.47	3078
3441669	Crampton St	0.05	4	Crush and shape or overlay	1.76	3117
3441669	Crampton St	0.05	4	Crush and shape or overlay	1.76	3117
3441669	Crampton St	0.06	4	Crush and shape or overlay	1.76	3117
3440043	Demill Blvd	0.30	4	Crush and shape or overlay	4.73	4720
3440043	Demill Blvd	0.16	4	Crush and shape or overlay	4.73	4720
3441168	Demill Blvd	0.45	4	Crush and shape or overlay	4.73	4720
3440043	Demill Blvd	0.13	4	Crush and shape or overlay	4.73	4720
1828604	Dewey St	0.15	4	Crush and shape or overlay	2.13	2290
1828604	Dewey St	0.13	4	Crush and shape or overlay	2.13	2290
755202	Fox St	0.04	4	Crush and shape or overlay	2.2	2938
760804	Fox St	0.06	4	Crush and shape or overlay	2.2	2938
760804	Fox St	0.03	4	Crush and shape or overlay	2.2	2938
760810	Higgins St	0.04	4	Crush and shape or overlay	1.56	2580
754507	Huron St	0.05	4	Crush and shape or overlay	2.23	2859
3251545	W Genesee St	0.17	4	Crush and shape or overlay	7.91	6817
3251545	W Genesee St	0.00	4	Crush and shape or overlay	7.91	6817
3251545	W Genesee St	0.05	4	Crush and shape or overlay	7.91	6817
3251545	W Genesee St	0.00	4	Crush and shape or overlay	7.91	6817
3251545	W Genesee St	0.10	4	Crush and shape or overlay	7.91	6817
3251545	W Genesee St	0.07	4	Crush and shape or overlay	7.91	6817
3251545	W Genesee St	0.13	4	Crush and shape or overlay	7.91	6817
760802	Jefferson St	0.06	4	Crush and shape or overlay	1.9	2826
760802	Jefferson St	0.06	4	Crush and shape or overlay	1.9	2826
760802	Jefferson St	0.00	4	Crush and shape or overlay	1.9	2826
760802	Jefferson St	0.06	4	Crush and shape or overlay	1.9	2826
760904	Jefferson St	0.01	4	Crush and shape or overlay	1.9	2826
3440626	Lamoreaux Dr	0.00	4	Crush and shape or overlay	1.92	2103
754502	Liberty St	0.05	4	Crush and shape or overlay	2.67	4641
755103	Lincoln St	0.04	4	Crush and shape or overlay	3.1	3594
755103	Lincoln St	0.01	4	Crush and shape or overlay	3.1	3594
754505	Michigan St	0.05	4	Crush and shape or overlay	1.45	1807
754505	Michigan St	0.05	4	Crush and shape or overlay	1.45	1807
754505	Michigan St	0.05	4	Crush and shape or overlay	1.45	1807
761304	Millville Rd	0.11	4	Crush and shape or overlay	2.84	3897
761103	Mockingbird Trl	0.06	4	Crush and shape or overlay	2.17	2313
755108	N Calhoun St	0.06	4	Crush and shape or overlay	2.63	3010
755108	N Calhoun St	0.06	4	Crush and shape or overlay	2.63	3010

755108 N Calhoun St	0.06	4	Crush and shape or overlay	2.63	3010
755108 N Calhoun St	0.06	4	Crush and shape or overlay	2.63	3010
755108 N Calhoun St	0.06	4	Crush and shape or overlay	2.63	3010
755108 N Calhoun St	0.06	4	Crush and shape or overlay	2.63	3010
755108 N Calhoun St	0.06	4	Crush and shape or overlay	2.63	3010
760803 N Madison St	0.03	4	Crush and shape or overlay	4.33	3741
755107 N Monroe St	0.05	4	Crush and shape or overlay	4.65	2860
755107 N Monroe St	0.06	4	Crush and shape or overlay	4.65	2860
755107 N Monroe St	0.06	4	Crush and shape or overlay	4.65	2860
755107 N Monroe St	0.06	4	Crush and shape or overlay	4.65	2860
754210 N Saginaw St	0.00	4	Crush and shape or overlay	5.68	5171
754210 N Saginaw St	0.14	4	Crush and shape or overlay	5.68	5171
755106 N Washington St	0.00	4	Crush and shape or overlay	4.99	3798
3441176 Old Carriage Ln	0.10	4	Crush and shape or overlay	2.08	1364
760806 Pine St	0.06	4	Crush and shape or overlay	2.73	3848
760806 Pine St	0.03	4	Crush and shape or overlay	2.73	3848
3441009 Raven St	0.03	4	Crush and shape or overlay	5.59	2270
761104 Raven St	0.06	4	Crush and shape or overlay	2.59	2270
3440100 S Court St	0.06	4	Crush and shape or overlay	5.79	4747
760703 S Elm St	0.10	4	Crush and shape or overlay	2.25	3050
754504 State St	0.05	4	Crush and shape or overlay	2.25	3184
754504 State St	0.05	4	Crush and shape or overlay	2.25	3184
754504 State St	0.05	4	Crush and shape or overlay	2.25	3184
754504 State St	0.05	4	Crush and shape or overlay	2.25	3184
760809 W Nepessing St	0.03	4	Crush and shape or overlay	6.37	5544
760809 W Nepessing St	0.14	4	Crush and shape or overlay	6.37	5544
760809 W Nepessing St	0.06	4	Crush and shape or overlay	6.37	5544
760809 W Nepessing St	0.06	4	Crush and shape or overlay	6.37	5544
754503 W Park St	0.05	4	Crush and shape or overlay	2.66	3394
754503 W Park St	0.06	4	Crush and shape or overlay	2.66	3394
Total	5.32	79			

2015 PASER Ratings

- 4 - Fair
- Other Roads

Source: Wade Trim, May 2015

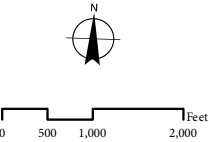
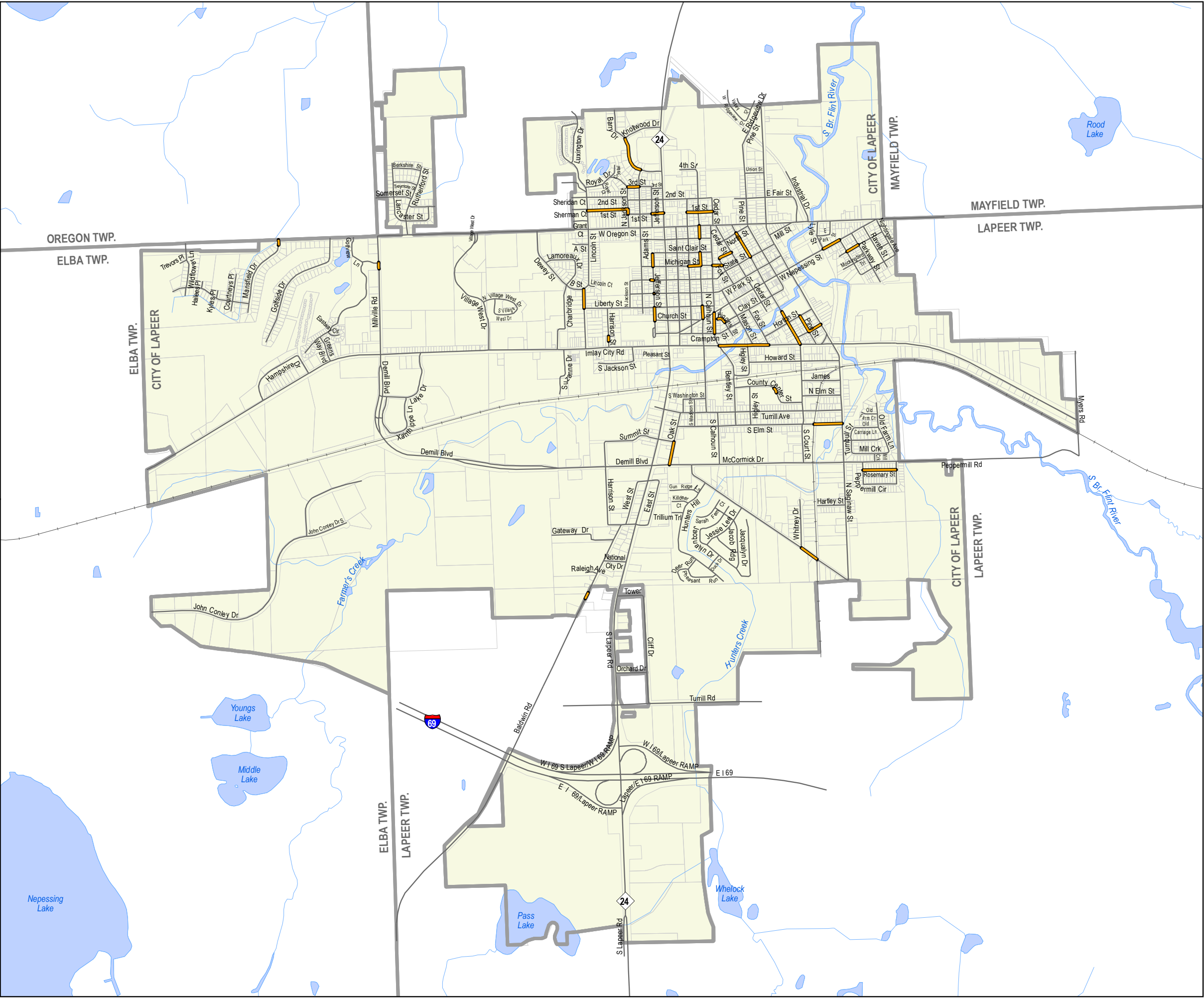


Number	Road Name	Length	2015 PASER	PASER Recommendation	Average	Average
		Mile	Rating		SN	SM
754509	1st St	0.05	3	Crush and shape or overlay	2.2	2371
760901	1st St	0.17	3	Crush and shape or overlay	2.2	2371
760906	1st St	0.05	3	Crush and shape or overlay	2.2	2371
760906	1st St	0.06	3	Crush and shape or overlay	2.2	2371
760909	3rd St	0.05	3	Crush and shape or overlay	1.67	2354
761305	Baldwin Rd	0.03	3	Crush and shape or overlay	3.54	4125
3440027	Barry Dr	0.16	3	Crush and shape or overlay	2.08	2510
761001	Biddle St	0.06	3	Crush and shape or overlay	1.29	3289
761008	County Center St	0.02	3	Crush and shape or overlay	3.24	3007
3440043	Demill Blvd	0.08	3	Crush and shape or overlay	4.73	4720
761106	Dove Ln	0.06	3	Crush and shape or overlay	2.51	2283
755104	Harrison St	0.02	3	Crush and shape or overlay	8.33	6279
760810	Higgins St	0.04	3	Crush and shape or overlay	1.56	2580
3251545	W Genesee St	0.12	3	Crush and shape or overlay	7.91	6817
3251545	W Genesee St	0.02	3	Crush and shape or overlay	7.91	6817
3251545	W Genesee St	0.07	3	Crush and shape or overlay	7.91	6817
760802	Jefferson St	0.00	3	Crush and shape or overlay	1.9	2826
760802	Jefferson St	0.05	3	Crush and shape or overlay	1.9	2826
760802	Jefferson St	0.00	3	Crush and shape or overlay	1.9	2826
760802	Jefferson St	0.05	3	Crush and shape or overlay	1.9	2826
755103	Lincoln St	0.08	3	Crush and shape or overlay	3.1	3594
1901618	Mansfield Dr	0.02	3	Crush and shape or overlay	1.95	2531
754505	Michigan St	0.05	3	Crush and shape or overlay	1.45	1807
754505	Michigan St	0.04	3	Crush and shape or overlay	1.45	1807
761304	Millville Rd	0.02	3	Crush and shape or overlay	2.84	3897
761304	Millville Rd	0.00	3	Crush and shape or overlay	2.84	3897
755108	N Calhoun St	0.00	3	Crush and shape or overlay	2.63	3010
755108	N Calhoun St	0.06	3	Crush and shape or overlay	2.63	3010
755108	N Calhoun St	0.03	3	Crush and shape or overlay	2.63	3010
760902	N Jackson St	0.02	3	Crush and shape or overlay	2.55	3276
755107	N Monroe St	0.05	3	Crush and shape or overlay	4.65	2860
755107	N Monroe St	0.06	3	Crush and shape or overlay	4.65	2860
755107	N Monroe St	0.05	3	Crush and shape or overlay	4.65	2860
3440045	Oak St	0.10	3	Crush and shape or overlay	3.92	3892
755204	Pine St	0.08	3	Crush and shape or overlay	2.73	3848
761005	Pope St	0.06	3	Crush and shape or overlay	2.05	4056
3440636	Rosemary St	0.14	3	Crush and shape or overlay	2.72	2281
3440100	S Court St	0.03	3	Crush and shape or overlay	5.79	4747
3440100	S Court St	0.07	3	Crush and shape or overlay	5.79	4747
3440100	S Court St	0.05	3	Crush and shape or overlay	5.79	4747
3440100	S Court St	0.12	3	Crush and shape or overlay	5.79	4747
760703	S Elm St	0.12	3	Crush and shape or overlay	2.25	3050
754504	State St	0.01	3	Crush and shape or overlay	2.25	3184
760809	W Nepessing St	0.08	3	Crush and shape or overlay	6.37	5544
Total		2.52	44			

2015 PASER Ratings

- 3 - Poor
- Other Roads

Source: Wade Trim, May 2015

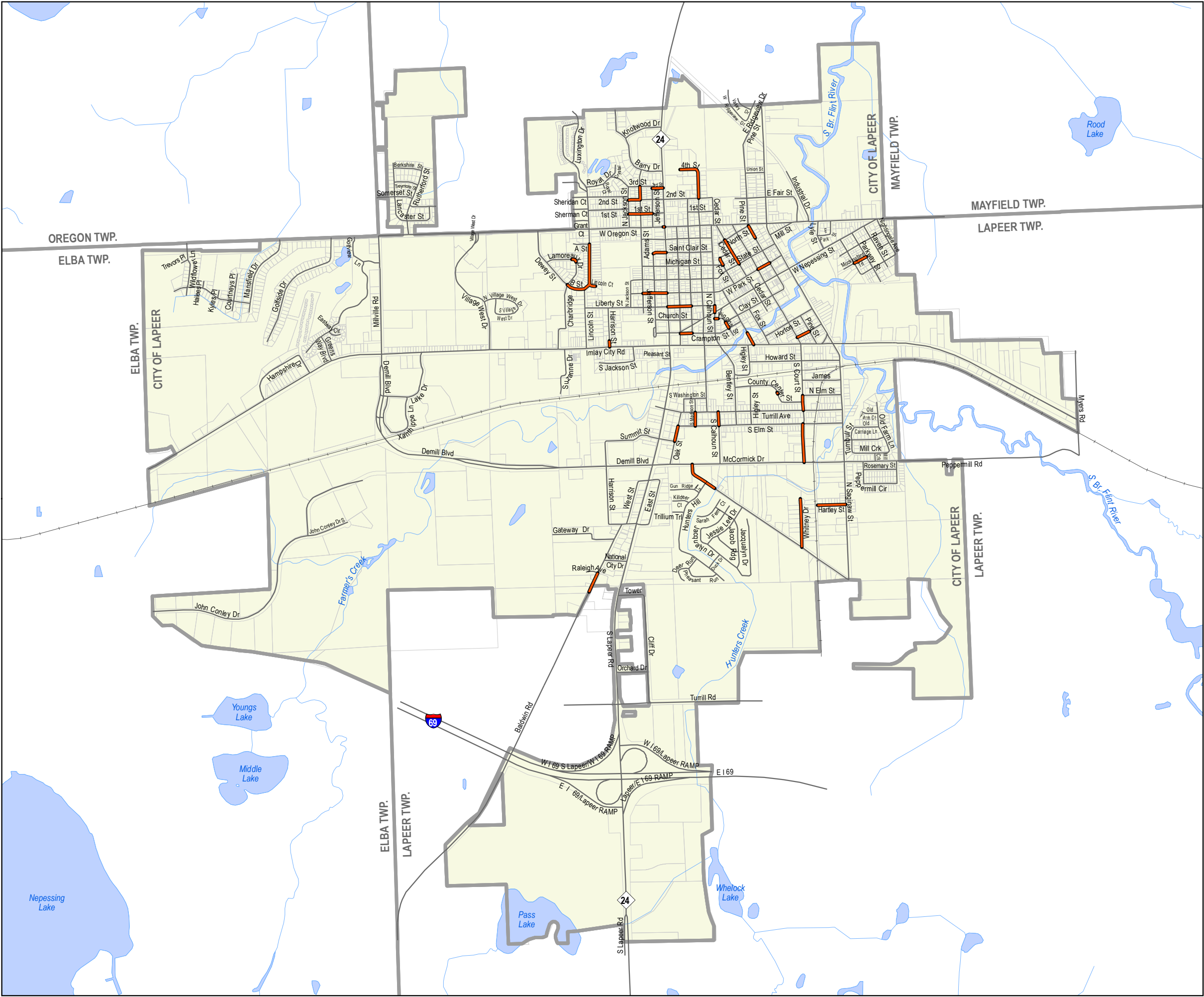
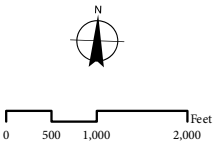


Number	Road Name	Length	2015 PASER		Average	Average
		Mile	Rating	PASER Recommendation	SN	SM
754509	1st St	0.05	2	Reconstruct	2.2	2371
754509	1st St	0.05	2	Reconstruct	2.2	2371
754510	2nd St	0.05	2	Reconstruct	2.23	2311
754601	3rd St	0.05	2	Reconstruct	1.67	2354
760920	4th St	0.08	2	Reconstruct	1.42	2202
760801	Adams St	0.06	2	Reconstruct	3.18	4103
761204	B St	0.08	2	Reconstruct		
761305	Baldwin Rd	0.09	2	Reconstruct	3.54	4125
760805	Cedar St	0.06	2	Reconstruct	2.7	3641
760805	Cedar St	0.06	2	Reconstruct	2.7	3641
3440042	Church St	0.01	2	Reconstruct	1.49	2427
761008	County Center St	0.01	2	Reconstruct	3.24	3007
3441669	Crampton St	0.05	2	Reconstruct	1.76	3117
3440043	Demill Blvd	0.04	2	Reconstruct	4.73	4720
3440043	Demill Blvd	0.11	2	Reconstruct	4.73	4720
760804	Fox St	0.03	2	Reconstruct	2.2	2938
755104	Harrison St	0.03	2	Reconstruct	8.33	6279
761120	Hartley St	0.12	2	Reconstruct	1.36	2676
760810	Higgins St	0.03	2	Reconstruct	1.56	2580
3440626	Lamoreaux Dr	0.02	2	Reconstruct	1.92	2103
754502	Liberty St	0.05	2	Reconstruct	2.67	4641
754502	Liberty St	0.05	2	Reconstruct	2.67	4641
761215	Lincoln Ct	0.03	2	Reconstruct	1.36	2560
755103	Lincoln St	0.03	2	Reconstruct	3.1	3594
755103	Lincoln St	0.17	2	Reconstruct	3.1	3594
755201	Mason St	0.06	2	Reconstruct	2.99	3869
761020	Mockingbird Trl	0.06	2	Reconstruct	2.17	2313
755108	N Calhoun St	0.03	2	Reconstruct	2.63	3010
755107	N Monroe St	0.12	2	Reconstruct	4.65	2860
3440045	Oak St	0.06	2	Reconstruct	3.92	3892
760806	Pine St	0.06	2	Reconstruct	2.73	3848
761005	Pope St	0.06	2	Reconstruct	2.05	4056
760706	S Calhoun St	0.06	2	Reconstruct	3.88	3569
760708	S Court St	0.16	2	Reconstruct	5.79	4747
3440100	S Court St	0.04	2	Reconstruct	5.79	4747
3440100	S Court St	0.03	2	Reconstruct	5.79	4747
760705	S Madison St	0.06	2	Reconstruct	1.97	2380
754506	Saint Clair St	0.06	2	Reconstruct	2.88	2770
761301	W Oregon St	0.01	2	Reconstruct	4.36	4774
754503	W Park St	0.05	2	Reconstruct	2.66	3394
754503	W Park St	0.05	2	Reconstruct	2.66	3394
754503	W Park St	0.06	2	Reconstruct	2.66	3394
1848105	Whitney Dr	0.21	2	Reconstruct	3.09	3679
Total		2.60	43			

2015 PASER Ratings

- 2 - Very Poor
- Other Roads

Source: Wade Trim, May 2015

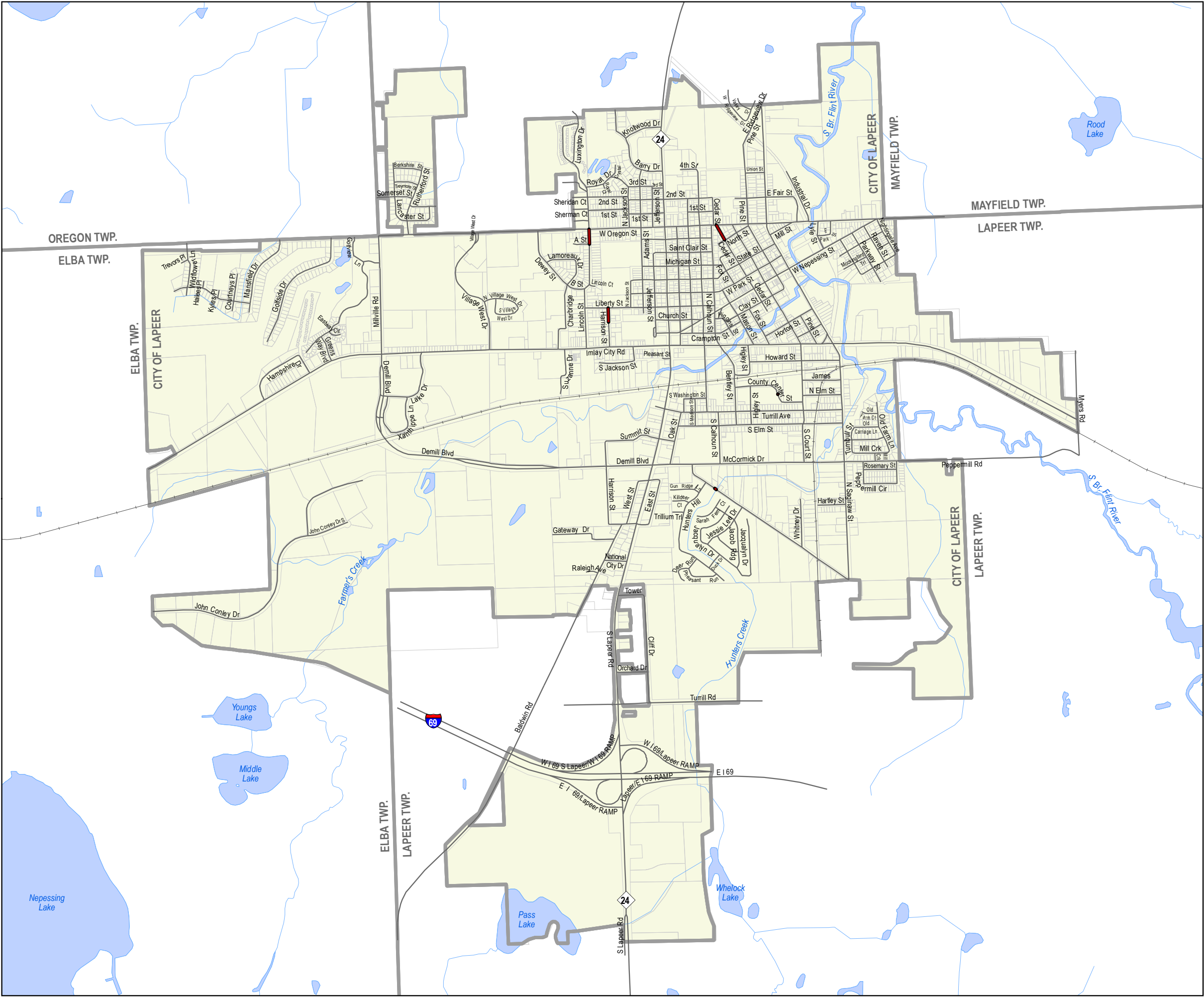
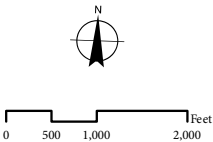


Number	Road Name	Length	2015 PASER		Average	Average
		Mile	Rating	PASER Recommendation	SN	SM
760805	Cedar St	0.07	1	Reconstruct	2.7	3641
761008	County Center St	0.00	1	Reconstruct	3.24	3007
3440043	Demill Blvd	0.01	1	Reconstruct	4.73	4720
755104	Harrison St	0.06	1	Reconstruct	8.33	6279
755103	Lincoln St	0.06	1	Reconstruct	3.1	3594
Total		0.20	5			

2015 PASER Ratings

- 1 - Failed
- Other Roads

Source: Wade Trim, May 2015





Appendix 2  
PASER Rating with Underground Improvements and  
Utility Improvements Matrix

## City of Lapeer - Future Underground Utility Improvement Needs

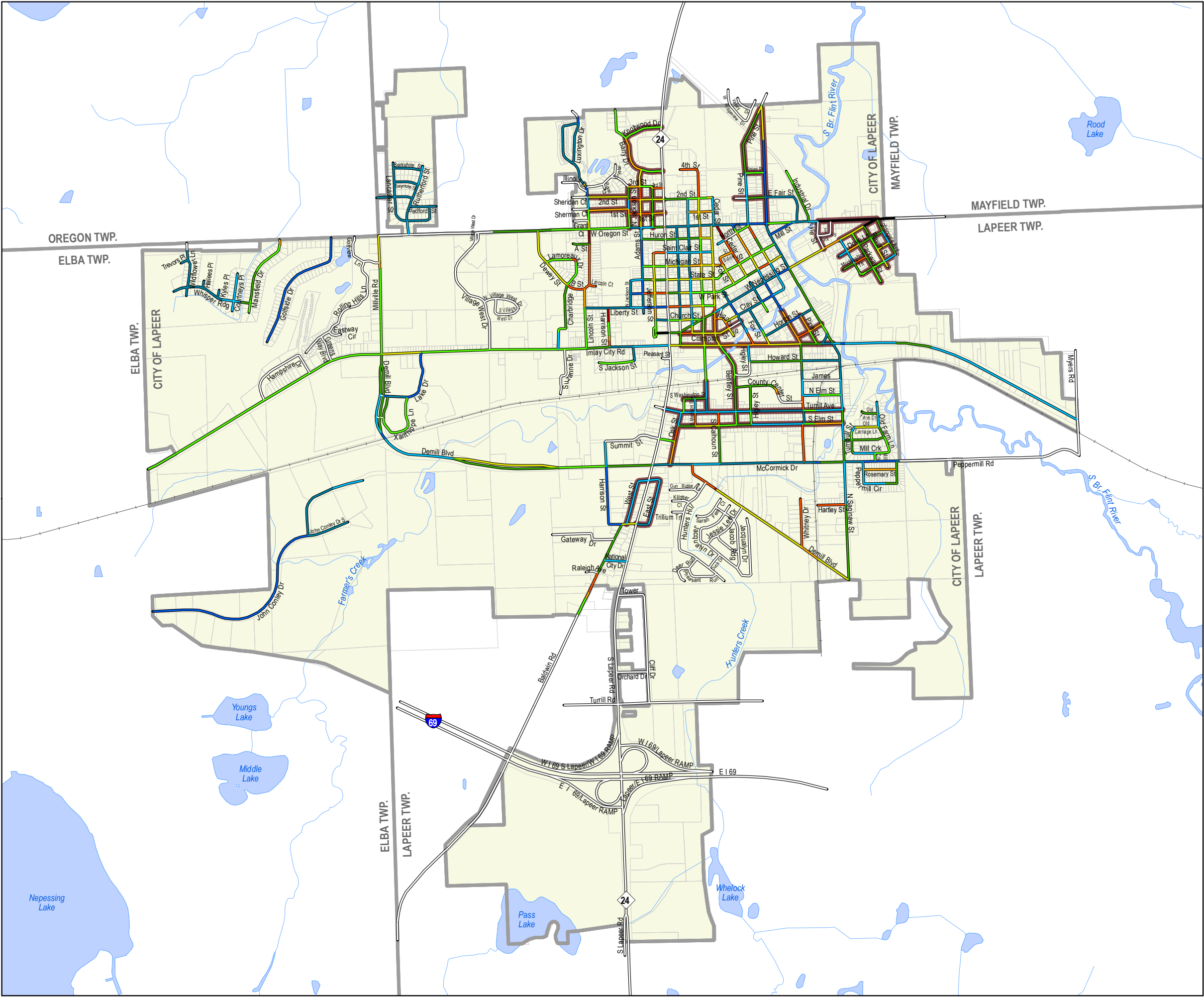
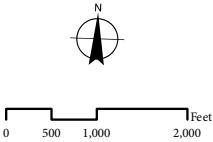
	Water	Storm	Storm Leads	Sanitary	Sanitary Repairs	Recent Reconstruct	Sump Leads
Adams Street	X	X	X	X			
Barry Drive	X						
Beach Street	X	X	X		X		
Bentley Street	X	X	X		X		
Calhoun Street	X	X	X		X		
Calhoun Street	X		X		X		
Court Street from Genesee to Bridge	X						X
Dove Lane	X	X	X	X			
Eagle Pass Street	X	X	X	X			
East Street	X						
Elm Street	X	X	X		X		
Fair Street	X	X	X	X			
First Street	X	X	X	X			
Genesee from Saginaw to Washington	X	X		X			
Jackson Street	X	X	X	X			
Jefferson Street	X	X	X	X			
Knollwood Drive	X						
Louis C. Cramton Street	X		X		X		
Lyle Street	X	X	X	X			
Mockingbird Trail	X	X	X	X			
Monroe Street	X	X	X		X		
Monroe Street	X		X		X		
N. Pine Street	X						
N. Saginaw Street	X	X		X			
Nepessing Street	X	X	X	X			
Nightingale Street	X	X	X	X			
Oak Street	X	X	X		X		
Oregon Street						X	
Park Street	X	X	X	X			
Parkway Street	X	X	X	X			
Pine Street	X	X	X	X			
Pope Street	X	X	X	X			
Railroad Street	X	X	X	X			
Raven Street	X	X	X	X			
Saginaw Street						X	
Second Street	X	X	X	X			
Turrill Avenue	X	X	X		X		
Union Street	X	X		X			
West Street	X						

2015 PASER Ratings

- 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

Planned Underground  
Utility Improvements

Source: Wade Trim, August 2015  
August 2015

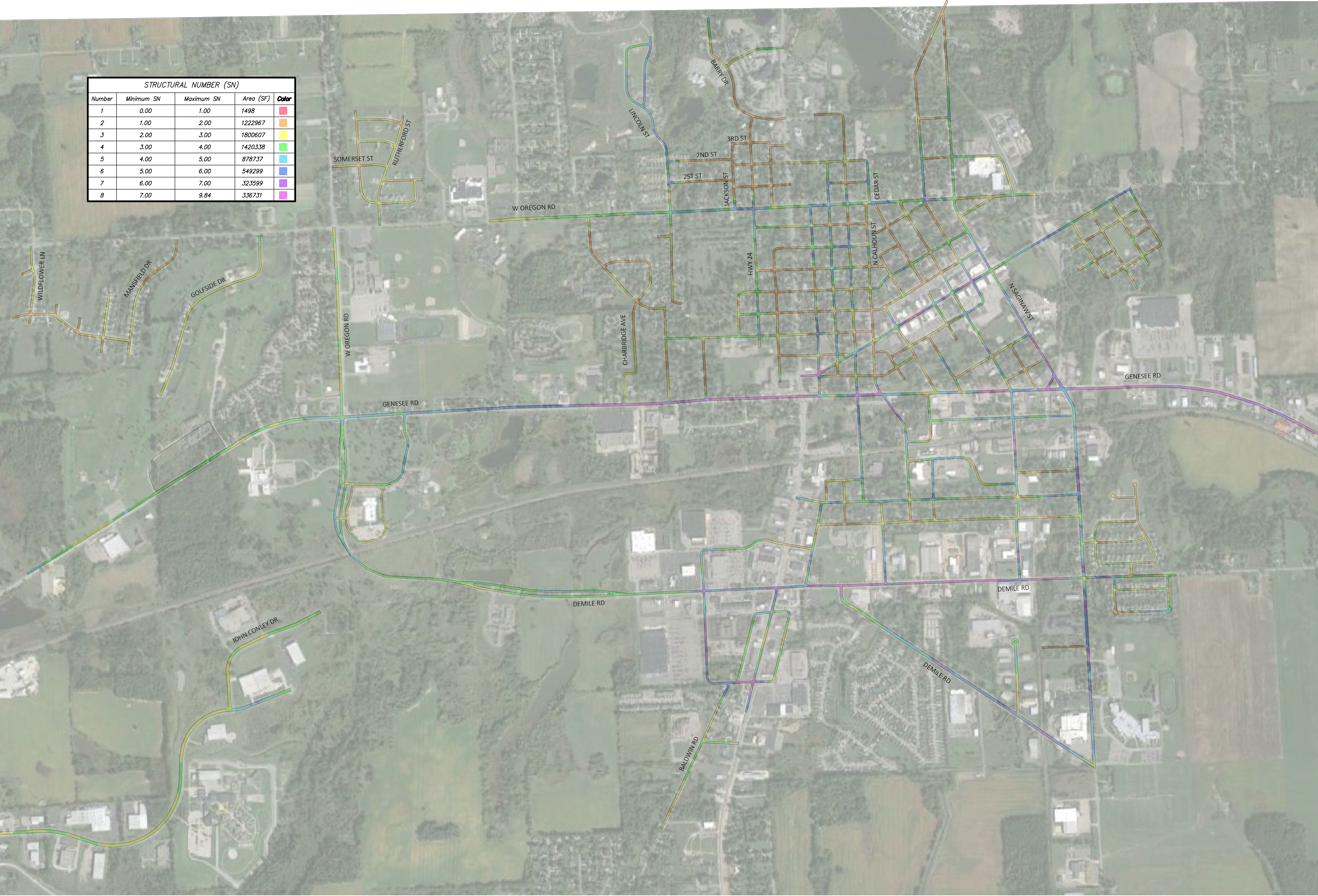




## Appendix 3

### Roadway Structural Number Diagram





STRUCTURAL NUMBER (SN)				
Number	Minimum SN	Maximum SN	Area (SF)	Color
1	0.00	1.00	1498	Red
2	1.00	2.00	1222967	Orange
3	2.00	3.00	1800607	Yellow
4	3.00	4.00	1420338	Light Green
5	4.00	5.00	878737	Light Blue
6	5.00	6.00	549299	Blue
7	6.00	7.00	323599	Purple
8	7.00	9.84	336731	Magenta



www.sme-usa.com

Orientation



Scale

0' 700' 1400'

GRAPHIC SCALE: 1" = 700'

Project

CITY OF LAPEER  
PAVEMENT ASSESSMENT  
PROJECT

Project Location

LAPEER, MICHIGAN

Sheet Name

ESTIMATED STRUCTURAL  
NUMBER DIAGRAM

Engineer's Seal

Revisions

REV	ISSUED FOR	DATE	BY

Date

6-18-15

SME Project No.

071837.00

Project Manager:

ABT

Designer:

ABT

CADD:

BH

Checked By:

ABT

Sheet No.

1

DRAWING NOTE: SCALE DEPICTED IS MEANT FOR 24" X 36" AND WILL SCALE INCORRECTLY IF PRINTED ON ANY OTHER SIZE MEDIA.  
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ESTIMATED STRUCTURAL NUMBER DIAGRAM

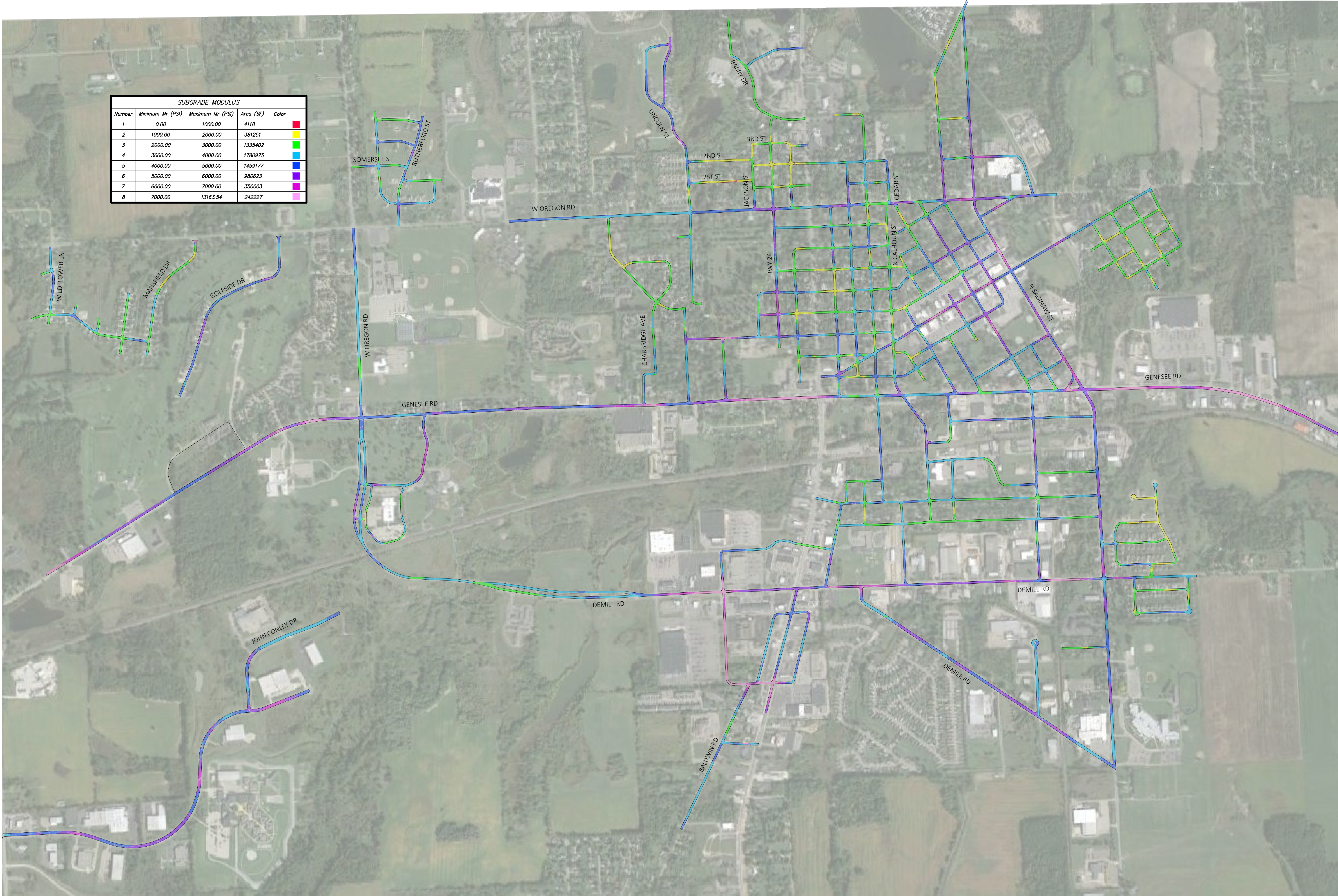
Nov 05, 2015 10:44am - mresmon FILE LOCATION: I:\me\inc\wp\WP071837.00\CADD\DWG\Sheet071837.00-ESK.dwg PLOT DATE:



## Appendix 4

### Roadway Subgrade Modulus Diagram





SUBGRADE MODULUS				
Number	Minimum Mr (PSI)	Maximum Mr (PSI)	Area (SF)	Color
1	0.00	1000.00	4118	Red
2	1000.00	2000.00	381251	Yellow
3	2000.00	3000.00	1335402	Green
4	3000.00	4000.00	1780975	Cyan
5	4000.00	5000.00	1459177	Blue
6	5000.00	6000.00	980623	Purple
7	6000.00	7000.00	350003	Magenta
8	7000.00	13163.54	242227	Pink



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Orientation



Scale

0' 700' 1400'

GRAPHIC SCALE: 1" = 700'

Project

CITY OF LAPEER  
PAVEMENT ASSESSMENT  
PROJECT

Project Location

LAPEER, MICHIGAN

Sheet Name

ESTIMATED SUBGRADE  
MODULUS DIAGRAM

Engineer's Seal

Revisions

REV	ISSUED FOR	DATE	BY

Date

6-18-15

SME Project No.

071837.00

Project Manager:

ABT

Designer:

ABT

CADD:

BH

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ABT

Sheet No.

1

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ESTIMATED SUBGRADE MODULUS DIAGRAM

Nov 05, 2015 10:44am - mcsimmons FILE LOCATION: \\sme-inc\p\WP\071837.00\CADD\SSW\rev1071837.00-ESM.dwg PLOT DATE:



## Appendix 5

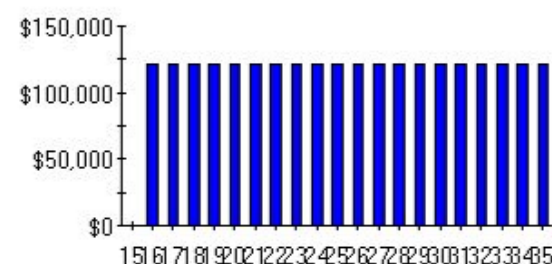
### Roadsoft Output Reports



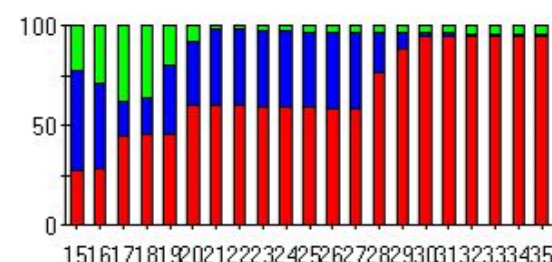
	Budget	Miles	Yr From	Yr To	
do not use - (\$ 7,040 / mile)					
Reconstruction - 6" base, 5" top - (\$ 651,482 / mile)					
	\$69,187	0.1062	12	12	
	\$65,083	0.0999	13	13	
	\$61,109	0.0938	14	14	
	\$57,200	0.0878	15	15	
	\$53,552	0.0822	16	16	
	\$51,532	0.0791	17	17	
	\$48,535	0.0745	18	18	
	\$45,929	0.0705	19	19	
	\$43,584	0.0669	20	20	
Crush & Shape/Resurface (Asp) - (\$ 197,472 / mile)					
	\$91,469	0.4632	4	4	
	\$99,960	0.5062	5	5	
	\$96,129	0.4868	6	6	
	\$92,417	0.468	7	7	
	\$88,862	0.45	8	8	
	\$82,682	0.4187	9	9	
	\$78,219	0.3961	10	10	
	\$73,855	0.374	11	11	
Do not use - (\$ 21,120 / mile)					
Do not use - (\$ 70,400 / mile)					
Mill & Overlay - 2" Thick - (\$ 151,078 / mile)					
Microseal - (\$ 49,984 / mile)					
	\$12,816	0.2564	2	2	
Crack Filling - (\$ 5,984 / mile)					
	\$116,947	19.5433	1	1	
	\$99,634	16.6501	2	2	
	\$108,124	18.0689	3	3	
	\$12,489	2.0871	4	4	
	\$2,772	0.4632	9	9	
	\$3,953	0.6606	10	10	
	\$5,155	0.8614	11	11	
	\$6,761	1.1298	12	12	
	\$7,983	1.334	13	13	
	\$9,138	1.5271	14	14	
	\$10,331	1.7264	15	15	
	\$11,388	1.9031	16	16	
	\$10,921	1.8251	17	17	
	\$11,478	1.9181	18	18	
	\$11,824	1.9759	19	19	
	\$11,933	1.9941	20	20	
Concrete-Standard: 0.320					
Reconstruction +- (\$ 398,933 / mile)					

## Entire Strategy

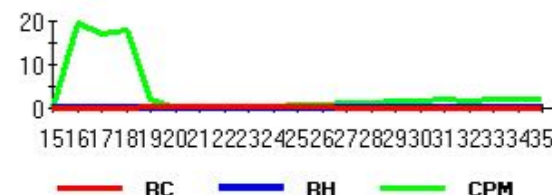
Cost by Year  
0.5 MIL - Entire Strategy



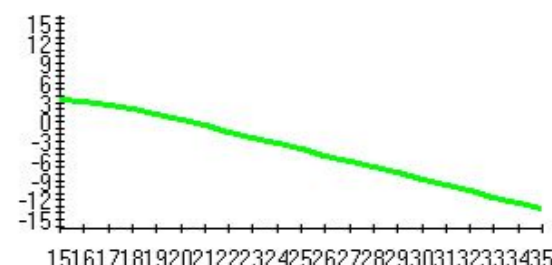
Percent of Good(grn) Fair(blue) Poor(red) by Year  
0.5 MIL - Entire Strategy



Lane Miles of Activity Performed by Year  
0.5 MIL - Entire Strategy



Average RSL by Year  
0.5 MIL - Entire Strategy



# Strategy Definition

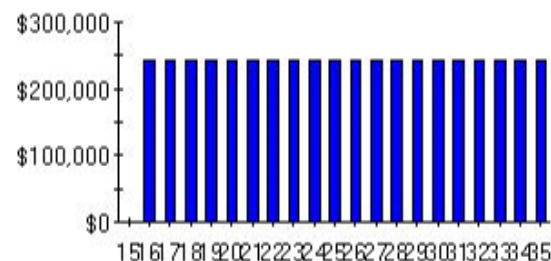
Work this year? ☐ Inflation 4 % Years 20

View Entire Strategy ☒

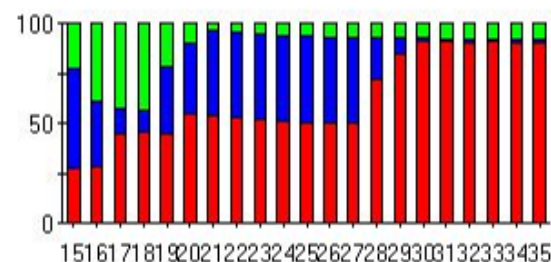
	Budget	Miles	Yr From	Yr To
Reconstruction - 6" base, 5" top - (\$ 651,482 / mile)				
	\$146,583	0.225	11	11
	\$137,332	0.2108	12	12
	\$129,124	0.1982	13	13
	\$121,176	0.186	14	14
	\$113,423	0.1741	15	15
	\$109,253	0.1677	16	16
	\$103,064	0.1582	17	17
	\$97,527	0.1497	18	18
	\$92,706	0.1423	19	19
	\$87,624	0.1345	20	20
Crush & Shape/Resurface (Asp) - (\$ 197,472 / mile)				
	\$44,372	0.2247	3	3
	\$207,918	1.0529	4	4
	\$199,921	1.0124	5	5
	\$192,239	0.9735	6	6
	\$184,854	0.9361	7	7
	\$176,402	0.8933	8	8
	\$164,158	0.8313	9	9
	\$155,568	0.7878	10	10
Do not use - (\$ 21,120 / mile)				
Do not use - (\$ 70,400 / mile)				
Mill & Overlay - 2" Thick - (\$ 151,078 / mile)				
Microseal - (\$ 49,984 / mile)				
	\$65,194	1.3043	1	1
	\$157,155	3.1441	2	2
	\$36,288	0.726	3	3
Crack Filling - (\$ 5,984 / mile)				
	\$168,695	28.191	1	1
	\$67,738	11.3198	2	2
	\$135,592	22.6591	3	3
	\$1,345	0.2247	8	8
	\$6,749	1.1278	9	9
	\$8,756	1.4633	10	10
	\$11,442	1.9121	11	11
	\$14,584	2.4371	12	12
	\$16,940	2.8308	13	13
	\$19,296	3.2246	14	14
	\$21,654	3.6186	15	15
	\$20,642	3.4496	16	16
	\$21,793	3.6418	17	17
	\$22,550	3.7683	18	18
	\$22,775	3.8059	19	19
	\$23,414	3.9127	20	20

## Entire Strategy

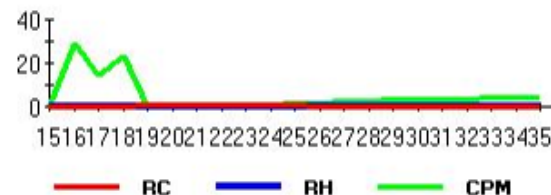
Cost by Year  
1.0 MIL - Entire Strategy



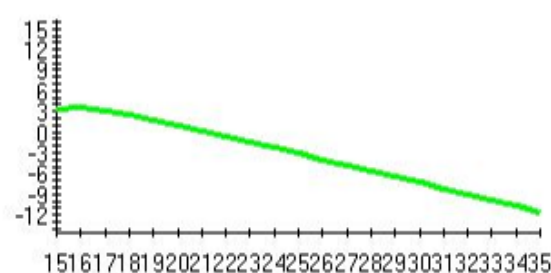
Percent of Good(grn) Fair(blue) Poor(red) by Year  
1.0 MIL - Entire Strategy



Lane Miles of Activity Performed by Year  
1.0 MIL - Entire Strategy



Average RSL by Year  
1.0 MIL - Entire Strategy



# Strategy Definition

Work this year? ☐

Inflation

% Years

View Entire Strategy ☒

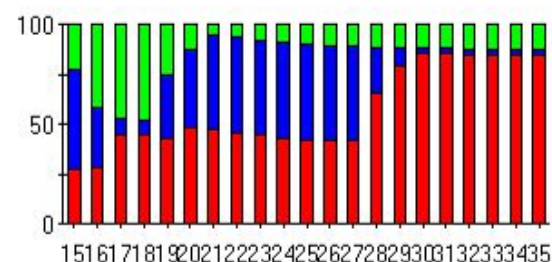
	Budget	Miles	Yr From	Yr To
Reconstruction - 6" base, 5" top - (\$ 651,482 / mile)				
	\$218,507	0.3354	11	11
	\$204,956	0.3146	12	12
	\$192,643	0.2957	13	13
	\$180,656	0.2773	14	14
	\$169,059	0.2595	15	15
	\$162,740	0.2498	16	16
	\$153,554	0.2357	17	17
	\$145,215	0.2229	18	18
	\$137,984	0.2118	19	19
	\$130,361	0.2001	20	20
Crush & Shape/Resurface (Asp) - (\$ 197,472 / mile)				
	\$141,963	0.7189	3	3
	\$311,887	1.5794	4	4
	\$299,901	1.5187	5	5
	\$288,349	1.4602	6	6
	\$277,270	1.4041	7	7
	\$262,302	1.3283	8	8
	\$245,458	1.243	9	9
	\$232,346	1.1766	10	10
Do not use - (\$ 21,120 / mile)				
Do not use - (\$ 70,400 / mile)				
Mill & Overlay - 2" Thick - (\$ 151,078 / mile)				
Microseal - (\$ 49,984 / mile)				
	\$182,137	3.6439	1	1
	\$264,935	5.3004	2	2
	\$36,288	0.726	3	3
Crack Filling - (\$ 5,984 / mile)				
	\$168,695	28.191	1	1
	\$72,404	12.0996	2	2
	\$146,115	24.4176	3	3
	\$4,302	0.7189	8	8
	\$10,885	1.819	9	9
	\$14,150	2.3646	10	10
	\$18,517	3.0944	11	11
	\$22,919	3.8301	12	12
	\$26,477	4.4247	13	13
	\$30,076	5.0261	14	14
	\$33,531	5.6035	15	15
	\$32,035	5.3535	16	16
	\$33,764	5.6423	17	17
	\$34,880	5.8288	18	18
	\$35,219	5.8855	19	19
	\$36,174	6.0451	20	20

## Entire Strategy

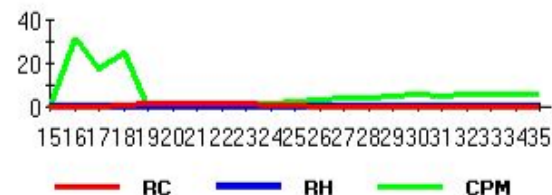
Cost by Year  
1.5 MIL - Entire Strategy



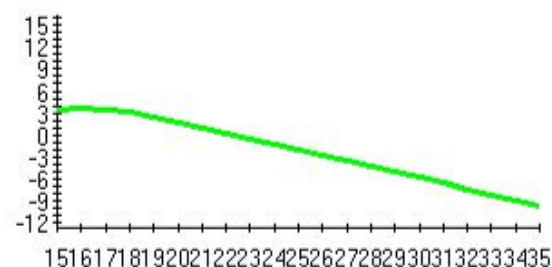
Percent of Good(grn) Fair(blue) Poor(red) by Year  
1.5 MIL - Entire Strategy



Lane Miles of Activity Performed by Year  
1.5 MIL - Entire Strategy



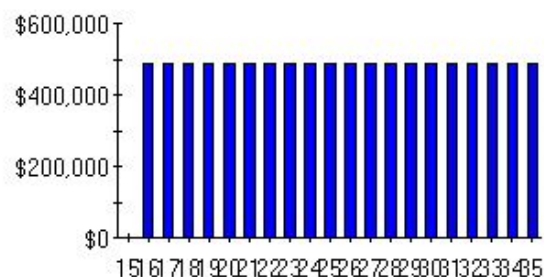
Average RSL by Year  
1.5 MIL - Entire Strategy



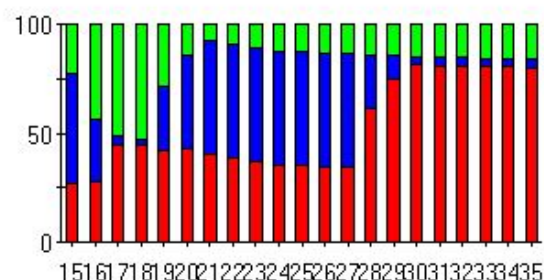
	Budget	Miles	Yr From	Yr To	
Reconstruction - 6" base, 5" top - (\$ 651,482 / mile)					
	\$73,748	0.1132	9	9	
	\$309,128	0.4745	10	10	
	\$290,430	0.4458	11	11	
	\$272,580	0.4184	12	12	
	\$256,163	0.3932	13	13	
	\$241,635	0.3709	14	14	
	\$231,797	0.3558	15	15	
	\$219,158	0.3364	16	16	
	\$207,823	0.319	17	17	
	\$197,529	0.3032	18	18	
	\$186,975	0.287	19	19	
	\$177,073	0.2718	20	20	
Crush & Shape/Resurface (Asp) - (\$ 197,472 / mile)					
	\$239,553	1.2131	3	3	
	\$415,856	2.1059	4	4	
	\$399,861	2.0249	5	5	
	\$384,478	1.947	6	6	
	\$369,687	1.8721	7	7	
	\$348,222	1.7634	8	8	
	\$253,021	1.2813	9	9	
Do not use - (\$ 21,120 / mile)					
Do not use - (\$ 70,400 / mile)					
Mill & Overlay - 2" Thick - (\$ 151,078 / mile)					
Microseal - (\$ 49,984 / mile)					
	\$299,084	5.9836	1	1	
	\$372,716	7.4567	2	2	
	\$36,288	0.726	3	3	
Crack Filling - (\$ 5,984 / mile)					
	\$168,695	28.191	1	1	
	\$77,071	12.8795	2	2	
	\$156,639	26.1763	3	3	
	\$7,259	1.2131	8	8	
	\$15,022	2.5103	9	9	
	\$19,544	3.266	10	10	
	\$25,592	4.2768	11	11	
	\$31,256	5.2232	12	12	
	\$36,016	6.0187	13	13	
	\$39,299	6.5674	14	14	
	\$38,363	6.4109	15	15	
	\$40,560	6.7781	16	16	
	\$41,911	7.0039	17	17	
	\$42,631	7.1242	18	18	
	\$43,921	7.3397	19	19	
	\$44,950	7.5117	20	20	
Concrete-Standard: 0.320					

## Entire Strategy

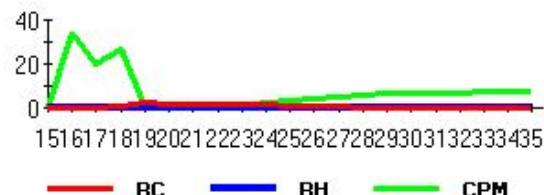
Cost by Year  
2.0 MIL - Entire Strategy



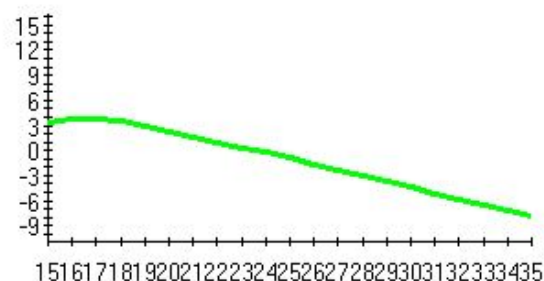
Percent of Good(grn) Fair(blue) Poor(red) by Year  
2.0 MIL - Entire Strategy



Lane Miles of Activity Performed by Year  
2.0 MIL - Entire Strategy



Average RSL by Year  
2.0 MIL - Entire Strategy



Strategy Definition Work this year? ☐ Inflation 4 % Years 20 ...

View Entire Strategy ☒

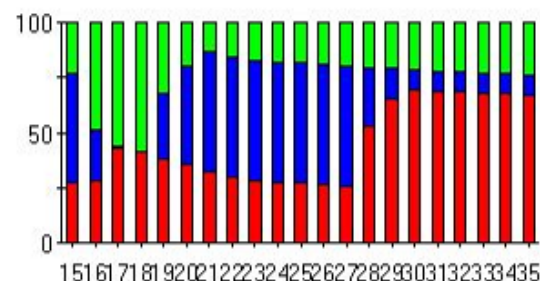
	Budget	Miles	Yr From	Yr To
Reconstruction - 6" base, 5" top - (\$ 651,482 / mile)				
.....	\$390,824	0.5999	8	8
.....	\$484,963	0.7444	9	9
.....	\$456,754	0.7011	10	10
.....	\$429,392	0.6591	11	11
.....	\$403,072	0.6187	12	12
.....	\$386,329	0.593	13	13
.....	\$367,175	0.5636	14	14
.....	\$348,021	0.5342	15	15
.....	\$331,213	0.5084	16	16
.....	\$314,340	0.4825	17	17
.....	\$298,053	0.4575	18	18
.....	\$282,743	0.434	19	19
.....	\$267,824	0.4111	20	20
Crush & Shape/Resurface (Asp) - (\$ 197,472 / mile)				
.....	\$292,555	1.4815	2	2
.....	\$482,720	2.4445	3	3
.....	\$623,775	3.1588	4	4
.....	\$599,782	3.0373	5	5
.....	\$576,717	2.9205	6	6
.....	\$545,674	2.7633	7	7
.....	\$124,802	0.632	8	8
Do not use - (\$ 21,120 / mile)				
Do not use - (\$ 70,400 / mile)				
Mill & Overlay - 2" Thick - (\$ 151,078 / mile)				
Microseal - (\$ 49,984 / mile)				
.....	\$532,969	10.6628	1	1
.....	\$295,715	5.9162	2	2
Crack Filling - (\$ 5,984 / mile)				
.....	\$168,695	28.191	1	1
.....	\$86,405	14.4393	2	2
.....	\$166,011	27.7424	3	3
.....	\$8,865	1.4815	7	7
.....	\$17,583	2.9383	8	8
.....	\$27,718	4.6321	9	9
.....	\$36,231	6.0546	10	10
.....	\$44,654	7.4622	11	11
.....	\$52,736	8.8129	12	12
.....	\$51,912	8.6751	13	13
.....	\$54,222	9.0611	14	14
.....	\$57,152	9.5508	15	15
.....	\$58,372	9.7547	16	16
.....	\$60,284	10.0742	17	17
.....	\$62,152	10.3863	18	18
.....	\$63,642	10.6354	19	19
.....	\$65,223	10.8995	20	20

## Entire Strategy

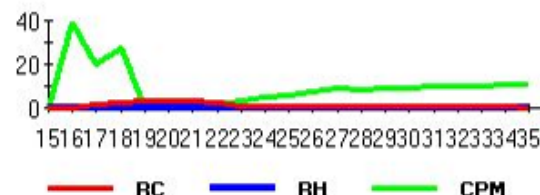
Cost by Year  
3 MIL - Entire Strategy



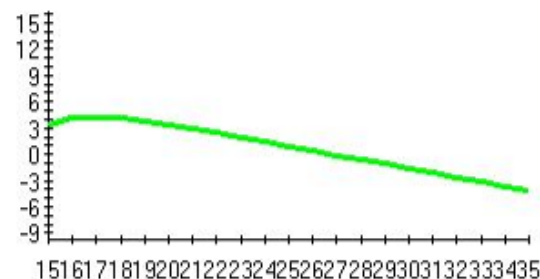
Percent of Good(grn) Fair(blue) Poor(red) by Year  
3 MIL - Entire Strategy



Lane Miles of Activity Performed by Year  
3 MIL - Entire Strategy



Average RSL by Year  
3 MIL - Entire Strategy



Strategy Definition Work this year? ☐ Inflation 4 % Years 20 ...

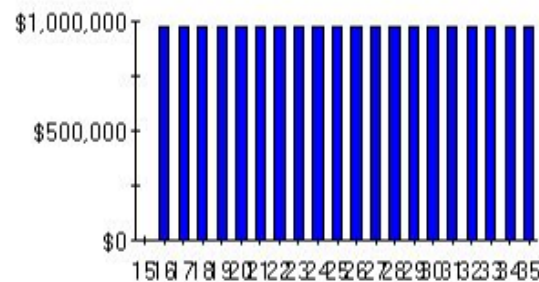
View Entire Strategy ☒

	Budget	Miles	Yr From	Yr To
Reconstruction - 6" base, 5" top - (\$ 651,482 / mile)				
.....	\$557,538	0.8558	8	8
.....	\$641,384	0.9845	9	9
.....	\$601,969	0.924	10	10
.....	\$566,659	0.8698	11	11
.....	\$531,674	0.8161	12	12
.....	\$509,850	0.7826	13	13
.....	\$484,051	0.743	14	14
.....	\$458,643	0.704	15	15
.....	\$436,297	0.6697	16	16
.....	\$413,756	0.6351	17	17
.....	\$392,062	0.6018	18	18
.....	\$371,670	0.5705	19	19
.....	\$351,800	0.54	20	20
Crush & Shape/Resurface (Asp) - (\$ 197,472 / mile)				
.....	\$742,001	3.7575	2	2
.....	\$695,852	3.5238	3	3
.....	\$831,693	4.2117	4	4
.....	\$799,722	4.0498	5	5
.....	\$768,956	3.894	6	6
.....	\$716,902	3.6304	7	7
.....	\$124,802	0.632	8	8
Do not use - (\$ 21,120 / mile)				
Do not use - (\$ 70,400 / mile)				
Mill & Overlay - 2" Thick - (\$ 151,078 / mile)				
Microseal - (\$ 49,984 / mile)				
.....	\$766,855	15.342	1	1
.....	\$61,830	1.237	2	2
Crack Filling - (\$ 5,984 / mile)				
.....	\$168,695	28.191	1	1
.....	\$95,738	15.999	2	2
.....	\$169,122	28.2623	3	3
.....	\$22,485	3.7575	7	7
.....	\$28,581	4.7763	8	8
.....	\$42,225	7.0563	9	9
.....	\$55,331	9.2465	10	10
.....	\$65,348	10.9204	11	11
.....	\$76,025	12.7047	12	12
.....	\$74,471	12.445	13	13
.....	\$77,839	13.0079	14	14
.....	\$81,641	13.6432	15	15
.....	\$83,189	13.9019	16	16
.....	\$85,773	14.3338	17	17
.....	\$88,217	14.7422	18	18
.....	\$90,172	15.0689	19	19
.....	\$92,267	15.4189	20	20

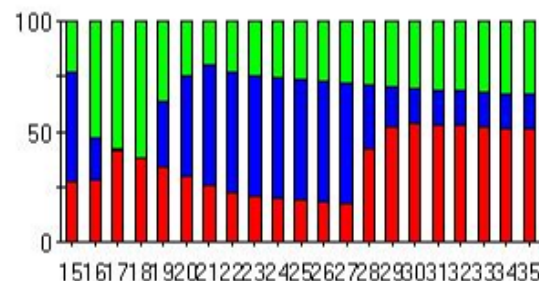
Concrete Standard: 0.220

## Entire Strategy

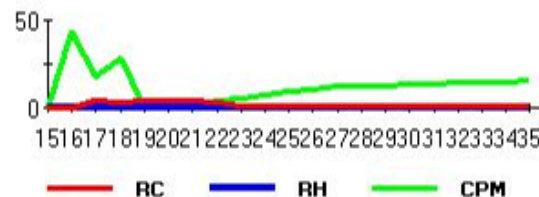
Cost by Year  
4.0 Mils - Entire Strategy



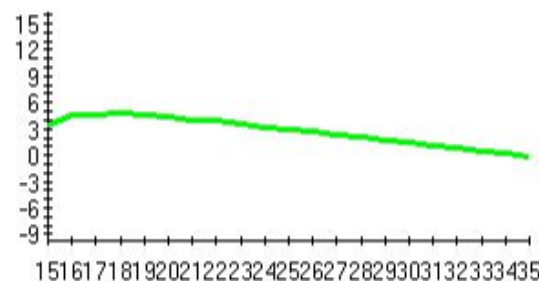
Percent of Good(grn) Fair(blue) Poor(red) by Year  
4.0 Mils - Entire Strategy



Lane Miles of Activity Performed by Year  
4.0 Mils - Entire Strategy



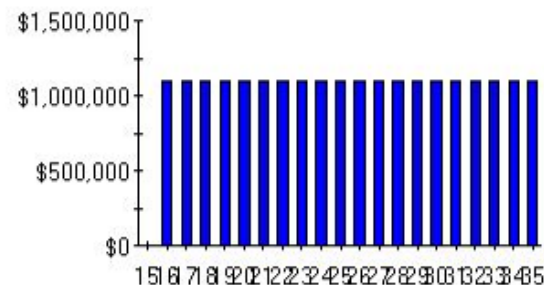
Average RSL by Year  
4.0 Mils - Entire Strategy



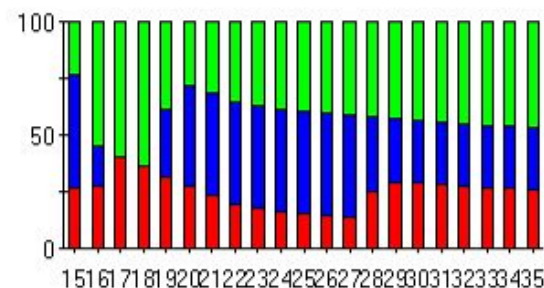
	Budget	Miles	Yr From	Yr To
Reconstruction - 6" base, 5" top - (\$ 651,482 / mile)				
	\$615,520	0.9448	8	8
	\$685,750	1.0526	9	9
	\$648,876	0.996	10	10
	\$608,810	0.9345	11	11
	\$567,831	0.8716	12	12
	\$545,095	0.8367	13	13
	\$515,648	0.7915	14	14
	\$486,982	0.7475	15	15
	\$462,291	0.7096	16	16
	\$436,949	0.6707	17	17
	\$412,648	0.6334	18	18
	\$389,912	0.5985	19	19
	\$367,631	0.5643	20	20
Crush & Shape/Resurface (Asp) - (\$ 197,472 / mile)				
	\$55,114	0.2791	1	1
	\$913,821	4.6276	2	2
	\$803,158	4.0672	3	3
	\$935,662	4.7382	4	4
	\$899,682	4.556	5	5
	\$806,752	4.0854	6	6
	\$784,675	3.9736	7	7
	\$124,802	0.632	8	8
Do not use - (\$ 21,120 / mile)				
Do not use - (\$ 70,400 / mile)				
Mill & Overlay - 2" Thick - (\$ 151,078 / mile)				
Microseal - (\$ 49,984 / mile)				
	\$828,685	16.579	1	1
Crack Filling - (\$ 5,984 / mile)				
	\$168,695	28.191	1	1
	\$98,205	16.4113	2	2
	\$169,944	28.3998	3	3
	\$58,318	9.7457	6	6
	\$47,131	7.8761	7	7
	\$59,488	9.9411	8	8
	\$83,333	13.9259	9	9
	\$90,580	15.137	10	10
	\$102,247	17.0868	11	11
	\$115,831	19.3568	12	12
	\$112,321	18.7703	13	13
	\$116,432	19.4572	14	14
	\$120,822	20.1908	15	15
	\$122,117	20.4072	16	16
	\$125,006	20.89	17	17
	\$127,655	21.3327	18	18
	\$129,663	21.6682	19	19
	\$131,914	22.0444	20	20

## Entire Strategy

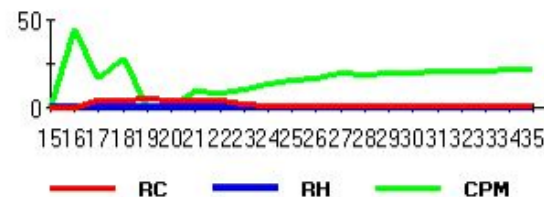
Cost by Year  
4.5 Mils - Entire Strategy



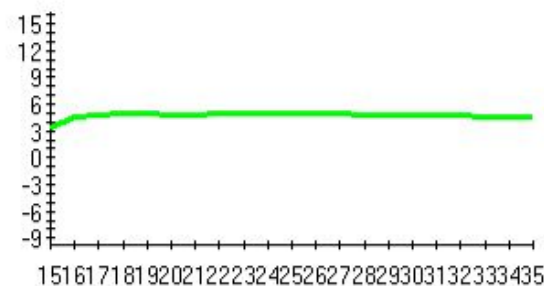
Percent of Good(grn) Fair(blue) Poor(red) by Year  
4.5 Mils - Entire Strategy



Lane Miles of Activity Performed by Year  
4.5 Mils - Entire Strategy



Average RSL by Year  
4.5 Mils - Entire Strategy



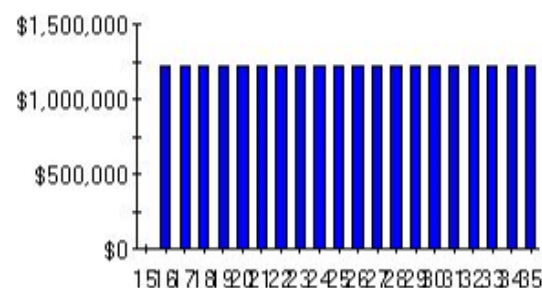
Strategy Definition Work this year? ☐ Inflation 4 % Years 20 ...

View Entire Strategy ☒

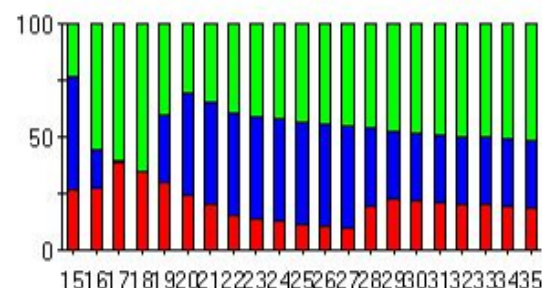
	Budget	Miles	Yr From	Yr To
Reconstruction - 6" base, 5" top - (\$ 651,482 / mile)				
.....	\$698,388	1.072	8	8
.....	\$763,276	1.1716	9	9
.....	\$721,907	1.1081	10	10
.....	\$677,280	1.0396	11	11
.....	\$632,002	0.9701	12	12
.....	\$606,855	0.9315	13	13
.....	\$574,020	0.8811	14	14
.....	\$542,163	0.8322	15	15
.....	\$514,801	0.7902	16	16
.....	\$486,526	0.7468	17	17
.....	\$459,620	0.7055	18	18
.....	\$434,278	0.6666	19	19
.....	\$409,586	0.6287	20	20
Crush & Shape/Resurface (Asp) - (\$ 197,472 / mile)				
.....	\$172,057	0.8713	1	1
.....	\$1,026,262	5.197	2	2
.....	\$911,274	4.6147	3	3
.....	\$1,039,631	5.2647	4	4
.....	\$999,643	5.0622	5	5
.....	\$899,327	4.5542	6	6
.....	\$872,510	4.4184	7	7
.....	\$124,802	0.632	8	8
Do not use - (\$ 21,120 / mile)				
Do not use - (\$ 70,400 / mile)				
Mill & Overlay - 2" Thick - (\$ 151,078 / mile)				
Microseal - (\$ 49,984 / mile)				
.....	\$828,685	16.579	1	1
Crack Filling - (\$ 5,984 / mile)				
.....	\$168,695	28.191	1	1
.....	\$98,205	16.4113	2	2
.....	\$169,944	28.3998	3	3
.....	\$61,862	10.3379	6	6
.....	\$51,719	8.6429	7	7
.....	\$65,475	10.9416	8	8
.....	\$91,189	15.2388	9	9
.....	\$99,753	16.67	10	10
.....	\$112,725	18.8377	11	11
.....	\$127,662	21.3339	12	12
.....	\$123,577	20.6512	13	13
.....	\$128,332	21.4459	14	14
.....	\$133,154	22.2517	15	15
.....	\$134,575	22.4892	16	16
.....	\$137,826	23.0324	17	17
.....	\$140,759	23.5226	18	18
.....	\$142,992	23.8958	19	19
.....	\$145,506	24.3158	20	20

## Entire Strategy

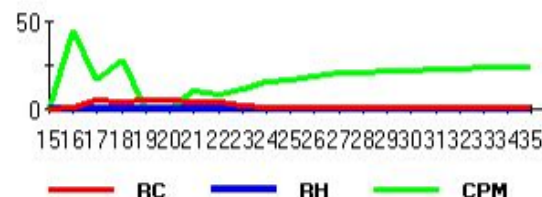
Cost by Year  
5 MIL - Entire Strategy



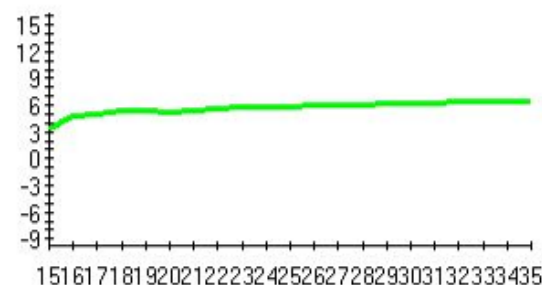
Percent of Good(grn) Fair(blue) Poor(red) by Year  
5 MIL - Entire Strategy




Lane Miles of Activity Performed by Year  
5 MIL - Entire Strategy



Average RSL by Year  
5 MIL - Entire Strategy





## Appendix 6

### Street and Infrastructure Improvements (2007-2015)



CITY OF LAPEER STREET PROJECT HISTORY					2007- CURRENT
Project Name/Description	Total Project Cost	Final Street Costs	Project Length Miles      Feet		Funding Source
<b><u>2015/2016 Saginaw Street Bridge Preventive Maintenance</u></b> <ul style="list-style-type: none"> <li>Project # 20130</li> <li>Street Classification: Major Street</li> <li>Status: Design scheduled to begin in July of 2015 with construction in the spring of 2016, MDOT schedule.</li> </ul>	<u>Estimated Cost:</u> \$168,000	<u>Project Not Complete</u> \$112,000 (Construction) + \$56,000 (Design & Constr. Eng.)	N/A	N/A	MDOT Local Bridge Program: \$112,000 General Obligation Bond: \$56,000
<b><u>2015/2016 DeMille Street and Whitney Drive Mill and Resurface Project</u></b> <ul style="list-style-type: none"> <li>Project # 19950</li> <li>Street Classification: Major Street</li> <li>Status: Construction began August 2015</li> <li>Project Overview: Pulverized base; some edge drain; structure rehabilitation; curb and gutter repairs; sidewalk repairs; aggregate and new HMA.</li> </ul>	<u>Estimated Cost:</u> \$1,227,382	<u>Project Not Complete</u> \$1,100,882 (Construction) + \$126,500 (Design & Constr. Eng.)	.85 (DeMille) .20 (Whitney)  <u>Total:</u> 1.05	4,488 (DeMille) 1,056 (Whitney)  <u>Total:</u> 5,544	General Obligation Bonds: \$45,183 MDOT TED Funding: \$873,199 CDBG Funding: \$309,000
<b><u>2014/2015 Lincoln Street and "B" Street – Mill and Resurface Project</u></b> <ul style="list-style-type: none"> <li>Project # 199960</li> <li>Street Classification: 50/50 between Major and Local Streets</li> <li>Status: Construction began June 2015</li> <li>Project Overview: Replace water main from Liberty Street south to Genesee Street and a portion from "B" street through Lincoln Court. Replace sanitary services within the influence of the street; curb and gutter repairs; sidewalk repairs; pulverize old HMA surface; base improvements; 8" pulverized material for base; some edge drains; structure rehabilitation and 5" of new HMA.</li> <li>"B" Street required geofabric with 12" of 1"x 3" and additional fabric with 8" of stone base due to unstable clay. A new curb structure was added to eliminate pooling and edge drain was placed on both north and south side of the street at the curb.</li> </ul>	Estimated Total Cost: \$1,002,823  1	<u>Project Not Complete</u> \$223,243 (Construction) + \$63,083 (Design & Constr. Eng.)	.56	2,957	SAD: \$85,608 Expires–N/A (Paid by TIFA #3) General Obligation Bond TIFA 3

<b><u>2014/2015 E. Oregon Street Reconstruction Project</u></b> <ul style="list-style-type: none"> <li>Project # 11400</li> <li>Street Classification: Major Street</li> <li>Status: Under construction April 2015</li> <li>Project Overview: total reconstruction project with new water main; new sanitary main; new storm main with storm leads for sump lines; water and sanitary services; curb and gutter, edge drain; 6" sand base; 8" stone base and 6.5" new HMA.</li> </ul>	Estimated Cost: \$1,566,415	<i><b>Project Not Complete</b></i> \$615,148 <i>(Construction = 60% of Local Share)</i> + \$140,054 <i>(Design &amp; Constr. Eng.)</i>	.36	1,901	Small Urban Grant: \$375,00 General Obligation Bond
<b><u>2014 Court Street and Clay Street Reconstruction Project</u></b> <ul style="list-style-type: none"> <li>Project # 20000</li> <li>Street Classification: Court Street – Major Street and Clay Street – Local Street *Court Street (Nepessing – Bridge) *Clay Street (Cedar – Court)</li> <li>Status: Completed in December 2014</li> <li>Project Overview: Total reconstruction project with new water and sanitary main and services; curb and gutter; storm system improvement that included a rain garden and edge drain; sidewalk replacement; ADA ramps; LED street lighting and the removal of several cobra lights; two retaining walls; sand subbase; aggregated base and pedestrian sitting area and walk.</li> </ul>	\$1,104,807	\$506,428 <i>(Construction)</i> + \$126,379 <i>(Design &amp; Constr. Eng.)</i>	.11 <i>(Court)</i> .06 <i>(Clay)</i> <b>Total:</b> .17	581 <i>(Court)</i> 317 <i>(Clay)</i> <b>Total:</b> 898	Community Development Dig Grant \$749,999 Water Fund Sewer Fund County Support
<b><u>2013 Saginaw Street Reconstruction Project</u></b> <ul style="list-style-type: none"> <li>Project # 11340</li> <li>Street Classification: Major Street</li> <li>Status: Completed March 2015</li> <li>Project Overview: Total reconstruction with new water and sanitary main and services; curb and gutter; storm system improvements; edge drain; sidewalk improvements; ADA ramps; 6" sand base; 8" stone base; 6" HMA pavement; signage; pavement markings and pedestrian crossing signal.</li> </ul>	\$655,698	\$171,227 <i>(Construction)</i> + \$127,031 <i>(Design &amp; Constr. Eng.)</i>	.25	1,320	MDOT Small Urban Grant: \$375,000 Major Street Fund Water Fund Sewer Fund





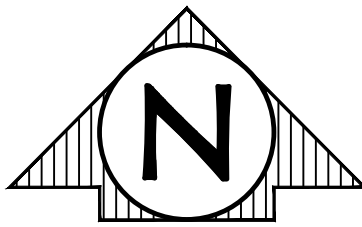
<p><b><u>2011 Paving Project</u></b>  <b><u>Golfside Drive: Mill and Resurface</u></b></p> <ul style="list-style-type: none"> <li>• Project # 19540</li> <li>• Street Classification: Local Street</li> <li>• Status: Completed April 2013</li> <li>• Project Overview: Mill 3" HMA; improve stone base and grade and install new HMA .</li> </ul> <p><b><u>Woodbridge Park Subdivision: New HMA Wearing Course and Repairs</u></b></p> <ul style="list-style-type: none"> <li>• Project # 19530</li> <li>• Street Classification: Local Street</li> <li>• Status: Completed April 2013</li> <li>• Project Overview: This subdivision has an HMA base coat only. Project included making needed repairs to the HMA base coat and completing the street in adding the wearing course.</li> </ul>	\$152,966	\$135,050 <i>(Construction)</i> + \$17,916 <i>(Design &amp; Constr. Eng.)</i>	.55	2,904	<u>SAD:</u> \$206,358 Expires: Oct., 2020
<p><b><u>2010 Mill Street Reconstruction Project</u></b></p> <ul style="list-style-type: none"> <li>• Project # 19190</li> <li>• Street Classification: Local Street</li> <li>• Status: Completed November 2011</li> <li>• Project Overview: Total reconstruction of Mill Street. Construction included water main replacement, sanitary replacement, storm sewer, sand subbase, aggregate base, concrete curb and gutter, concrete sidewalk, ADA ramps, HMA pavement, signage, and pavement markings.</li> </ul>	\$54,442	\$49,386 <i>(Construction)</i> + \$5,056 <i>(Design &amp; Constr. Eng.)</i>	.10	508	<u>SAD:</u> \$17,032 Expires: Oct., 2019
<p><b><u>2009 Saginaw Street Reconstruction Project</u></b></p> <ul style="list-style-type: none"> <li>• Project # 19090</li> <li>• Street Classification: Major Street</li> <li>• Status: Completed November 2010</li> <li>• Project Overview: Total reconstruction of Saginaw Street. Construction included water main replacement, sanitary sewer replacement, new sanitary services, eliminating storm and sanitary connections, storm sewer, sand subbase, aggregate base, concrete curb and gutter, concrete sidewalk, ADA ramps, HMA pavement, signage and pavement markings.</li> </ul>	\$1,165,932 Local Share = \$645,186	\$97,650 <i>(Construction)</i> + \$126,615 <i>(Design &amp; Constr. Eng.)</i>	.32	1,670	<u>SAD:</u> \$78,803 Expires: Oct., 2019 FED Hwy Admin. = \$520,747 ARRA = \$240,000 STP = \$280,747 Major St. Fund Water Fund Sewer Fund

<b><u>2008 Horton Street Reconstruction Project</u></b> <ul style="list-style-type: none"> <li>Project # 14250</li> <li>Street Classification: Local Street</li> <li>Status: Completed November 2009</li> <li>Project Overview: Total reconstruction of Horton Street. Fox Street - Saginaw Street construction included water main replacement and sanitary sewer replacement. Fox Street - Court Street construction included new storm sewers with sump leads, aggregate base, concrete curb and gutter, HMA pavement, signage and pavement markings.</li> </ul>	\$571,000	\$218,468 <i>(Construction)</i> + \$39,944 <i>(Design &amp; Constr. Eng.)</i>	.12	634	<u>SAD:</u> \$43,401 Expires: Oct., 2017 General Obligation Bond Local Street Fund Water Fund Sewer Fund
<b><u>2008 DeMille/Harrison Intersection Improvement</u></b> <ul style="list-style-type: none"> <li>Project # 18420</li> <li>Street Classification: Major Street</li> <li>Status: Completed July 2009</li> <li>Project Overview: Total reconstruction of the Harrison and DeMille intersection. Construction included the addition of 200-foot to the right turn lane of DeMille for northbound traffic onto Harrison Street and a 150 foot right-turn lane on Harrison Street for eastbound traffic onto DeMille, intersection alignment improvements, traffic signal improvements and reconstruction of 260 linear feet of Harrison Street north of DeMille. Intersection was constructed to meet new ADA requirements. Project also included signage and pavement markings.</li> </ul>	\$321,558 Local Share = \$64,312	\$64,312 <i>(Construction)</i> + \$74,407 <i>(Design &amp; Constr. Eng.)</i>	.11	610	FED. Hwy. Admin, STP \$257,247 MDOT Safety Grant Major Street Fund
<b><u>2008 Oregon Street Reconstruction Project</u></b> <ul style="list-style-type: none"> <li>Project # 16400</li> <li>Street Classification: Major Street</li> <li>Status: Completed November 2009</li> <li>Project Overview: Total reconstruction from Cedar Street to Saginaw Street. Construction included water main replacement, sanitary sewer replacement, storm sewer, aggregate base, concrete curb and gutter, concrete sidewalk, ADA ramps, HMA pavement, signage and pavement markings.</li> </ul>	\$563,397 Local Share = \$199,138	\$17,582 <i>(Construction)</i> + \$73,063 <i>(Design &amp; Constr. Eng.)</i>	.25	1,320	<u>SAD:</u> \$68,494 Expires: Oct., 2016 Major Street Fund Water Fund Sewer Fund MDOT-Small Urban Grant

<b><u>2007 State Street Reconstruction Project</u></b> <ul style="list-style-type: none"> <li>Project # 12520</li> <li>Street Classification: Local Street</li> <li>Status: Completed November 2008</li> <li>Project Overview: Reconstruct 250 feet of existing gravel street. Construction included water main, sanitary main, storm sewer, sump leads, aggregate base, curb and gutter, HMA pavement, signage and pavement markings</li> </ul>	\$77,596	\$33,201 <i>(Construction)</i> + \$7,643 <i>(Design &amp; Constr. Eng.)</i>	.05	250	<u>SAD:</u> \$14,696 Expires: Oct., 2016 Local Street Fund Water Fund Sewer Fund
<b><u>2007 Jackson Street Reconstruction Project</u></b> <ul style="list-style-type: none"> <li>Project #12530</li> <li>Street Classification: Local Street</li> <li>Status: Completed November 2008</li> <li>Project Overview: Reconstruction of 500 feet of an existing gravel street. Construction included water main, sanitary sewer, storm sewer with sump leads, aggregate base, curb and gutter, HMA, signage and pavement markings.</li> </ul>	\$160,708	\$74,656 <i>(Construction)</i> + \$17,095 <i>(Design &amp; Constr. Eng.)</i>	.09	500	<u>SAD:</u> \$9,470 Expires: Oct., 2016 General Obligation Bond Local Street Fund Water fund Sewer Fund
<b><u>2007 John Conley Drive Extension</u></b> <ul style="list-style-type: none"> <li>Project # 18590</li> <li>Street Classification: Major Street</li> <li>Status: Completed October 2008</li> <li>Project Overview: Construct .17 mile extension of existing street. Construction included aggregate base, curb and gutter, sidewalk, ADA ramps, HMA pavement, signage and pavement markings.</li> </ul>	\$211,300	\$211,300 <i>(Construction)</i> + \$38,850 <i>(Design &amp; Constr. Eng.)</i>	.17	915	Community Block Grant Local Development Finance Authority
<b><u>2007 Fair Street Reconstruction Project</u></b> <ul style="list-style-type: none"> <li>Project # 17700</li> <li>Street Classification: Major Street</li> <li>Status: Completed October 2008</li> <li>Project Overview: Total reconstruction project and extension of existing street from Saginaw to Oregon Street. Construction included water main replacement, storm sewer, aggregate base, curb and gutter, concrete sidewalk, ADA ramps, HMA pavement, signage and pavement markings.</li> </ul>	\$449,254	\$291,292 <i>(Construction)</i> + \$62,859 <i>(Design &amp; Constr. Eng.)</i>	.25	1,320	Community Block Grant Water Fund Major Street Fund
<b><u>TOTALS</u></b>	<b>\$12,584,469</b>	Construction= \$5,439,132 Design & Constr. Eng.= \$1,423,495 <b>TOTAL =</b> <b>\$6,862,627</b>	8.10 Miles	42,788 Feet	

# CITY OF LAPEER

## STREET IMPROVEMENTS (2007-2016)

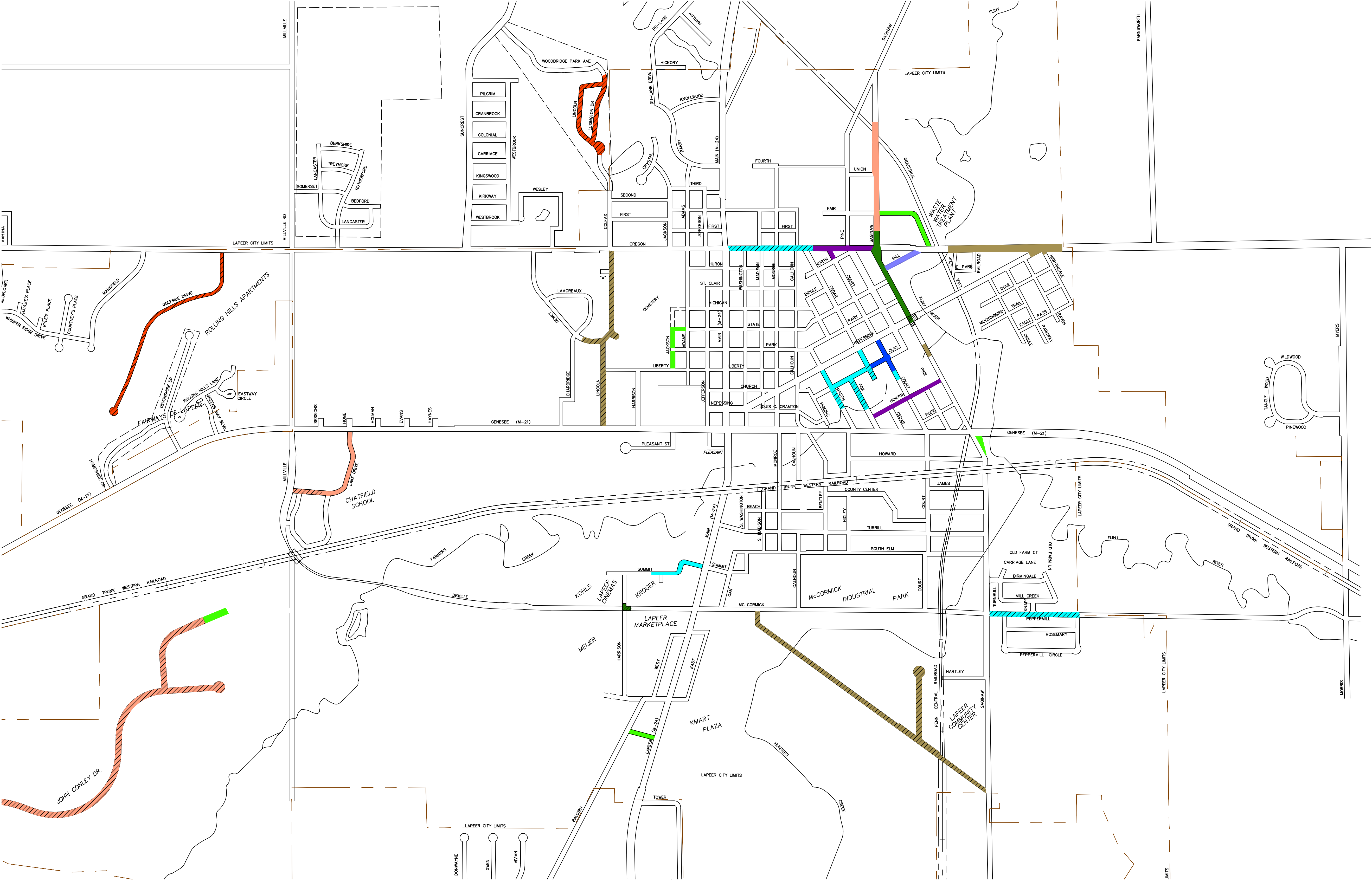


AUGUST 2015

### STREET INDEX BY YEAR

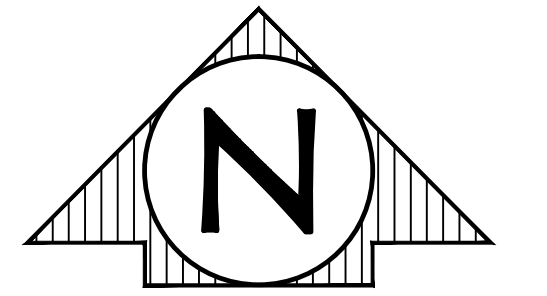
- 2007
- 2008
- 2009
- 2010
- 2011
- 2012
- 2013
- 2014
- 2015

INDICATES MILLED AND RESURFACED

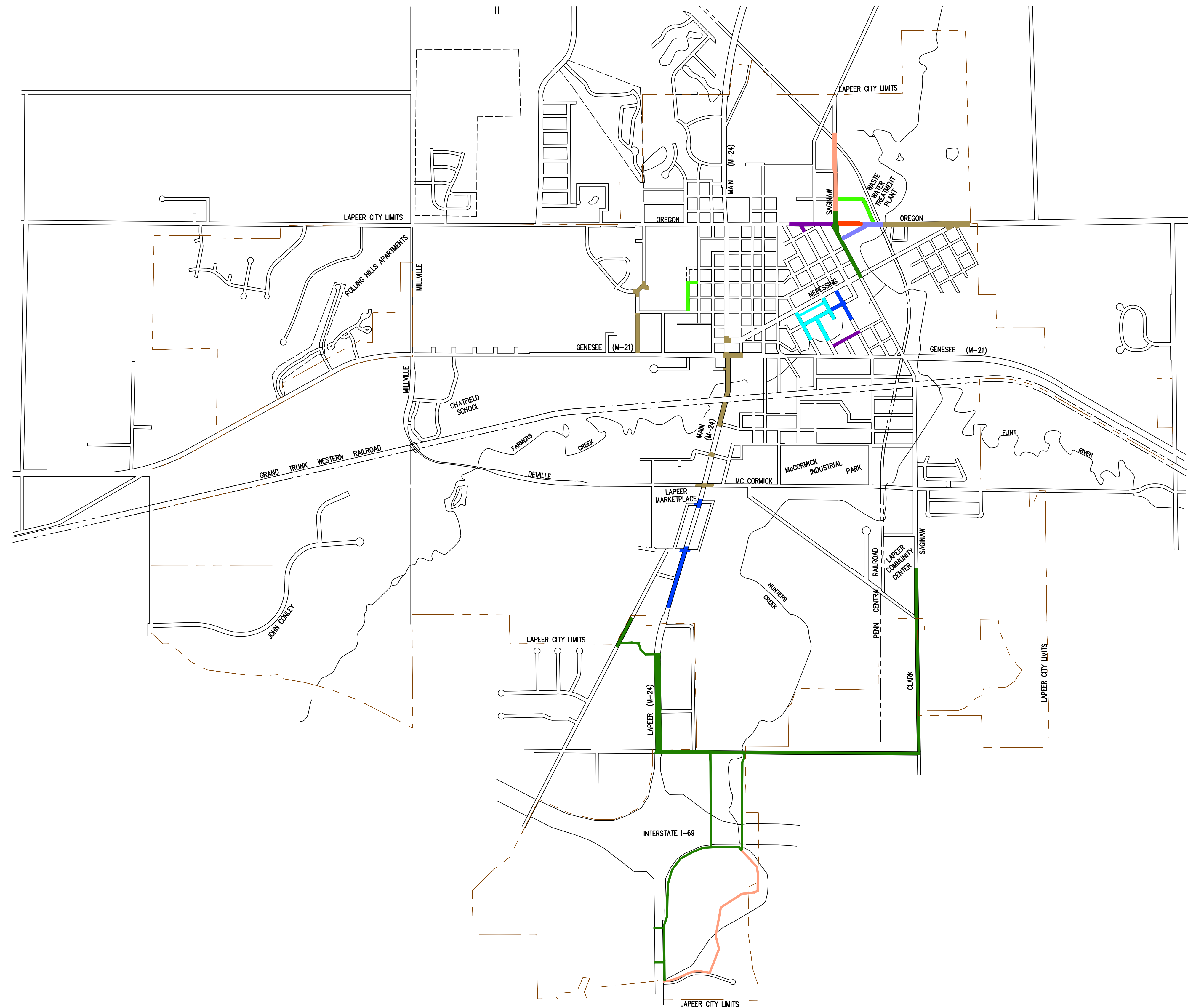


# CITY OF LAPEER

## WATER IMPROVEMENTS (2007-2016)



AUGUST 2015



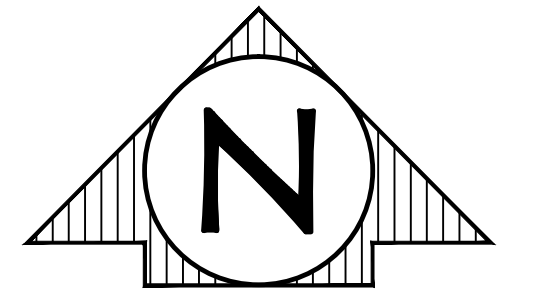
WATER INDEX  
BY YEAR

- 2007
- 2008
- 2009
- 2010
- 2011
- 2012
- 2013
- 2014
- 2015

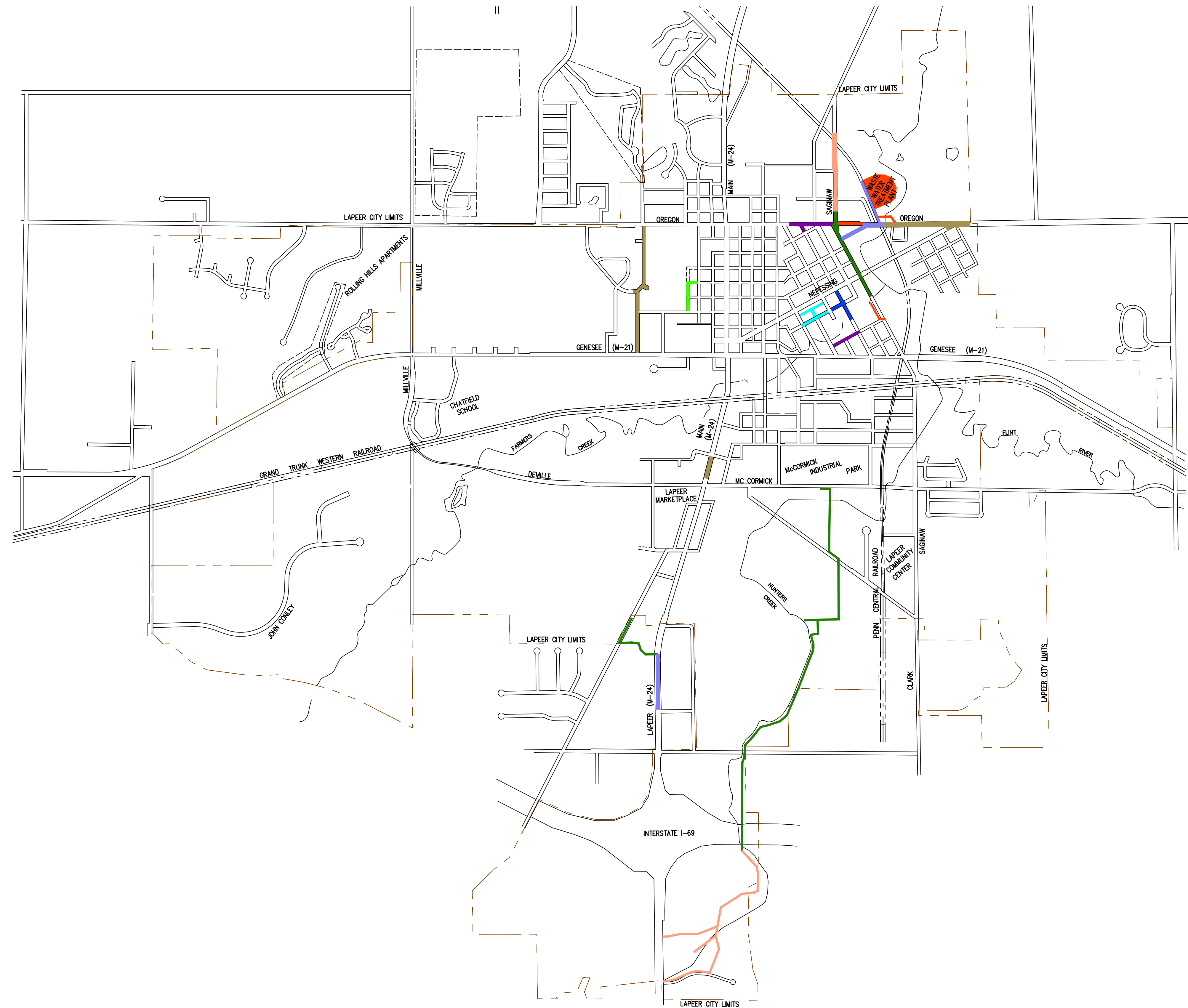


# CITY OF LAPEER

## SANITARY SEWER IMPROVEMENTS (2007-2016)




AUGUST 2015



SANITARY INDEX  
BY YEAR

- 2007
- 2008
- 2009
- 2010
- 2011
- 2012
- 2013
- 2014
- 2015

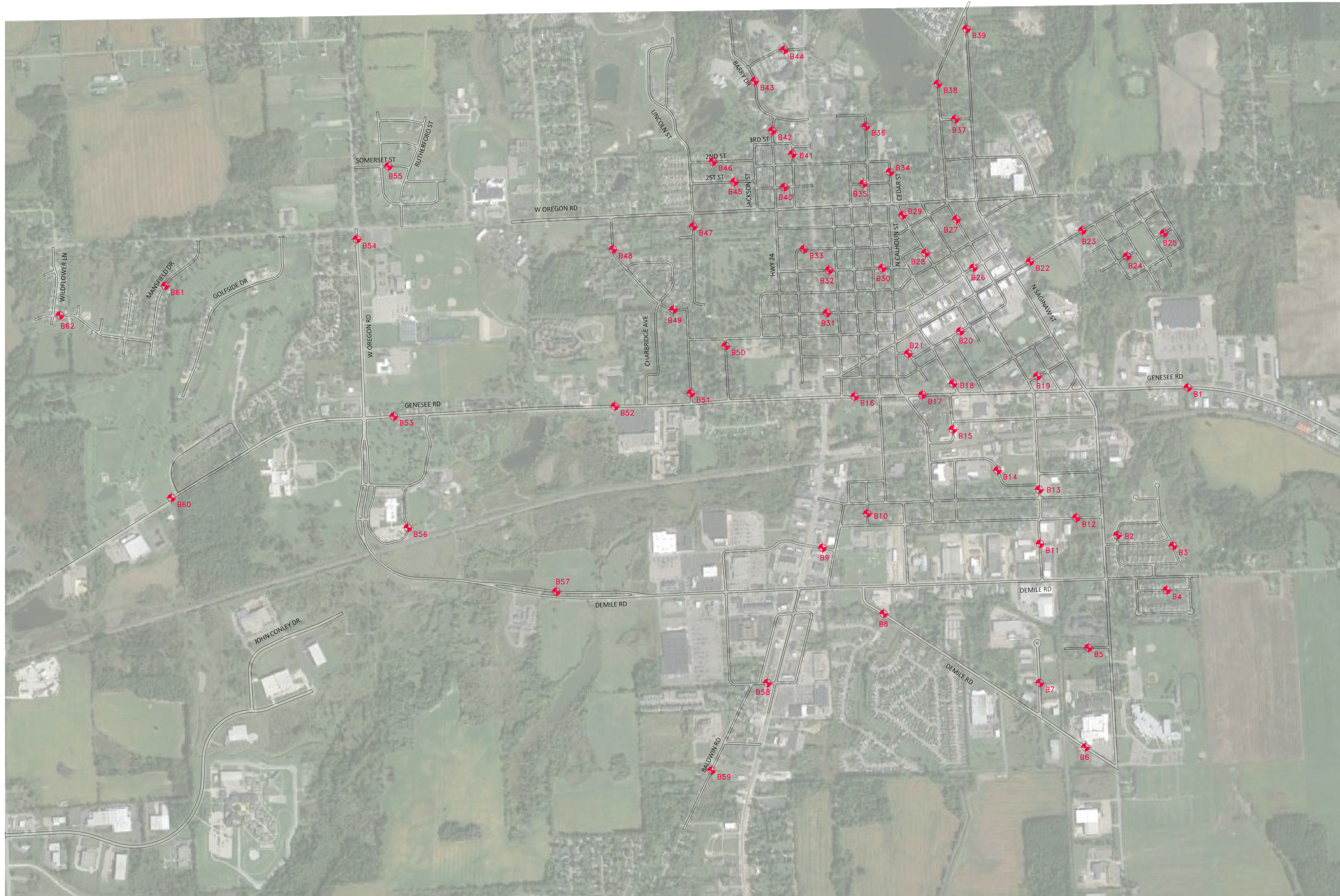




## Appendix 7

### Pavement Coring Data





**BORING LOCATION DIAGRAM**

**LEGEND**

 APPROXIMATE BORING LOCATION



www.sme-usa.com

Orientation



Scale

0' 700' 1400'

GRAPHIC SCALE: 1" = 700'

Project

**CITY OF LAPEER  
PAVEMENT ASSESSMENT  
PROJECT**

Project Location

**LAPEER, MICHIGAN**

Sheet Name

**BORING LOCATION DIAGRAM**

Engineer's Seal

Revisions

REV	ISSUED FOR	DATE	BY

Date

6-18-15

SME Project No.

071837.00

Project Manager:

ABT

Designer:

ABT

CADD:

BH

Checked By:

ABT

Sheet No.

1

DRAWING NOTE: SCALE DEPICTED IS MEANT FOR 24" X 36" AND WILL SCALE INCORRECTLY IF PRINTED ON ANY OTHER SIZE MEDIA.  
NO REPRODUCTION SHALL BE MADE WITHOUT THE PRIOR CONSENT OF SME.  
© 2015

Nov 05, 2015 10:33am - mcsimmons FILE LOCATION: \\name-hic-06\p\WP\071837.00\CADD\DWG\Draw\071837.00-Boring Location Diagram.dwg PLOT DATE:



PROBE/CORE: B1  
STREET: Genessee Rd  
LANE: \_\_\_\_\_  
STATION: \_\_\_\_\_  
OFFSET: \_\_\_\_\_  
ADDRESS: \_\_\_\_\_  
GROUND EL: \_\_\_\_\_

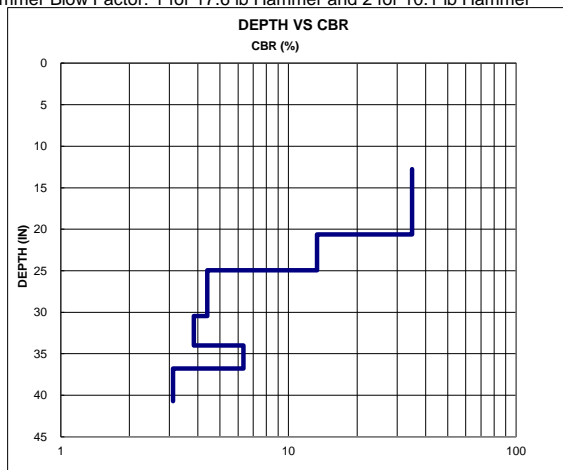
Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	1.75	1.75	Asphalt Concrete Wearing Course	Intact
1.75	12.75	11	Asphalt Concrete Leveling Course(s)	Intact
12.75	22	9.25	Sand and Gravel	(GP/Agg Base)
22	46	24	LEAN CLAY - occasional silt seams - brown - v. stiff to stiff	(CL) At 23": Qp = 3.5 ksf, MC = 19% At 38": Qp = 1.25 ksf, MC = 19%
46	48	2	Fine-to-medium SILTY SAND - moist - brown	(SP)
			End of Test Hole at 48"	

NOTES:

Depth to start of test from ex. ground surface: 12.75 inches

[illegible]

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



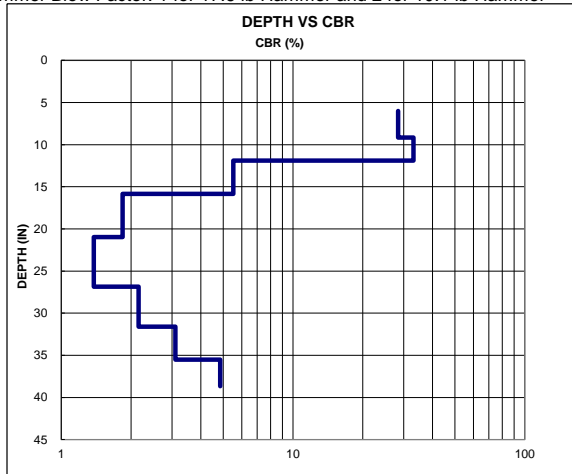
© 2015 SME



PROBE/CORE: B2  
STREET: Turnbull St.  
LANE: \_\_\_\_\_  
STATION: \_\_\_\_\_  
OFFSET: \_\_\_\_\_  
ADDRESS: \_\_\_\_\_  
GROUND EL: \_\_\_\_\_

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	2.5	2.5	Asphalt Concrete Wearing Course	Intact
2.5	6	3.5	Asphalt Concrete Leveling Course	Intact
6	14.5	8.5	Crushed Limestone	(GP/Agg Base)
14.5	19	4.5	LEAN CLAY - dark grey - stiff	(CL) At 15": Qp = 1.0 ksf , MC = 27%
19	48	29	LEAN CLAY - brown/grey - v. stiff	(CL) At 35": Qp = 3.5 ksf, MC = 19%
			End of Test Hole at 48"	

NOTES:

[illegible]

Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/1 4- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
PROJECT NO.: 71837.00  
LOCATION: Lapeer, MI  
CLIENT: Wade-Trim, Inc.  
A/E: \_\_\_\_\_  
DATE: 7/8/15  
BY: RSS/KHB

PROBE/CORE: B3  
STREET: Old Farm Lane  
LANE: \_\_\_\_\_  
STATION: \_\_\_\_\_  
OFFSET: \_\_\_\_\_  
ADDRESS: \_\_\_\_\_  
GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	1.5	1.5	Asphalt Concrete Wearing Course	Intact
1.5	4	2.5	Asphalt Concrete Leveling Course	Intact
4	6.25	2.25	Asphalt Concrete Leveling Course	Intact
6.25	12	5.75	Crushed Limestone	(GP/Agg Base)
12	48	36	LEAN CLAY - occasional silt seams - brown - stiff to v. stiff	(CL) At 13": Qp = 1.25 ksf, MC = 15% At 40": Qp = 3.0 ksf, MC = 19%
			End of Test Hole at 48"	

Depth to Groundwater From Ground Surface

Upon Completion: none encountered

NOTES:

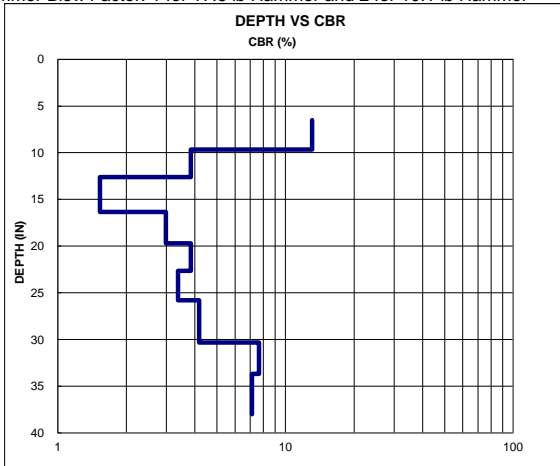
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 6.5 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	320	0		2				Agg Base	
10	400	80	8	2	9.6	13.1	Very Poor	Agg Base	13.1
5	475	75	15	2	12.6	3.8	Poor	Subgrade	
4	570	95	24	2	16.3	1.5	Very Poor	Subgrade	
5	655	85	17	2	19.7	3.0	Very Poor	Subgrade	
5	730	75	15	2	22.6	3.8	Poor	Subgrade	
5	810	80	16	2	25.8	3.4	Poor	Subgrade	
8	925	115	14	2	30.3	4.2	Poor	Subgrade	
8	1010	85	11	2	33.7	7.6	Marginal	Subgrade	
10	1120	110	11	2	38.0	7.1	Marginal	Subgrade	4.4

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness  
CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/8/15  
 BY: RSS/KHB

PROBE/CORE: B4  
 STREET: Rosemary St.  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	2	2	Asphalt Concrete Wearing Course	Intact
2	5	3	Asphalt Concrete Leveling Course	Intact
5	11	6	Asphalt Millings	(GP/Agg Base)
11	22	11	LEAN CLAY - dark grey - v. stiff	(CL) At 12": Qp = 3.0 ksf, MC = 11%
22	48	26	LEAN CLAY - brown - hard	(CL) At 30": 4.25 ksf, MC = 21%
			End of Test Hole at 48"	

Depth to Groundwater From Ground Surface

Upon Completion: none encountered

NOTES:

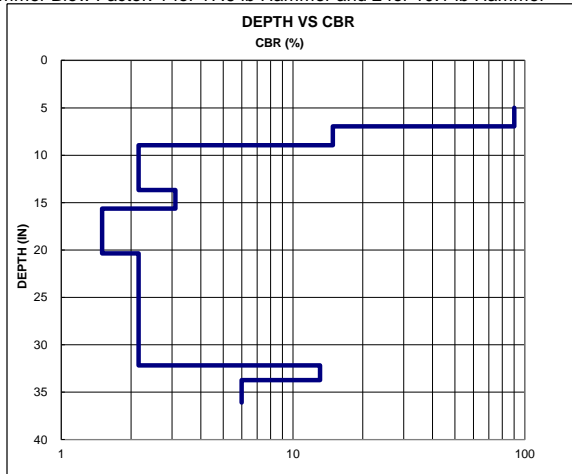
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 5 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	290	0		2				Agg Base	
35	340	50	1	2	7.0	90.1	Good	Agg Base	
7	390	50	7	2	8.9	14.9	Very Poor	Agg Base	52.5
3	450	60	20	2	11.3	2.2	Very Poor	Subgrade	
3	510	60	20	2	13.7	2.2	Very Poor	Subgrade	
3	560	50	17	2	15.6	3.1	Poor	Subgrade	
5	680	120	24	2	20.4	1.5	Very Poor	Subgrade	
5	780	100	20	2	24.3	2.2	Very Poor	Subgrade	
5	880	100	20	2	28.2	2.2	Very Poor	Subgrade	
5	980	100	20	2	32.2	2.2	Very Poor	Subgrade	
5	1020	40	8	2	33.7	13.1	Good	Subgrade	
5	1080	60	12	2	36.1	6.0	Marginal	Subgrade	3.1

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness

CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP

# PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
PROJECT NO.: 71837.00  
LOCATION: Lapeer, MI  
CLIENT: Wade-Trim, Inc.  
A/E: \_\_\_\_\_  
DATE: 7/8/15  
BY: RSS/KHB

PROBE/CORE: B5  
STREET: Hartly St.  
LANE: \_\_\_\_\_  
STATION: \_\_\_\_\_  
OFFSET: \_\_\_\_\_  
ADDRESS: \_\_\_\_\_  
GROUND EL: \_\_\_\_\_

## PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	1.75	1.75	Asphalt Concrete Wearing Course	Chipseal delaminated from Wearing Course
1.75	7	5.25	Sand and Gravel	(GP/Agg Base)
7	48	41	LEAN CLAY - dark brown - medium to v. stiff	(CL) At 8": Qp = 0.75 ksf, MC = 24% At 25": Qp = 3.5 ksf, MC = 17%
			End of Test Hole at 48"	

Depth to Groundwater From Ground Surface  
Upon Completion: none encountered

NOTES:

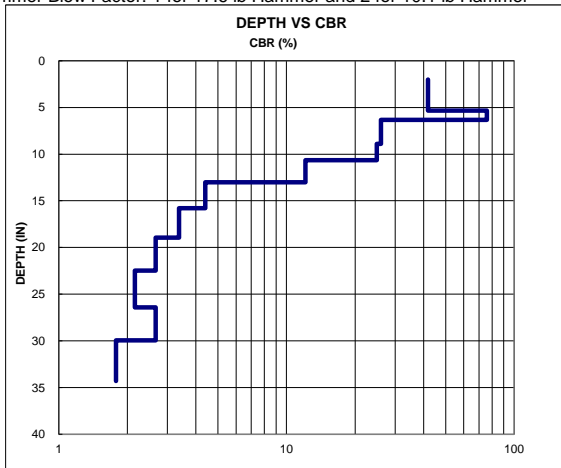
## DCP TEST RESULTS

Depth to start of test from ex. ground surface: 2 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	190	0		2				Agg Base	
30	275	85	3	2	5.3	41.8	Poor	Agg Base	
15	300	25	2	2	6.3	75.8	Marginal	Agg Base	49.6
15	365	65	4	2	8.9	26.0	Good	Subgrade	
10	410	45	5	2	10.7	24.9	Good	Subgrade	
7	470	60	9	2	13.0	12.1	Good	Subgrade	
5	540	70	14	2	15.8	4.4	Poor	Subgrade	
5	620	80	16	2	18.9	3.4	Poor	Subgrade	
5	710	90	18	2	22.5	2.7	Very Poor	Subgrade	
5	810	100	20	2	26.4	2.2	Very Poor	Subgrade	
5	900	90	18	2	30.0	2.7	Very Poor	Subgrade	
5	1010	110	22	2	34.3	1.8	Very Poor	Subgrade	7.1

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness  
CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/1 4- Clay DCP







PROBE/CORE: B8  
STREET: Demille Rd.  
LANE: \_\_\_\_\_  
STATION: \_\_\_\_\_  
OFFSET: \_\_\_\_\_  
ADDRESS: \_\_\_\_\_  
GROUND EL: \_\_\_\_\_

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	2.25	2.25	Asphalt Concrete Wearing Course	Intact
2.25	6	3.75	Asphalt Concrete Leveling Course	Vertical Cracks through
6	11.5	5.5	Sand and Gravel	(GP/Agg Base)
11.5	16	4.5	Fine-to-medium SILTY SAND - moist - brown	(SM)
16	24	8	LEAN CLAY with sand - trace organics - dark grey - stiff	(CL) At 18": Qp = 1.75 ksf, MC = 18%
24	48	24	LEAN CLAY - brown/grey - v. stiff	(CL) At 35": Qp = 3.0 ksf, MC = 20%
			End of Test Hole at 48"	

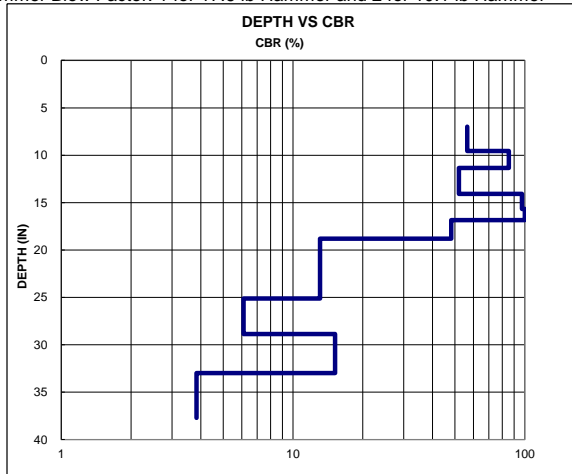
NOTES:

Upon Completion: none encountered

Depth to start of test from ex. ground surface: 7 inches

[illegible]

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness  
CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/1 4- Clay DCP





## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E:  
 DATE: 7/8/15  
 BY: RSS/KHB

PROBE/CORE: B10  
 STREET: S. Madison St.  
 LANE:  
 STATION:  
 OFFSET:  
 ADDRESS:  
 GROUND EL:

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	1.5	1.5	Asphalt Concrete Wearing Course	Cracked into pieces
1.5	12	10.5	Sand and Gravel	(GP/Agg Base)
12	20	8	LEAN CLAY with sand - brown - stiff	(CL) At 13": Qp = 1.5 ksf, MC = 18%
20	48	28	LEAN CLAY with sand - brown/grey - hard	(CL) At 30": Qp = 4.5+ ksf, MC = 17% At 44": Qp = 4.0 ksf, MC = 17%
			End of Test Hole at 48"	

Depth to Groundwater From Ground Surface  
 Upon Completion: none encountered

NOTES:

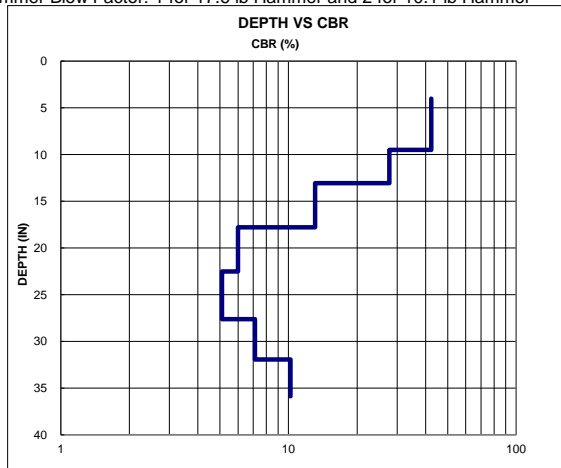
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 4 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	280	0		2				Agg Base	
25	350	70	3	2	6.8	42.4	Poor	Agg Base	
25	420	70	3	2	9.5	42.4	Poor	Agg Base	42.4
22	510	90	4	2	13.1	27.7	Good	Subgrade	
15	630	120	8	2	17.8	13.1	Good	Subgrade	
10	750	120	12	2	22.5	6.0	Marginal	Subgrade	
10	880	130	13	2	27.6	5.1	Marginal	Subgrade	
10	990	110	11	2	32.0	7.1	Marginal	Subgrade	
10	1090	100	10	2	35.9	10.2	Good	Subgrade	10.8

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness  
 CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/8/15  
 BY: RSS/KHB

PROBE/CORE: B11  
 STREET: S. Court St.  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	2.25	2.25	Asphalt Concrete Wearing Course	Intact
2.25	7.25	5	Asphalt Concrete Leveling Course	Intact
7.25	14.5	7.25	Asphalt Millings	(GP/Agg Base)
14.5	24	9.5	LEAN CLAY - dark grey - medium	(CL) At 15": Qp = 0.75 ksf, MC = 18%
24	48	24	LEAN CLAY - brown/grey - hard	(CL) At 34": Qp = 4.0 ksf, MC = 21%
			End of Test Hole at 48"	

Depth to Groundwater From Ground Surface

Upon Completion: none encountered

NOTES:

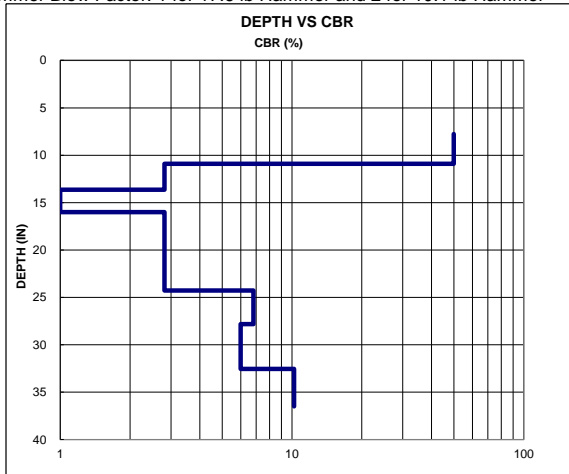
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 7.75 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	350	0		2					
33	430	80	2	2	10.9	49.8	Poor	Agg Base	
4	500	70	18	2	13.7	2.8	Very Poor	Agg Base	27.9
2	560	60	30	2	16.0	1.0	Very Poor	Subgrade	
4	630	70	18	2	18.8	2.8	Very Poor	Subgrade	
4	700	70	18	2	21.5	2.8	Very Poor	Subgrade	
4	770	70	18	2	24.3	2.8	Very Poor	Subgrade	
8	860	90	11	2	27.8	6.8	Marginal	Subgrade	
10	980	120	12	2	32.6	6.0	Marginal	Subgrade	
10	1080	100	10	2	36.5	10.2	Good	Subgrade	5.2

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness

CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
PROJECT NO.: 71837.00  
LOCATION: Lapeer, MI  
CLIENT: Wade-Trim, Inc.  
A/E: \_\_\_\_\_  
DATE: 7/8/15  
BY: RSS/KHB

PROBE/CORE: B12  
STREET: S. Elm St.  
LANE: \_\_\_\_\_  
STATION: \_\_\_\_\_  
OFFSET: \_\_\_\_\_  
ADDRESS: \_\_\_\_\_  
GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	1	1	Asphalt Concrete Wearing Course	Vehicle Crack through
1	3.25	2.25	Asphalt Concrete Leveling Course	Vehicle Crack through
3.25	11	7.75	Sand and Gravel	(GP/Agg Base)
11	20	9	Fine-to-Medium Silty Sand, Clay layer @ 16" - moist- brown	SM
20	48	28	LEAN CLAY- brown/gray- stiff	CL At 21": Qp = 1.5 ksf, MC = 20% At 36": Qp = 2.75 ksf, MC = 19%

Depth to Groundwater From Ground Surface

Upon Completion: none encountered

NOTES:

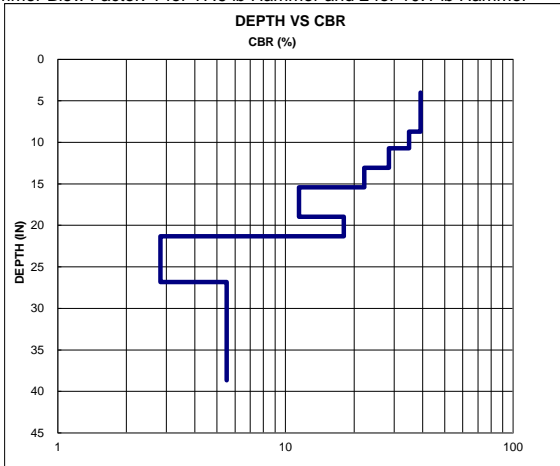
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 4 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	260	0		2					
20	320	60	3	2	6.4	39.3	Poor	Agg Base	
20	380	60	3	2	8.7	39.3	Poor	Agg Base	
15	430	50	3	2	10.7	34.9	Poor	Agg Base	
15	490	60	4	2	13.1	28.4	Good	Subgrade	
12	550	60	5	2	15.4	22.2	Good	Subgrade	
10	640	90	9	2	19.0	11.5	Good	Subgrade	
10	700	60	6	2	21.3	18.1	Good	Subgrade	
8	840	140	18	2	26.8	2.8	Very Poor	Subgrade	
8	940	100	13	2	30.8	5.5	Marginal	Subgrade	
8	1040	100	13	2	34.7	5.5	Marginal	Subgrade	
8	1140	100	13	2	38.6	5.5	Marginal	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness  
CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
PROJECT NO.: 71837.00  
LOCATION: Lapeer, MI  
CLIENT: Wade-Trim, Inc.  
A/E: \_\_\_\_\_  
DATE: 7/8/15  
BY: RSS/KHB

PROBE/CORE: B13  
STREET: S. Court St.  
LANE: \_\_\_\_\_  
STATION: \_\_\_\_\_  
OFFSET: \_\_\_\_\_  
ADDRESS: \_\_\_\_\_  
GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	1.25	1.25	Asphalt Concrete Wearing Course	Intact
1.25	2.75	1.5	Asphalt Concrete Leveling Course	Intact
2.75	4.25	1.5	Asphalt Concrete Leveling Course	Intact
4.25	11.5	7.25	Asphalt Concrete Leveling Course	Intact
11.5	22	10.5	Sand and Gravel	(GP/Agg Base) CL At 15": Qp = 2.25 ksf, MC = 21%
22	48	26	LEAN CLAY with sand- brown- very stiff	CL At 27": Qp = 3.25 ksf, MC = 19%

Depth to Groundwater From Ground Surface

Upon Completion: none encountered

NOTES:

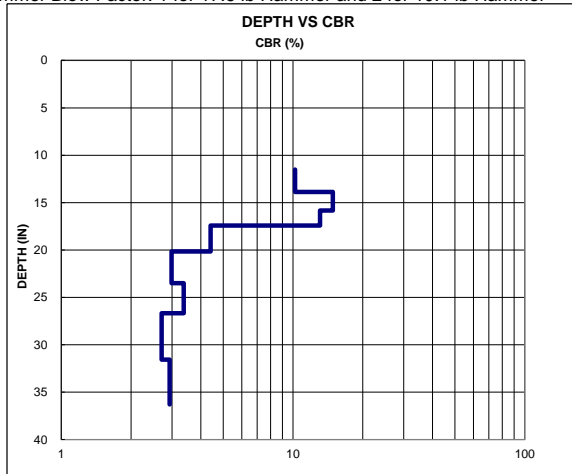
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 11.5 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	450	0		2					
6	510	60	10	2	13.9	10.2	Very Poor	Agg Base	
7	560	50	7	2	15.8	14.9	Very Poor	Agg Base	
5	600	40	8	2	17.4	13.1	Very Poor	Agg Base	
5	670	70	14	2	20.2	4.4	Very Poor	Agg Base	
5	755	85	17	2	23.5	3.0	Very Poor	Subgrade	
5	835	80	16	2	26.7	3.4	Poor	Subgrade	
7	960	125	18	2	31.6	2.7	Very Poor	Subgrade	
7	1080	120	17	2	36.3	2.9	Very Poor	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3





## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E:  
 DATE: 7/8/15  
 BY: RSS/KHB

PROBE/CORE: B14  
 STREET: County Center St.  
 LANE:  
 STATION:  
 OFFSET:  
 ADDRESS:  
 GROUND EL:

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	1.5	1.5	Asphalt Concrete Wearing course	Intact
1.5	7.5	6	Asphalt Concrete Leveling course	Intact
7.5	32	24.5	LEAN CLAY with Sand, Sand and Gravel Layers- gray/brown-soft/stiff	(GP/Agg Base) CL At 8": Qp = 0.4 ksf, MC = 15% At 20": Qp = 1.5 ksf, MC = 20%
32	48	16	LEAN CLAY with Sand- brown/gray- Very Stiff	CL At 36": Qp = 2.75 ksf, MC = 20%

Depth to Groundwater From Ground Surface

Upon Completion: none encountered

NOTES:

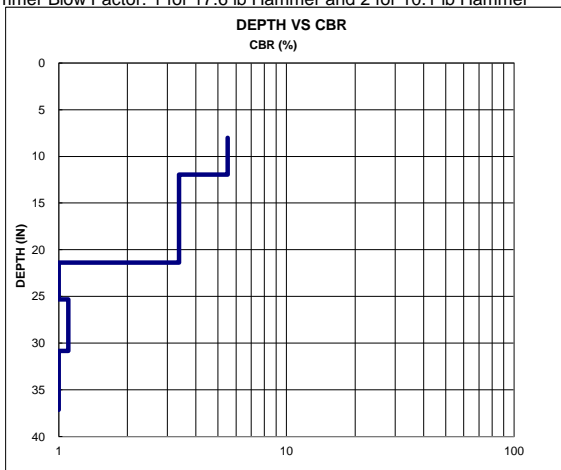
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 8 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	370	0		2					
8	470	100	13	2	11.9	5.5	Very Poor	Agg Base	
5	550	80	16	2	15.1	3.4	Very Poor	Agg Base	
10	710	160	16	2	21.4	3.4	Very Poor	Agg Base	
3	810	100	33	2	25.3	0.8	Very Poor	Agg Base	
5	950	140	28	2	30.8	1.1	Very Poor	Agg Base	
3	1110	160	53	2	37.1	0.3	Very Poor	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness

CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/8/15  
 BY: RSS/KHB

PROBE/CORE: B15  
 STREET: Higley St.  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	2.5	2.5	Asphalt Concrete Wearing Course	Intact
2.5	6.75	4.25	Asphalt Concrete Leveling Course	Intact
6.75	22	15.25	Sandy LEAN CLAY- brown/dark brown	(GP/Agg Base) CL At 8": Qp = 0.2 ksf, MC = 9%
22	48	26	Silty Sand- moist- brown	SM

Depth to Groundwater From Ground Surface

Upon Completion: none encountered

NOTES:

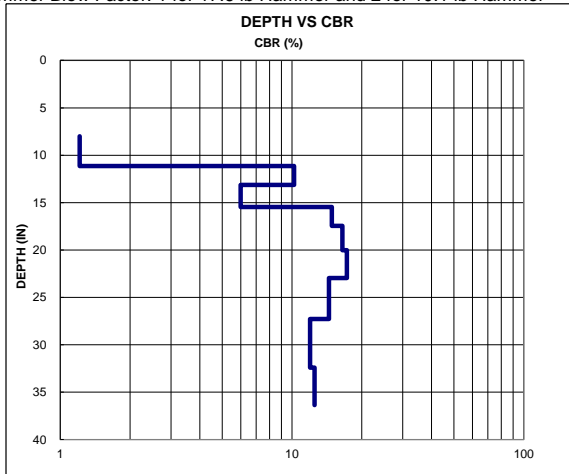
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 8 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	350	0		2					
3	430	80	27	2	11.1	1.2	Very Poor	Agg Base	
5	480	50	10	2	13.1	10.2	Very Poor	Agg Base	
5	540	60	12	2	15.5	6.0	Very Poor	Agg Base	
7	590	50	7	2	17.4	14.9	Very Poor	Agg Base	
10	655	65	7	2	20.0	16.5	Very Poor	Agg Base	
12	730	75	6	2	23.0	17.3	Good	Subgrade	
15	840	110	7	2	27.3	14.4	Good	Subgrade	
15	970	130	9	2	32.4	12.0	Good	Subgrade	
12	1070	100	8	2	36.3	12.5	Good	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness

CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP





## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/8/15  
 BY: RSS/KHB

PROBE/CORE: B17  
 STREET: West Genesee  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	1	1	Asphalt Concrete Wearing Course	Intact
1	2	1	Asphalt Concrete Leveling Course	Intact- Delaminated from layer below
2	10	8	Portland Cement Concrete	Resteel @ 5.25"
10	24	14	Fine-to-Medium Silty Sand- Clay layers @ 14" -moist-brown	(GP/Agg Base)
24	42	18	Fine Silty Sand- dark brown- moist	SP-SM
42	48	6	Sandy LEAN CLAY- brown	CL At 43": Qp = 0.75 ksf, MC = 15%

Depth to Groundwater From Ground Surface

Upon Completion: none encountered

NOTES:

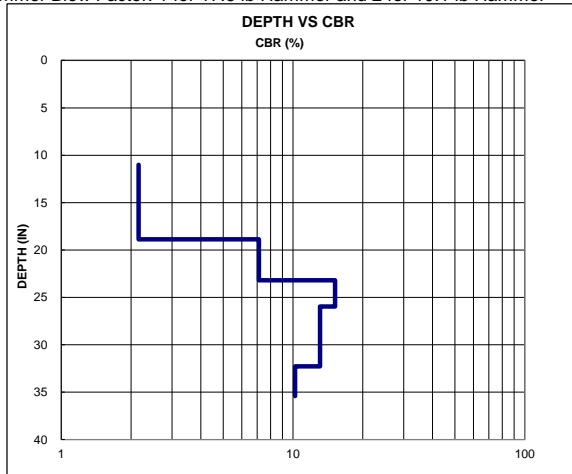
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 11 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	450	0		2					
5	550	100	20	2	14.9	2.2	Very Poor	Agg Base	
5	650	100	20	2	18.9	2.2	Very Poor	Agg Base	
10	760	110	11	2	23.2	7.1	Very Poor	Agg Base	
10	830	70	7	2	26.0	15.2	Good	Subgrade	
10	910	80	8	2	29.1	13.1	Good	Subgrade	
10	990	80	8	2	32.3	13.1	Good	Subgrade	
8	1070	80	10	2	35.4	10.2	Good	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness

CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/8/15  
 BY: RSS/KHB

PROBE/CORE: B18  
 STREET: Mason St.  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	2.75	2.75	Asphalt Concrete Wearing Course	Vertical Crack Through- Chip Seal
2.75	11	8.25	Sand and Gravel	(GP/Agg Base)
11	20	9	Sandy LEAN CLAY- trace of Organics- black/gray-stiff	CL At 12": Qp = 1.25 ksf, MC = 19%
20	48	28	Sandy LEAN CLAY- Sand layers @ 28"- brown/dark- stiff/Very Stiff	CL At 24": Qp = 3.0 ksf, MC = 11%

Depth to Groundwater From Ground Surface

Upon Completion: none encountered

NOTES:

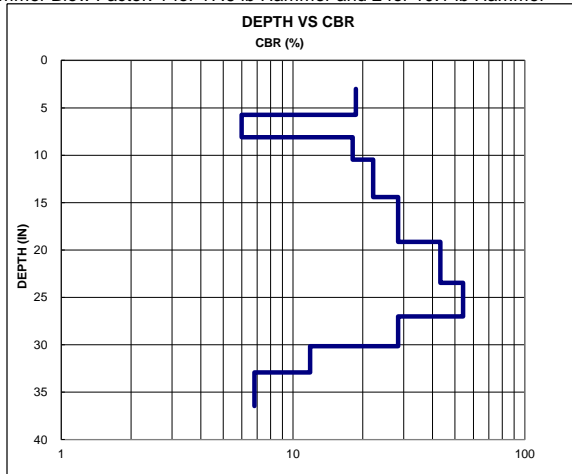
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 3 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	230	0		2					
12	300	70	6	2	5.8	18.6	Very Poor	Agg Base	
5	360	60	12	2	8.1	6.0	Very Poor	Agg Base	
10	420	60	6	2	10.5	18.1	Very Poor	Agg Base	
10	470	50	5	2	12.4	22.2	Good	Subgrade	
10	520	50	5	2	14.4	22.2	Good	Subgrade	
30	640	120	4	2	19.1	28.4	Good	Subgrade	
40	750	110	3	2	23.5	43.3	Good	Subgrade	
40	840	90	2	2	27.0	54.2	Good	Subgrade	
20	920	80	4	2	30.2	28.4	Good	Subgrade	
8	990	70	9	2	32.9	11.8	Good	Subgrade	
8	1080	90	11	2	36.5	6.8	Marginal	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness

CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/8/15  
 BY: RSS/KHB

PROBE/CORE: B19  
 STREET: Pope St.  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	2.5	2.5	Asphalt Concrete Wearing Course	Intact- Chip Seal
2.5	10	7.5	Sand and Gravel	(GP/Agg Base)
10	17	7	Fine Sand- moist- brown	SP At 18": Qp = 4.25 ksf, MC = 13%
17	48	31	LEAN CLAY- brown- hard	CL

Depth to Groundwater From Ground Surface

Upon Completion: none encountered

NOTES:

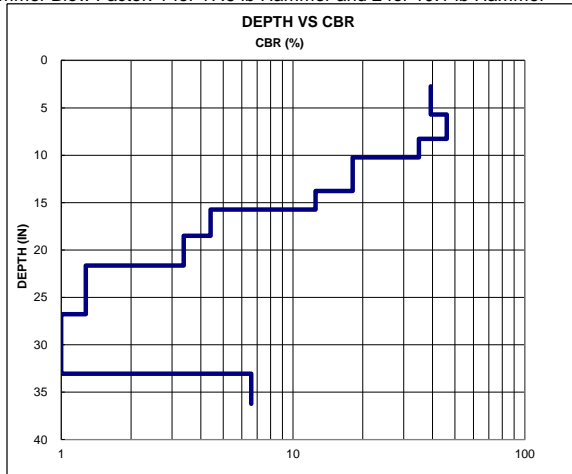
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 2.75 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	220	0		2					
25	295	75	3	2	5.7	39.3	Poor	Agg Base	
25	360	65	3	2	8.3	46.1	Poor	Agg Base	
15	410	50	3	2	10.2	34.9	Good	Subgrade	
15	500	90	6	2	13.8	18.1	Good	Subgrade	
6	550	50	8	2	15.7	12.5	Good	Subgrade	
5	620	70	14	2	18.5	4.4	Poor	Subgrade	
5	700	80	16	2	21.6	3.4	Poor	Subgrade	
5	830	130	26	2	26.8	1.3	Very Poor	Subgrade	
5	990	160	32	2	33.1	0.8	Very Poor	Subgrade	
7	1070	80	11	2	36.2	6.6	Marginal	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness

CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP





## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
PROJECT NO.: 71837.00  
LOCATION: Lapeer, MI  
CLIENT: Wade-Trim, Inc.  
A/E: \_\_\_\_\_  
DATE: 7/8/15  
BY: RSS/KHB

PROBE/CORE: B21  
STREET: Higgins  
LANE: \_\_\_\_\_  
STATION: \_\_\_\_\_  
OFFSET: \_\_\_\_\_  
ADDRESS: \_\_\_\_\_  
GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	1.25	1.25	Asphalt Concrete Wearing Course	Intact- Chip Seal
1.25	4	2.75	Asphalt Concrete Leveling Course	Intact
4	5.75	1.75	Asphalt Concrete Leveling Course	Slightly Deteriorated
5.75	13	7.25	Fill- Fine to Medium Sand with silt- moist- dark gray	(GP/Agg Base)
13	32	19	Fill- Sandy LEAN CLAY- dark gray- Very Stiff	CL At 14": Qp = 3.25 ksf, MC = 11% At 24": Qp = 1.75 ksf, MC = 18%
32	38	6	LEAN CLAY with Sand- trace of organics- dark gray- very stiff	CL
38	48	10	LEAN CLAY with Sand- brown- stiff	CL At 40": Qp = 1.5 ksf, MC = 19%

Depth to Groundwater From Ground Surface  
Upon Completion: none encountered

NOTES:

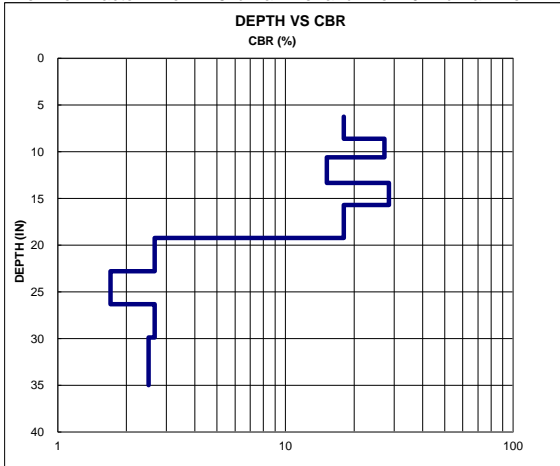
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 6.25 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	310	0		2					
10	370	60	6	2	8.6	18.1	Very Poor	Agg Base	
12	420	50	4	2	10.6	27.2	Very Poor	Agg Base	
10	490	70	7	2	13.3	15.2	Good	Subgrade	
15	550	60	4	2	15.7	28.4	Good	Subgrade	
15	640	90	6	2	19.2	18.1	Good	Subgrade	
5	730	90	18	2	22.8	2.7	Very Poor	Subgrade	
4	820	90	23	2	26.3	1.7	Very Poor	Subgrade	
5	910	90	18	2	29.9	2.7	Very Poor	Subgrade	
7	1040	130	19	2	35.0	2.5	Very Poor	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness  
CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/8/15  
 BY: RSS/KHB

PROBE/CORE: B22  
 STREET: Nepeessing Rd.  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	1.25	1.25	Asphalt Concrete Wearing Course	Intact- Delaminated from layer below
1.25	3	1.75	Asphalt Concrete Leveling Course	Intact
3	6.75	3.75	Asphalt Concrete Leveling Course	Intact
6.75	10.5	3.75	Sand and Gravel	(GP/Agg Base)
10.5	13.75	3.25	Asphalt Concrete	
13.75	48	34.25	Portland Cement Concrete	
48	68	20	Fill- LEAN CLAY with Sand- crushed concrete layers- brown- stiff	CL
68	78	10	LEAN CLAY- with traces of sand- brown- very stiff	CL

Depth to Groundwater From Ground Surface

Upon Completion: none encountered

NOTES:

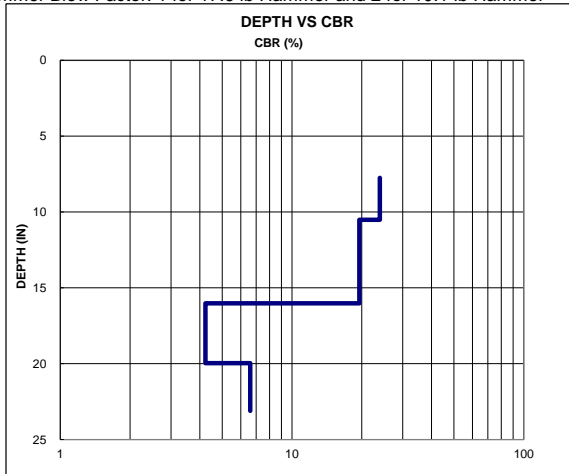
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 7.75 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	730	0		2					
15	800	70	5	2	10.5	23.9	Very Poor	Agg Base	
25	940	140	6	2	16.0	19.5	Good	Subgrade	
7	1040	100	14	2	20.0	4.2	Poor	Subgrade	
7	1120	80	11	2	23.1	6.6	Marginal	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness

CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E:  
 DATE: 7/8/15  
 BY: RSS/KHB

PROBE/CORE: B23  
 STREET: Nepessing Rd.  
 LANE:  
 STATION:  
 OFFSET:  
 ADDRESS:  
 GROUND EL:

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	2.75	2.75	Asphalt Concrete Wearing Course	Intact- Chip Seal
2.75	5.75	3	Asphalt Concrete Leveling Course	Intact
5.75	9.5	3.75	Asphalt Concrete Leveling Course	Partially deteriorated
9.5	48	38.5	LEAN CLAY- brown- hard	CL At 10": Qp = 4.5 ksf, MC = 13% At 35": Qp = 4.25 ksf, MC = 20%

Depth to Groundwater From Ground Surface  
 Upon Completion: none encountered

NOTES:

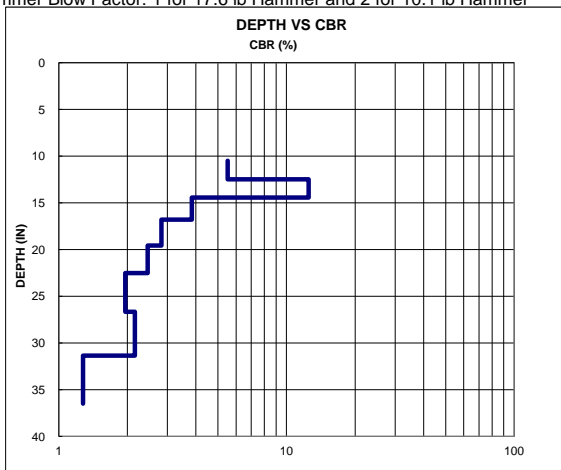
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 10.5 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	410	0		2					
4	460	50	13	2	12.5	5.5	Marginal	Subgrade	
6	510	50	8	2	14.4	12.5	Good	Subgrade	
4	570	60	15	2	16.8	3.8	Poor	Subgrade	
4	640	70	18	2	19.6	2.8	Very Poor	Subgrade	
4	715	75	19	2	22.5	2.5	Very Poor	Subgrade	
5	820	105	21	2	26.6	2.0	Very Poor	Subgrade	
6	940	120	20	2	31.4	2.2	Very Poor	Subgrade	
5	1070	130	26	2	36.5	1.3	Very Poor	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness  
 CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/1 4- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E:  
 DATE: 7/8/15  
 BY: RSS/KHB

PROBE/CORE: B24  
 STREET: Mocking Bird Trail  
 LANE:  
 STATION:  
 OFFSET:  
 ADDRESS:  
 GROUND EL:

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	1.25	1.25	Asphalt Concrete Wearing Course	Intact
1.25	3	1.75	Asphalt Concrete Leveling Course	Slight Voids
3	12.5	9.5	Pulverized Asphalt	(GP/Agg Base)
12.5	48	35.5	LEAN CLAY- brown- hard	CL At 14": Qp = 4.5 ksf, MC = 16% At 35": Qp = 4.5 ksf, MC = 17%

Depth to Groundwater From Ground Surface

Upon Completion: none encountered

NOTES:

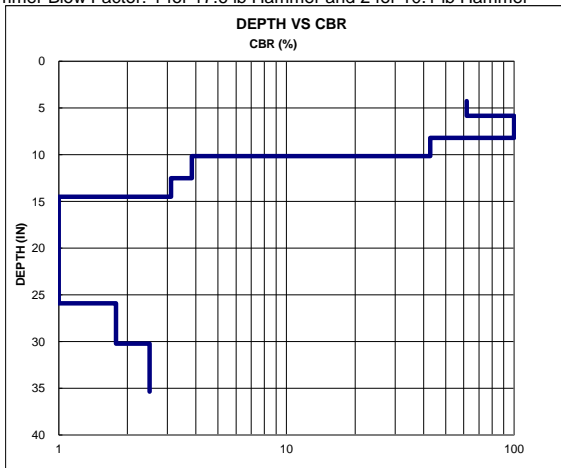
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 4.25 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	250	0		2					
20	290	40	2	2	5.8	61.8	Marginal	Agg Base	
30	300	10	0	2	6.2	100.0	Good	Agg Base	
40	320	20	1	2	7.0	100.0	Good	Agg Base	
50	350	30	1	2	8.2	100.0	Good	Agg Base	
18	400	50	3	2	10.2	42.8	Poor	Agg Base	
4	460	60	15	2	12.5	3.8	Very Poor	Agg Base	
3	510	50	17	2	14.5	3.1	Poor	Subgrade	
2	575	65	33	2	17.0	0.8	Very Poor	Subgrade	
2	645	70	35	2	19.8	0.7	Very Poor	Subgrade	
2	710	65	33	2	22.4	0.8	Very Poor	Subgrade	
3	800	90	30	2	25.9	1.0	Very Poor	Subgrade	
5	910	110	22	2	30.2	1.8	Very Poor	Subgrade	
7	1040	130	19	2	35.4	2.5	Very Poor	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness

CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/1 4- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/8/15  
 BY: RSS/KHB

PROBE/CORE: B25  
 STREET: Mocking Bird Trail  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	1.5	1.5	Asphalt Concrete Wearing Course	Intact
1.5	3.5	2	Asphalt Concrete Leveling Course	Intact
3.5	6.5	3	Asphalt Concrete Leveling Course	Intact
6.5	15	8.5	Fill- LEAN CLAY with sand- trace of Asphalt Millings- gray- stiff	(GP/Agg Base) At 7": Qp = 1.5 ksf, MC = 16%
15	48	33	Fine Sand with Silt- moist- brown	SP-SM

Depth to Groundwater From Ground Surface

Upon Completion: none encountered

NOTES:

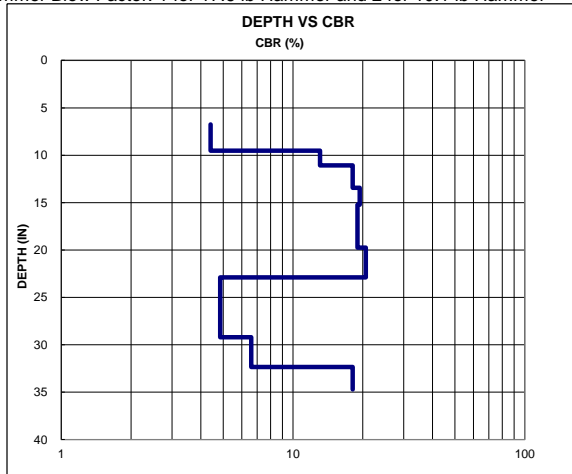
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 6.75 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	330	0		2					
5	400	70	14	2	9.5	4.4	Very Poor	Agg Base	
5	440	40	8	2	11.1	13.1	Very Poor	Agg Base	
10	500	60	6	2	13.4	18.1	Very Poor	Agg Base	
8	545	45	6	2	15.2	19.4	Good	Subgrade	
20	660	115	6	2	19.7	18.9	Good	Subgrade	
15	740	80	5	2	22.9	20.6	Good	Subgrade	
12	900	160	13	2	29.2	4.9	Poor	Subgrade	
7	980	80	11	2	32.3	6.6	Marginal	Subgrade	
10	1040	60	6	2	34.7	18.1	Good	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness

CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/8/15  
 BY: RSS/KHB

PROBE/CORE: B26  
 STREET: West Park St.  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	2	2	Asphalt Concrete Wearing Course	Intact
2	3	1	Asphalt Concrete Wearing Course	Intact
3	7	4	Pulverized Asphalt	(GP/Agg Base)
7	14	7	Sand with Gravel	SM
14	48	34	LEAN CLAY- brown- very stiff	CL At 15": Qp = 3.25 ksf, MC = 14%

Depth to Groundwater From Ground Surface

Upon Completion: none encountered

NOTES:

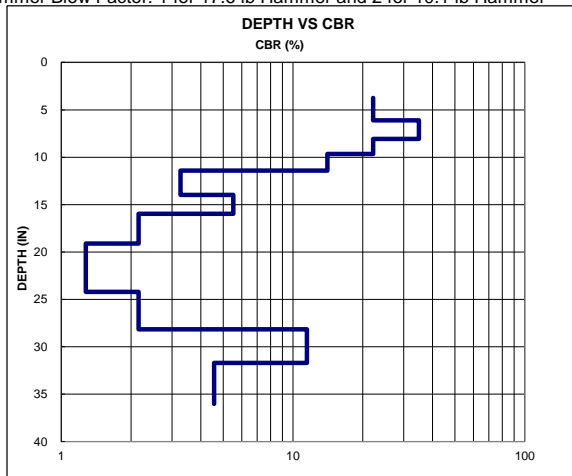
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 3.75 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	220	0		2					
12	280	60	5	2	6.1	22.2	Very Poor	Agg Base	
15	330	50	3	2	8.1	34.9	Poor	Agg Base	
8	370	40	5	2	9.7	22.2	Very Poor	Agg Base	
6	415	45	8	2	11.4	14.1	Very Poor	Agg Base	
4	480	65	16	2	14.0	3.3	Poor	Subgrade	
4	530	50	13	2	16.0	5.5	Marginal	Subgrade	
4	610	80	20	2	19.1	2.2	Very Poor	Subgrade	
5	740	130	26	2	24.2	1.3	Very Poor	Subgrade	
5	840	100	20	2	28.2	2.2	Very Poor	Subgrade	
10	930	90	9	2	31.7	11.5	Good	Subgrade	
8	1040	110	14	2	36.0	4.6	Poor	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness

CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/8/15  
 BY: RSS/KHB

PROBE/CORE: B27  
 STREET: Pine St.  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	1.75	1.75	Asphalt Concrete Wearing Course	Intact- Chip Seal
1.75	2.75	1	Asphalt Concrete Leveling Course	Intact
2.75	14	11.25	Sand Gravel	(GP/Agg Base)
14	48	34	Sandy LEAN CLAY- Frequent Sand Layer- brown/gray- Very Stiff	CL At 15": Qp = 2.75 ksf, MC = 12% At 35": Qp = 1.5 ksf, MC = 14%

Depth to Groundwater From Ground Surface  
 Upon Completion: none encountered

NOTES:  
 Moved 6' North due to water Main

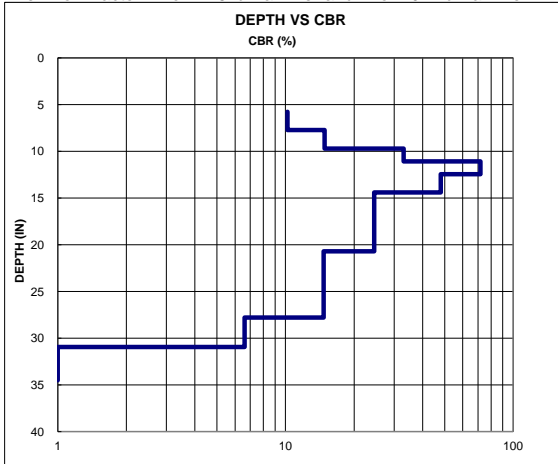
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 5.75 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	310	0		2					
5	360	50	10	2	7.7	10.2	Very Poor	Agg Base	
7	410	50	7	2	9.7	14.9	Very Poor	Agg Base	
10	445	35	4	2	11.1	33.0	Poor	Agg Base	
20	480	35	2	2	12.4	71.8	Marginal	Agg Base	
20	530	50	3	2	14.4	48.1	Good	Subgrade	
35	690	160	5	2	20.7	24.5	Good	Subgrade	
25	870	180	7	2	27.8	14.7	Good	Subgrade	
7	950	80	11	2	30.9	6.6	Marginal	Subgrade	
3	1040	90	30	2	34.5	1.0	Very Poor	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness  
 CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/8/15  
 BY: RSS/KHB

PROBE/CORE: B28  
 STREET: Cedar St.  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	1.75	1.75	Asphalt Concrete Wearing Course	Partially Deteriorated
1.75	30	28.25	Fill- Fine to Medium Sand with silt- moist- gray	(GP/Agg Base)
30	48	18	Fill- Fine Sand to Silt and traces of Asphalt millings- moist- brown	SP-SM

Depth to Groundwater From Ground Surface

Upon Completion: none encountered

NOTES:

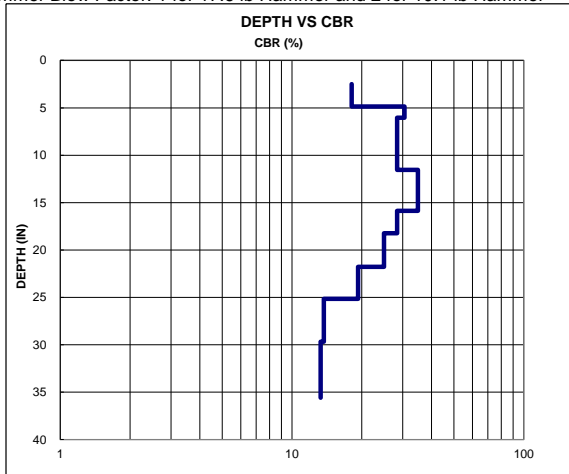
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 2.5 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	210	0		2					
10	270	60	6	2	4.9	18.1	Very Poor	Agg Base	
8	300	30	4	2	6.0	30.6	Poor	Agg Base	
10	340	40	4	2	7.6	28.4	Very Poor	Agg Base	
10	380	40	4	2	9.2	28.4	Very Poor	Agg Base	
15	440	60	4	2	11.6	28.4	Very Poor	Agg Base	
15	490	50	3	2	13.5	34.9	Poor	Agg Base	
18	550	60	3	2	15.9	34.9	Poor	Agg Base	
15	610	60	4	2	18.2	28.4	Very Poor	Agg Base	
20	700	90	5	2	21.8	24.9	Very Poor	Agg Base	
15	785	85	6	2	25.1	19.3	Very Poor	Agg Base	
15	900	115	8	2	29.7	13.7	Very Poor	Agg Base	
19	1050	150	8	2	35.6	13.3	Good	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness  
 CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/8/15  
 BY: RSS/KHB

PROBE/CORE: B29  
 STREET: Cedar St.  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	2.25	2.25	Asphalt Concrete Wearing Course	Intact- Chip Seal
2.25	3	0.75	Asphalt Concrete Leveling Course	Intact
3	10	7	Sand and Gravel	(GP/Agg Base)
10	36	26	Fill- LEAN CLAY with Sand- traces of Asphalt millings- brown/gray-hard	CL At 11": Qp = 4.5 ksf, MC = 10%
36	48	12	Sandy LEAN CLAY- brown/gray	CL At 40": Qp = 2.25 ksf, MC = 11%

Depth to Groundwater From Ground Surface

Upon Completion: none encountered

NOTES:

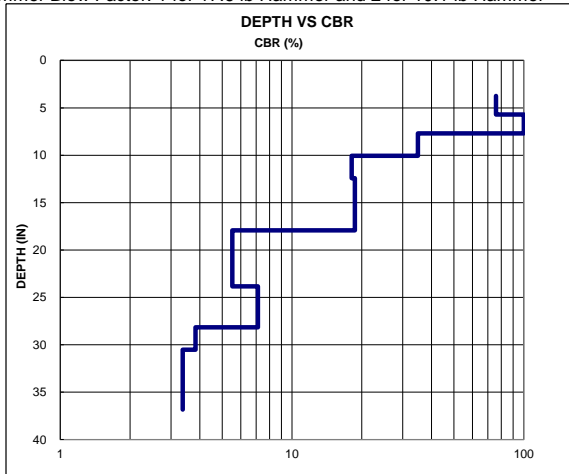
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 3.75 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	250	0		2					
30	300	50	2	2	5.7	75.8	Marginal	Agg Base	
40	350	50	1	2	7.7	100.0	Good	Agg Base	
18	410	60	3	2	10.0	34.9	Poor	Agg Base	
10	470	60	6	2	12.4	18.1	Good	Subgrade	
24	610	140	6	2	17.9	18.6	Good	Subgrade	
12	760	150	13	2	23.8	5.5	Marginal	Subgrade	
10	870	110	11	2	28.2	7.1	Marginal	Subgrade	
4	930	60	15	2	30.5	3.8	Poor	Subgrade	
5	1010	80	16	2	33.7	3.4	Poor	Subgrade	
5	1090	80	16	2	36.8	3.4	Poor	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness

CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/8/15  
 BY: RSS/KHB

PROBE/CORE: B30  
 STREET: Michigan St.  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	2.25	2.25	Asphalt Concrete Wearing Course	Slight Voids
2.25	19	16.75	Sand and Gravel	(GP/Agg Base)
19	48	29	Fine Sand- Occasional Clay layers- moist- brown	SP At 28": Qp = 2.75 ksf, MC = 20%

Depth to Groundwater From Ground Surface

Upon Completion: none encountered

NOTES:

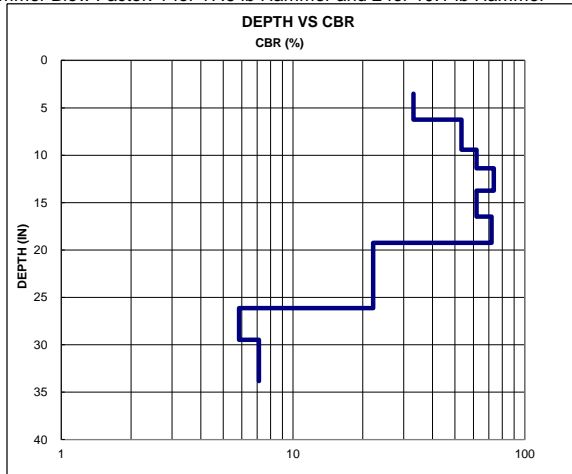
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 3.5 inches

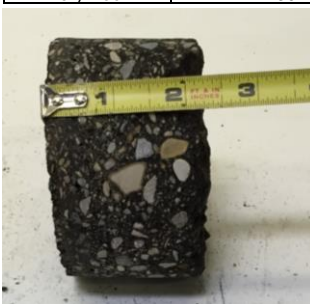
No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	240	0		2					
20	310	70	4	2	6.3	33.0	Poor	Agg Base	
35	390	80	2	2	9.4	53.2	Poor	Agg Base	
25	440	50	2	2	11.4	61.8	Marginal	Agg Base	
35	500	60	2	2	13.7	73.5	Marginal	Agg Base	
35	570	70	2	2	16.5	61.8	Marginal	Agg Base	
40	640	70	2	2	19.2	71.8	Good	Subgrade	
35	815	175	5	2	26.1	22.2	Good	Subgrade	
7	900	85	12	2	29.5	5.9	Marginal	Subgrade	
10	1010	110	11	2	33.8	7.1	Marginal	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness

CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E:  
 DATE: 7/8/15  
 BY: RSS/KHB

PROBE/CORE: B31  
 STREET: Park St.  
 LANE:  
 STATION:  
 OFFSET:  
 ADDRESS:  
 GROUND EL:

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	3	3	Alright Concrete Wearing Course	Intact
3	9	6	Sand Gravel	(GP/Agg Base)
9	48	39	LEAN CLAY- brown- hard	CL At 10": Qp = 4.0 ksf, MC = 17% At 35": Qp = 4.5 ksf, MC = 13%

Depth to Groundwater From Ground Surface  
 Upon Completion: none encountered

NOTES:

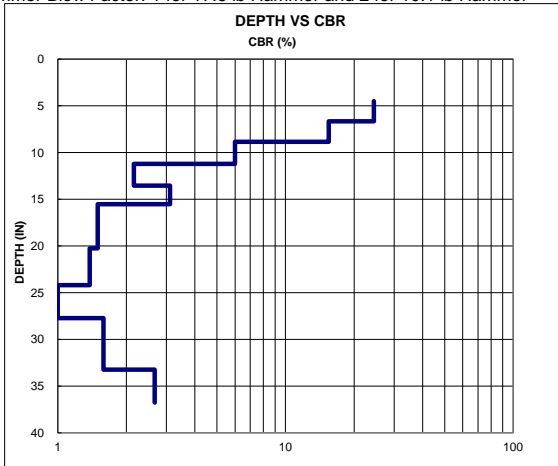
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 4.5 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	270	0		2					
12	325	55	5	2	6.7	24.4	Very Poor	Agg Base	
8	380	55	7	2	8.8	15.5	Very Poor	Agg Base	
5	440	60	12	2	11.2	6.0	Marginal	Subgrade	
3	500	60	20	2	13.6	2.2	Very Poor	Subgrade	
3	550	50	17	2	15.5	3.1	Poor	Subgrade	
5	670	120	24	2	20.2	1.5	Very Poor	Subgrade	
4	770	100	25	2	24.2	1.4	Very Poor	Subgrade	
3	860	90	30	2	27.7	1.0	Very Poor	Subgrade	
3	930	70	23	2	30.5	1.6	Very Poor	Subgrade	
3	1000	70	23	2	33.2	1.6	Very Poor	Subgrade	
5	1090	90	18	2	36.8	2.7	Very Poor	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness  
 CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/1 4- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/8/15  
 BY: RSS/KHB

PROBE/CORE: B32  
 STREET: Michigan St.  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	0.75	0.75	Asphalt Concrete Wearing Course	Intact- delaminated from layer below
0.75	1.5	0.75	Asphalt Concrete Leveling Course	Cracked into pieces
1.5	3.75	2.25	Asphalt Concrete Leveling Course	Cracked into pieces
3.75	10	6.25	Sand & Gravel w/ asphalt millings	(GP/Agg Base)
10	48	38	Lean CLAY with Sand- Brown- hard	(CL) At 11": Qp=4.5ksf, MC= 17%

Depth to Groundwater From Ground Surface

Upon Completion: None Encountered

NOTES:

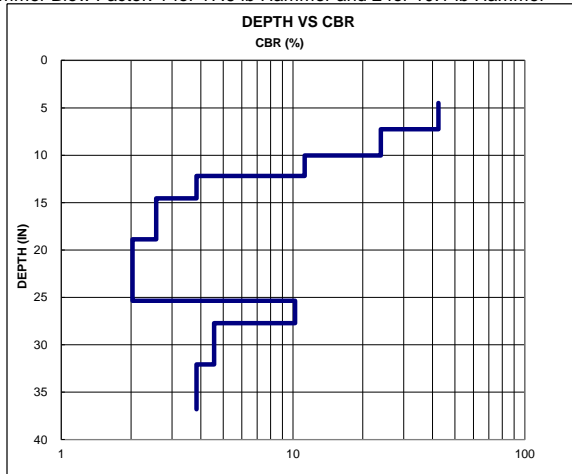
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 4.5 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	260	0		2					
25	330	70	3	2	7.3	42.4	Poor	Agg Base	
15	400	70	5	2	10.0	23.9	Very Poor	Agg Base	
6	455	55	9	2	12.2	11.2	Very Poor	Agg Base	
4	515	60	15	2	14.5	3.8	Very Poor	Agg Base	
6	625	110	18	2	18.9	2.6	Very Poor	Subgrade	
8	790	165	21	2	25.4	2.0	Very Poor	Subgrade	
6	850	60	10	2	27.7	10.2	Good	Subgrade	
8	960	110	14	2	32.1	4.6	Poor	Subgrade	
8	1080	120	15	2	36.8	3.8	Poor	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness

CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/8/15  
 BY: RSS/KHB

PROBE/CORE: B33  
 STREET: St. Clair  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	2.5	2.5	Asphalt Concrete Wearing Course	Cracked into pieces
2.5	3.75	1.25	Asphalt Concrete Leveling Course	Cracked into pieces
3.75	15	11.25	Fine Silty Sand- Gray-Moist	SM
15	48	33	LEAN CLAY with Sand- Brown- Hard	CL At 16": Qp=4.5ksf, MC= 18%

Depth to Groundwater From Ground Surface

Upon Completion: None Encountered

NOTES:

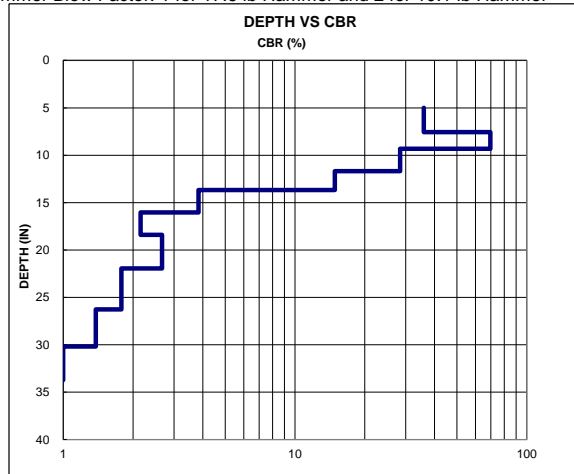
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 5 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	280	0		2					
20	345	65	3	2	7.6	35.9	Poor	Agg Base	
25	390	45	2	2	9.3	69.6	Marginal	Agg Base	
15	450	60	4	2	11.7	28.4	Very Poor	Agg Base	
7	500	50	7	2	13.7	14.9	Very Poor	Agg Base	
4	560	60	15	2	16.0	3.8	Poor	Subgrade	
3	620	60	20	2	18.4	2.2	Very Poor	Subgrade	
5	710	90	18	2	21.9	2.7	Very Poor	Subgrade	
5	820	110	22	2	26.3	1.8	Very Poor	Subgrade	
4	920	100	25	2	30.2	1.4	Very Poor	Subgrade	
3	1010	90	30	2	33.7	1.0	Very Poor	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness

CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/8/15  
 BY: RSS/KHB

PROBE/CORE: B34  
 STREET: Cedar St.  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	1.5	1.5	Asphalt Concrete Wearing Course	Intact
1.5	4	2.5	Asphalt Concrete Leveling Course	Intact
4	7.5	3.5	Asphalt Concrete Leveling Course	Intact
7.5	23	15.5	Crushed Limestone	(GP/Agg Base)
23	30	7	LEAN CLAY with Sand- Brown- Very Stiff	CL At 24": Qp=2.5ksf, MC= 18%

Depth to Groundwater From Ground Surface

Upon Completion: None Encountered

NOTES:

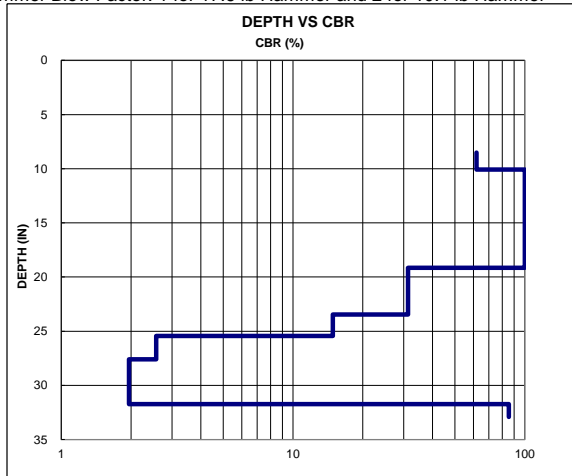
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 8.5 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	380	0		2					
20	420	40	2	2	10.1	61.8	Marginal	Agg Base	
40	470	50	1	2	12.0	100.0	Good	Agg Base	
40	510	40	1	2	13.6	100.0	Good	Agg Base	
40	560	50	1	2	15.6	100.0	Good	Agg Base	
40	600	40	1	2	17.2	100.0	Good	Agg Base	
40	650	50	1	2	19.1	100.0	Good	Agg Base	
30	760	110	4	2	23.5	31.4	Good	Subgrade	
7	810	50	7	2	25.4	14.9	Good	Subgrade	
3	865	55	18	2	27.6	2.6	Very Poor	Subgrade	
5	970	105	21	2	31.7	2.0	Very Poor	Subgrade	
20	1000	30	2	2	32.9	85.3	Good	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness  
 CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/8/15  
 BY: RSS/KHB

PROBE/CORE: B35  
 STREET: N. Monroe St.  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	2	2	Asphalt Concrete Wearing Course	Intact
2	3.75	1.75	Asphalt Concrete Leveling Course	Intact
3.75	7.5	3.75	Asphalt Concrete Leveling Course	Intact
7.5	19	11.5	Fill-Sand & Gravel- Asphalt millings	(GP/Agg Base)
19	36	17	LEAN CLAY with Sand- gray- very stiff	CL At 20": Qp=2.0ksf, MC= 16%
36	48	12	LEAN CLAY with Sand- brown- very stiff	CL At 24": Qp=2.5ksf, MC= 16%

Depth to Groundwater From Ground Surface

Upon Completion: None Encountered

NOTES:

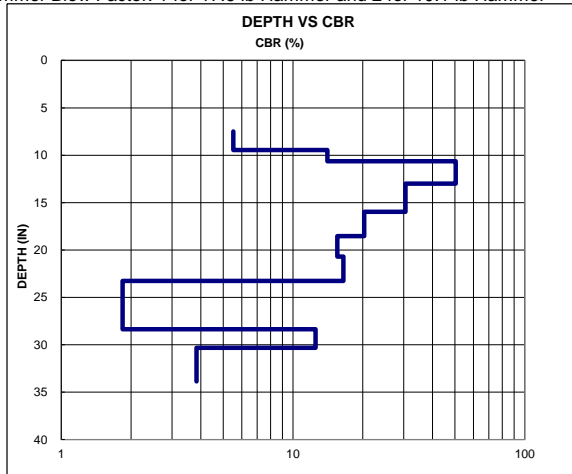
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 7.5 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	360	0		2					
4	410	50	13	2	9.5	5.5	Very Poor	Agg Base	
4	440	30	8	2	10.6	14.1	Very Poor	Agg Base	
25	500	60	2	2	13.0	50.4	Poor	Agg Base	
20	575	75	4	2	16.0	30.6	Poor	Agg Base	
12	640	65	5	2	18.5	20.3	Very Poor	Agg Base	
8	695	55	7	2	20.7	15.5	Good	Subgrade	
10	760	65	7	2	23.2	16.5	Good	Subgrade	
6	890	130	22	2	28.4	1.8	Very Poor	Subgrade	
6	940	50	8	2	30.3	12.5	Good	Subgrade	
6	1030	90	15	2	33.9	3.8	Poor	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness

CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/8/15  
 BY: RSS/KHB

PROBE/CORE: B36  
 STREET: N. Monroe St.  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	2.25	2.25	Asphalt Concrete Wearing Course	Vehicle Crack Through
2.25	15	12.75	Fill- Sand & Gravel	(GP/Agg Base)
15	40	25	LEAN CLAY with Sand- brown- hard	CL At 16": Qp=4.5ksf, MC= 15%
40	48	8	SILT- moist- brown	ML

Depth to Groundwater From Ground Surface

Upon Completion: None Encountered

NOTES:

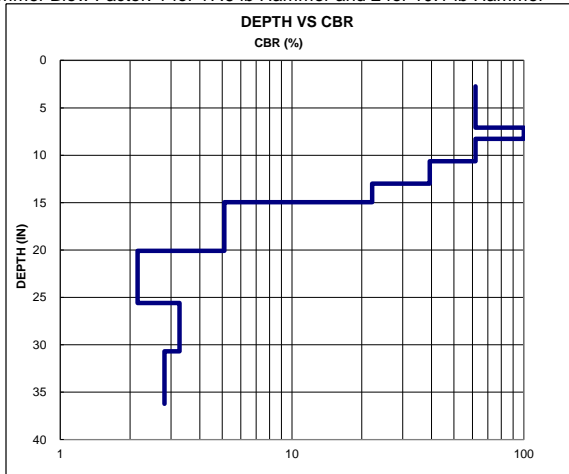
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 2.75 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	210	0		2					
25	260	50	2	2	4.7	61.8	Marginal	Agg Base	
30	320	60	2	2	7.1	61.8	Marginal	Agg Base	
30	350	30	1	2	8.3	100.0	Good	Agg Base	
30	410	60	2	2	10.6	61.8	Marginal	Agg Base	
20	470	60	3	2	13.0	39.3	Poor	Agg Base	
10	520	50	5	2	15.0	22.2	Very Poor	Agg Base	
10	650	130	13	2	20.1	5.1	Marginal	Subgrade	
7	790	140	20	2	25.6	2.2	Very Poor	Subgrade	
8	920	130	16	2	30.7	3.3	Poor	Subgrade	
8	1060	140	18	2	36.2	2.8	Very Poor	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness  
 CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/9/15  
 BY: RSS/KHB

PROBE/CORE: B37  
 STREET: Union St.  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	1	1	Asphalt Concrete Wearing Course	Intact
1	2.5	1.5	Asphalt Concrete Leveling Course	Intact- Delaminated from layer below
2.5	4	1.5	Asphalt Concrete Leveling Course	Verticle crack through
4	10	6	Fill- Sand & Gravel- crushed asphalt	(GP/Agg Bass)
10	19	9	LEAN CLAY- gray- hard	CL At 11": Qp=4.5ksf, MC= 16%
19	48	29	LEAN CLAY- brown- very stiff	CL At 20": Qp=3.5ksf, MC= 23%

Depth to Groundwater From Ground Surface

Upon Completion: None Encountered

NOTES:

Moved 5' North due to gas Line

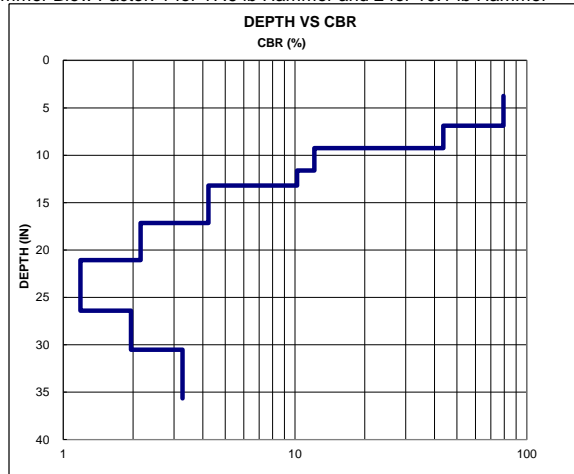
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 3.75 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	250	0		2					
50	330	80	2	2	6.9	79.4	Marginal	Agg Base	
22	390	60	3	2	9.3	43.7	Poor	Agg Base	
7	450	60	9	2	11.6	12.1	Good	Subgrade	
4	490	40	10	2	13.2	10.2	Good	Subgrade	
7	590	100	14	2	17.1	4.2	Poor	Subgrade	
5	690	100	20	2	21.1	2.2	Very Poor	Subgrade	
5	825	135	27	2	26.4	1.2	Very Poor	Subgrade	
5	930	105	21	2	30.5	2.0	Very Poor	Subgrade	
8	1060	130	16	2	35.6	3.3	Poor	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness

CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/9/15  
 BY: RSS/KHB

PROBE/CORE: B38  
 STREET: Pine St.  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	2.5	2.5	Asphalt Concrete Wearing Course	Intact
2.5	3.5	1	Asphalt Concrete Leveling Course	Intact- Delaminated from layer below
3.5	4.25	0.75	Asphalt Concrete Leveling Course	Intact- Delaminated from layer below
4.25	6	1.75	Asphalt Concrete Leveling Course	Deteriorated
6	14	8	Sand & Gravel	(GP/Agg Base)
14	22	8	LEAN CLAY- brown-hard	CL At 15": Qp=4.5ksf, MC= 13%
22	41	19	Sandy LEAN CLAY- gray- Very Stiff	CL At 23": Qp=2.75ksf, MC= 13%
41	48	7	LEAN CLAY with Sand- brown- Very Stiff	CL At 45": Qp=2.5ksf, MC= 15%

Depth to Groundwater From Ground Surface

Upon Completion: None Encountered

NOTES:

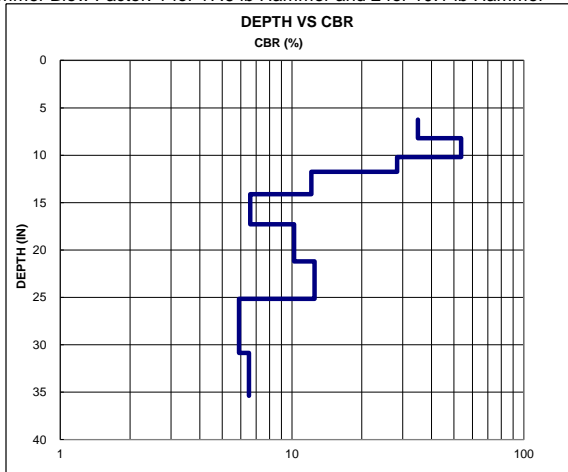
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 6.25 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	310	0		2					
15	360	50	3	2	8.2	34.9	Poor	Agg Base	
22	410	50	2	2	10.2	53.6	Poor	Agg Base	
10	450	40	4	2	11.8	28.4	Very Poor	Agg Base	
7	510	60	9	2	14.1	12.1	Good	Subgrade	
7	590	80	11	2	17.3	6.6	Marginal	Subgrade	
10	690	100	10	2	21.2	10.2	Good	Subgrade	
12	790	100	8	2	25.1	12.5	Good	Subgrade	
12	935	145	12	2	30.9	5.9	Marginal	Subgrade	
10	1050	115	12	2	35.4	6.5	Marginal	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness

CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E:  
 DATE: 7/9/15  
 BY: RSS/KHB

PROBE/CORE: B39  
 STREET: N. Saginaw St.  
 LANE:  
 STATION:  
 OFFSET:  
 ADDRESS:  
 GROUND EL:

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	2	2	Asphalt Concrete Wearing Course	Intact- Delaminated from layer below- chip seal delaminated
2	7	5	Asphalt Concrete Leveling Course	Partially Deteriorated- Delaminated from layer below
7	9.75	2.75	Asphalt Concrete Leveling Course	Partially Deteriorated
9.75	14	4.25	Crushed Concrete	(GP/Agg Base)
14	48	34	LEAN CLAY-brown- hard	CL At 15": Qp=4.5ksf, MC= 15% At 35": Qp=4.25ksf, MC= 16%

Depth to Groundwater From Ground Surface  
 Upon Completion: None Encountered

NOTES:

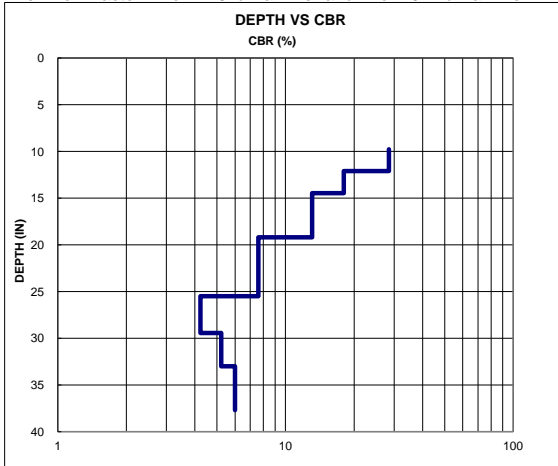
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 9.75 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	400	0		2					
15	460	60	4	2	12.1	28.4	Very Poor	Agg Base	
10	520	60	6	2	14.5	18.1	Good	Subgrade	
15	640	120	8	2	19.2	13.1	Good	Subgrade	
15	800	160	11	2	25.5	7.6	Marginal	Subgrade	
7	900	100	14	2	29.4	4.2	Poor	Subgrade	
7	990	90	13	2	33.0	5.2	Marginal	Subgrade	
10	1110	120	12	2	37.7	6.0	Marginal	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness  
 CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/9/15  
 BY: RSS/KHB

PROBE/CORE: B40  
 STREET: 1st Street  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	0.75	0.75	Asphalt Concrete Wearing Coarse	Intact- slight voids- chip seal
0.75	2.75	2	Asphalt Concrete Leveling Coarse	Intact
2.75	3.75	1	Asphalt Concrete Leveling Coarse	Intact
3.75	11	7.25	Sand & Gravel	(GP/Agg Base)
11	16	5	Fine to Medium CLAY SAND- gray	SL
16	48	32	Sandy LEAN CLAY- brown- soft/stiff	CL At 17": TV=0.4ksf, MC= 19% At 35": TV=1.0ksf, MC= 17%

Depth to Groundwater From Ground Surface  
 Upon Completion: None Encountered

NOTES:

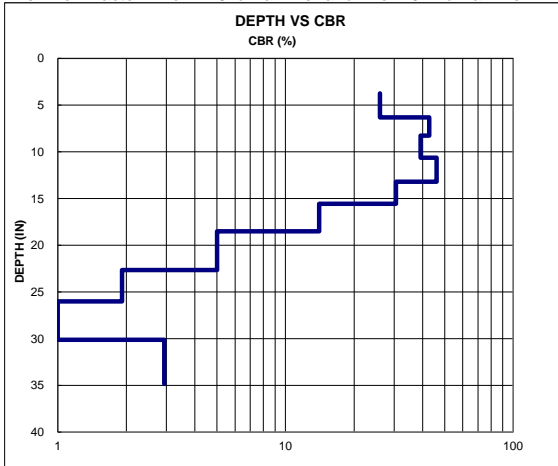
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 3.75 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	260	0		2					
15	325	65	4	2	6.3	26.0	Very Poor	Agg Base	
18	375	50	3	2	8.3	42.8	Poor	Agg Base	
20	435	60	3	2	10.6	39.3	Poor	Agg Base	
25	500	65	3	2	13.2	46.1	Good	Subgrade	
16	560	60	4	2	15.6	30.6	Good	Subgrade	
10	635	75	8	2	18.5	14.1	Good	Subgrade	
8	740	105	13	2	22.6	5.0	Marginal	Subgrade	
4	825	85	21	2	26.0	1.9	Very Poor	Subgrade	
3	930	105	35	2	30.1	0.7	Very Poor	Subgrade	
7	1050	120	17	2	34.9	2.9	Very Poor	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness  
 CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/9/15  
 BY: RSS/KHB

PROBE/CORE: B41  
 STREET: Jefferson St.  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	1.25	1.25	Asphalt Concrete Wearing Course	Intact- Chip Seal
1.25	2.25	1	Asphalt Concrete Leveling Course	Verticle crack through
2.25	3.75	1.5	Asphalt Concrete Leveling Course	Verticle crack through
3.75	13	9.25	Sand & Gravel	(GP/Agg Base)
13	37	24	LEAN CLAY with sand- brown/gray-Very Stiff	CL At 14": Qp=3.25ksf, MC= 24%
37	48	11	LEAN CLAY- brown- Stiff	CL At 40": Qp=1.5ksf, MC= 22%

Depth to Groundwater From Ground Surface

Upon Completion: None Encountered

NOTES:

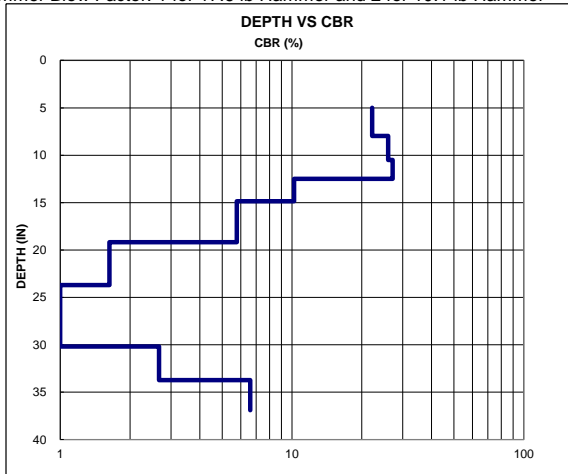
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 5 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	280	0		2					
15	355	75	5	2	8.0	22.2	Very Poor	Agg Base	
15	420	65	4	2	10.5	26.0	Very Poor	Agg Base	
12	470	50	4	2	12.5	27.2	Very Poor	Agg Base	
6	530	60	10	2	14.8	10.2	Good	Subgrade	
9	640	110	12	2	19.2	5.8	Marginal	Subgrade	
5	755	115	23	2	23.7	1.6	Very Poor	Subgrade	
2	860	105	53	2	27.8	0.3	Very Poor	Subgrade	
2	920	60	30	2	30.2	1.0	Very Poor	Subgrade	
5	1010	90	18	2	33.7	2.7	Very Poor	Subgrade	
7	1090	80	11	2	36.9	6.6	Marginal	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness

CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/9/15  
 BY: RSS/KHB

PROBE/CORE: B42  
 STREET: Adams St.  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	1	1	Asphalt Concrete Wearing Course	Intact
1	2.5	1.5	Asphalt Concrete Leveling Course	Intact- Delaminated from layer below
2.5	3.5	1	Asphalt Concrete Leveling Course	Vertical crack through
3.5	16.5	13	Fill- Sand & Gravel	(GP/Agg Base)
16.5	48	31.5	LEAN CLAY with Sand- brown- stiff/very stiff	CL At 17": Qp=1.5ksf, MC= 19% At 35": Qp=2.0ksf, MC= 17%

Depth to Groundwater From Ground Surface  
 Upon Completion: None Encountered

NOTES:

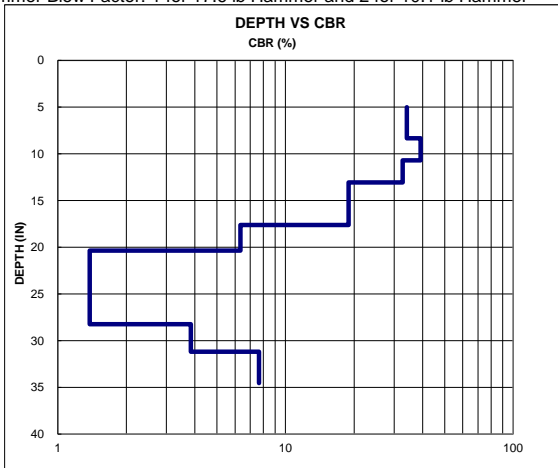
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 5 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	290	0		2					
25	375	85	3	2	8.3	34.1	Poor	Agg Base	
20	435	60	3	2	10.7	39.3	Poor	Agg Base	
17	495	60	4	2	13.1	32.7	Poor	Agg Base	
20	610	115	6	2	17.6	18.9	Good	Subgrade	
6	680	70	12	2	20.4	6.3	Marginal	Subgrade	
4	780	100	25	2	24.3	1.4	Very Poor	Subgrade	
4	880	100	25	2	28.2	1.4	Very Poor	Subgrade	
5	955	75	15	2	31.2	3.8	Poor	Subgrade	
8	1040	85	11	2	34.5	7.6	Marginal	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness  
 CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E:  
 DATE: 7/9/15  
 BY: RSS/KHB

PROBE/CORE: B43  
 STREET: Barry Dr.  
 LANE:  
 STATION:  
 OFFSET:  
 ADDRESS:  
 GROUND EL:

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	3	3	Asphalt Concrete Wearing Course	Cracked into pieces- Chip seal
3	9	6	Fill- Sand & Gravel	(GP/Agg Base)
9	48	39	LEAN CLAY- brown- hard/very Stiff	CL At 10": Qp=4.25ksf, MC= 13% At 35": Qp=3.0ksf, MC= 17%

Depth to Groundwater From Ground Surface  
 Upon Completion: None Encountered

NOTES:

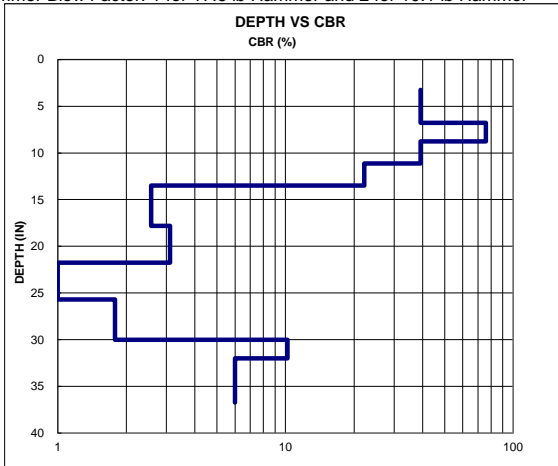
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 3.25 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	210	0		2					
30	300	90	3	2	6.8	39.3	Poor	Agg Base	
30	350	50	2	2	8.8	75.8	Marginal	Agg Base	
20	410	60	3	2	11.1	39.3	Good	Subgrade	
12	470	60	5	2	13.5	22.2	Good	Subgrade	
6	580	110	18	2	17.8	2.6	Very Poor	Subgrade	
6	680	100	17	2	21.8	3.1	Poor	Subgrade	
3	780	100	33	2	25.7	0.8	Very Poor	Subgrade	
5	890	110	22	2	30.0	1.8	Very Poor	Subgrade	
5	940	50	10	2	32.0	10.2	Good	Subgrade	
10	1060	120	12	2	36.7	6.0	Marginal	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness  
 CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/9/15  
 BY: RSS/KHB

PROBE/CORE: B44  
 STREET: Knowlwood Dr.  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	3	3	Asphalt Concrete Leveling Course	Intact
3	4	1	Asphalt Concrete Leveling Course	Intact
4	12	8	Fill- Sand & Gravel	(GP/Agg Base)
12	48	36	LEAN CLAY with Sand- brown- stiff	CL At 13": Qp=1.25ksf, MC= 13% At 35": Qp=1.5ksf, MC= 14%

Depth to Groundwater From Ground Surface  
 Upon Completion: None Encountered

NOTES:

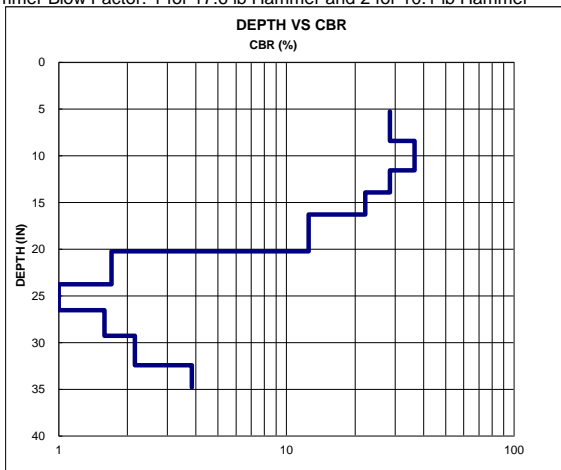
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 5.25 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	290	0		2					
20	370	80	4	2	8.4	28.4	Very Poor	Agg Base	
25	450	80	3	2	11.5	36.5	Poor	Agg Base	
15	510	60	4	2	13.9	28.4	Good	Subgrade	
12	570	60	5	2	16.3	22.2	Good	Subgrade	
12	670	100	8	2	20.2	12.5	Good	Subgrade	
4	760	90	23	2	23.8	1.7	Very Poor	Subgrade	
2	830	70	35	2	26.5	0.7	Very Poor	Subgrade	
3	900	70	23	2	29.3	1.6	Very Poor	Subgrade	
4	980	80	20	2	32.4	2.2	Very Poor	Subgrade	
4	1040	60	15	2	34.8	3.8	Poor	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness  
 CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/9/15  
 BY: RSS/KHB

PROBE/CORE: B45  
 STREET: 1st Street  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	3	3	Asphalt Concrete Wearing Course	Intact- Delaminated from layer below
3	5.25	2.25	Asphalt Concrete Leveling Course	Partially Deteriorated
5.25	12	6.75	Fill- Sand & Gravel	(GP/Agg Base)
12	32	20	LEAN CLAY- brown- very stiff	CL At 13": Qp=3.0ksf, MC= 28%
32	48	16	LEAN to FAT CLAY- gray- very stiff	CL/CH At 34": Qp=3.75ksf, MC= 27%

Depth to Groundwater From Ground Surface

Upon Completion: None Encountered

NOTES:

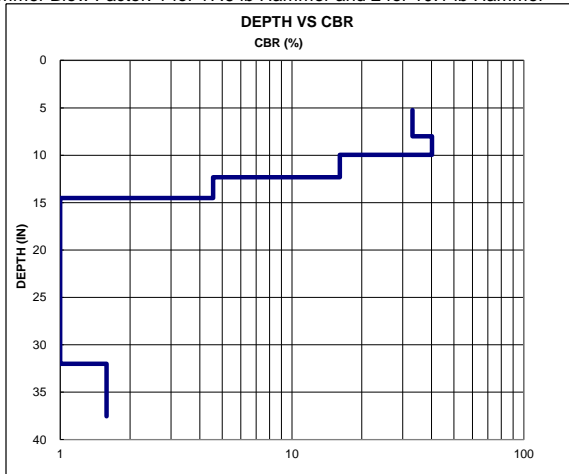
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 5.25 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	290	0		2					
20	360	70	4	2	8.0	33.0	Poor	Agg Base	
17	410	50	3	2	10.0	40.1	Poor	Agg Base	
9	470	60	7	2	12.3	16.0	Good	Subgrade	
4	525	55	14	2	14.5	4.6	Poor	Subgrade	
2	600	75	38	2	17.5	0.6	Very Poor	Subgrade	
3	710	110	37	2	21.8	0.6	Very Poor	Subgrade	
3	830	120	40	2	26.5	0.5	Very Poor	Subgrade	
2	910	80	40	2	29.7	0.5	Very Poor	Subgrade	
2	970	60	30	2	32.0	1.0	Very Poor	Subgrade	
3	1040	70	23	2	34.8	1.6	Very Poor	Subgrade	
3	1110	70	23	2	37.5	1.6	Very Poor	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness

CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E:  
 DATE: 7/9/15  
 BY: RSS/KHB

PROBE/CORE: B46  
 STREET: 2nd Street  
 LANE:  
 STATION:  
 OFFSET:  
 ADDRESS:  
 GROUND EL:

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	1.5	1.5	Asphalt Concrete Wearing Course	Verticle crack through- Chip seal
1.5	3.25	1.75	Asphalt Concrete Leveling Course	Verticle crack through
3.25	12.5	9.25	Fill- Sand & Gravel	(GP/Agg Base)
12.5	48	35.5	LEAN CLAY- brown/gray- hard	CL At 13": Qp=4.5ksf, MC= 22% At 35": Qp=4.0ksf, MC= 23%

Depth to Groundwater From Ground Surface  
 Upon Completion: None Encountered

NOTES:  
 Moved 8' West due to water line

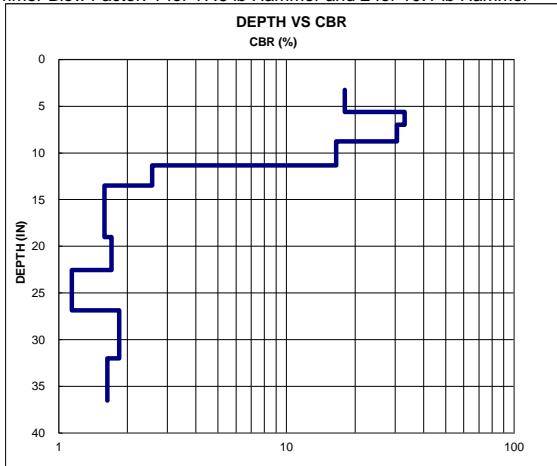
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 3.25 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	240	0		2					
10	300	60	6	2	5.6	18.1	Very Poor	Agg Base	
10	335	35	4	2	7.0	33.0	Poor	Agg Base	
12	380	45	4	2	8.8	30.6	Poor	Agg Base	
10	445	65	7	2	11.3	16.5	Very Poor	Agg Base	
3	500	55	18	2	13.5	2.6	Very Poor	Subgrade	
3	570	70	23	2	16.2	1.6	Very Poor	Subgrade	
3	640	70	23	2	19.0	1.6	Very Poor	Subgrade	
4	730	90	23	2	22.5	1.7	Very Poor	Subgrade	
4	840	110	28	2	26.9	1.1	Very Poor	Subgrade	
6	970	130	22	2	32.0	1.8	Very Poor	Subgrade	
5	1085	115	23	2	36.5	1.6	Very Poor	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness  
 CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/9/15  
 BY: RSS/KHB

PROBE/CORE: B48  
 STREET: Dewey Street  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	2	2	Asphalt Concrete Wearing Course	Intact- Chip seal
2	6	4	Asphalt Concrete Leveling Course	Intact
6	12.5	6.5	Pulverized Asphalt	(GP/Agg Base)
12.5	30	17.5	LEAN CLAY with Sand- Frequent Sand Layers- brown-hard	CL At 14": Qp=4.25ksf, MC= 10%
30	48	18	LEAN CLAY- brown- Very Stiff	CL At 35": Qp=3.75ksf, MC= 14%

Depth to Groundwater From Ground Surface

Upon Completion: None Encountered

NOTES:

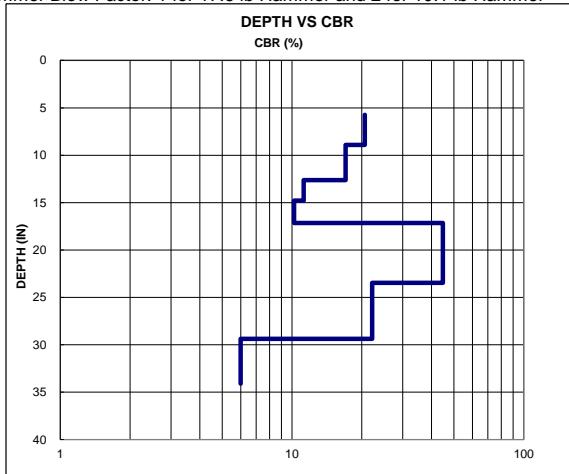
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 5.75 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	300	0		2					
15	380	80	5	2	8.9	20.6	Very Poor	Agg Base	
15	475	95	6	2	12.6	17.0	Good	Subgrade	
6	530	55	9	2	14.8	11.2	Good	Subgrade	
6	590	60	10	2	17.2	10.2	Good	Subgrade	
60	750	160	3	2	23.5	44.8	Good	Subgrade	
30	900	150	5	2	29.4	22.2	Good	Subgrade	
10	1020	120	12	2	34.1	6.0	Marginal	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness

CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/9/15  
 BY: RSS/KHB

PROBE/CORE: B50  
 STREET: Harrison St.  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	1	1	Asphalt Concrete Wearing Course	Intact- Delaminated from layer below
1	2.5	1.5	Asphalt Concrete Leveling Course	Intact
2.5	10	7.5	Fill- Sand and Gravel	(GP/Agg Base)
10	48	38	LEAN CLAY with Sand- brown- hard/very stiff	CL At 11": Qp=4.0ksf, MC= 14% At 35": Qp=3.5ksf, MC= 17%

Depth to Groundwater From Ground Surface  
 Upon Completion: None Encountered

NOTES:  
 Moved 6' South due to water line

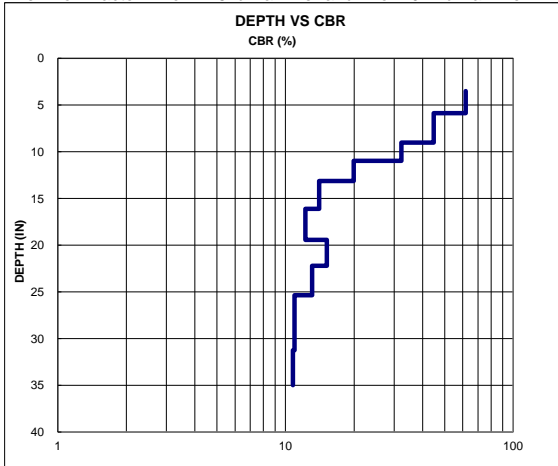
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 3.5 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	220	0		2					
30	280	60	2	2	5.9	61.8	Marginal	Agg Base	
30	360	80	3	2	9.0	44.8	Poor	Agg Base	
14	410	50	4	2	11.0	32.3	Good	Subgrade	
10	465	55	6	2	13.1	19.9	Good	Subgrade	
10	540	75	8	2	16.1	14.1	Good	Subgrade	
10	625	85	9	2	19.4	12.2	Good	Subgrade	
10	695	70	7	2	22.2	15.2	Good	Subgrade	
10	775	80	8	2	25.4	13.1	Good	Subgrade	
8	850	75	9	2	28.3	11.0	Good	Subgrade	
8	925	75	9	2	31.3	11.0	Good	Subgrade	
10	1020	95	10	2	35.0	10.8	Good	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness  
 CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/9/15  
 BY: RSS/KHB

PROBE/CORE: B52  
 STREET: West Genessee Rd.  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	2.25	2.25	Asphalt Concrete Wearing Course	Intact
2.25	4.25	2	Asphalt Concrete Leveling Course	Intact
4.25	7.5	3.25	Asphalt Concrete Leveling Course	Intact- delaminated from layer below
7.5	16.5	9	Portland Cement Concrete	Intact
16.5	25	8.5	Fill- Fine to Medium Silty Sand- brown- moist	SM
25	48	23	LEAN CLAY with Sand- stiff	CL At 26": Qp=1.5ksf, MC= 20%

Depth to Groundwater From Ground Surface  
 Upon Completion: None Encountered

NOTES:  
 Moved 15' East due to gas line

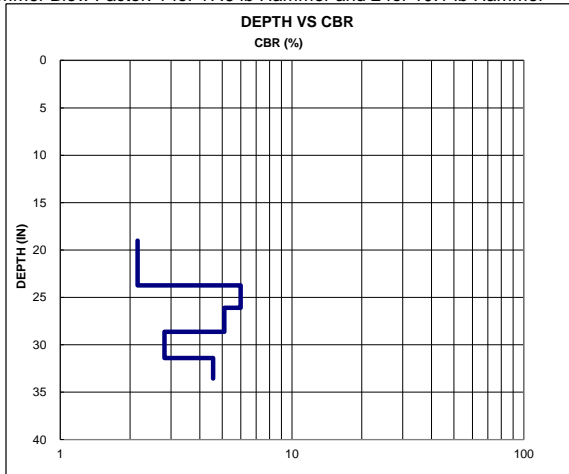
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 19 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	640	0		2					
6	760	120	20	2	23.7	2.2	Very Poor	Agg Base	
5	820	60	12	2	26.1	6.0	Marginal	Subgrade	
5	885	65	13	2	28.6	5.1	Marginal	Subgrade	
4	955	70	18	2	31.4	2.8	Very Poor	Subgrade	
4	1010	55	14	2	33.6	4.6	Poor	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness  
 CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP





## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/9/15  
 BY: RSS/KHB

PROBE/CORE: B54  
 STREET: Millville Rd.  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	2.25	2.25	Asphalt Concrete Wearing Course	Intact
2.25	5.5	3.25	Asphalt Concrete Leveling Course	Intact
5.5	10.5	5	Fill- Sand & Gravel	(GP/Agg Base)
10.5	26	15.5	Fill- Fine to Medium Sand with Silt- moist- brown	SP & SM
26	48	22	LEAN CLAY with Sand- gray/brown	CL At 27": Qp=1.5ksf, MC= 16%

Depth to Groundwater From Ground Surface

Upon Completion: None Encountered

NOTES:

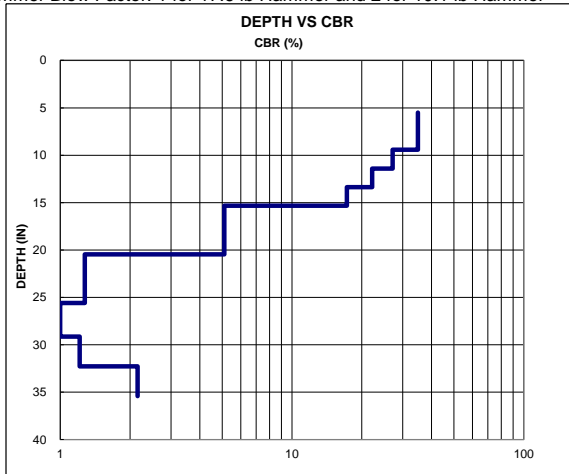
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 5.5 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	300	0		2					
30	400	100	3	2	9.4	34.9	Poor	Agg Base	
12	450	50	4	2	11.4	27.2	Good	Subgrade	
10	500	50	5	2	13.4	22.2	Good	Subgrade	
8	550	50	6	2	15.3	17.3	Good	Subgrade	
10	680	130	13	2	20.5	5.1	Marginal	Subgrade	
5	810	130	26	2	25.6	1.3	Very Poor	Subgrade	
3	900	90	30	2	29.1	1.0	Very Poor	Subgrade	
3	980	80	27	2	32.3	1.2	Very Poor	Subgrade	
4	1060	80	20	2	35.4	2.2	Very Poor	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness

CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
PROJECT NO.: 71837.00  
LOCATION: Lapeer, MI  
CLIENT: Wade-Trim, Inc.  
A/E: \_\_\_\_\_  
DATE: 7/9/15  
BY: RSS/KHB

PROBE/CORE: B55  
STREET: Somerset St.  
LANE: \_\_\_\_\_  
STATION: \_\_\_\_\_  
OFFSET: \_\_\_\_\_  
ADDRESS: \_\_\_\_\_  
GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	3	3	Asphalt Concrete Wearing Course	Intact
3	14	11	Crushed Limestone	(GP/Agg Base)
14	48	34	LEAN CLAY with Sand- brown/gray- hard	CL At 15": Qp=4.5ksf, MC= 11% At 35": Qp=4.0ksf, MC= 14%

Depth to Groundwater From Ground Surface  
Upon Completion: None Encountered

NOTES:

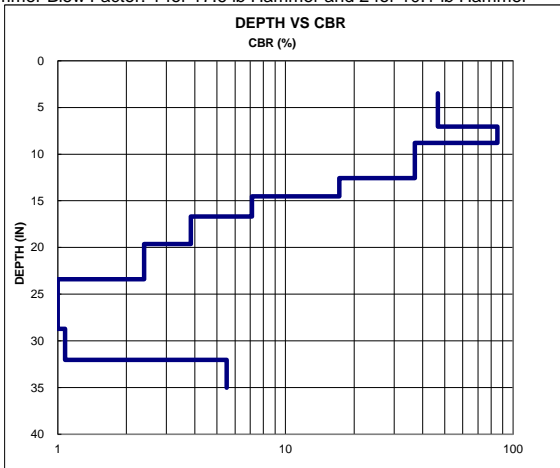
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 3.5 inches

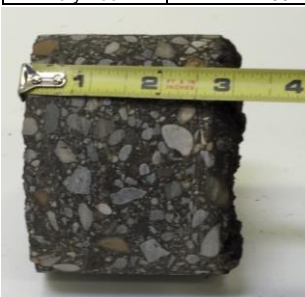
No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	250	0		2					
35	340	90	3	2	7.0	46.6	Poor	Agg Base	
30	385	45	2	2	8.8	85.3	Good	Agg Base	
30	480	95	3	2	12.6	36.9	Poor	Agg Base	
8	530	50	6	2	14.5	17.3	Good	Subgrade	
5	585	55	11	2	16.7	7.1	Marginal	Subgrade	
5	660	75	15	2	19.6	3.8	Poor	Subgrade	
5	755	95	19	2	23.4	2.4	Very Poor	Subgrade	
2	820	65	33	2	25.9	0.8	Very Poor	Subgrade	
2	890	70	35	2	28.7	0.7	Very Poor	Subgrade	
3	975	85	28	2	32.0	1.1	Very Poor	Subgrade	
6	1050	75	13	2	35.0	5.5	Marginal	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness  
CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/1 4- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/9/15  
 BY: RSS/KHB

PROBE/CORE: B57  
 STREET: Demille Blvd.  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	1.5	1.5	Asphalt Concrete Wearing Course	Verticle crack through, Cracked from layer below
1.5	3.5	2	Asphalt Concrete Leveling Course	Cracked from layer above
3.5	11.5	8	Asphalt Concrete Leveling Course	Deteriorated
11.5	19	7.5	Fill- Fine to Medium Sand with silt- moist- brown	SP & SM
19	48	29	LEAN CLAY- brown- Very Stiff	CL At 20": Qp=2.25ksf, MC= 18%

Depth to Groundwater From Ground Surface

Upon Completion: 36.0

NOTES:

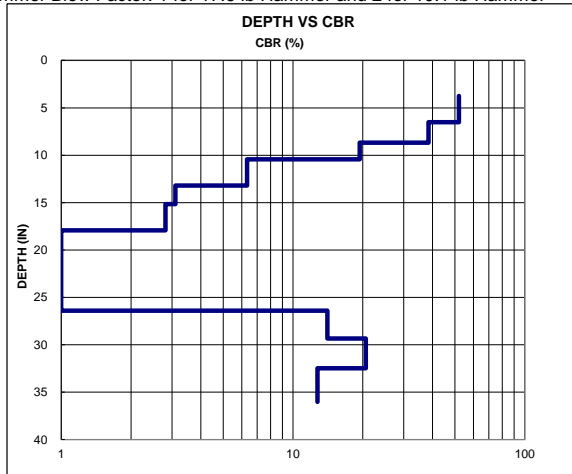
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 3.75 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	240	0		2					
30	310	70	2	2	6.5	52.0	Poor	Agg Base	
18	365	55	3	2	8.7	38.5	Poor	Agg Base	
8	410	45	6	2	10.4	19.4	Very Poor	Agg Base	
6	480	70	12	2	13.2	6.3	Very Poor	Agg Base	
3	530	50	17	2	15.2	3.1	Very Poor	Agg Base	
4	600	70	18	2	17.9	2.8	Very Poor	Agg Base	
3	720	120	40	2	22.6	0.5	Very Poor	Subgrade	
3	815	95	32	2	26.4	0.9	Very Poor	Subgrade	
10	890	75	8	2	29.3	14.1	Good	Subgrade	
15	970	80	5	2	32.5	20.6	Good	Subgrade	
11	1060	90	8	2	36.0	12.8	Good	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness  
 CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
PROJECT NO.: 71837.00  
LOCATION: Lapeer, MI  
CLIENT: Wade-Trim, Inc.  
A/E: \_\_\_\_\_  
DATE: 7/9/15  
BY: RSS/KHB

PROBE/CORE: B58  
STREET: Baldwin Rd.  
LANE: \_\_\_\_\_  
STATION: \_\_\_\_\_  
OFFSET: \_\_\_\_\_  
ADDRESS: \_\_\_\_\_  
GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	3.5	3.5	Asphalt Concrete Wearing Course	Partially deteriorated
3.5	11	7.5	Pulverized Asphalt	(GP/Agg Base)
11	48	37	LEAN CLAY with Sand- brown- hard/very stiff	CL At 12": Qp=4.25ksf, MC= 15% At 40": Qp=3.75ksf, MC= 17%

Depth to Groundwater From Ground Surface  
Upon Completion: None Encountered

NOTES:

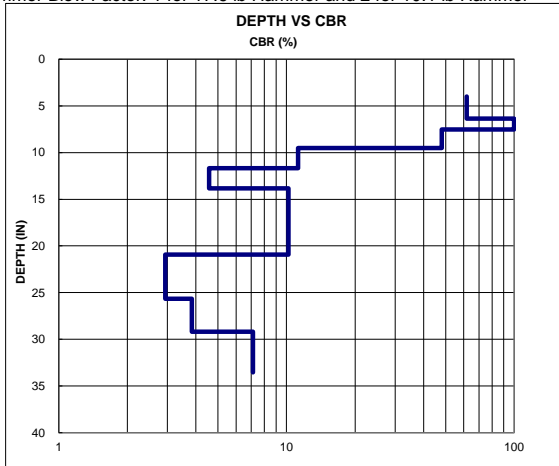
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 4 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	250	0		2					
30	310	60	2	2	6.4	61.8	Marginal	Agg Base	
40	340	30	1	2	7.5	100.0	Good	Agg Base	
20	390	50	3	2	9.5	48.1	Poor	Agg Base	
6	445	55	9	2	11.7	11.2	Good	Subgrade	
4	500	55	14	2	13.8	4.6	Poor	Subgrade	
8	580	80	10	2	17.0	10.2	Good	Subgrade	
10	680	100	10	2	20.9	10.2	Good	Subgrade	
7	800	120	17	2	25.7	2.9	Very Poor	Subgrade	
6	890	90	15	2	29.2	3.8	Poor	Subgrade	
10	1000	110	11	2	33.5	7.1	Marginal	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness  
CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/9/15  
 BY: RSS/KHB

PROBE/CORE: B59  
 STREET: Baldwin rd.  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	2.75	2.75	Asphalt Concrete Wearing Course	Verticle cracking
2.75	12	9.25	Crushed Limestone	(GP/Agg Base)
12	17	5	Fill- Sand & Gravel	SP-SM
17	29	12	Fine Silty Sand- moist- brown	SM
29	48	19	LEAN CLAY with Sand- brown	CL At 30": Qp=3.75ksf, MC= 12%

Depth to Groundwater From Ground Surface

Upon Completion: None Encountered

NOTES:

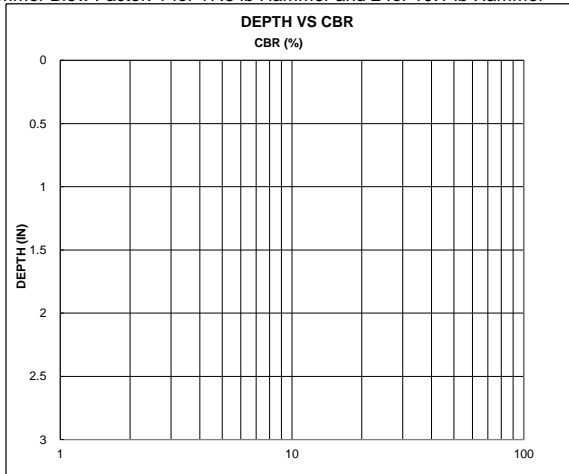
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 2.75 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	240	0		2					
40	310	70	2	2	5.5	71.8	Marginal	Agg Base	
35	370	60	2	2	7.9	73.5	Marginal	Agg Base	
20	420	50	3	2	9.8	48.1	Poor	Agg Base	
25	490	70	3	2	12.6	42.4	Good	Subgrade	
25	550	60	2	2	15.0	50.4	Good	Subgrade	
15	600	50	3	2	16.9	34.9	Good	Subgrade	
40	730	130	3	2	22.0	35.9	Good	Subgrade	
50	790	60	1	2	24.4	100.0	Good	Subgrade	
40	870	80	2	2	27.6	61.8	Good	Subgrade	
30	990	120	4	2	32.3	28.4	Good	Subgrade	
20	1050	60	3	2	34.6	39.3	Good	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness

CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/9/15  
 BY: RSS/KHB

PROBE/CORE: B60  
 STREET: West Genessee Rd.  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	2.25	2.25	Asphalt Concrete Wearing Course	Intact
2.25	4.25	2	Asphalt Concrete Leveling Course	Intact
4.25	16	11.75	Fill- Sand & Gravel	(GP/Agg Base)
16	34	18	Crushed Concrete	
34	48	14	LEAN CLAY with Sand- brown	CL

Depth to Groundwater From Ground Surface  
 Upon Completion: None Encountered

NOTES:  
 DCP Refusal at 500mm (19.75in)

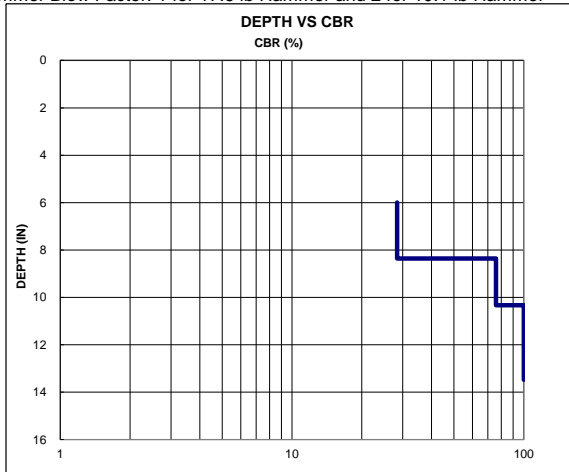
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 6 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	310	0		2					
15	370	60	4	2	8.4	28.4	Very Poor	Agg Base	
30	420	50	2	2	10.3	75.8	Marginal	Agg Base	
40	460	40	1	2	11.9	100.0	Good	Agg Base	
40	500	40	1	2	13.5	100.0	Good	Agg Base	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness  
 CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/9/15  
 BY: RSS/KHB

PROBE/CORE: B61  
 STREET: Mansfield  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	1.75	1.75	Asphalt Concrete Wearing Course	Intact- Chip seal
1.75	3	1.25	Asphalt Concrete Leveling Course	Partially deteriorated
3	15.5	12.5	Fill- Sand & Gravel	(GP/Agg Base)
15.5	48	32.5	LEAN CLAY with Sand- brown- hard/stiff	CL At 17": Qp=3.75ksf, MC= 12%

Depth to Groundwater From Ground Surface

Upon Completion: None Encountered

NOTES:

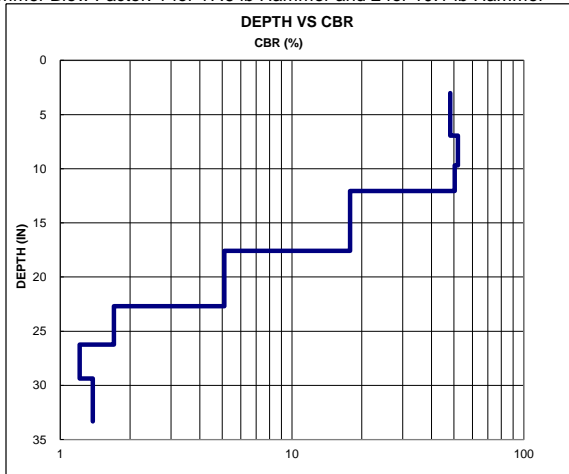
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 3 inches

No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	240	0		2					
40	340	100	3	2	6.9	48.1	Poor	Agg Base	
30	410	70	2	2	9.7	52.0	Poor	Agg Base	
25	470	60	2	2	12.1	50.4	Poor	Agg Base	
23	610	140	6	2	17.6	17.8	Good	Subgrade	
10	740	130	13	2	22.7	5.1	Marginal	Subgrade	
4	830	90	23	2	26.2	1.7	Very Poor	Subgrade	
3	910	80	27	2	29.4	1.2	Very Poor	Subgrade	
4	1010	100	25	2	33.3	1.4	Very Poor	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness

CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## PAVEMENT CORE LOG AND USACE DCP DATA

PROJECT NAME: City of Lapeer Pavement Assessment  
 PROJECT NO.: 71837.00  
 LOCATION: Lapeer, MI  
 CLIENT: Wade-Trim, Inc.  
 A/E: \_\_\_\_\_  
 DATE: 7/9/15  
 BY: RSS/KHB

PROBE/CORE: B62  
 STREET: Whiper Ridge Dr.  
 LANE: \_\_\_\_\_  
 STATION: \_\_\_\_\_  
 OFFSET: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 GROUND EL: \_\_\_\_\_

### PAVEMENT AND SUBSURFACE CONDITIONS

Layer, in.		Layer Thickness, in.	Description	Comment
From	To			
0	2	2	Asphalt Concrete Wearing Course	Intact- chip seal
2	3.5	1.5	Asphalt Concrete Leveling Course	Intact
3.5	19	15.5	Crushed Limestone	(GP/Agg Base)
19	27	8	Fill- Fine to Coarse Silty Sand- moist- brown	SM
27	48	21	LEAN CLAY with Sand- brown- hard	CL At 28": Qp=4.5ksf, MC= 9%

Depth to Groundwater From Ground Surface

Upon Completion: None Encountered

NOTES:

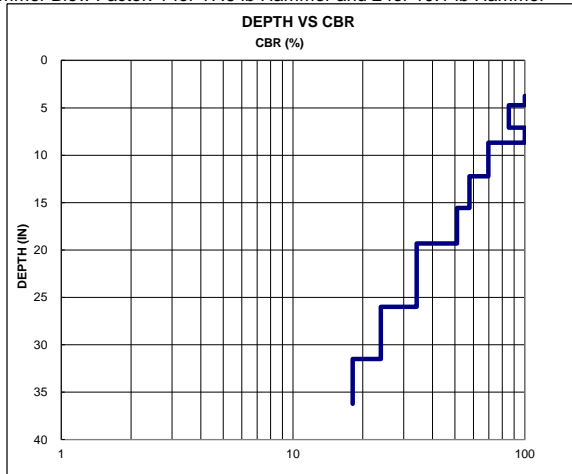
### DCP TEST RESULTS

Depth to start of test from ex. ground surface: 3.75 inches

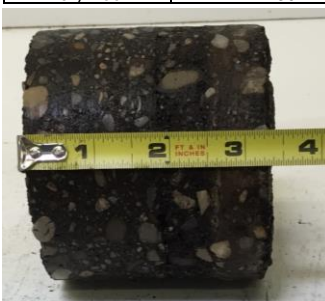
No. of Blows	Pen. (mm)	Blow Set (mm)	Pen./Blow (mm)	Blow Factor	Depth from Surface (inches)	CBR (%)	Comment	Soil Type	Average CBR (%)
0	285	0		2					
30	310	25	1	2	4.7	100.0	Good	Agg Base	
40	370	60	2	2	7.1	85.3	Good	Agg Base	
40	410	40	1	2	8.7	100.0	Good	Agg Base	
50	500	90	2	2	12.2	69.6	Marginal	Agg Base	
40	585	85	2	2	15.6	57.8	Poor	Agg Base	
40	680	95	2	2	19.3	51.0	Good	Subgrade	
50	850	170	3	2	26.0	34.1	Good	Subgrade	
30	990	140	5	2	31.5	23.9	Good	Subgrade	
20	1110	120	6	2	36.2	18.1	Good	Subgrade	

Hammer Blow Factor: 1 for 17.6 lb Hammer and 2 for 10.1 lb Hammer

\*CBR breaklines are based on blow counts performed prior to sampling. Depths are approximate.



Support Conditions	CBR Range for Aggregate Base Materials (%)	CBR Range for Subgrade Soils (%)
Good	>80	>10
Marginal	60 to 80	5 to 10
Poor	30 to 60	3 to 5
Very Poor	<30	<3



\*\*Core picture shows approximate thickness

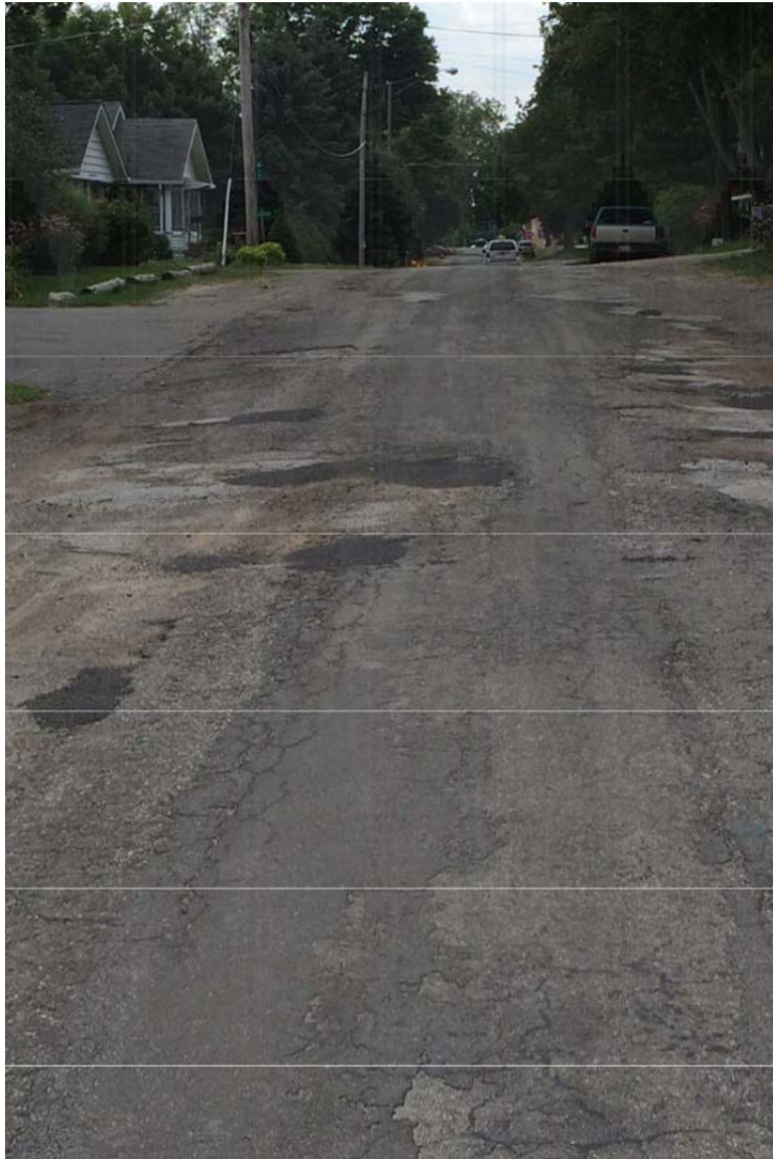
CORE LOG DCP 1 meter rod (standard).XLS ver. 2/7/14- Clay DCP



## Appendix 8

### Representative Photos of PASER Ratings

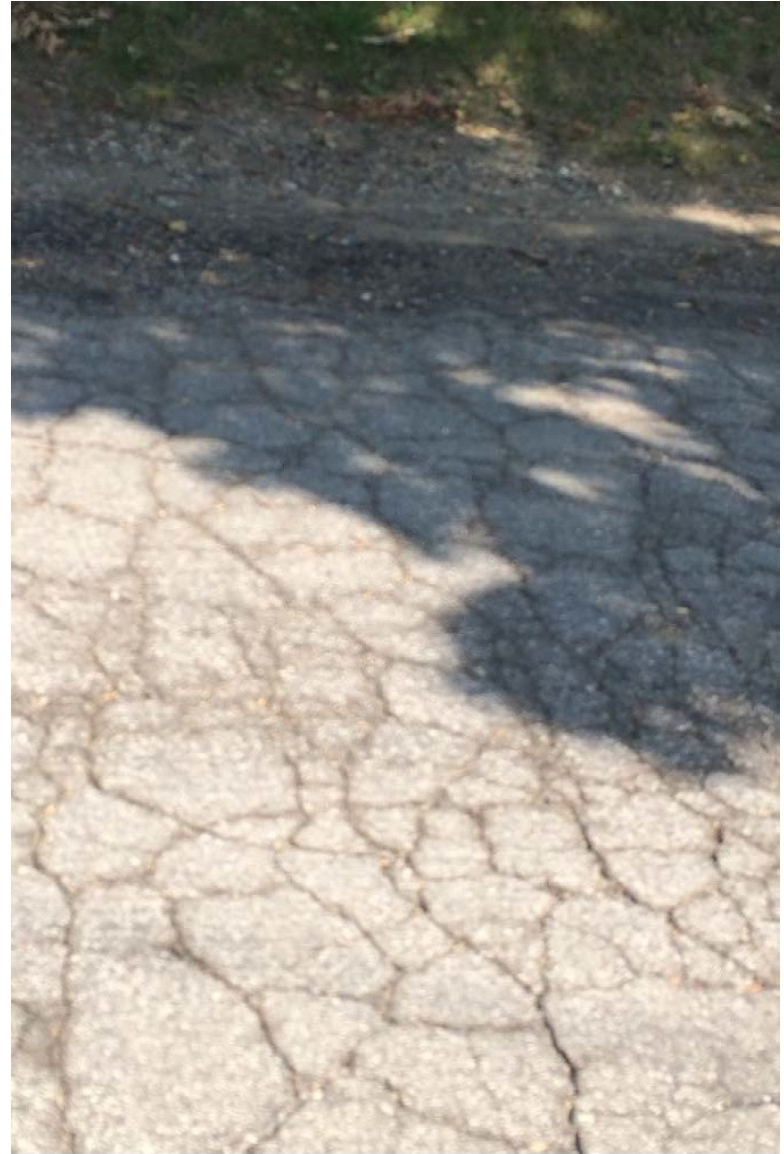




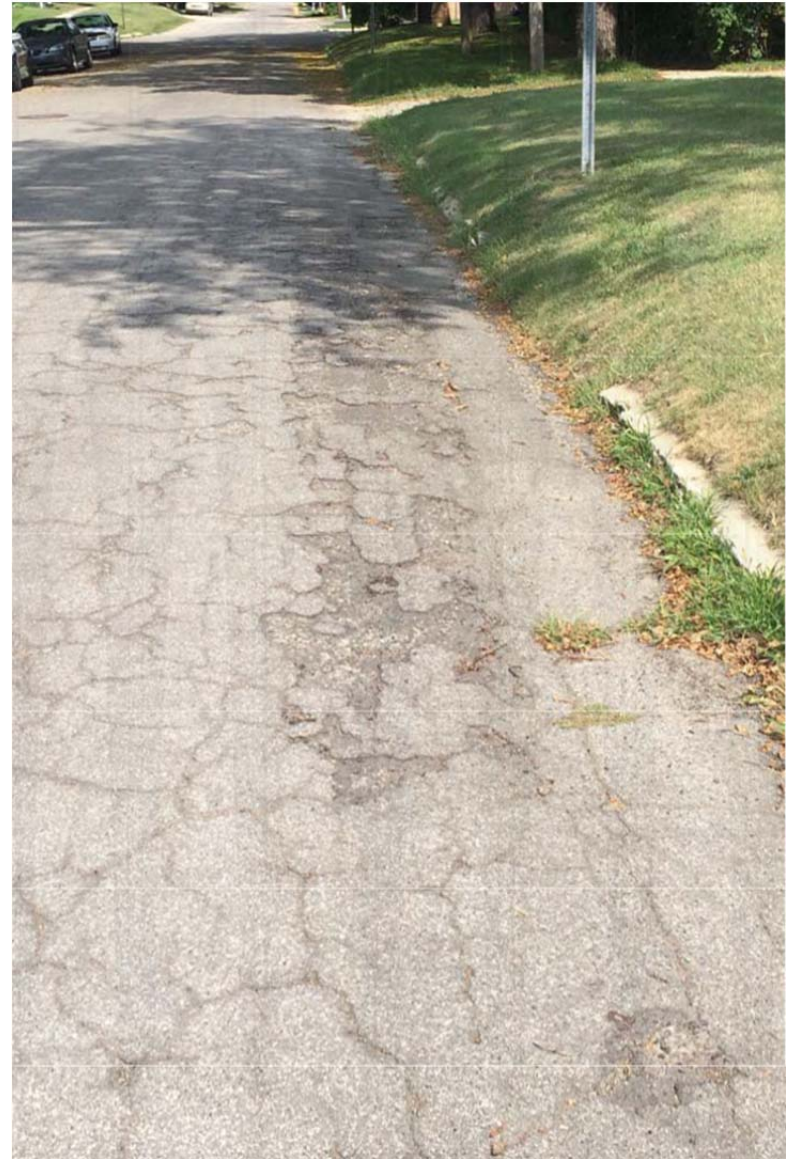
**Cedar Street From North Street to Oregon**  
**Rating: 1**



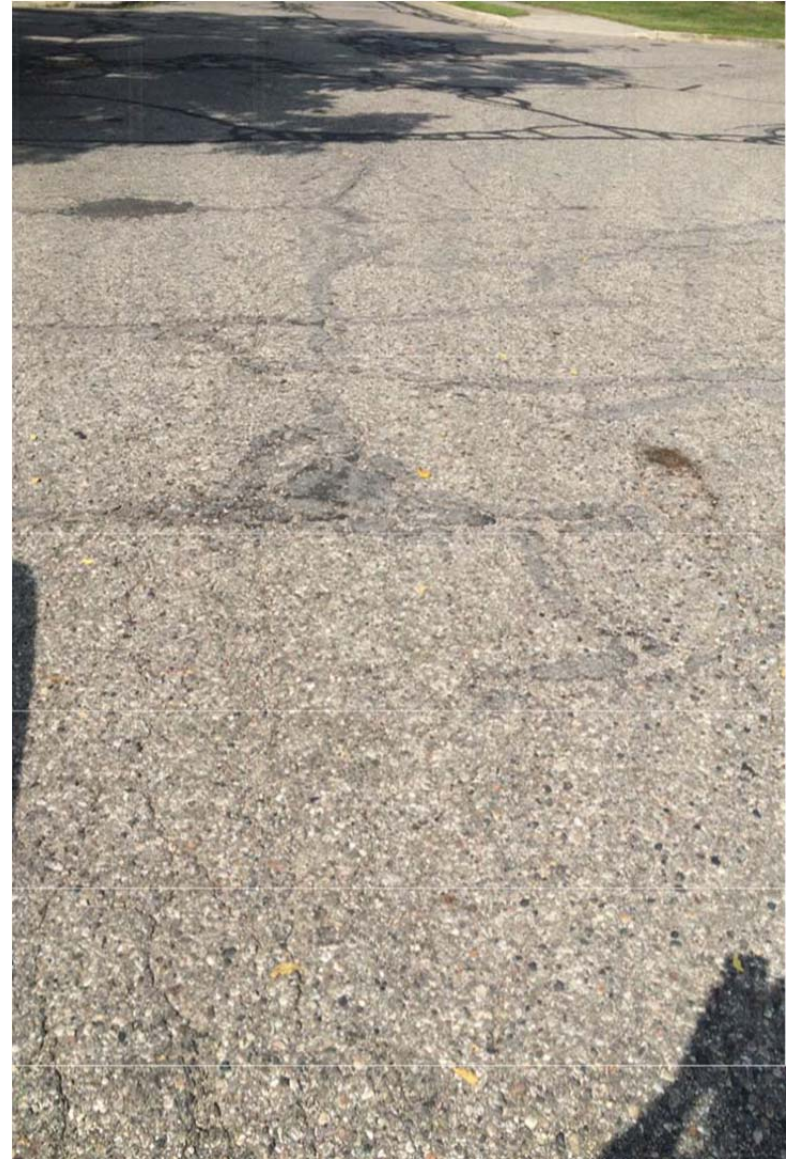
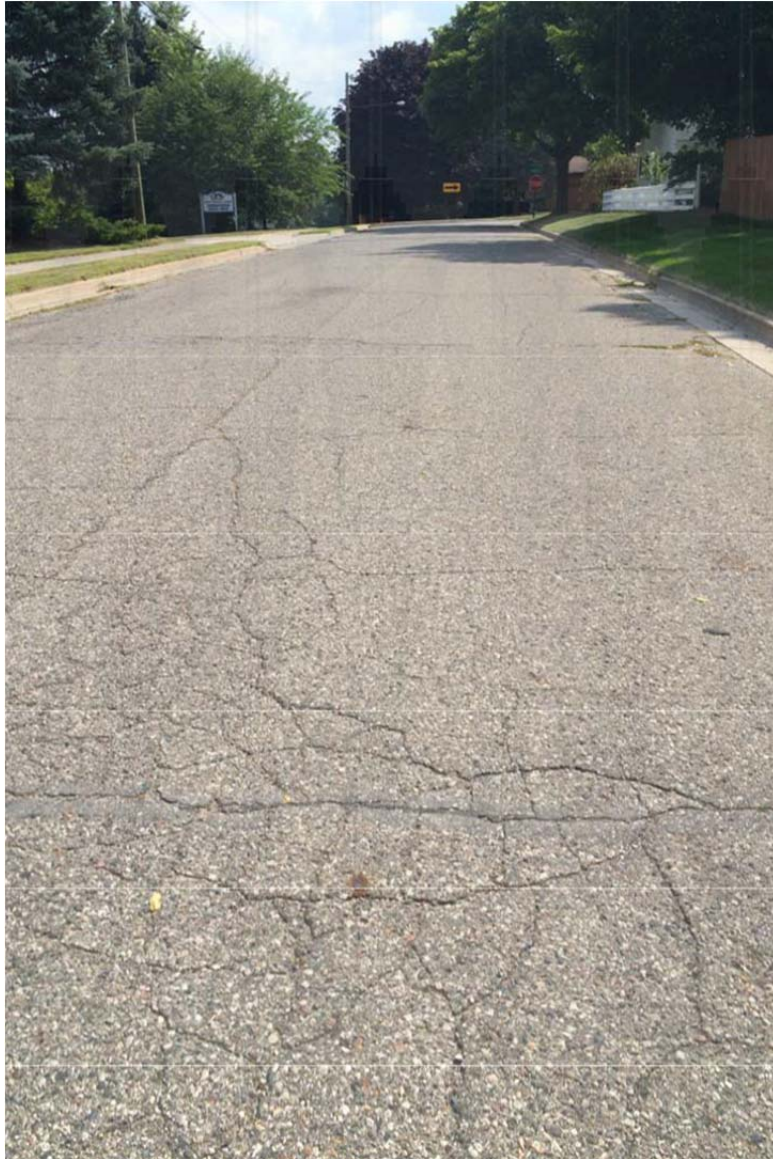
**Saint Clair Street From Jefferson Street to N Main Street  
Rating: 2**



**1st Street From Monroe Street to Cedar Street**  
**Rating: 3**



**Cedar Street from Park Street to Law Street**  
**Rating: 4**



2nd Street From N Madison Street to N Monroe Street  
Rating: 5



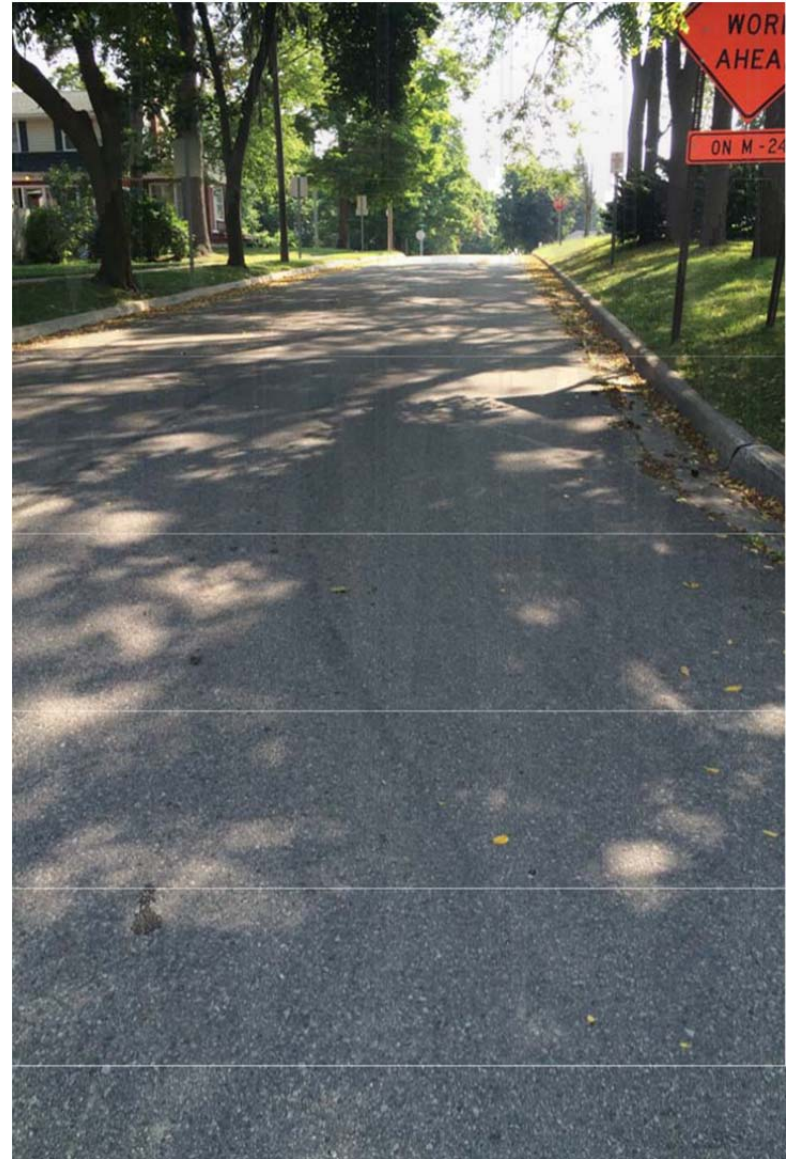
**Huron Street From N Main Street to N Washington Street**  
**Rating: 6**



S Court Street From Nepessing Street to Park Street  
Rating: 7



Clay Street From Mason Street to Fox Street  
Rating: 8



Liberty Street from Jefferson Street to NMain Street  
Rating: 9

## Rating system

Surface rating	Visible distress*	General condition/ treatment measures
<b>10</b> Excellent	None.	New construction.
<b>9</b> Excellent	None.	Recent overlay. Like new.
<b>8</b> Very Good	No longitudinal cracks except reflection of paving joints. Occasional transverse cracks, widely spaced (40' or greater). All cracks sealed or tight (open less than 1/4").	Recent sealcoat or new cold mix. Little or no maintenance required.
<b>7</b> Good	Very slight or no raveling, surface shows some traffic wear. Longitudinal cracks (open 1/4") due to reflection or paving joints. Transverse cracks (open 1/4") spaced 10' or more apart, little or slight crack raveling. No patching or very few patches in excellent condition.	First signs of aging. Maintain with routine crack filling.
<b>6</b> Good	Slight raveling (loss of fines) and traffic wear. Longitudinal cracks (open 1/4"–1/2"), some spaced less than 10'. First sign of block cracking. Slight to moderate flushing or polishing. Occasional patching in good condition.	Shows signs of aging. Sound structural condition. Could extend life with sealcoat.
<b>5</b> Fair	Moderate to severe raveling (loss of fine and coarse aggregate). Longitudinal and transverse cracks (open 1/2") show first signs of slight raveling and secondary cracks. First signs of longitudinal cracks near pavement edge. Block cracking up to 50% of surface. Extensive to severe flushing or polishing. Some patching or edge wedging in good condition.	Surface aging. Sound structural condition. Needs sealcoat or thin non-structural overlay (less than 2")
<b>4</b> Fair	Severe surface raveling. Multiple longitudinal and transverse cracking with slight raveling. Longitudinal cracking in wheel path. Block cracking (over 50% of surface). Patching in fair condition. Slight rutting or distortions (1/2" deep or less).	Significant aging and first signs of need for strengthening. Would benefit from a structural overlay (2" or more).
<b>3</b> Poor	Closely spaced longitudinal and transverse cracks often showing raveling and crack erosion. Severe block cracking. Some alligator cracking (less than 25% of surface). Patches in fair to poor condition. Moderate rutting or distortion (1" or 2" deep). Occasional potholes.	Needs patching and repair prior to major overlay. Milling and removal of deterioration extends the life of overlay.
<b>2</b> Very Poor	Alligator cracking (over 25% of surface). Severe distortions (over 2" deep) Extensive patching in poor condition. Potholes.	Severe deterioration. Needs reconstruction with extensive base repair. Pulverization of old pavement is effective.
<b>1</b> Failed	Severe distress with extensive loss of surface integrity.	Failed. Needs total reconstruction.

\* Individual pavements will not have all of the types of distress listed for any particular rating. They may have only one or two types.

## Rating pavement surface condition

### **RATING 10 & 9**

#### **EXCELLENT — No maintenance required**

Newly constructed or recently overlaid roads are in excellent condition and require no maintenance.



**RATING 10**  
New construction.



**RATING 9**  
Recent overlay,  
rural.



**RATING 9**  
Recent overlay,  
urban.



## RATING 8

### VERY GOOD —

#### Little or no maintenance required

This category includes roads which have been recently sealcoated or overlaid with new cold mix. It also includes recently constructed or overlaid roads which may show longitudinal or transverse cracks. All cracks are tight or sealed.



Recent  
chip seal.



Recent  
slurry seal.

▼ Widely spaced,  
sealed cracks.



▲ New cold mix surface.



## RATING 7

### GOOD —

#### Routine sealing recommended

Roads show first signs of aging, and they may have very slight raveling. Any longitudinal cracks are along paving joint. Transverse cracks may be approximately 10' or more apart. All cracks are 1/4" or less, with little or no crack erosion. Few if any patches, all in very good condition. Maintain a crack sealing program.

►  
**Tight and sealed  
transverse and  
longitudinal cracks.  
Maintain crack  
sealing program.**



►  
**Tight and sealed  
transverse and  
longitudinal cracks.**



►  
**Transverse cracks  
about 10' or more  
apart. Maintain crack  
sealing program.**



## RATING 6

### GOOD —

#### Consider preservative treatment

Roads are in sound structural condition but show definite signs of aging. Seal-coating could extend their useful life. There may be slight surface raveling. Transverse cracks can be frequent, less than 10' apart. Cracks may be 1/4–1/2" and sealed or open. Pavement is generally sound adjacent to cracks. First signs of block cracking may be evident. May have slight or moderate bleeding or polishing. Patches are in good condition.

◀  
**Slight surface raveling  
with tight cracks, less  
than 10' apart.**

◀  
**Transverse cracking  
less than 10' apart;  
cracks well-sealed.**



▼ **Large blocks, early signs of  
raveling and block cracking.**



▼ **Open crack, 1/2"  
wide; adjoining  
pavement sound.**



▼ **Moderate flushing.**



## RATING 5

**FAIR —**

**Preservative maintenance treatment required**

Roads are still in good structural condition but clearly need sealcoating or overlay. They may have moderate to severe surface raveling with significant loss of aggregate. First signs of longitudinal cracks near the edge. First signs of raveling along cracks. Block cracking up to 50% of surface. Extensive to severe flushing or polishing. Any patches or edge wedges are in good condition.

▼ Block cracking with open cracks.



► Moderate to severe raveling in wheel paths.



▼ Severe flushing.



▲ Wedges and patches extensive but in good condition.

Severe raveling with  
▼ extreme loss of aggregate.



Load cracking and slight  
▼ rutting in wheel path.



## RATING 4

**FAIR —**

### **Structural improvement required**

Roads show first signs of needing strengthening by overlay. They have very severe surface raveling which should no longer be sealed. First longitudinal cracking in wheel path. Many transverse cracks and some may be raveling slightly. Over 50% of the surface may have block cracking. Patches are in fair condition. They may have rutting less than 1/2" deep or slight distortion.

◀ **Longitudinal cracking;  
early load-related  
distress in wheel path.  
Strengthening needed.**



▼ **Slight rutting; patch  
in good condition.**



▼ **Extensive block cracking.  
Blocks tight and sound.**  
◀ **Slight rutting in  
wheel path.**

### RATING 3

#### POOR—

#### Structural improvement required

Roads must be strengthened with a structural overlay (2" or more). Will benefit from milling and very likely will require pavement patching and repair beforehand. Cracking will likely be extensive. Raveling and erosion in cracks may be common. Surface may have severe block cracking and show first signs of alligator cracking. Patches are in fair to poor condition. There is moderate distortion or rutting (1-2") and occasional potholes.

►  
**Many wide and  
raveled cracks  
indicate need for  
milling and overlay.**



►  
**2" ruts  
need mill  
and overlay.**



►  
**Open and  
raveled  
block cracks.**



### RATING 3

**POOR** — (continued)

**Structural improvement required**

◀ Alligator cracking.  
Edge needs repair  
and drainage needs  
improvement prior  
to rehabilitation.

▼ Distortion with patches  
in poor condition. Repair  
and overlay.



## RATING 2

### **VERY POOR— Reconstruction required**

Roads are severely deteriorated and need reconstruction. Surface pulverization and additional base may be cost-effective. These roads have more than 25% alligator cracking, severe distortion or rutting, as well as potholes or extensive patches in poor condition.

►  
**Extensive alligator cracking. Pulverize and rebuild.**



▲ **Severe rutting.  
Strengthen base and reconstruct.**

▲ **Patches in poor condition, wheelpath rutting. Pulverize, strengthen and reconstruct.**



►  
**Severe frost damage.  
Reconstruct.**

**RATING 1**

**FAILED —**

**Reconstruction required**

Roads have failed, showing severe distress and extensive loss of surface integrity.



**Potholes from frost damage. Reconstruct.**



**Potholes and severe alligator cracking. Failed pavement. Reconstruct.**



**Extensive loss of surface. Rebuild.**



## Appendix 9

### Photo of Alleys



Alley Photos (8 pages)



**N Saginaw St – Pine St (NW of Law St)**  
**Rating: 1**



**Pine St – N. Court St (NW of Law St)**  
**Rating: 1**



**N Court St – Cedar St (NW of Law St)**  
**Rating: 2**



**Cedar St – Fox St (NW of Law St)**  
**Rating: 2**



**Pine St – N Court St (SE of North St)**  
**Rating: 1**



**Pine St-N Court St (between Law & Park)**  
**Rating: 2**



**N Court St – Cedar St (between Law & Park)**  
**Rating: 2**



**Cedar St – Fox St (between Law & Park)**  
**Rating: 1**



**SE of Fox St (between Law & Park)**  
**Rating: 2**



**W Oregon St – Fair St (between N Saginaw & Pine)**  
**Rating: 1**



**Fair St – Union St (between Pine & N Saginaw)**  
**Rating: 1**



**SE of N Saginaw (between Law & Park)**  
**Rating: 1**




**Mason St-Higgins St (between Clay & Genesee)**  
**Rating: 1**



**Mason St-Fox St (between Clay & Genesee)**  
**(130' gravel)**  
**Rating: 3**

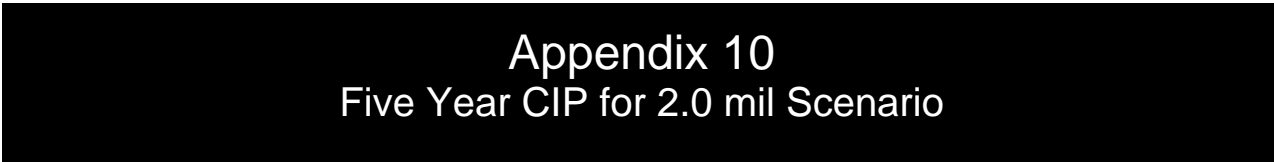


**NE of Summit St (between S Main & Oak)**  
**Rating: 3**



## Appendix 10

### Five Year CIP for 2.0 mil Scenario



## 2.0 mil Scenario Recommended Improvements

Year 1	Lane Miles	Paser rating	Improves to
Crack filling	28.19	7 & 8	8
Microseal	5.98	6	8
Mill & overlay	0.00	5	9
Crush & reshape	0.00	3 & 4	10
Reconstruction	0.00	1 & 2	10

Year 2	Lane Miles	Paser rating	Improves to
Crack filling	12.88	7 & 8	8
Microseal	7.46	6	8
Mill & overlay	0.00	5	9
Crush & reshape	0.00	3 & 4	10
Reconstruction	0.00	1 & 2	10

Year 3	Lane Miles	Paser rating	Improves to
Crack filling	26.17	7 & 8	8
Microseal	0.73	6	8
Mill & overlay	0.00	5	9
Crush & reshape	1.21	3 & 4	10
Reconstruction	0.00	1 & 2	10

Year 4	Lane Miles	Paser rating	Improves to
Crack filling	0.00	7 & 8	8
Microseal	0.00	6	8
Mill & overlay	0.00	5	9
Crush & reshape	2.10	3 & 4	10
Reconstruction	0.00	1 & 2	10

Year 5	Lane Miles	Paser rating	Improves to
Crack filling	0.00	7 & 8	8
Microseal	0.00	6	8
Mill & overlay	0.00	5	9
Crush & reshape	2.02	3 & 4	10
Reconstruction	0.00	1 & 2	10

**Year 1 Crack filling**

<u>Segment</u>	<u>Number</u>	<u>Road Miles</u>	<u>Segment</u>	<u>Number</u>	<u>Road Miles</u>
N Washington St	755106	0.06	Adams St	760801	0.06
N Washington St	755106	0.06	N Madison St	760803	0.06
N Washington St	755106	0.06	N Madison St	760803	0.06
N Jackson St	760710	0.06	N Madison St	760803	0.06
N Jackson St	760710	0.05	N Madison St	760803	0.05
Adams St	760801	0.02	W Nepessing St	760809	0.04
Adams St	760801	0.06	W Nepessing St	760809	0.12
McCormick Dr	761009	0.04	W Nepessing St	760809	0.00
McCormick Dr	761009	0.01	W Nepessing St	760809	0.05
Imlay City Rd	3251545	0.10	W Nepessing St	760809	0.00
Imlay City Rd	3251545	0.00	W Nepessing St	760809	0.06
Imlay City Rd	3251545	0.05	E Fair St	760907	0.12
Clay St	3440040	0.06	Horton St	761004	0.11
S Court St	3440100	0.06	Horton St	761004	0.06
S Court St	3440100	0.04	Howard St	761006	0.16
Whisper Rdg	3440539	0.02	McCormick Dr	761009	0.35
Whisper Rdg	3440539	0.01	Peppermill Rd	761210	0.08
Whisper Rdg	3440539	0.06	Peppermill Rd	761210	0.01
Whisper Rdg	3440539	0.04	W Oregon St	761301	0.05
Whisper Rdg	3440539	0.02	W Oregon St	761301	0.05
Whisper Rdg	3440539	0.02	W Oregon St	761301	0.05
Whisper Rdg	3440539	0.04	W Oregon St	761301	0.05
John Conley Dr	3440887	0.26	W Oregon St	761301	0.05
Somerset St	3441223	0.04	W Oregon St	761301	0.01
Somerset St	3441223	0.04	W Oregon St	761301	0.01
N Saginaw St	754210	0.05	W Oregon St	761301	0.07
N Saginaw St	754210	0.01	W Oregon St	761301	0.01
N Saginaw St	754210	0.03	W Oregon St	761301	0.05
N Saginaw St	754210	0.08	Clay St	3440040	0.06
N Saginaw St	754210	0.06	Demill Blvd	3440043	0.07
N Saginaw St	754210	0.01	Demill Blvd	3440043	0.09
N Saginaw St	754210	0.06	Pleasant St	3440050	0.04
N Saginaw St	754210	0.00	John Conley Dr S	3441142	0.18
N Saginaw St	754210	0.04	Luxington Dr	3441595	0.17
N Saginaw St	754210	0.00	Lincoln St	755103	0.24
N Saginaw St	754210	0.05	E Fair St	760907	0.11
N Saginaw St	754210	0.00	Lake Dr	3440049	0.08
Baldwin Rd	754403	0.05	Wildflower Ln	3441160	0.12
Turrill Ave	754407	0.22	Wildflower Ln	3441160	0.04
Church St	754501	0.06	Trevors Pl	3441161	0.03
Liberty St	754502	0.10	Hailees Pl	3441162	0.03
Liberty St	754502	0.10	Kyles Pl	3441163	0.04
N Washington St	755106	0.06	Lancaster St	3441213	0.15
N Washington St	755106	0.06	Lancaster St	3441213	0.13
N Washington St	755106	0.05	Lancaster St	3441213	0.06
N Monroe St	755107	0.06	Lancaster St	3441213	0.06
S Jackson St	755115	0.06	Lancaster St	3441213	0.03
Mason St	755201	0.03	Rutherford St	3441215	0.07
Mason St	755201	0.06	Rutherford St	3441215	0.03
N Saginaw St	755205	0.05	Rutherford St	3441215	0.06

**Year 1 Crack filling**

<u>Segment</u>	<u>Number</u>	<u>Road Miles</u>	<u>Segment</u>	<u>Number</u>	<u>Road Miles</u>
Treymore St	3441216	0.10	East St	754404	0.24
Berkshire St	3441217	0.12	Turrill Ave	754407	0.07
Bedford St	3441218	0.08	Turrill Ave	754407	0.05
Bedford St	3441218	0.03	Turrill Ave	754407	0.05
Cedar St	3441219	0.06	Turrill Ave	754407	0.05
Cedar St	3441219	0.03	Turrill Ave	754407	0.06
Wildflower Ln	3441220	0.04	Turrill Ave	754407	0.11
Somerset St	3441223	0.08	State St	754504	0.05
Fox St	755202	0.09	Saint Clair St	754506	0.05
Mason St	755201	0.03	Saint Clair St	754506	0.05
Lincoln St	755103	0.11	Saint Clair St	754506	0.05
Turrill Ave	754407	0.07	Saint Clair St	754506	0.05
Liberty St	754502	0.05	Lincoln St	755103	0.05
Charbridge	755102	0.07	N Washington St	755106	0.06
Adams St	760801	0.05	N Monroe St	755107	0.07
Pine St	760806	0.11	Higley St	755110	0.07
Pine St	760806	0.11	S Elm St	760703	0.22
McCormick Dr	761009	0.12	S Madison St	760705	0.06
Oriole St	761101	0.06	N Madison St	760803	0.02
Oriole St	761101	0.06	N Madison St	760803	0.06
Eagle Pass	761107	0.06	N Madison St	760803	0.06
West St	761209	0.23	N Madison St	760803	0.06
Imlay City Rd	3251545	0.00	N Madison St	760803	0.06
Imlay City Rd	3251545	0.15	N Madison St	760803	0.06
Imlay City Rd	3251545	0.00	Pine St	760806	0.06
Imlay City Rd	3251545	0.03	Pine St	760806	0.06
Imlay City Rd	3251545	0.02	W Nepessing St	760809	0.00
Imlay City Rd	3251545	0.69	W Nepessing St	760809	0.03
Clay St	3440040	0.06	W Nepessing St	760809	0.00
Demill Blvd	3440043	0.09	N Jackson St	760902	0.04
Demill Blvd	3440043	0.07	Cedar St	760905	0.06
Demill Blvd	3440043	0.31	Cedar St	760905	0.06
Oak St	3440045	0.06	Nightingale Ave	761105	0.06
N Elm St	3440047	0.07	Dove Ln	761106	0.04
S Court St	3440100	0.06	W Oregon St	761301	0.05
S Court St	3440100	0.06	W Oregon St	761301	0.01
Whisper Rdg	3440539	0.05	W Oregon St	761301	0.04
Old Farm Ln	3440631	0.04	North St	3440057	0.03
Old Farm Ln	3440631	0.02	Summit St	3440044	0.10
Old Farm Ln	3440631	0.03	Courtneys Pl	3441159	0.12
Old Farm Ln	3440631	0.02	Courtneys Pl	3441164	0.04
Mill Crk	3440632	0.09	Rutherford St	3441215	0.06
Peppermill Cir	3440635	0.04	Rutherford St	3441215	0.06
Peppermill Cir	3440635	0.15	Rutherford St	3441215	0.02
John Conley Dr	3440887	0.13	National City Dr	3441668	0.10
N Saginaw St	754210	0.18	Whisper Rdg	3440539	0.03
N Saginaw St	754210	0.07	Fox St	755202	0.02
N Saginaw St	754210	0.06	Mason St	755201	0.02
N Saginaw St	754210	0.06	Imlay City Rd	3251545	0.20
N Saginaw St	754210	0.00	Turnbull St	3440634	0.02

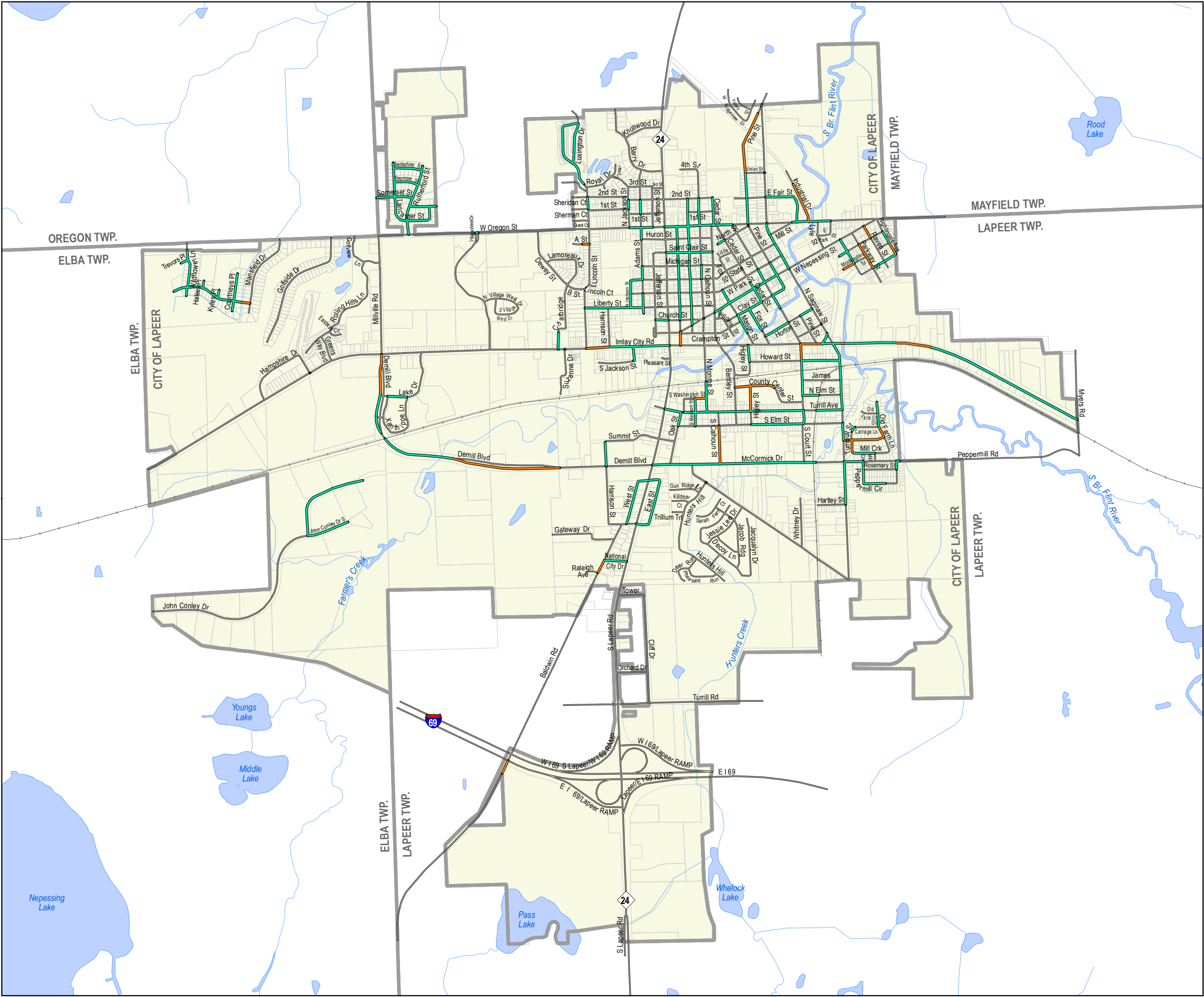
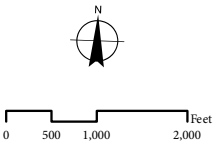
**Year 1 Crack filling**

<u>Segment</u>	<u>Number</u>	<u>Road Miles</u>
<b><u>Micro Seal</u></b>		
N Washington St	755106	0.05
N Washington St	755106	0.01
S Calhoun St	760706	0.16
S Washington St	760709	0.05
Pine St	760806	0.00
Pine St	760806	0.00
Pine St	760806	0.26
County Center St	761008	0.07
County Center St	761008	0.10
Mockingbird Trl	761020	0.05
Parkway St	761102	0.06
Parkway St	761102	0.06
Raven St	761104	0.06
Nightingale Ave	761105	0.06
Industrial Dr	761207	0.17
A St	761213	0.03
Baldwin Rd	761305	0.06
Imlay City Rd	3251545	0.10
Imlay City Rd	3251545	0.07
Imlay City Rd	3251545	0.02
Imlay City Rd	3251545	0.15
Demill Blvd	3440043	0.04
Demill Blvd	3440043	0.13
Demill Blvd	3440043	0.00
Demill Blvd	3440043	0.00
Demill Blvd	3440043	0.45
Higley St	3440046	0.00
Higley St	3440046	0.11
S Court St	3440100	0.04
S Court St	3440100	0.07
Whisper Rdg	3440539	0.04
Brimingale Ave	3440630	0.04
Brimingale Ave	3440630	0.14
Old Farm Ln	3440631	0.04
Old Farm Ln	3440631	0.01
Turnbull St	3440634	0.06
Peppermill Cir	3440635	0.04

Year 1 CIP Improvements

- Crack Filling
- Micro Seal
- Mill & Overlay
- Crush & Reshape
- Reconstruction

Source: Wade Trim, August 2015  
August 2015



Year 2 **Crack filling**

<u>Segment</u>	<u>Number</u>	<u>Road Miles</u>
Liberty St	754502	0.05
Liberty St	754502	0.05
Adams St	760801	0.11
Peppermill Rd	761210	0.09
Demill Blvd	3440043	0.03
S Court St	3440100	0.07
Harrison St	3440854	0.30
John Conley Dr	3440887	0.88
N Saginaw St	754210	0.11
N Saginaw St	754210	0.00
N Saginaw St	754210	0.10
N Saginaw St	754210	0.00
N Saginaw St	754210	0.14
W Park St	754503	0.05
Lincoln St	755103	0.02
Mason St	755201	0.06
Adams St	760801	0.06
W Nepessing St	760809	0.06
Mill St	761003	0.11
Horton St	761004	0.06
Peppermill Rd	761210	0.05
W Oregon St	761301	0.07
W Oregon St	761301	0.08
Clay St	3440040	0.05
Luxington Dr	3441595	0.03
Lincoln St	755103	0.02
Lincoln St	755103	0.00
Lake Dr	3440049	0.02
Lake Dr	3440049	0.22
Golfside Dr	3441158	0.56
S Court St	3440100	0.06
S Court St	3440100	0.02
Imlay City Rd	3251545	0.02
S Court St	3440100	0.02
McCormick Dr	761009	0.02
N Washington St	755106	0.05
N Washington St	755106	0.01
S Calhoun St	760706	0.16
S Washington St	760709	0.05
Pine St	760806	0.00
Pine St	760806	0.00
Pine St	760806	0.26
County Center St	761008	0.07
County Center St	761008	0.10
Mockingbird Trl	761020	0.05
Parkway St	761102	0.06
Parkway St	761102	0.06
Raven St	761104	0.06
Nightingale Ave	761105	0.06
Industrial Dr	761207	0.17
A St	761213	0.03
Baldwin Rd	761305	0.06
Imlay City Rd	3251545	0.10
Imlay City Rd	3251545	0.07
Imlay City Rd	3251545	0.02
Imlay City Rd	3251545	0.15
Demill Blvd	3440043	0.04
Demill Blvd	3440043	0.13
Demill Blvd	3440043	0.00
Demill Blvd	3440043	0.00
Demill Blvd	3440043	0.45
Higley St	3440046	0.00
Higley St	3440046	0.11
S Court St	3440100	0.04
S Court St	3440100	0.07
Whisper Rdg	3440539	0.04
Brimingale Ave	3440630	0.04
Brimingale Ave	3440630	0.14
Old Farm Ln	3440631	0.04
Old Farm Ln	3440631	0.01
Turnbull St	3440634	0.06
Peppermill Cir	3440635	0.04

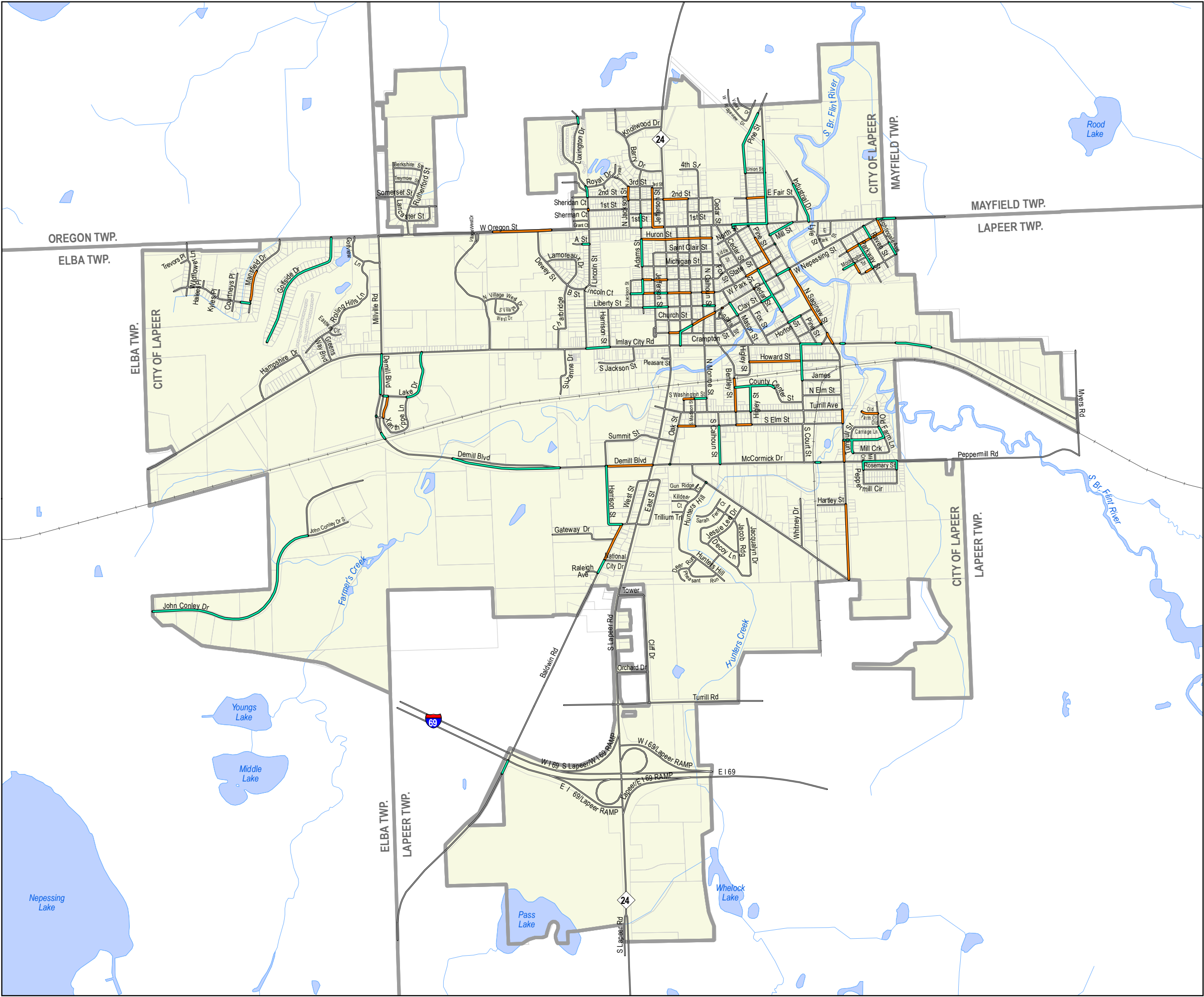
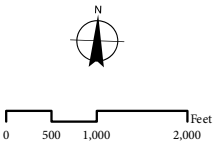
<u>Segment</u>	<u>Number</u>	<u>Road Miles</u>
<b><u>Micro Seal</u></b>		
N Saginaw St	754210	0.32
N Saginaw St	754210	0.09
N Saginaw St	754210	0.06
N Saginaw St	754210	0.05
N Saginaw St	754210	0.08
N Saginaw St	754210	0.19
W Park St	754503	0.05
W Park St	754503	0.06
State St	754504	0.04
State St	754504	0.05
Huron St	754507	0.10
Huron St	754507	0.05
Huron St	754507	0.05
Huron St	754507	0.05
2nd St	754510	0.10
Bentley St	755109	0.10
Bentley St	755109	0.04
Higley St	755110	0.08
S Elm St	760703	0.07
S Elm St	760703	0.06
Pine St	760806	0.06
W Nepessing St	760809	0.05
W Nepessing St	760809	0.00
W Nepessing St	760809	0.06
W Nepessing St	760809	0.04
W Nepessing St	760809	0.01
W Nepessing St	760809	0.00
W Nepessing St	760809	0.05
N Jackson St	760902	0.02
N Jackson St	760902	0.04
Jefferson St	760904	0.06
Jefferson St	760904	0.05
E Fair St	760907	0.08
Howard St	761006	0.22
Nightingale Ave	761105	0.06
Dove Ln	761106	0.06
Dove Ln	761106	0.06
W Oregon St	761301	0.19
W Oregon St	761301	0.06
W Oregon St	761301	0.04
Baldwin Rd	761305	0.10
Baldwin Rd	761305	0.07
Demill Blvd	3440043	0.19
Lincoln St	755103	0.01
Old Farm Ct	3441175	0.07
Xanthippe Ln	3441594	0.09
Mansfield Dr	1901618	0.13
Eagle Pass	761107	0.03
Oriole St	761101	0.05
S Washington St	760709	0.05

Year 2 CIP Improvements

- Crack Filling
- Micro Seal
- Mill & Overlay
- Crush & Reshape
- Reconstruction

Source: Wade Trim, August 2015

August 2015



Year 3 Crack filling

<u>Segment</u>	<u>Number</u>	<u>Road Miles</u>	<u>Segment</u>	<u>Number</u>	<u>Road Miles</u>
Demill Blvd	3441167	0.09	Pleasant St	3440050	0.04
Demill Blvd	3441167	0.00	John Conley Dr S	3441142	0.18
Demill Blvd	3441167	0.07	Luxington Dr	3441595	0.17
N Washington St	755106	0.06	Lincoln St	755103	0.24
N Washington St	755106	0.06	E Fair St	760907	0.11
N Washington St	755106	0.06	Lake Dr	3440049	0.08
N Jackson St	760710	0.06	Wildflower Ln	3441160	0.12
N Jackson St	760710	0.05	Wildflower Ln	3441160	0.04
Adams St	760801	0.02	Trevors Pl	3441161	0.03
Adams St	760801	0.06	Hailees Pl	3441162	0.03
McCormick Dr	761009	0.04	Kyles Pl	3441163	0.04
McCormick Dr	761009	0.01	Lancaster St	3441213	0.15
Imlay City Rd	3251545	0.10	Lancaster St	3441213	0.13
Imlay City Rd	3251545	0.00	Lancaster St	3441213	0.06
Imlay City Rd	3251545	0.05	Lancaster St	3441213	0.06
Clay St	3440040	0.06	Lancaster St	3441213	0.03
S Court St	3440100	0.06	Rutherford St	3441215	0.07
S Court St	3440100	0.04	Rutherford St	3441215	0.03
Whisper Rdg	3440539	0.02	Rutherford St	3441215	0.06
Whisper Rdg	3440539	0.01	Treymore St	3441216	0.10
Whisper Rdg	3440539	0.06	Berkshire St	3441217	0.12
Whisper Rdg	3440539	0.04	Bedford St	3441218	0.08
Whisper Rdg	3440539	0.02	Bedford St	3441218	0.03
Whisper Rdg	3440539	0.02	Cedar St	3441219	0.06
Whisper Rdg	3440539	0.04	Cedar St	3441219	0.03
John Conley Dr	3440887	0.26	Wildflower Ln	3441220	0.04
Somerset St	3441223	0.04	Somerset St	3441223	0.08
Somerset St	3441223	0.04	Fox St	755202	0.09
N Saginaw St	754210	0.05	Mason St	755201	0.03
N Saginaw St	754210	0.01	Lincoln St	755103	0.11
N Saginaw St	754210	0.03	Turrill Ave	754407	0.07
N Saginaw St	754210	0.08	Liberty St	754502	0.05
N Saginaw St	754210	0.06	Charbridge	755102	0.07
N Saginaw St	754210	0.01	Adams St	760801	0.05
N Saginaw St	754210	0.06	Pine St	760806	0.11
N Saginaw St	754210	0.00	Pine St	760806	0.11
N Saginaw St	754210	0.04	McCormick Dr	761009	0.12
N Saginaw St	754210	0.00	Oriole St	761101	0.06
N Saginaw St	754210	0.05	Oriole St	761101	0.06
N Saginaw St	754210	0.00	Eagle Pass	761107	0.06
Baldwin Rd	754403	0.05	West St	761209	0.23
Turrill Ave	754407	0.22	Imlay City Rd	3251545	0.00
Church St	754501	0.06	Imlay City Rd	3251545	0.15
Liberty St	754502	0.10	Imlay City Rd	3251545	0.00
Liberty St	754502	0.10	Imlay City Rd	3251545	0.03
N Washington St	755106	0.06	Imlay City Rd	3251545	0.02
N Washington St	755106	0.06	Imlay City Rd	3251545	0.69
N Washington St	755106	0.05	Clay St	3440040	0.06
N Monroe St	755107	0.06	Demill Blvd	3440043	0.09
S Jackson St	755115	0.06	Demill Blvd	3440043	0.07
Mason St	755201	0.03	Demill Blvd	3440043	0.31
Mason St	755201	0.06	Oak St	3440045	0.06
N Saginaw St	755205	0.05	N Elm St	3440047	0.07
Adams St	760801	0.06	S Court St	3440100	0.06
N Madison St	760803	0.06	S Court St	3440100	0.06
N Madison St	760803	0.06	Whisper Rdg	3440539	0.05
N Madison St	760803	0.06	Old Farm Ln	3440631	0.04
N Madison St	760803	0.05	Old Farm Ln	3440631	0.02
W Nepessing St	760809	0.04	Old Farm Ln	3440631	0.03
W Nepessing St	760809	0.12	Old Farm Ln	3440631	0.02
W Nepessing St	760809	0.00	Mill Crk	3440632	0.09
W Nepessing St	760809	0.05	Peppermill Cir	3440635	0.04
W Nepessing St	760809	0.00	Peppermill Cir	3440635	0.15
W Nepessing St	760809	0.06	John Conley Dr	3440887	0.13
E Fair St	760907	0.12	N Saginaw St	754210	0.18
Horton St	761004	0.11	N Saginaw St	754210	0.07
Horton St	761004	0.06	N Saginaw St	754210	0.06
Howard St	761006	0.16	N Saginaw St	754210	0.06
McCormick Dr	761009	0.35	N Saginaw St	754210	0.00
Peppermill Rd	761210	0.08	East St	754404	0.24
Peppermill Rd	761210	0.01	Turrill Ave	754407	0.07
W Oregon St	761301	0.05	Turrill Ave	754407	0.05
W Oregon St	761301	0.05	Turrill Ave	754407	0.05
W Oregon St	761301	0.05	Turrill Ave	754407	0.05
W Oregon St	761301	0.05	Turrill Ave	754407	0.06
W Oregon St	761301	0.05	Turrill Ave	754407	0.11
W Oregon St	761301	0.01	State St	754504	0.05
W Oregon St	761301	0.01	Saint Clair St	754506	0.05
W Oregon St	761301	0.07	Saint Clair St	754506	0.05
W Oregon St	761301	0.01	Saint Clair St	754506	0.05
W Oregon St	761301	0.05	Saint Clair St	754506	0.05
Clay St	3440040	0.06	Lincoln St	755103	0.05
Demill Blvd	3440043	0.07	N Washington St	755106	0.06
Demill Blvd	3440043	0.09	N Monroe St	755107	0.07

Year 3 **Crack filling**

<u>Segment</u>	<u>Number</u>	<u>Road Miles</u>
Higley St	755110	0.07
S Elm St	760703	0.22
S Madison St	760705	0.06
N Madison St	760803	0.02
N Madison St	760803	0.06
N Madison St	760803	0.06
N Madison St	760803	0.06
N Madison St	760803	0.06
N Madison St	760803	0.06
Pine St	760806	0.06
Pine St	760806	0.06
W Nepessing St	760809	0.00
W Nepessing St	760809	0.03
W Nepessing St	760809	0.00
N Jackson St	760902	0.04
Cedar St	760905	0.06
Cedar St	760905	0.06
Nightingale Ave	761105	0.06

**Micro Seal**

Charbridge	755102	0.18
A St	761213	0.04
Peppermill Cir	3440635	0.11
McCormick Dr	761009	<u>0.10</u>

**Crush and Reshape**

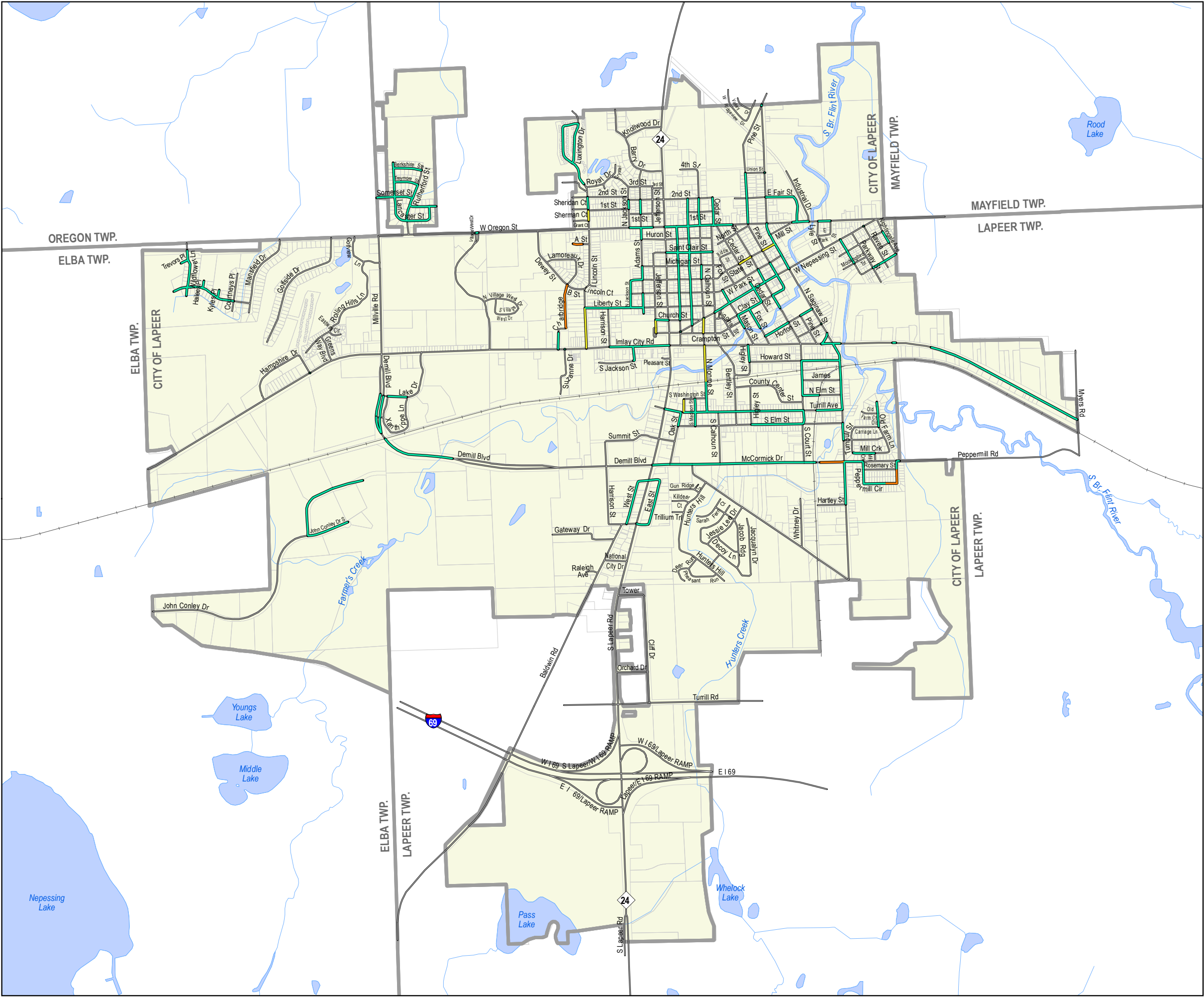
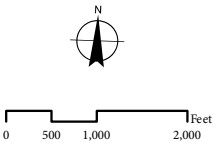
State St	754504	0.06
Lincoln St	755103	0.17
Lincoln St	755103	0.04
N Monroe St	755107	0.15
N Monroe St	755107	0.06
S Washington St	760709	0.05
Jefferson St	760802	0.00
Jefferson St	760802	0.02
Jefferson St	760802	0.03

Year 3 CIP Improvements

- Crack Filling
- Micro Seal
- Mill & Overlay
- Crush & Reshape
- Reconstruction

Source: Wade Trim, August 2015

August 2015



Year 4 Crush and Reshape

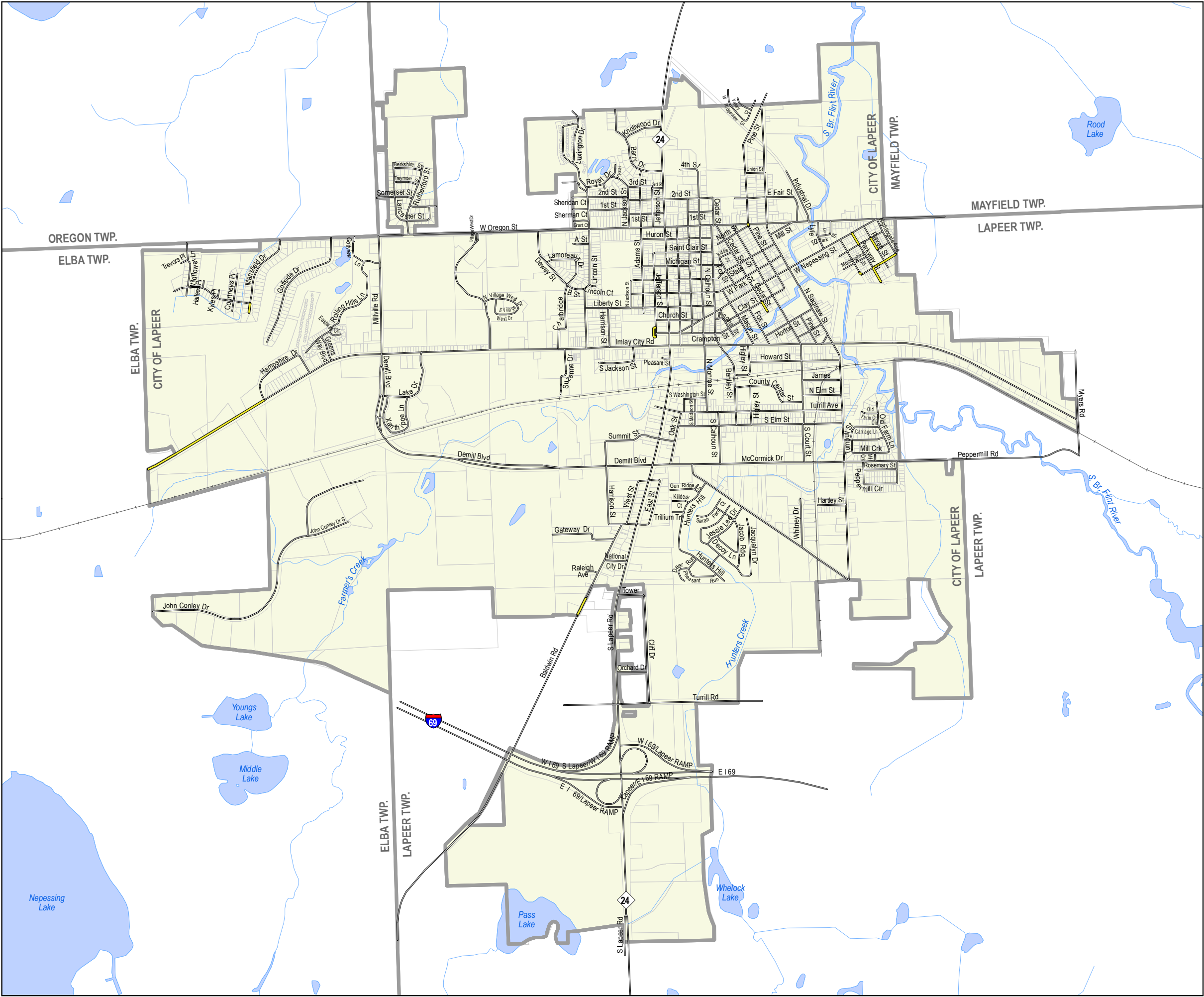
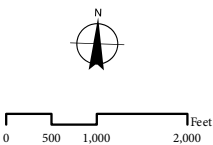
<u>Segment</u>	<u>Number</u>	<u>Road Miles</u>
Pine St	760806	0.00
Pine St	760806	0.01
Oriole St	761101	0.01
Parkway St	761102	0.07
Parkway St	761102	0.06
Raven St	761104	0.06
Eagle Pass	761107	0.06
Cedar St	761119	0.05
Jefferson St	761201	0.05
Baldwin Rd	761305	0.08
Mansfield Dr	1901618	0.04
Imlay City Rd	3251545	0.13
Imlay City Rd	3251545	0.44

Year 4 CIP Improvements

- Crack Filling
- Micro Seal
- Mill & Overlay
- Crush & Reshape
- Reconstruction

Source: Wade Trim, August 2015

August 2015



**Year 5 Crush and Reshape**

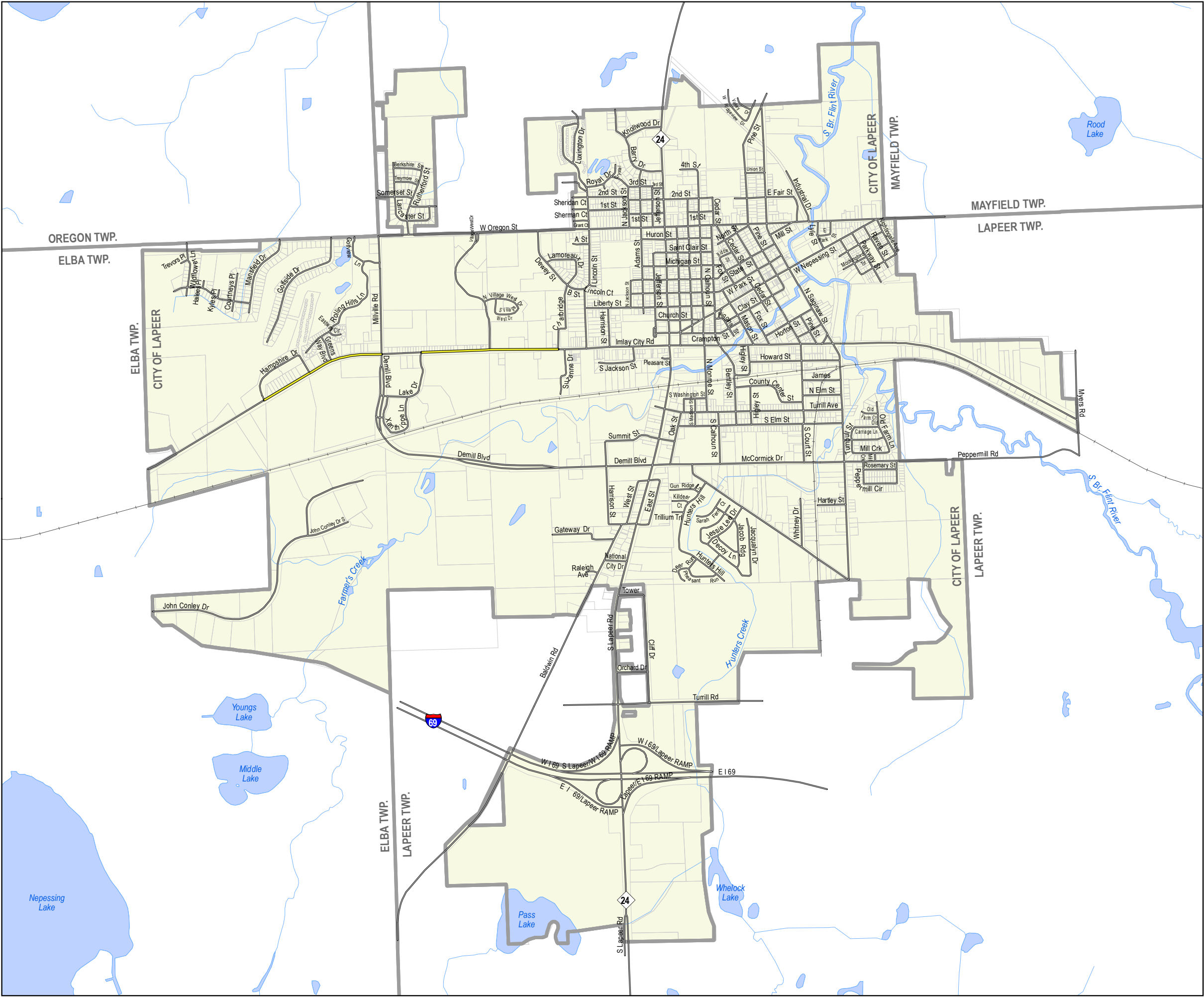
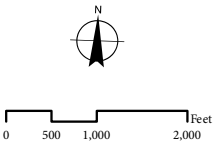
<u>Segment</u>	<u>Number</u>	<u>Road Miles</u>
Imlay City Rd	3251545	0.22
Imlay City Rd	3251545	0.10
Imlay City Rd	3251545	0.21
Imlay City Rd	3251545	0.29
Imlay City Rd	3251545	0.29

Year 5 CIP Improvements

- Crack Filling
- Micro Seal
- Mill & Overlay
- Crush & Reshape
- Reconstruction

Source: Wade Trim, August 2015

August 2015





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