

**Transportation
Asset Management Plan
2023**

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EXECUTIVE SUMMARY

As conduits for commerce and connections to vital services, roads and bridges are some of the most important assets in any community, and other assets like culverts, traffic signs, traffic signals, and utilities support and affect roads and bridges. The City of Grand Rapids' (Grand Rapids) roads, bridges, and support systems are also some of the most valuable and extensive public assets, all of which are paid for with taxes collected from ordinary citizens and businesses. The cost of building and maintaining these assets, their importance to society, and the investment made by taxpayers all place a high level of responsibility on local agencies to plan, build, and maintain roads, bridges, and support assets in an efficient and effective manner. This asset management plan is intended to report on how Grand Rapids is meeting its obligations to maintain the public assets for which it is responsible.

This plan identifies Grand Rapids' assets and condition and how Grand Rapids maintains and plans to improve the overall condition of those assets. An asset management plan is required by Michigan Public Act 325 of 2018, and this document represents fulfillment of some of Grand Rapids' obligations towards meeting these requirements. However, this plan and its supporting documents are intended to be much more than a fulfillment of required reporting. This asset management plan helps to demonstrate Grand Rapids' responsible use of public funds by providing elected and appointed officials as well as the general public with the inventory and condition information of Grand Rapids' assets, and it gives taxpayers the information they need to make informed decisions about investing in Grand Rapids' essential transportation infrastructure.

INTRODUCTION

Asset management is defined by Public Act 325 of 2018 as “an ongoing process of maintaining, preserving, upgrading, and operating physical assets cost effectively, based on a continuous physical inventory and condition assessment and investment to achieve established performance goals”. In other words, asset management is a process that uses data to manage and track assets, like roads and bridges, in a cost-effective manner using a combination of engineering and business principles. This process is endorsed by leaders in municipal planning and transportation infrastructure, including the Michigan Municipal League, County Road Association of Michigan, the Michigan Department of Transportation (MDOT), and the Federal Highway Administration (FHWA). The City of Grand Rapids is supported in its use of asset management principles and processes by the Michigan Transportation Asset Management Council (TAMC), formed by the State of Michigan.

Asset management, in the context of this plan, ensures that public funds are spent as effectively as possible to maximize the condition of the road and bridge network. Asset management also provides a transparent decision-making process that allows the public to understand the technical and financial challenges of managing transportation infrastructure with a limited budget.

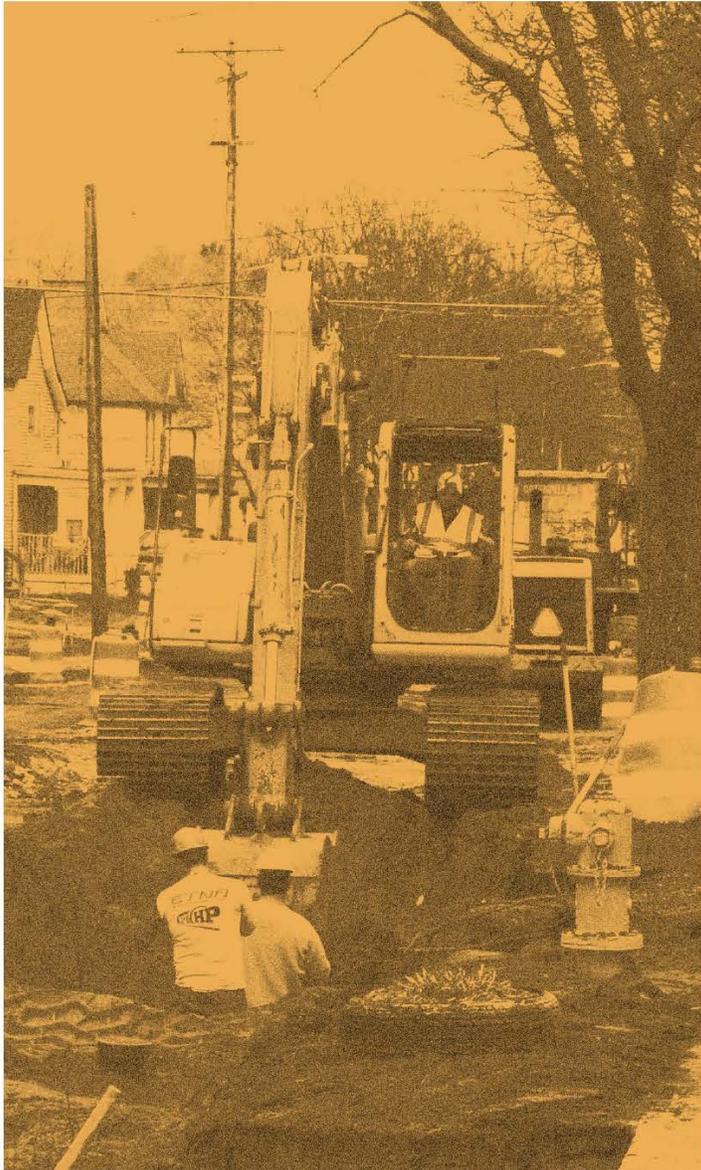
The City of Grand Rapids (Grand Rapids) has adopted an “asset management” business process to overcome the challenges presented by having limited financial, staffing, and other resources while needing to meet road users’ expectations. Grand Rapids is responsible for maintaining and operating over 605 miles of streets and 23 bridge structures. It is also responsible for 303 culverts and 216 signals, 31 flashers and 9 rectangular rapid flashing beacons (RRFB).

This City of Grand Rapids Asset Management Plan for Pavements, July 2017, the City of Grand Rapids 2020 Bridge Asset Management Plan and Stormwater Asset Management and Capital Improvement Plan, May 2013 identify Grand Rapids’ street, bridge and culvert assets and their condition as well as the strategy that Grand Rapids uses to maintain and upgrade these particular assets given Grand Rapids’ condition goals, priorities of network’s road users, and resources. An updated plan is to be released approximately every year for streets, every 3 years for bridges and 5 years for culverts both to comply with Public Act 325 and to reflect changes in road conditions, finances, and priorities. An asset management plan for traffic signals is in the process of being developed.

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**1. CITY OF GRAND RAPIDS
ASSET MANAGEMENT
PLAN FOR PAVEMENTS,
JULY 2017
2023 UPDATE**



City of Grand Rapids Asset Management Plan for Pavements

July 2017

2023 Update



Special thanks to:

MICHIGAN TRANSPORTATION ASSET MANAGEMENT COUNCIL



MICHIGAN DEPARTMENT OF TRANSPORTATION



OPUS INTERNATIONAL CONSULTANTS INC.



WASHTENAW COUNTY ROAD COMMISSION



for the development and use of the “Asset Management Plan for Pavements: A Template for End Users May, 2011” which served as a guide for this asset management plan

and also to:



for the high quality (free) software used to identify the current condition of our street system and to develop various scenarios for investment.

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Foreword

The City of Grand Rapids, like other organizations, has been on a long journey towards asset management of all of our assets, including streets. This document will reference frequently the Sustainable Streets Task Force Report, dated August 13, 2013. This document is an important addendum to this plan. In the letter to the Mayor, City Commissioners, City Employees and Citizens of Grand Rapids, the Task Force states: ***“The City’s street system is a vital asset of more than \$1 billion in value. We know we can extend the useful life of this investment through a planned approach utilizing asset management.”***

Overview of Asset Management

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 following figure provides an overview of the asset management process.



1 Current Assets



The City of Grand Rapids is the jurisdictional authority over all public roads lying within the City of Grand Rapids, exclusive of any state trunkline and Kent County Road Commission highways. As of July 1, 2016, Grand Rapids certified approximately 211 center-line miles of City Major streets and approximately 394 center-line miles of City Local streets. The City Major streets include 38 center-line miles of Principal Arterial, 79 centerline-miles of Minor Arterial and 50 centerline-miles of Collector streets. In addition, the Sustainable Streets Task Force (SSTF) investment strategy identified Major streets that are not Federal aid eligible. There are 47 centerline-miles of Major Non-Federal Aid Urban (MNF) streets.

1.1 Asset Inventory

MDOT annually certifies all public roads within the State of Michigan. Certification maps are maintained by Grand Rapids and are the basis for determining the amount of money received from the Michigan Transportation Fund. Generally, Grand Rapids receives a higher level of reimbursement for Major streets than Local streets. Further information on public road miles can be found in the following public road mileage chart. Additional information can be found on Grand Rapids maps. It is also noted that Grand Rapids has borderline (shared) streets with Kentwood, Wyoming, Walker and the Kent County Road Commission. The improvement and maintenance of the borderline streets are governed by various borderline street agreements.

There were significant changes and updates to the mileage certification for July 1, 2018. The City completed a Trunkline turnback agreement with MDOT in December, 2017 which resulted in an additional 5.29 miles of primarily Principal Arterial streets. Also, a number of Local streets had not been included in previous certification. The Grand Rapids street mileage increased from 588 miles to 605.10 miles. The certified Act 51 mileage for 2022 is 605.52 miles. The Principal Arterial, Minor Arterial and Collector streets information is from the City's Principal-Minor-Collector Streets Master Plan.

Principal Arterial	Minor Arterial	Collector	Major Non-FAU	Local
38	79	50	44	394

1.2 Current Data and Software Tools

Data about the pavement and road surface assets under Grand Rapids' jurisdiction is provided by the Grand Valley Metro Council (GVMC). The annual survey of Federal Aid streets is a service GVMC provides to all members. Grand Rapids also contracts with GVMC to provide pavement condition information on Local streets on an annual basis. This data is augmented with information on the construction work that is administered by the City Engineer's Office. Also, data on more significant preventative maintenance activities, like temporary paving, cape sealing and crack sealing are provided by Grand Rapids' Public Services department. With the approval of the Vital Streets plan, Executive Order 2014-1 – Vital Streets Implementation established a formalized structure of roles and responsibilities.

Grand Rapids currently uses various types of software to manage current asset data and cost information. The following table lists specific software packages utilized by the City and descriptions of the functions these software packages perform.

Name	Function/Purpose/Data	Location
RoadSoft	Roadway Asset Management System	Server
	Asset Inventory	
	Asset Condition Data	
	Asset Deterioration Modeling	
	Strategy Evaluation	
MS Excel	Annual Cost for Various Treatments	Server
	Pavement Deterioration predictive models	
CGI Advantage 360	Accounting software	Server
	Income and Expenditure	
Hardcopy/Digital	As-Built Plans	Archives/Doc Locator

1.3 Data management

Most road data is managed through the RoadSoft program. Data, such as street width and surface type, is collected regularly and ensures that the road data will be

- a) *kept up to date,*
- b) *not able to be corrupted,*
- c) *backed-up, and*
- d) *improved over time for accuracy and completeness.*

Only certain people are allowed to access the RoadSoft system which acts as a base security control. Since the information is on the City's server, the City's security and back-up protocols are followed. This is the responsibility of the Technology and Change department. RoadSoft data is also backed-up frequently through the software.

1.4 Data Accessibility

As shown in the table in section 1.3, four different software/tool types are used to manage Grand Rapids streets. The table includes RoadSoft, MS Excel, CGI Advantage 360 and Hardcopy/digital plans. Also, Microsoft Excel spreadsheets have been developed for contract purposes. These different tools are not available to everyone, but rather to a select few so as not to corrupt the data's security. The security of these various tools follows the City's security and back-up protocols. This is the responsibility of the Technology and Change department.

Different outputs are given from each data location as each has different types of data input into it. All outputs are given on the computer and can be distributed electronically or by hardcopy. These outputs may include PDFs or printed pages. This data is given to contractors and staff working on the roads, City Commission, Vital Streets Oversight Commission, Community Engagement and 311 staff and the public. The data is also included in annual reports by the Vital Streets Oversight Commission to the City Commission.

2 Finances

The City of Grand Rapids is an independent financial entity. The Grand Rapids City Commission adopts an Annual Budget, and approves all expenditures in accordance with accepted accounting principles for government agencies. An independent audit is performed annually on all accounts, and the results are provided to the Michigan Department of Treasury.

The following sections document the financial status of the City of Grand Rapids. The following data was compiled during the third quarter of 2017, and is provided here for the purposes of asset management considerations. The most recent financial information available can be obtained through the City of Grand Rapids website.

2.1 Current Asset Investment

Grand Rapids currently invests in 605.52 miles of road surface assets. The investments include three main surface types: Hot Mix Asphalt (HMA), concrete, and brick streets.

The currently estimated street asset investment is:

a) Current Investment	\$543,196,914
b) Depreciated Value	\$436,391,288
c) Net Value	\$106,805,626

2.2 Sources

On May 6, 2014, Grand Rapids voters overwhelmingly approved investing in Vital Streets. **This decision will provide investment resources that, when coupled with existing investment sources, grants and anticipated new State resources will enable the City to achieve a goal of 70% Good and Fair condition of our streets over the next 15 years.** It was anticipated that this extension of a 0.2% increase in income tax will generate approximately \$8 to 9 million each year. **Currently, it is projected to generate \$15,709,378 - \$16,803,868 million in FY2024 – FY2028.**

A guiding principal of the Vital Streets investment is that during the fifteen year life, Grand Rapids will continue to invest \$3.4 million of Major and Local Street Fund revenues as the base investment for street repair, improvement and reconstruction. This funding is from the Michigan Transportation Fund (MTF). This fund is supported by taxes on motor vehicle fuels and registered motor vehicles (except general sales and use taxes and regulatory fees). Grand Rapids' allocation is based on a formula, which includes factors such as population and mileage for the type of street when compared to the total for the State.

Another guiding principal of the Vital Streets investment is that Grand Rapids will commit \$13 million of General Operating Fund support over the next fifteen years with a minimum of \$500,000 per year. The General Operating Fund revenues are primarily derived from property taxes. **For FY2022 - FY2024, the General Operating Fund support was advanced to pay bond principle.**

The City traditionally receives approximately \$3 million each year in Federal grants. These grant dollars are primarily provided through the Grand Valley Metropolitan Council (GVMC), the regional metropolitan planning organization. The funds are allocated throughout the region and are primarily from the Surface Transportation Program – Urban (STPU). **GVMC recently approved the Transportation Improvement Program for FY2023 - FY2026. Grand Rapids is expected to receive \$12.75 million during this time or \$4.25 million/year..**

In November, 2015, the State of Michigan approved an additional \$1.2 billion in road funding for all road agencies. The funds, derived from an increase in fuel taxes and registration fees and funding from the State's general fund, could increase the City's revenues from the Michigan Transportation Fund by \$9.5 million (\$14.1 million in 2015 to \$23.6 million in 2021). The funds will incrementally increase over FY2017 – FY2021. Half of the investment amount is assured through increased gas and weight taxes and vehicle registration fees. It is projected that to reach the condition of Good and Fair for 70% of our streets will require an additional state investment of \$6 million/year. Since the new investment did not begin in FY2015 when the plan was first implemented and may be less than \$6 million, the percentage of the City's Local streets that are in Good and Fair condition may be significant less than 70%.

Improvements to the City's street system may also result from investment by private developers, public and private utilities and tax increment financing authorities. The City has a history of partnering with others to leverage these types of investments. The following table lists the anticipated revenues for the 2024 Fiscal Year. It should be noted that a portion of the revenues from the Income Tax Support will be used for principal/interest payment of the third bond that was issued in 2015 and will be retired in FY2026. The proposed FY2024 – FY2028 Vital Streets Plan is included in the appendix.

2024 VITAL STREETS – SOURCES

Revenue Source	Budget (\$)
Bond Proceeds	0
Act 51 Revenues	3,483,608
Income Tax Support	15,709,378
GOF Support	0
Grants (estimated)	5,343,361
Bond Principal Repayment - Sidewalks	64,793
State Investment	7,588,511
Cash Available (FY2022)	10,200,000
Total	42,389,652

2.3 Uses

Grand Rapids maintains four funds for the purposes of maintaining the street system: Vital Streets Fund, Major Street Fund, Local Street Fund and Streets Capital Fund.

The Michigan Department of Transportation has advised that the Major and Local Street Funds cannot be transferred to the Vital Streets Fund, even for street activities. The transfer was desirable to demonstrate transparency required in the Investment Guidelines for Vital Streets. The base investment of \$3,483,608 in FY2024 will be expended first each fiscal year and will be shown as a subfund in the Major and Local Street Funds.

Since the State of Michigan additional road funding are half general fund dollars, these funds will need to be appropriated each year. Since the State has many needs/priorities for this funding, the City will include these dollars in the Sources amount, but for uses, the general fund dollars will be shown in a Contingency Account. If the funds are appropriated, additional project work will be added to the Capital plan to recognize the appropriation.

To honor the intent of the investment guidelines, staff from Fiscal Services, Comptroller and Engineering have developed a schedule of how the additional State funds will be allocated between Vital Streets and Major/Local Street Funds. In general, the first \$6 million will be allocated to Vital Streets. The additional

amount above \$6 million will be prorated between Vital Streets and Major/Local Street Funds by the amount allocated in FY2015 (approximately 25-75%).

The Vital Streets Fund share will be used to fund Traffic Safety/Signals capital projects, the City's Act 51 trunkline responsibilities, bridges, and preventative maintenance, rehabilitation and reconstruction of our Federal Aid, Major Non-Federal Aid and Local Streets. **The work of lining storm sewers in streets and right-of-way/green infrastructure maintenance will also be funded through the Vital Streets Fund.**

2.4 Unfunded Projects

The work by the Sustainable Streets Task Force included a review and discussion of various scenarios of condition goals and how much the reaching of each goal may cost. The recommended investment of approximately \$300 million over 15 years was projected to result in 70% of the City's streets in good and fair condition. It would be fair to say that the unfunded projects would include the 30% of the system that aren't in good or fair condition and there may not be funding to address that need. The City, working through the Vital Streets Oversight Commission will utilize the principals that were employed throughout the City's Transformation process to evaluate the effectiveness of the plan and any course corrections. We will need to look at sustainability of additional investments and employ our Plan, Do, Check and Act principals to the effort.

2.5 Optimized Capital Plan

The Sustainable Streets Task Force report included a Sources and Uses of how the resources would be invested. This will continue to guide us for where the funds will be invested. The City will also look for opportunities to partner and leverage the investments of others. This may result in redirection to specific projects while still following the overall plan. Staff is working on an investment plan for each road segment that would consider what work was previously done, what is the scheduled preventative maintenance, rehabilitation or reconstruction work, when should that be done and what are the future costs. Also, as part of the work on the Vital Streets Plan, the City will have the ability to utilize the Demographic Need and Connectivity Opportunity tool to refine the areas of investment. A graphical matrix will be used to identify areas of High – Low Demographic Need and High – Low Connectivity Opportunity. **Also, a review of Neighborhoods of Focus based on census tract information will also be used to inform and prioritize the City's investment.**



3 Managing Lifecycles



3.1 Current Conditions

Grand Rapids is committed to continually reevaluating the current conditions of the transportation system. GVMC provides the annual evaluation of both Federal Aid and non-Federal Aid streets using a specially outfitted van. The evaluation of the current road surface conditions is done with the Pavement Surface Evaluation Rating (PASER) system. The PASER system is the preferred method for Michigan agencies to rate their road pavements. PASER ratings for HMA and concrete surfaces are defined in the following tables.

Asphalt PASER Ratings		
PASER Rating	Condition	Treatment
9 & 10	Excellent	No maintenance required
8	Very Good	Little or no maintenance
7	Good	Crack sealing and minor patching
5 & 6	Fair – Good	Preservative treatments (non-structural)
3 & 4	Poor – Fair	Structural renewal (overlay)
1 & 2	Failed	Reconstruction

Concrete PASER Ratings		
PASER Rating	Condition	Treatment
9 & 10	Excellent	No maintenance required
7 & 8	Very Good	Routine maintenance
5 & 6	Fair – Good	Surface repairs, sealing, partial-depth patching
3 & 4	Poor – Fair	Extensive slab or joint rehabilitation
1 & 2	Failed	Reconstruction

The following tables provide the PASER ratings for all roadways under the City of Grand Rapids' jurisdiction.

2011	Ratings										Total
	10	9	8	7	6	5	4	3	2	1	
FAU	1.881	1.536	13.823	19.517	14.737	31.344	39.461	30.107	3.664	0.000	156.070
MNF	0.810	0.790	1.981	3.409	4.358	7.523	14.104	12.924	1.496	0.000	47.395
Local	4.095	3.373	6.203	15.080	57.327	108.892	139.622	42.157	2.891	0.028	379.668
2011 Totals	6.786	5.699	22.007	38.006	76.422	147.759	193.187	85.188	8.051	0.028	583.133
Percentage	1.2%	1.0%	3.8%	6.5%	13.1%	25.3%	33.1%	14.6%	1.4%	0.0%	100.0%
2012	Ratings**										Total
	10	9	8	7	6	5	4	3	2	1	
FAU	2.232	22.965	18.544	29.879	16.691	15.004	24.204	21.689	7.100	0.358	158.666
MNF	0.197	16.979	3.982	3.312	3.549	1.724	3.946	8.291	5.386	0.398	47.764
Local	1.841	11.074	17.473	17.853	28.538	73.014	100.87	109.501	22.253	1.100	383.517
2012 Totals	4.270	51.018	39.999	51.044	48.778	89.742	129.02	139.481	34.739	1.856	589.947
Percentage	0.7%	8.6%	6.8%	8.7%	8.3%	15.2%	21.9%	23.6%	5.9%	0.3%	100.0%
2013	Ratings										Total
	10	9	8	7	6	5	4	3	2	1	
FAU	1.116	5.970	11.051	20.464	13.187	27.029	36.757	29.266	10.295	0.140	155.275
MNF	0.723	0.650	1.726	2.881	3.533	5.277	13.601	12.511	5.240	0.196	46.340
Local	3.841	4.940	8.306	11.394	40.065	93.387	122.274	79.804	14.524	2.636	381.171
2013 Totals	5.680	11.560	21.083	34.739	56.785	125.694	172.632	121.582	30.059	2.972	582.786
Percentage	1.0%	2.0%	3.6%	6.0%	9.7%	21.6%	29.6%	20.9%	5.2%	0.5%	100.0%
2014	Ratings										Total
	10	9	8	7	6	5	4	3	2	1	
FAU	1.518	12.763	15.882	18.059	18.577	23.467	37.500	20.257	7.730	0.604	156.357
MNF	0.585	6.633	3.699	4.182	3.705	3.402	7.790	12.310	4.889	0.413	47.607
Local	0.973	2.471	11.438	15.847	35.832	90.377	117.347	91.722	14.462	0.990	381.459
2014 Totals	3.076	21.867	31.019	38.088	58.113	117.246	162.638	124.289	27.080	2.007	585.423
Percentage	0.5%	3.7%	5.3%	6.5%	9.9%	20.0%	27.8%	21.2%	4.6%	0.3%	100.0%
2015	Ratings										Total
	10	9	8	7	6	5	4	3	2	1	
FAU	2.2320	22.9650	18.5440	29.8790	16.6910	15.0040	24.2040	21.6890	7.1000	0.3580	158.6660
MNF	0.1968	16.9785	3.9820	3.3120	3.5486	1.7242	3.9456	8.2906	5.3863	0.3984	47.7630
Local	1.8409	11.0737	17.4734	17.8528	28.5381	73.0141	100.8705	109.5006	22.2535	1.1002	383.5179
2015 Totals	4.270	51.017	39.999	51.044	48.778	89.742	129.020	139.480	34.740	1.857	589.947
Percentage	0.7%	8.6%	6.8%	8.7%	8.3%	15.2%	21.9%	23.6%	5.9%	0.3%	100.0%
2016	Ratings										Total
	10	9	8	7	6	5	4	3	2	1	
FAU	0	27.871	26.305	21.009	21.64	17.126	20.822	17.679	4.069	0.031	156.552
MNF	1.656	15.561	8.207	3.955	4.207	3.237	1.779	6.843	3.23	0.743	49.418
Local	4.676	35.951	18.12	46.513	25.051	61.92	70.071	94.323	25.762	2.169	384.556
2016 Totals	6.332	79.383	52.632	71.477	50.898	82.283	92.672	118.845	33.061	2.943	590.526
Percentage	1.1%	13.4%	8.9%	12.1%	8.6%	13.9%	15.7%	20.1%	5.6%	0.5%	100.0%

2017	Ratings										
	10	9	8	7	6	5	4	3	2	1	Total
FAU	1.429	19.140	28.441	18.353	23.306	17.767	18.074	21.332	9.008	0.031	156.881
MNF	3.086	11.071	11.322	5.545	4.581	3.120	2.872	4.818	2.391	0.362	49.168
Local	1.810	54.370	21.714	30.844	32.165	52.068	51.681	89.896	42.970	4.979	382.497
2017 Totals	6.325	84.581	61.477	54.742	60.052	72.955	72.627	116.046	54.369	5.372	588.546
Percentage	1.1%	14.4%	10.4%	9.3%	10.2%	12.4%	12.3%	19.7%	9.2%	0.9%	100.0%
2018	Ratings										
	10	9	8	7	6	5	4	3	2	1	Total
FAU	1.917	18.781	33.904	25.813	30.309	14.862	13.947	15.178	6.207	0.131	161.049
MNF	0.056	7.816	13.932	9.751	0.419	1.883	2.327	3.964	2.084	0.942	43.174
Local	1.384	44.987	39.658	31.615	38.614	41.247	43.612	86.510	53.845	6.353	387.825
2018 Totals	3.357	71.584	87.494	67.179	69.342	57.992	59.886	105.652	62.136	7.426	592.048
Percentage	0.6%	12.1%	14.8%	11.3%	11.7%	9.8%	10.1%	17.8%	10.5%	1.3%	100.0%
2019	Ratings										
	10	9	8	7	6	5	4	3	2	1	Total
FAU	1.255	10.042	28.399	21.356	31.901	15.253	11.833	20.703	12.853	0.045	153.640
MNF	3.086	11.071	11.322	5.545	4.581	3.120	2.872	4.818	2.391	0.362	49.168
Local	3.488	48.727	49.577	30.045	39.707	36.095	39.657	70.066	61.286	4.375	383.023
2019 Totals	7.829	69.840	89.298	56.946	76.189	54.468	54.362	95.587	76.530	4.782	585.831
Percentage	1.3%	11.9%	15.2%	9.7%	13.0%	9.3%	9.3%	16.3%	13.1%	0.8%	100.0%
2020	Ratings										
	10	9	8	7	6	5	4	3	2	1	Total
FAU	1.389	18.703	28.192	18.801	27.838	11.928	26.838	16.438	16.200	0.269	166.596
MNF	0.873	3.359	12.398	9.169	11.411	1.344	2.714	3.001	3.123	0.649	48.041
Local	2.607	40.676	40.406	29.803	56.830	36.271	36.387	57.965	79.775	5.299	386.019
2020 Totals	4.869	62.738	80.996	57.773	96.079	49.543	65.939	77.404	99.098	6.217	600.656
Percentage	0.8%	10.4%	13.5%	9.6%	16.0%	8.2%	11.0%	12.9%	16.5%	1.0%	100.0%
2021	Ratings										
	10	9	8	7	6	5	4	3	2	1	Total
FAU	2.322	16.216	19.702	30.187	29.961	9.472	29.257	17.936	11.746	0.081	166.880
MNF	0.034	4.252	9.642	10.596	9.343	3.965	2.618	2.721	4.591	0.371	48.133
Local	3.525	53.133	40.266	32.355	47.500	51.101	34.234	48.964	70.154	5.858	387.090
2021 Totals	5.881	73.601	69.610	73.138	86.804	64.538	66.109	69.621	86.491	6.310	602.103
Percentage	1.0%	12.2%	11.6%	12.1%	14.4%	10.7%	11.0%	11.6%	14.4%	1.0%	100.0%
2022	Ratings										
	10	9	8	7	6	5	4	3	2	1	Total
FAU	2.937	20.122	17.682	20.331	28.745	16.376	33.262	15.873	10.493	0.269	166.090
MNF	0.058	4.790	5.604	6.553	14.692	5.747	3.883	2.909	3.527	0.376	48.139
Local	2.039	50.873	31.841	29.722	59.829	49.051	31.443	50.683	79.948	2.156	387.585
2022 Totals	5.034	75.785	55.127	56.606	103.266	71.174	68.588	69.465	93.968	2.801	601.814
Percentage	0.8%	12.6%	9.2%	9.4%	17.2%	11.8%	11.4%	11.5%	15.6%	0.5%	100.0%

Data drawn from SSTF

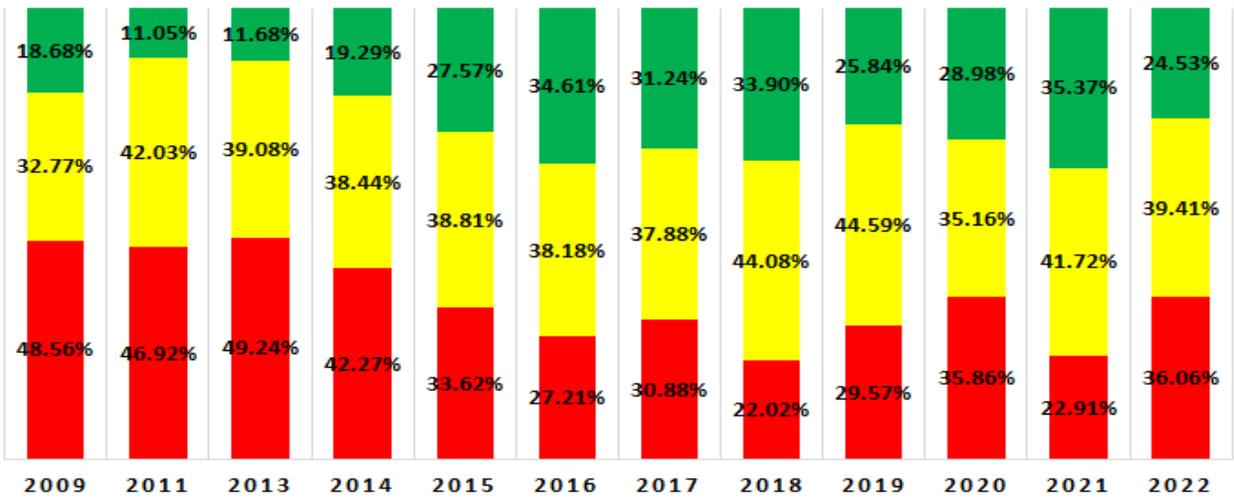
2011	
Federal Aid Urban (FAU) Pavement Condition Summary (Paved)	
Good Condition	11.05% or 17.240 miles
Fair Condition	42.03% or 65.598 miles
Poor Condition	46.92% or 73.232 miles
In 2011 there were 156.070 miles of FAU streets in the City	
MNF Pavement Condition Summary (Paved)	
Good Condition	7.56% or 3.581 miles
Fair Condition	32.26% or 15.290 miles
Poor Condition	60.18% or 28.524 miles
In 2011 there were 47.395 miles of MNF streets in the City	
Local Streets Pavement Condition Summary (Paved)	
Good Condition	3.60% or 13.671 miles
Fair Condition	47.75% or 181.299 miles
Poor Condition	48.65% or 184.698 miles
In 2011 there were 379.668 miles of Local streets in the City	
2012	
Federal Aid Urban (FAU) Pavement Condition Summary (Paved)	
Good Condition	27.57% or 43.741 miles
Fair Condition	38.81% or 61.574 miles
Poor Condition	33.62% or 53.351 miles
In 2015 there were 158.667 miles of FAU streets in the City	
MNF Pavement Condition Summary (Paved)	
Good Condition	44.30% or 21.157 miles
Fair Condition	17.97% or 8.585 miles
Poor Condition	37.73% or 18.021 miles
In 2015 there were 47.763 miles of MNF streets in the City	
Local Streets Pavement Condition Summary (Paved)	
Good Condition	7.92% or 30.388 miles
Fair Condition	31.13% or 119.405 miles
Poor Condition	60.94% or 233.725 miles
In 2015 there were 383.518 miles of Local streets in the City	
2013	
Federal Aid Urban (FAU) Pavement Condition Summary (Paved)	
Good Condition	11.68% or 18.137 miles
Fair Condition	39.08% or 60.680 miles
Poor Condition	49.24% or 76.458 miles
In 2013 there were 155.275 miles of FAU streets in the City	
MNF Pavement Condition Summary (Paved)	
Good Condition	6.69% or 3.100 miles
Fair Condition	25.23% or 11.692 miles
Poor Condition	68.08% or 31.548 miles
In 2013 there were 46.340 miles of MNF streets in the City	
Local Streets Pavement Condition Summary (Paved)	
Good Condition	4.48% or 17.087 miles
Fair Condition	38.00% or 144.846 miles
Poor Condition	57.52% or 219.238 miles
In 2013 there were 381.171 miles of Local streets in the City	
2014	
Federal Aid Urban (FAU) Pavement Condition Summary (Paved)	
Good Condition	19.29% or 30.163 miles
Fair Condition	38.44% or 60.103 miles
Poor Condition	42.27% or 66.091 miles
In 2014 there were 156.357 miles of FAU streets in the City	
MNF Pavement Condition Summary (Paved)	
Good Condition	22.93% or 10.917 miles
Fair Condition	23.71% or 11.288 miles
Poor Condition	53.36% or 25.402 miles
In 2014 there were 47.607 miles of MNF streets in the City	
Local Streets Pavement Condition Summary (Paved)	
Good Condition	3.90% or 14.882 miles
Fair Condition	37.24% or 142.056 miles
Poor Condition	58.86% or 224.521 miles
In 2014 there were 381.459 miles of Local streets in the City	

2015	
Federal Aid Urban (FAU) Pavement Condition Summary (Paved)	
Good Condition	27.57% or 43.741 miles
Fair Condition	38.81% or 61.574 miles
Poor Condition	33.62% or 53.351 miles
In 2015 there were 158.666 miles of FAU streets in the City	
MNF Pavement Condition Summary (Paved)	
Good Condition	44.30% or 21.157 miles
Fair Condition	17.97% or 8.585 miles
Poor Condition	37.73% or 18.021 miles
In 2015 there were 47.763 miles of MNF streets in the City	
Local Streets Pavement Condition Summary (Paved)	
Good Condition	7.92% or 30.388 miles
Fair Condition	31.13% or 119.405
Poor Condition	60.94% or 233.725 miles
In 2015 there were 383.518 miles of Local streets in the City	
2016	
Federal Aid Urban (FAU) Pavement Condition Summary (Paved)	
Good Condition	34.61% or 54.176 miles
Fair Condition	38.18% or 59.775 miles
Poor Condition	27.21% or 42.601 miles
In 2016 there were 156.552 miles of FAU streets in the City	
MNF Pavement Condition Summary (Paved)	
Good Condition	44.30% or 21.157 miles
Fair Condition	17.97% or 8.585 miles
Poor Condition	37.73% or 18.021 miles
In 2016 there were 49.418 miles of MNF streets in the City	
Local Streets Pavement Condition Summary (Paved)	
Good Condition	15.28% or 58.747 miles
Fair Condition	34.71% or 133.484
Poor Condition	50.01% or 192.325 miles
In 2016 there were 384.556 miles of Local streets in the City	
2017	
Federal Aid Urban (FAU) Pavement Condition Summary (Paved)	
Good Condition	31.24% or 49.010 miles
Fair Condition	37.88% or 59.426 miles
Poor Condition	30.88% or 48.445 miles
In 2017 there were 156.881 miles of FAU streets in the City	
MNF Pavement Condition Summary (Paved)	
Good Condition	51.82% or 25.479 miles
Fair Condition	26.94% or 13.246 miles
Poor Condition	21.24% or 10.443 miles
In 2017 there were 49.168 miles of MNF streets in the City	
Local Streets Pavement Condition Summary (Paved)	
Good Condition	20.36% or 77.894 miles
Fair Condition	30.09% or 115.077 miles
Poor Condition	49.55% or 189.526 miles
In 2017 there were 382.497 miles of Local streets in the City	
2018	
Federal Aid Urban (FAU) Pavement Condition Summary (Paved)	
Good Condition	33.90% or 54.602 miles
Fair Condition	44.08% or 70.984 miles
Poor Condition	22.02% or 35.463 miles
In 2018 there were 161.049 miles of FAU streets in the City	
MNF Pavement Condition Summary (Paved)	
Good Condition	46.79% or 22.305 miles
Fair Condition	33.67% or 16.053 miles
Poor Condition	19.54% or 9.317 miles
In 2018 there were 47.675 miles of MNF streets in the City	
Local Streets Pavement Condition Summary (Paved)	
Good Condition	22.18% or 86.029 miles
Fair Condition	28.74% or 111.476 miles
Poor Condition	49.07% or 190.320 miles
In 2018 there were 387.825 miles of Local streets in the City	

2019	
Federal Aid Urban (FAU) Pavement Condition Summary (Paved)	
Good Condition	25.84% or 39.696 miles
Fair Condition	44.59% or 68.510 miles
Poor Condition	29.57% or 45.434 miles
In 2019 there were 153.640 miles of FAU streets in the City	
MNF Pavement Condition Summary (Paved)	
Good Condition	51.82% or 25.479 miles
Fair Condition	26.94% or 13.246 miles
Poor Condition	21.24% or 10.443 miles
In 2019 there were 49.168 miles of MNF streets in the City	
Local Streets Pavement Condition Summary (Paved)	
Good Condition	25.93% or 101.792 miles
Fair Condition	29.41% or 115.459 miles
Poor Condition	44.67% or 175.384 miles
In 2019 there were 383.023 miles of Local streets in the City	
2020	
Federal Aid Urban (FAU) Pavement Condition Summary (Paved)	
Good Condition	28.98% or 48.284 miles
Fair Condition	35.16% or 58.567 miles
Poor Condition	35.86% or 59.745 miles
In 2020 there were 166.596 miles of FAU streets in the City	
MNF Pavement Condition Summary (Paved)	
Good Condition	34.62% or 16.630 miles
Fair Condition	45.64% or 21.924 miles
Poor Condition	19.75% or 9.487 miles
In 2020 there were 48.041 miles of MNF streets in the City	
Local Streets Pavement Condition Summary (Paved)	
Good Condition	21.68% or 83.689 miles
Fair Condition	31.84% or 122.904 miles
Poor Condition	46.48% or 179.426 miles
In 2020 there were 386.019 miles of Local streets in the City	
2021	
Federal Aid Urban (FAU) Pavement Condition Summary (Paved)	
Good Condition	22.91% or 38.240 miles
Fair Condition	41.72% or 69.620 miles
Poor Condition	35.37% or 59.020 miles
In 2021 there were 166.880 miles of FAU streets in the City	
MNF Pavement Condition Summary (Paved)	
Good Condition	28.57% or 13.928 miles
Fair Condition	49.66% or 23.904 miles
Poor Condition	21.77% or 10.301 miles
In 2021 there were 48.133 miles of MNF streets in the City	
Local Streets Pavement Condition Summary (Paved)	
Good Condition	25.04% or 96.924 miles
Fair Condition	33.83% or 130.956 miles
Poor Condition	41.13% or 159.210 miles
In 2021 there were 387.090 miles of Local streets in the City	
2022	
Federal Aid Urban (FAU) Pavement Condition Summary (Paved)	
Good Condition	24.81% or 41.433 miles
Fair Condition	39.28% or 65.610 miles
Poor Condition	35.91% or 59.969 miles
In 2022 there were 167.012 miles of FAU streets in the City	
MNF Pavement Condition Summary (Paved)	
Good Condition	21.71% or 10.452 miles
Fair Condition	56.07% or 26.992 miles
Poor Condition	22.22% or 10.695 miles
In 2022 there were 48.139 miles of MNF streets in the City	
Local Streets Pavement Condition Summary (Paved)	
Good Condition	21.87% or 84.753 miles
Fair Condition	35.76% or 138.602 miles
Poor Condition	42.37% or 164.230 miles
In 2021 there were 387.585 miles of Local streets in the City	

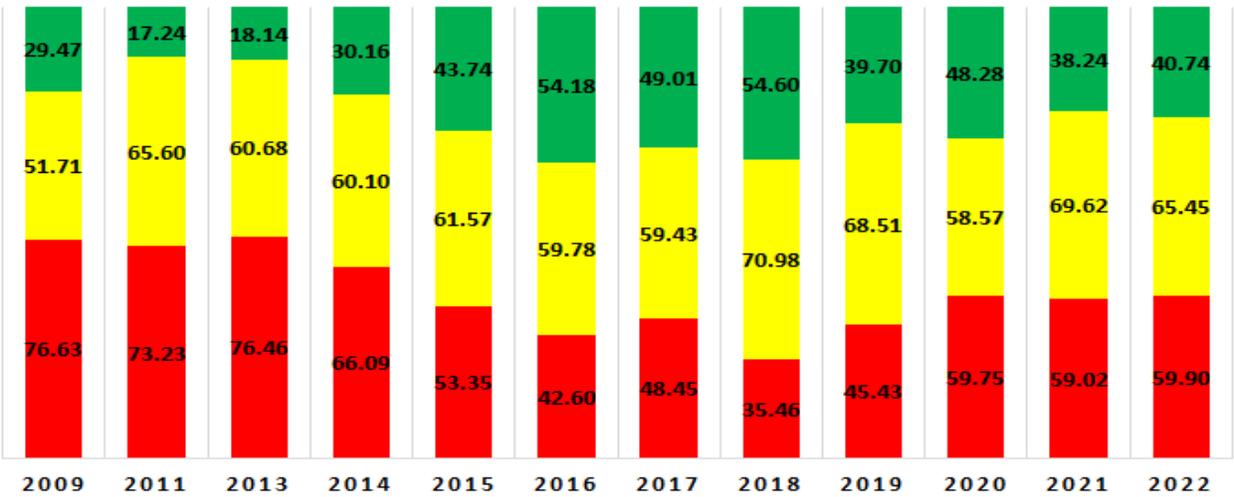
FAU STREETS PERCENTAGE

■ Poor ■ Fair ■ Good



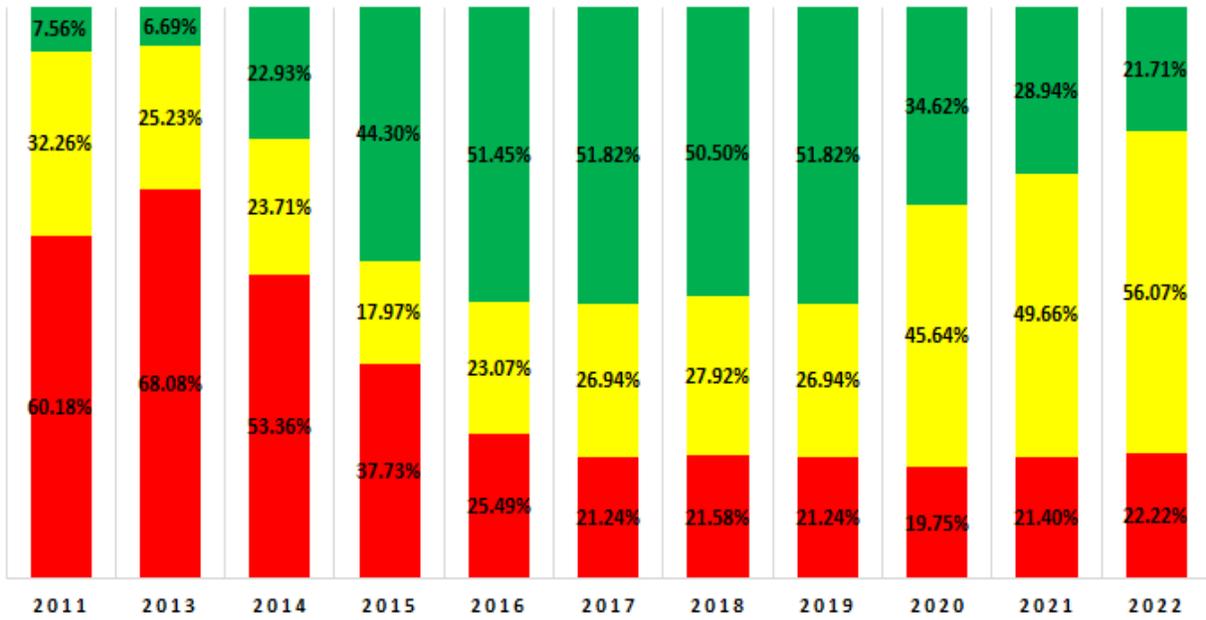
FAU STREETS MILES

■ Poor ■ Fair ■ Good



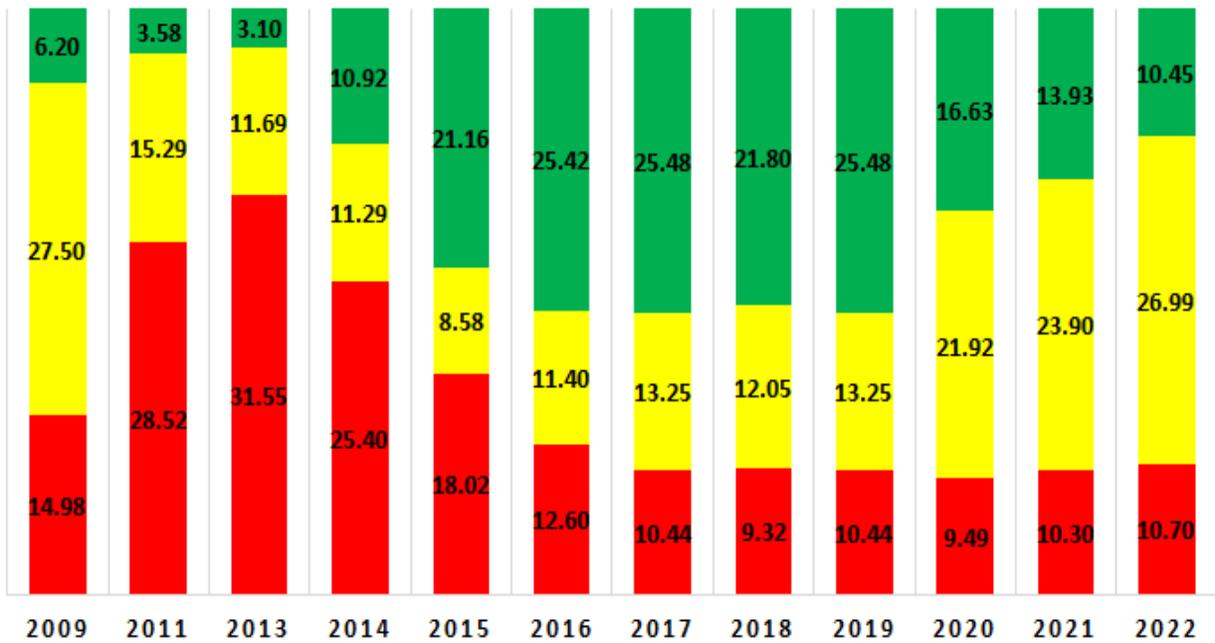
MAJOR NON-FAU STREETS PERCENTAGE

■ Poor ■ Fair ■ Good



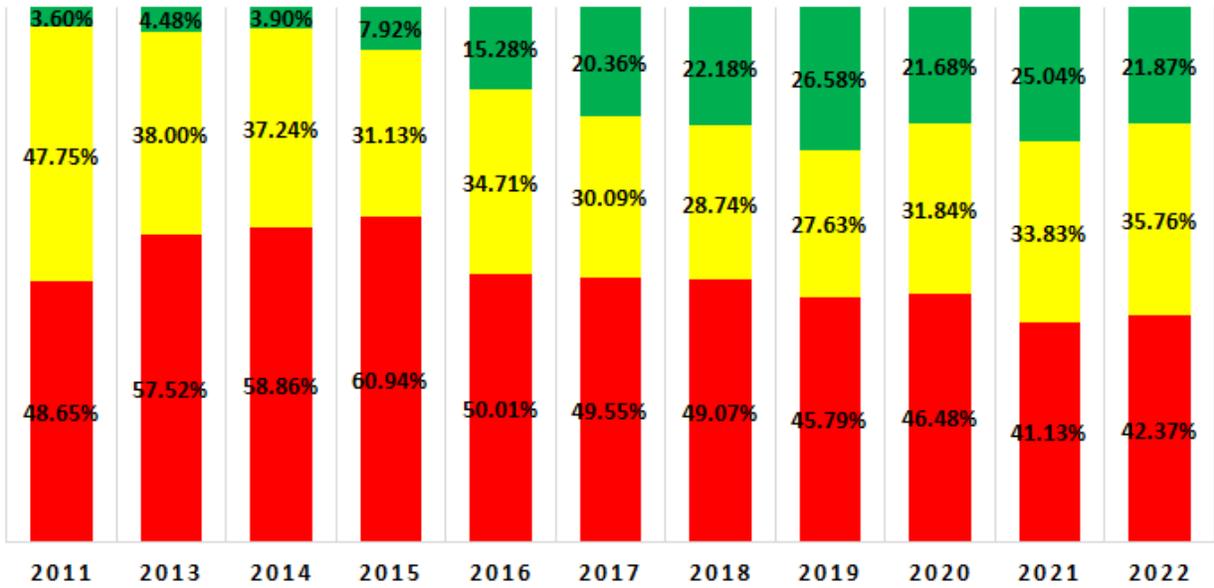
MAJOR NON-FAU STREETS MILES

■ Poor ■ Fair ■ Good



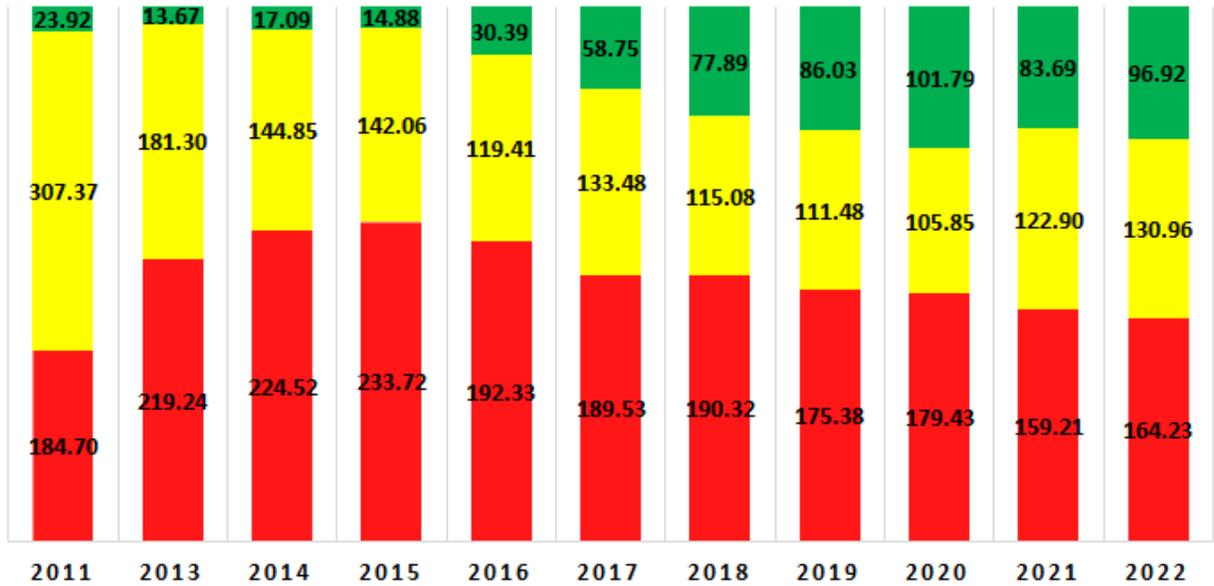
LOCAL STREETS PERCENTAGE

■ Poor ■ Fair ■ Good



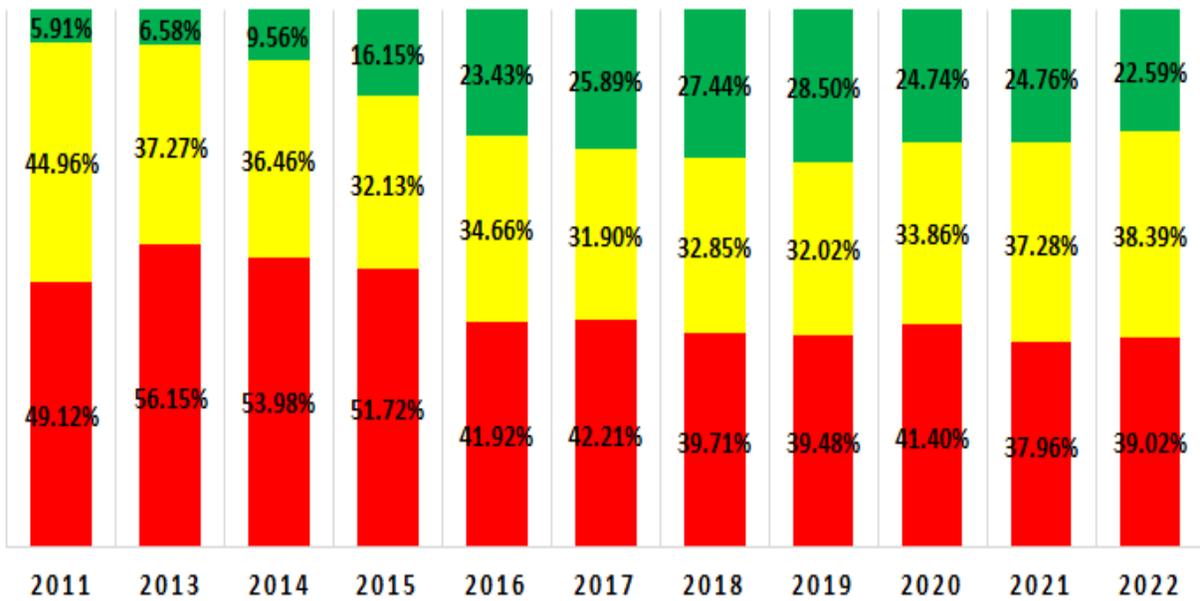
LOCAL STREETS MILES

■ Poor ■ Fair ■ Good



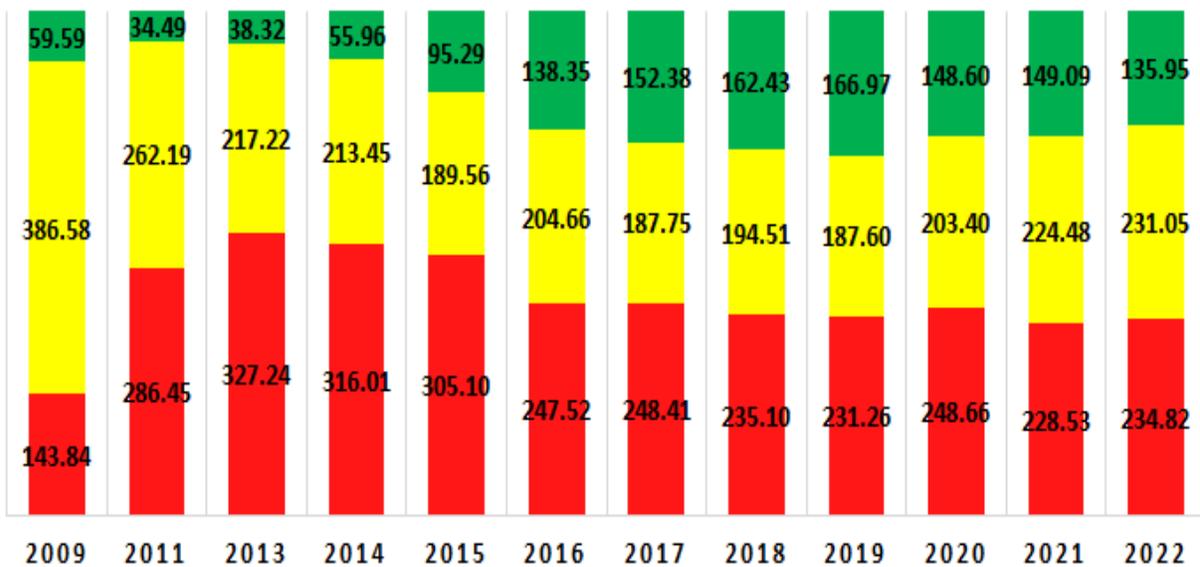
ALL STREETS PERCENTAGE

■ Poor
 ■ Fair
 ■ Good

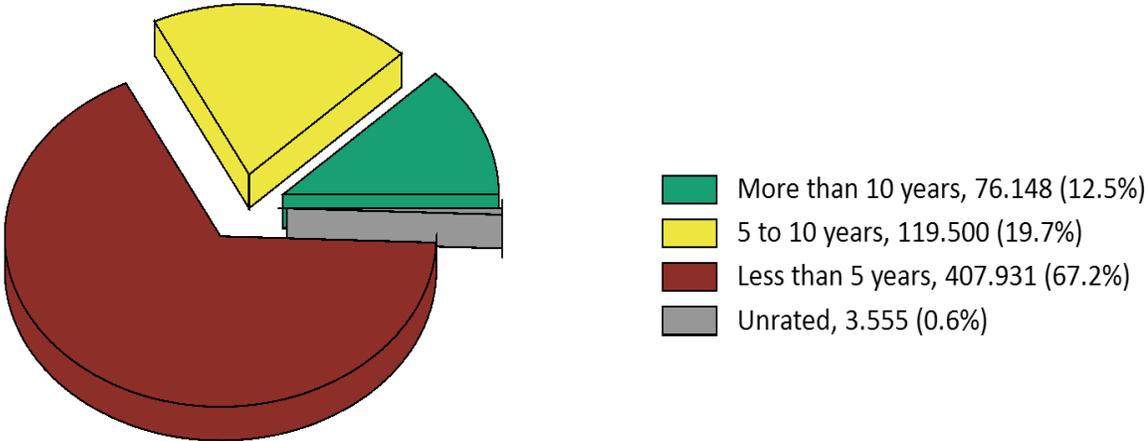


ALL STREETS MILES

■ Poor
 ■ Fair
 ■ Good



The current known ratings provide important information regarding the estimated remaining life for the pavements owned by the City. The estimation of remaining life of service was based on the standard degradation models included in the PASER rating system. The following chart provides a breakdown of the expected remaining service life, with a PASER rating of 10 or 9 having more than 10 years of remaining service life, a rating of 8 or 7 having an RSL of 5 to 10 years, and a rating of 6 or below equating to less than 5 years RSL. The PASER rating is a reflection of the surface quality of the roadway, not an absolute indicator of quality. A roadway with a low or PASER rating, or one past its Remaining Service Life is still a usable road. (Updated information April 20, 2023.)



3.2 Level of Service

As recommended by the Sustainable Streets Task Force and approved by the City Commission, the City has a goal of reaching a 70% good and fair condition for all our streets in the next fifteen years (by FY2030). The strategy to reach this goal was to divide the system into three elements: Federal Aid Urban (FAU) streets, Major Non-FAU streets, and Local streets. To maximize the potential grants available for FAU streets, the investment in FAU over the next 15 years would be approximately \$6.5 million each year with an anticipated grant amount of \$3 million per year. This grant amount was based on historic information. The strategy for Major Non-FAU streets was to invest heavily in years 1 and 2 of the program, reach 70% good and fair for these streets and maintain the investment. The goal of 70% good and fair with Major Non-FAU streets has been reached. The plan for the Local streets was to invest a minimum amount in years 1 and 2 (while investing heavily in Major Non-FAU streets) and then directing the previous Major Non-FAU street investment to Local streets.

The strategy has had to be altered as the anticipated State investment of \$6 million/year did not occur in FY2015. The decision by the Sustainable Streets Task Force was to reduce the investment in Local streets and maintain the recommended investment in FAU and Major Non-FAU streets. It is also planned that as additional investment, as seen with increased income tax revenues and potential State funding in FY2021, will be directed in most part to Local streets.

In future years, the outcomes of the investment will need to be reevaluated. The Vital Streets Oversight Commission may need to recommend modifications to the future investment to the City Commission depending on outcomes achieved. The process should include a review by staff of outcomes over a number of years, a recommendation to the Vital Streets Oversight Commission of any needed increase or decrease of the investment and a recommendation to the City Commission of recommended changes. It may require an amendment to the investment guidelines.

3.3 Assess Treatment Alternatives

Grand Rapids currently uses the following treatment alternatives:

- Crack sealing
- Spray sealing
- Temporary Paving
- Rotomill/resurfacing
- Reconstruction
- Concrete slab repair or replacement

The Temporary Paving treatment is a thin overlay by the City's Public Services for streets in Poor and Failed condition until a more permanent treatment can be funded. While this treatment deviates from the asset management principles, this treatment keeps the street in a safe condition and also reduces the emergency treatment of pothole repairs. As the need for this treatment is reduced, the Public Services crews will transition to Preventative Maintenance and Rehabilitation work.

The City continues to look at additional treatments that would provide a broader toolkit. The additional treatments will allow the City to have more flexibility in choosing treatment options and will provide better solutions.

3.4 Mix-of-Fixes Analysis

The following treatments, type, estimated square yard cost and anticipated life are currently utilized:

Asphalt and Composite Pavement Treatments

Treatment	Min PASER	Max PASER	Reset PASER	Cost/Sq. Yd.	Type
Crack Seal - COGR	7	7	8	\$ 0.30	Preventive Maintenance PM (CPM)
Mill & Overlay - 3" Thick - COGR	3	3	9	\$ 42.64	Rehabilitation RH (SI)
Mill & Overlay 1.5" - COGR	5	5	9	\$ 39.92	Preventive Maintenance PM (CPM)
Reconstruction - COGR	1	2	10	\$168.21	Reconstruction RC (SI)
Sealcoat + Microsurface - COGR	5	6	7	\$ 4.64	Preventive Maintenance PM (CPM)
Spray Patching - COGR	7	7	8	\$ 0.26	Preventive Maintenance PM (CPM)
Crack Seal - COGR	7	7	8	\$ 0.30	Preventive Maintenance PM (CPM)
Mill & Overlay - 3" Thick - COGR	3	3	9	\$ 42.64	Rehabilitation RH (SI)
Mill & Overlay 1.5" - COGR	5	5	9	\$ 36.26	Preventive Maintenance PM (CPM)
Overlay - 1.5"	5	5	9	\$ 5.00	Preventive Maintenance PM (CPM)
Sealcoat + Microsurface - COGR	5	6	7	\$ 4.64	Preventive Maintenance PM (CPM)
Spray Patching - COGR	7	7	8	\$ 0.26	Preventive Maintenance PM (CPM)

Brick Pavement Treatments

Treatment	Min PASER	Max PASER	Reset PASER	Cost/Sq. Yd.	Type
Concrete Base Repair	2	6	6	\$250.00	Preventive Maintenance PM (CPM)
Reconstruction - COGR	1	3	10	\$193.03	Reconstruction RC (SI)

Concrete Pavement Treatments

Treatment	Min PASER	Max PASER	Reset PASER	Cost/Sq. Yd.	Type
Crack Repair - COGR	5	7	7	\$ 18.00	Preventive Maintenance PM (CPM)
Full Depth / Overlay	4	4	9	\$ 7.25	Rehabilitation RH (SI)
Full Depth / Slab Replacement	3	4	9	\$165.00	Rehabilitation RH (SI)
Partial Depth Repair - COGR	5	6	6	\$252.00	Preventive Maintenance PM (CPM)
Reconstruction - COGR	1	2	10	\$161.84	Reconstruction RC (SI)

3.5 Optimized Level of Service

The Vital Street and Sidewalk Investment Guidelines that were approved by the City Commission on February 11, 2014 were promises to the citizens of Grand Rapids that if they approved the income tax increase extension for 15 years as dedicated funding for streets, "The City will consider asset management, balance and distribution, outcomes from engagement, maintaining access, completion of safe walking and bicycle routes and coordination with other projects when making annual investments in order to ensure conditions improve in all areas of the City." The optimized level of service includes implementation of this asset management plan on a continuous basis. It also includes annual course corrections to where investments are occurring throughout the City.

4 Make and Know the Rules

4.1 Strategic Goals

The Sustainable Streets Task Force adopted a vision statement in August, 2013. Prior to the request for the income tax extension for Vital Streets, the City Commission on February 11, 2014 adopted the Vital Street and Sidewalk Investment Guidelines. These documents form the basis for the development of annual goals and strategies to guide our work with our partners and stakeholders, regularly monitor and report on those efforts, and review and adjust plans as necessary.

4.2 Our Vision

City Streets and rights-of-way will be accessible, attractive, and safe, serving all people of our community, contributing to the livability of our neighborhoods and business districts and increasing economic opportunity to individuals, businesses, and new development.

Infrastructure assets will be maintained and well-managed, using a multi-faceted funding strategy and innovative approaches to preserve our investment.

4.3 Our Guiding Principles

The City has established 13 Investment Guidelines in order to help make recommendations to the City Manager and City Commission on the expenditure of revenue from the income tax continuation, report to the City Commission on achievement of Vital Street and Sidewalk outcomes and advise on asset management strategies.

❖ *Base Investment*

The City shall continue to invest \$3.4 million of Major and Local Street Fund Revenues to pay for base level street repair, improvement and reconstruction.

❖ *Income Tax Investment*

This principle is meant to ensure that funds are given to both Vital Streets and sidewalks. At least 84% (estimated at \$8,300,000 annually) of the revenue from the income tax continuation would be dedicated to Vital Street investments and up to 16% (estimated at \$1,600,000 annually) would be dedicated to systematic sidewalk investments.

❖ *Decreased State Investment*

This guideline describes what would happen if future reductions are necessary in the City's Major and Local Street Fund budget during any of the years of this income tax continuation, beginning with Fiscal Year 2016, as the result of a decrease in State payments, the Major and Local Street Fund budget supporting the base level street repair, improvement and reconstruction and stormwater for that year shall be reduced by a percentage no greater than the percentage reduction of the total State payments to the Major and Local Street Fund.

❖ *Increased State Investment*

Any increase in State payments as the result of a change in the transportation formula and/or increase in State revenue for street repair and maintenance will be dedicated to Vital Street investments in the year received. In fiscal years after such an increase in State payments, any increase in state payments for street repair and maintenance will be allocated between capital investment and operations based upon the percentage amount of the increase. The Vital Streets plan relied on state to investment to help reach its goal

of 70% good and fair streets within 15 years. The state legislature began action in 2015 and as a result new revenues are beginning in FY2017.

❖ ***Community Engagement***

All capital projects planning for investing the revenue from the income tax continuation shall engage citizens, neighborhoods and business districts. The VSOC is a very important component that helped to shape these practices and their effectiveness. Additionally Community Engagement staff members were hired in Fall 2014 to help develop a program that bases engagement level on various projects. Community Engagement uses a wide range of methods to help involve the community including meetings, a road construction website, 311, pictures, road signs, mailers, and an e-mail distribution list. CE is continuously coming up with new techniques consisting of features such as updating the website more frequently and launching a map to help 311 identify work done.

❖ ***Vital Streets Oversight Commission***

The Oversight Commission will ensure that an independent body tracks the progress made and insure the investment that is being used. The City Commission shall establish and appoint the Vital Streets Oversight Commission to make recommendations to the City Manager and City Commission on the expenditure of revenue from the income tax continuation, report to the City Commission on achievement of Vital Street and Sidewalk outcomes and advise on asset management strategies. The annual capital budget for proposed expenditures of the revenue from the income tax continuation shall be reviewed by the Vital Streets Oversight Commission and approved by the City Commission prior to any spending.

❖ ***Auditing***

As with all other City funds, an outside audit is insured to be completed annually. Auditing began for FY2015 and will continue for every year afterwards. All expenditures from the revenue from the income tax continuation shall be audited by a professional auditing firm. The annual investments shall be reported to the Vital Streets Oversight Commission, Stormwater Oversight Commission and City Commission and posted on the City's website.

❖ ***Shared Services Costs***

The portion of revenue from the income tax continuation devoted to street repair, improvement and reconstruction shall be deposited in a specially designated capital fund and shall only be subject to shared services costs of the City related to capital projects. The portion of revenue from the income tax continuation devoted to sidewalk repair, improvement and reconstruction shall be subject to shared services costs, consistent with all City services.

❖ ***Vital Streets – Design and Guidance***

Vital Streets will be the default design approach for street, sidewalk and right-of-way repair, improvement and reconstruction and shall be used unless clear engineering difficulties prevent its use. City Commission shall cause appropriate ordinances, City Commission policies, practices, and plans to be adopted or amended as required to guide implementation of Vital Streets and Sidewalks.

❖ ***Low Impact Design***

Low impact design will be the default design approach for street, sidewalk and right-of-way repair, improvement and reconstruction and shall be used unless clear engineering difficulties prevent its use in order to enable the City to achieve a minimum of Stormwater Management Level C investment by FY2022 as depicted in the 2013 Stormwater Asset Management Plan. The search for appropriate applications for low impact designs for projects is an ongoing job. A Green Infrastructure Design Standard is being developed to assist staff and developers with tools to determine opportunities and their constraints. This includes both a guidance manual and a technical specifications manual of green infrastructure practices.

❖ **Investment Factors**

The City will consider asset management, balance and distribution, outcomes from engagement, maintaining access, completion of safe walking and bicycle routes and coordination with other projects when making annual investments in order to ensure conditions improve in all areas of the City. Advanced funding that the City has received has provided the ability to comply with this guidance principle in all parts of the City and in all modes of transportation.

❖ **General Operating Fund Investment**

The investment guideline is a very important principle for the City. It makes a commitment to supplement the voter approved income tax extension and is intended to help accelerate progress. Beginning in fiscal year 2016 (July 1, 2015), the City Commission will commit to \$13 million of General Operating Fund support for sustainable streets over the next fifteen years with a minimum of \$500,000 per year. In addition, in fiscal years where General Operating Fund financial results are more favorable than the December 2013 projections, the City Commission will make additional strategic investments with a goal of an additional \$1 million per year in sustainable streets.

❖ **Vital Streets: Definition and Framework**

Vital Street and Sidewalk investments will be guided by this definition and framework: Vital Streets and rights-of-way are accessible, attractive, environmentally responsible and safe; serving all people of our community. Vital Streets embrace the entire right-of-way through design that provides safe access for all users, manages stormwater in place through low impact development practices, enhances urban tree canopy and quality of life in neighborhoods and economic vitality in business districts. This guideline will eventually be converted to policy through a citizen driven process.

4.4 Legislation, Policy, and Standards

To inform the design and construction of Vital Streets, the City of Grand Rapids utilizes many different documents:

- AASHTO A Policy On Geometric Design of Highways and Streets
- MDOT Geometric Design Guide
- MDOT Maintaining Traffic Typicals, Traffic and Safety Division
- MDOT Road and Bridge Standard Plans
- MDOT Standard Specifications For Construction
- Michigan Manual on Uniform Traffic Control Devices
- City of Grand Rapids Standard Construction Specifications
- Vital Streets Plan
- Vital Streets Design Guidelines
- **City of Grand Rapids Green Infrastructure Standards**

The City complies with Michigan Public Act 199 of 2007, which requires:

“The department, each county road commission, and each city and village of this state shall annually submit a report to the Council. This report shall include a multi-year program developed through the asset management process described in this section. Projects contained in the department’s annual multi-year program shall be consistent with department’s asset management process and shall be reported consistent with categories established by the Council. Projects contained in the annual multi-year program of each local agency shall be consistent with the asset management process of each local road agency and shall be reported consistent with categories established by the Council.”

4.5 Reporting

Two guiding principles that were approved with the request for the dedicated income tax increase extension were:

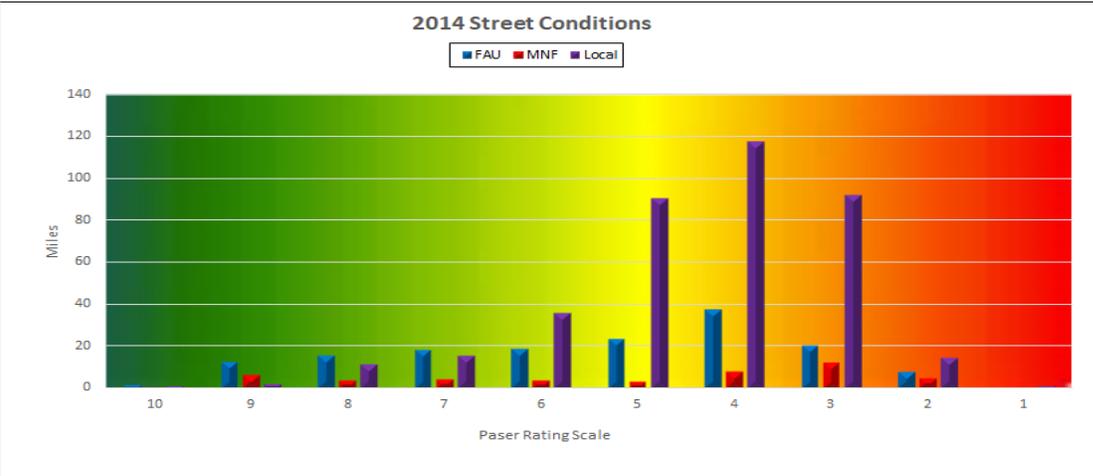
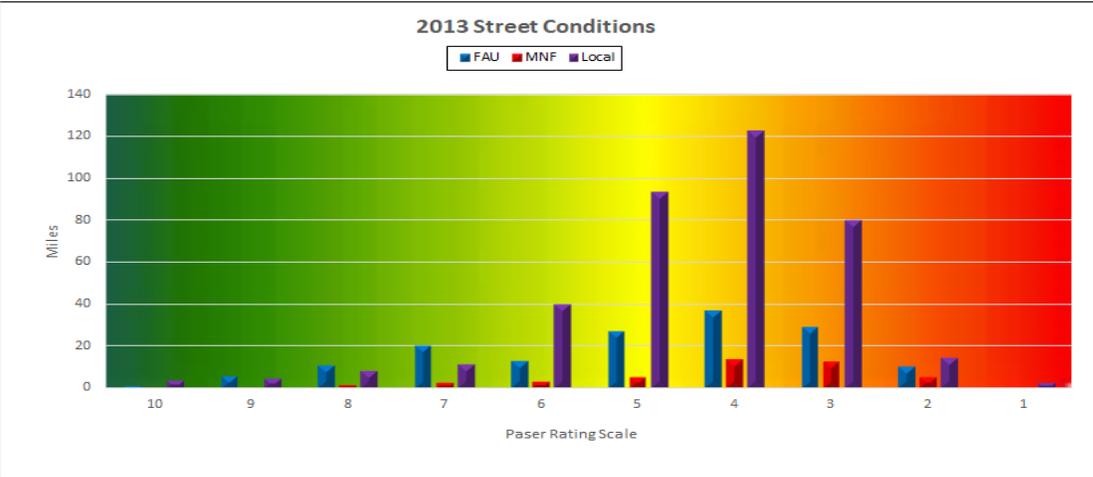
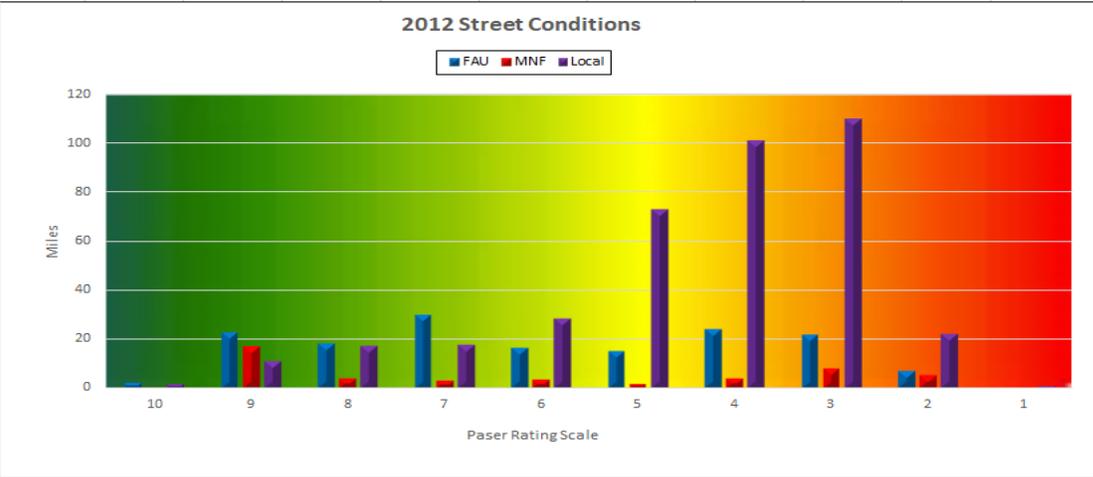
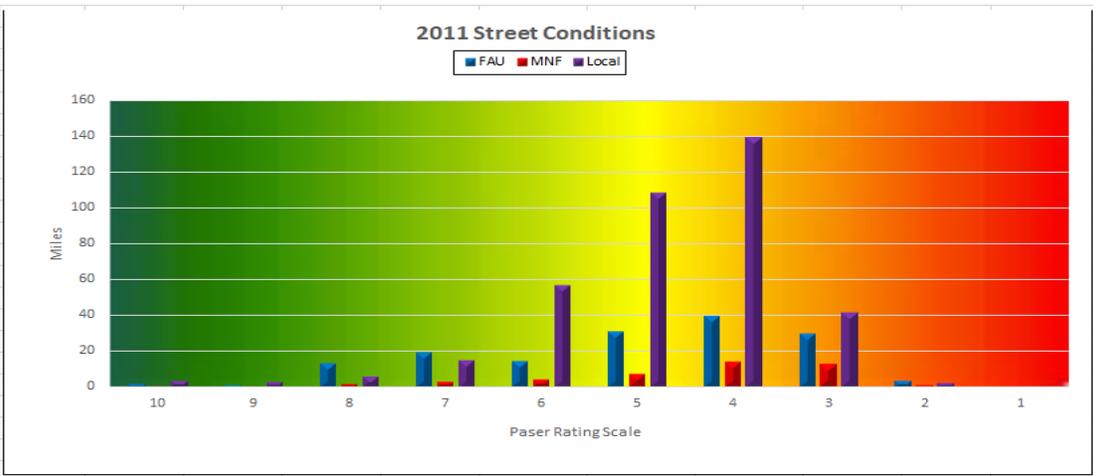
- “The City Commission shall establish and appoint the Vital Streets Oversight Commission to make recommendations to the City Manager and City Commission on the expenditure of revenue from the income tax continuation, report to the City Commission on achievement of Vital Street and Sidewalk outcomes and advise on asset management strategies. The annual capital budget for proposed expenditures of the revenue from the income tax continuation shall be reviewed by the Vital Streets Oversight Commission and approved by the City Commission prior to any spending.”
- “All expenditures from the revenue from the income tax continuation shall be audited by a professional auditing firm. The annual investments shall be reported to the Vital Streets Oversight Commission, Stormwater Oversight Commission and City Commission and posted on the City’s website.”

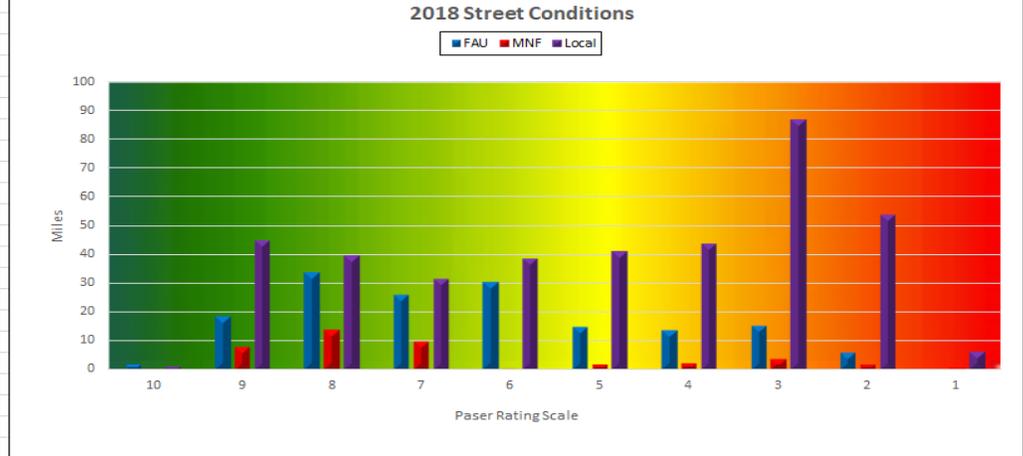
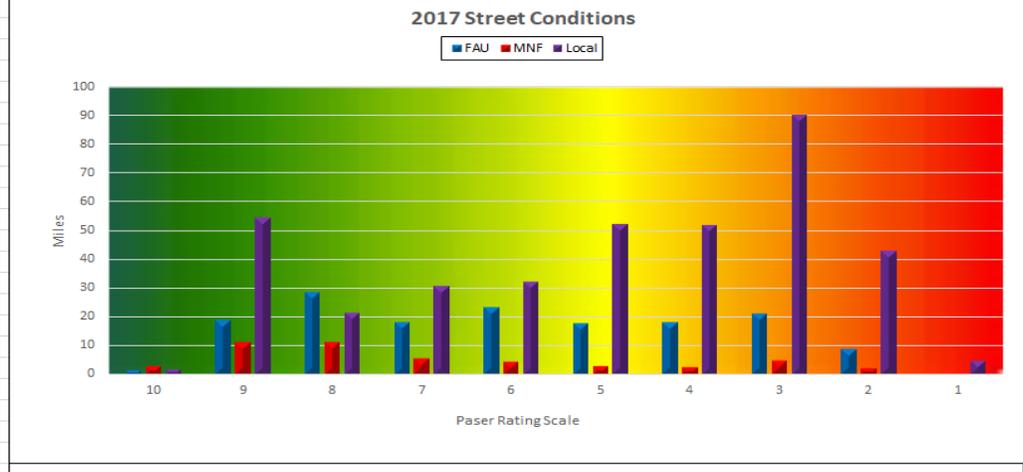
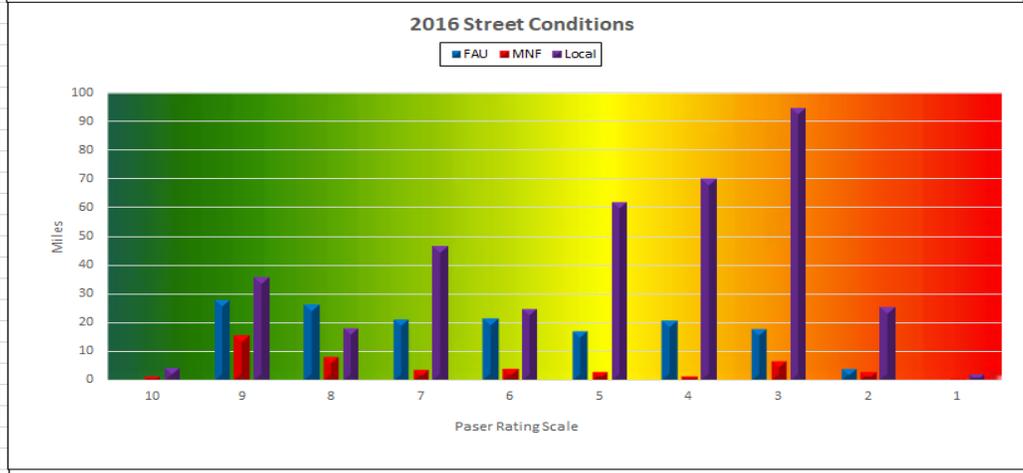
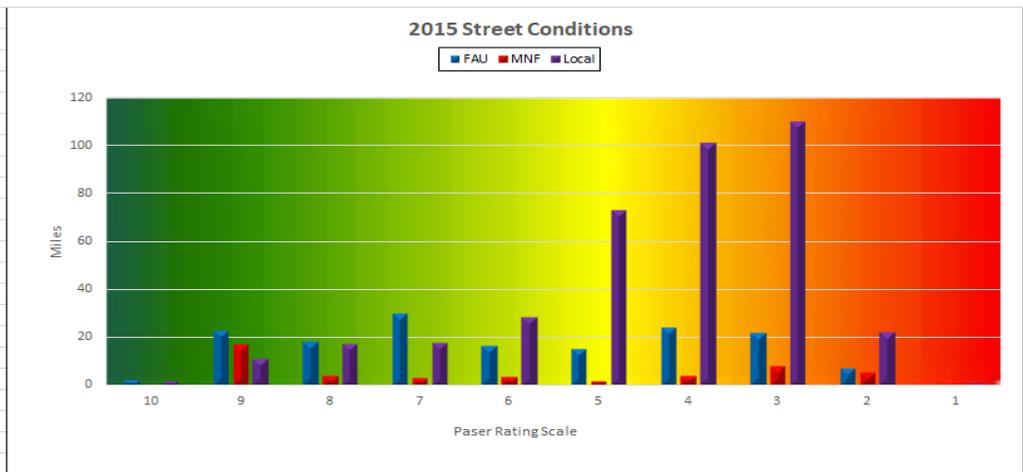
The Vital Streets Oversight Commission has been appointed and now meets on a **bi-monthly** basis. Annually, they review and recommend the Vital Streets Capital plan to the City Commission for the City Commission’s consideration. They were also instrumental in crafting the Vital Streets Plan that was approved by the City Commission in December, 2016. The recommended FY2018 – FY2022 Capital plan, **as well as all approved Capital plans, are** included in the Appendix.

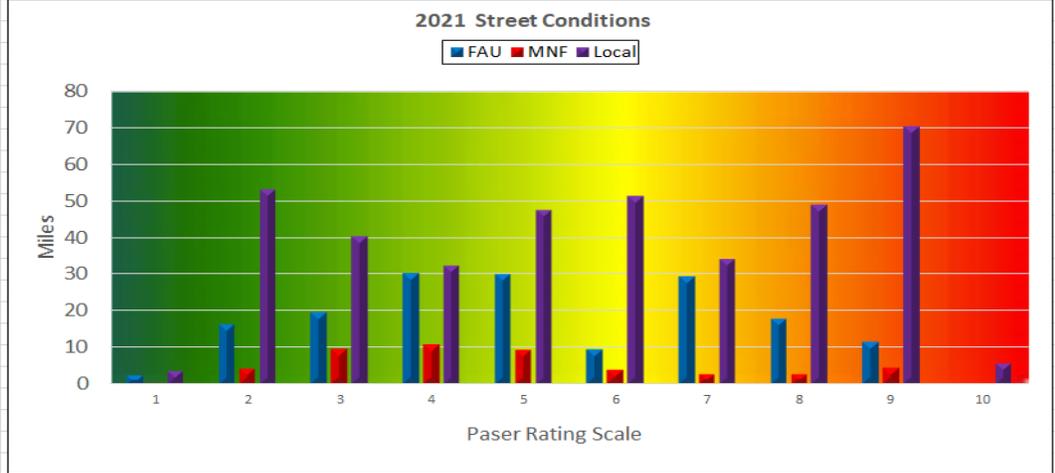
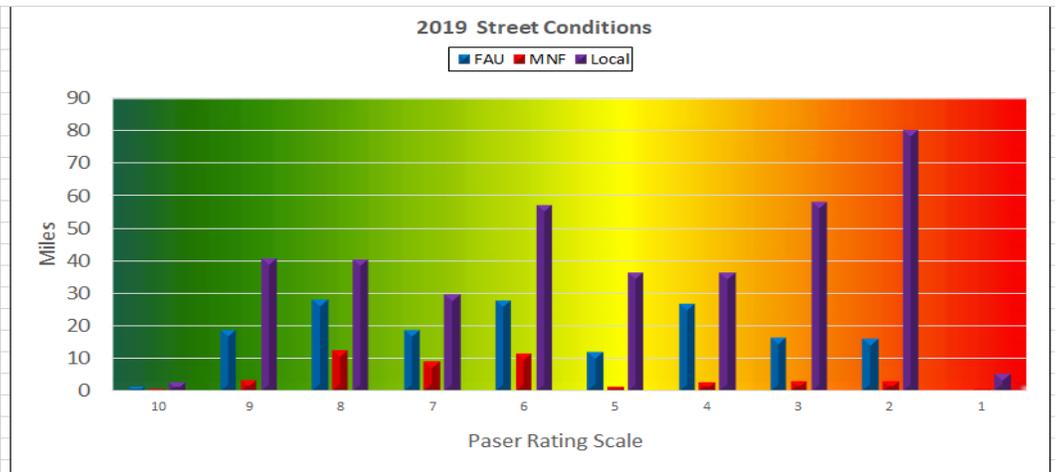
The City, by law, completes a Comprehensive Financial Annual Report after each fiscal year. A separate Vital Streets Fund has been set-up for the income tax revenues and general operating fund revenues. Unfortunately, it was found that the funds for the Act 51 base investment and additional State funding could not be moved from the Major/Local Street Funds to the Vital Street Fund. The funds appropriated for Vital Streets in the Major/Local Street Funds are clearly identified as a sub-fund and are expended first each fiscal year.

4.6 Evaluation of Goals and Performance Targets

It is anticipated that over the coming years, a reevaluation will be done of the goal, the progress made to date versus the anticipated projected progress, and recommended adjustments. It should be noted that at the time of the SSTF strategy/recommendation, there was not an anticipated \$13 million investment by the General Operating Fund over the course of the program. Also, Public Services has provided an invaluable service of Temporary Paving. This work, scheduled as \$1.6 million/year, was meant to hold streets together that were in Failed or Poor condition until a more permanent investment could be made. It will be important to try to determine how long this investment lasts and adjust the investment strategy/results accordingly. While this treatment deviates from the asset management principles, this treatment keeps the street in a safe condition and also reduces the emergency treatment of pothole repairs. As the need for this treatment is reduced, the Public Services crews will transition to Preventative Maintenance and Rehabilitation work. It should be also noted that to reach the goal of 70% good and fair condition by FY2030 required an annual additional investment by the State of \$6 million beginning in FY2015. The additional funding that was approved will ramp up over a number of years and may not reach the \$6 million mark until year 7 of the program, if at all.







5 Decision Making

5.1 Evaluate Decision Process

The City takes a multi-disciplinary approach to determining the renewal, replacement, and improvement projects to implement in any given year. There were several guiding principles that were used prior to the Sustainable Streets Task Force work:

- Preserve the investment first.
- Maximize available grants (insure available funds for the local match and non-participating shares of costs)
- Utilize the National Functional Classification System (NFC - Principal and Minor Arterials, Collectors, Non-FAU Majors, Locals) to develop priorities.
- Utilize the current average daily traffic (ADT) to further prioritize.
- Review miles of streets, condition and level of investment in each of the 77 precincts to insure all precincts are receiving investment and are on track to reach 70% good + fair condition.
- Utilize grants to partner with others where the local match is not available in the Streets Capital Fund.
- Maximize the leveraging of public utility investment to improve the condition of the streets. (In future, develop an overlay of condition and recommended public utility work with PASER/ NFC/Grants to further stretch the investments.

The Sustainable Streets Task Force added and further refined these principles:

- Well-maintained city streets contribute to the economic vitality and sustainability of our community.
- We want to establish partnerships and leverage other infrastructure investment where possible.
- The city's transportation system should be interconnected, multimodal and designed as Vital Streets.
- We must efficiently move goods and people throughout the region.
- We want to regard city streets as "places" that are walkable, attractive, green, accessible and safe for all.
- We must continuously manage and invest in our street assets.
- We must continuously explore and test new practices and applications as they emerge (e.g. green infrastructure, financing methods, pavement techniques, etc.).

The Vital Streets Plan reflects the fundamental values of our community. In Grand Rapids, Vital Streets shall:

- Be safe and accessible for all members of the community.
- Be soundly designed and well maintained for lasting investment
- Be developed in partnership among city agencies, communities and other stakeholders.
- Promote equitable access to the amenities of the city.
- Expand travel options to increase mobility and improve public health.
- Strengthen community by promoting human interaction and reflecting local character.
- Protect and enhance the environment.
- Embrace innovation and support continuous learning through measurement and evaluation.

The Vital Streets Guidelines, which are being developed, will memorialize how these decisions are currently being made.

As previously discussed, the City Commission approved guidelines prior to the vote in May, 2014. These guidelines related to assuring the funds would be spent appropriately as promised. It also included:

- The City will consider asset management, balance and distribution, outcomes from engagement, maintaining access, completion of safe walking and bicycle routes and coordination with other projects when making annual investments in order to ensure conditions improve in all areas of the City.

Once the City establishes the initial potential project list for a fiscal year the actual field conditions of the project location are verified. The City reevaluates the project list after completing the field inspections to reprioritize as necessary.

5.2 Basic Process Improvement Plan

The City has found several areas where improvements to the decision making process can be made. This section of the asset management plan documents these areas for improvement and provides insight into how the City chooses to approach these changes to the decision making process.

At the time the City embarked on our Vital Streets journey, the **total** Street Capital investment for FY2015 was planned to be **\$500,000**. With the approval of the Vital Streets guidelines, the approval of the income tax increase dedicated to streets for the next fifteen years and the decision to issue short term debt to accelerate the investment, the City will have invested **\$166 million** during **FY2015 – FY2023** or an average of **\$18.5 million/year**. It will be critical in the coming years to implement regularly scheduled preventative maintenance on those segments receiving treatments. It will also be critical to evaluate the effectiveness of the various treatments, especially the temporary paving and Capeseal treatments. The migration from paper forms to CityWorks and tablets will improve the collection of the data.

The selection of which segments to work on is guided by asset management principles, balance and distribution and other factors outlined in the approved Investment Guidelines. Recently, with the completion of the Vital Streets Plan, additional tools have been provided to inform the decision making process. The equity and opportunity analysis (Demographic Need and Connectivity Opportunity matrix) will provide the ability to refine the investment to more closely meet community needs and opportunities. The process to do this will need to be developed. A map utilizing a matrix of Demographic Need versus Connectivity Opportunity demonstrates how this information can be graphically displayed and utilized. Work is already underway to incorporate these factors into the RoadSoft road module framework.

5.3 Collaboration and Integration Plan

The City's Design Team has been meeting regularly for **almost two** decades. The meetings are scheduled for three times each month and include representatives from each department: Planning, Traffic Safety, Engineer-ing, Environmental Services (Sanitary/Storm), Water, Fire and may include other departments and outside agencies for specific project discussion. The meeting provides an opportunity to discuss specific projects, raise and address concerns, and work at consensus for both City designed public projects and private development projects. The work and process of the Design Team is currently being memorialized in the Vital Streets Plan as part of the Implementation section.



6 Establishing Sustainability

6.1 Sustainability Assessment

With the approval of the Investment Guidelines and the subsequent approval by our citizens of the income tax increase dedicated to Vital Streets for 15 years, investment in our streets is on a solid foundation that hasn't been seen in decades.

At the present time, there are 5 revenue streams to fund the Vital Streets and Sidewalks investment: the base investment from Major/Local Street Funds; the Income Tax extension revenue; the City's General Operating Fund; Grants and State Investment. Each stream and the sustainability of the revenue stream will be discussed in detail:

- The first investment guideline states: "The City shall continue to invest \$3.4 million of Major and Local Street Fund revenues to pay for base level street repair, improvement and reconstruction." This revenue stream will remain at \$3.4 million throughout the fifteen years. A provision has been included in the guidelines (Guideline #3) on how this \$3.4 million would be impacted by a decrease in State payments. The guideline states that "for that year shall be reduced by a percentage no greater than the percentage reduction of the total State payments to the Major and Local Street Fund." Guideline #4 provides guidance on "Any increase in State payments as the result of a change in the transportation formula and/or increase in State revenue...". A schedule has been developed and is included in the Appendix of how increased state revenues as a result of the State's General Fund transportation funding would be allocated. The guidelines insure that the base investment will remain available for the 15 year program.
- The second investment guideline states: "At least 84% (estimated at \$8,300,000 annually) of the revenue from the income tax continuation would be dedicated to Vital Street investments and up to 16% (estimated at \$1,600,000) annually) would be dedicated to systematic sidewalk investments." While income tax will vary depending on the economy and other factors, it is projected that for years **FY2024 – FY2028**, the income tax support is estimated to increase from **\$15,709,378** in **FY2024** to **\$16,803,868** in **FY2028**.
- The twelfth investment guideline states: "Beginning in fiscal year 2016 (July 1, 2015), the City Commission will commit to \$13 million of General Operating Fund support for sustainable streets over the next fifteen years with a minimum of \$500,000 per year. In addition, in fiscal years where General Operating Fund financial results are more favorable than the December 2013 projections, the City Commission will make additional strategic investments with a goal of an additional \$1 million per year in sustainable streets." For the recommended **FY2024 – FY2028** Capital plan, the amount is **\$0** in **FY2024** and \$850,000 annually in **FY2025 – FY2028**.
- The City, as a member of the Grand Valley Metropolitan Council (GVMC) Metropolitan Planning Organization (MPO) receives on average about \$3 million/year in grants. These grants are primarily from the Surface Transportation Program – Urban program. The City also seeks other grant funds and has traditionally been successful in receiving Enhancement/TAP grants and more recently Transportation Economic Development Fund – Category A and Department of Commerce Economic Development Administration grants.
- In 2015, the State approved \$1.4 billion in additional revenue for roads and transit throughout Michigan. The funding for each jurisdiction will be allocated based on the existing Michigan Transportation Fund (MTF) funding formula. A portion of the funding, approximately 50% will come from increased gas and weight taxes and registration fees and is considered by Grand Rapids as sustainable. The other half of the funds will need to be approved each year by the legislators and governor and will come from the State's General Fund. Given the State's term limits and pressure on the State's General Fund for other needs, the City will show **\$7,588,511** in **FY2024** to **\$8,014,884** in **FY2028** as revenues, but will include a contingency account which will recognize the GF portion of the State's additional funding. This will begin in **FY2024** with **\$3,794,256** to **\$4,007,442** in **FY2028**. The City will only program projects for these funds once they are approved by the State.

In addition, the Transformation Plan provided a road map to financial resiliency. Phase II of the plan is for sustainable asset management throughout the organization and all assets. A key principle of this work is collaboration of all asset managers. This collaboration work is underway and will continue throughout the 15 year investment in Vital Streets.

While it is difficult to predict the will of future legislators and commissioners and the directions the economies of the State and City, the Investment Guidelines provide valuable information on what the intent of the City in 2014 was. When the guidelines were presented and approved by the City Commission, the Mayor at the time described them as "promises to our citizens". If the citizens approved the income tax continuation, the City would dedicate those funds as well as other funding sources for the duration of the continuation.

The goal of the \$22 million investment each year was to reach 70% good + fair condition with all our streets. The 2022 survey results indicate that the percent good and fair have increased to 61%. At the time of the Sustainable Streets Task Force report, the percent good and fair was 37%. Given the change in investment from 2012 (when the plan was developed), the addition of treatments like temporary paving and the increased use of treatments like capesealing, it may be necessary for the Vital Streets Oversight Commission to revisit the investment and/or the goal and provide a recommendation to the City Commission.

6.2 Program Coordination

The City currently works to coordinate preventative maintenance, rehabilitation and reconstruction with other agencies and asset managers. The City plans to continue this coordination in the future.

Key stakeholders the City coordinates with for design input and funding partnerships are:

- ❖ Design Team
- ❖ Cities with Borderline Streets
- ❖ Grand Valley Metropolitan Council members
- ❖ Michigan Department of Transportation – Grand Region
- ❖ Public and Private Utilities
- ❖ Tax Increment Financing Authorities such as DDA, MNTIFA, and SmartZone and Corridor Improvement Authorities
- ❖ The private sector and development community
- ❖ Citizens

The City also seeks funding partnerships for federal grant programs, such as the Surface Transportation Program – Urban (STPU), Congestion Mitigation and Air Quality (CMAQ) and Transportation Alternative Program (TAP) funding programs, special grant programs, such as Transportation Economic Development Fund – Category A (TEDF-A) and U.S. Department of Commerce Economic Development Administration (EDA), private sector funding partnerships, such as new developments and impact mitigation, and through Special Assessment Districts (SADs), Business Improvement Districts (BIDs) and Corridor Improvement Authorities (CIAs).

Two examples of how the City has accomplished program coordination in the past are:

<p><u>Market Avenue - Williams Street to Fulton Street and Fulton Street - the Grand River to Market Avenue (Contract 1) and Market Avenue - Wealthy Street to Williams Street (Contract 2) (2021/2022)</u></p> <p>The City reconstructed Market Avenue and Fulton Street within the limits shown to relocate the City's Eastside Trunk Sewer from parcels on the west side of Market Avenue to allow for the redevelopment to occur on the parcels. The parcels then can be redeveloped for an amphitheatre, much needed housing and commercial investment. The project included reconstruction of the streets, curb and gutter, sidewalks, ADA sidewalk ramps, and ornamental LED street lighting, replacement of storm and sanitary sewers and water mains, planters, additional street trees, and landscaping.</p>	<p><u>Cesar E..Chavez Avenue - Beacon Street to Martin Luther King Jr. Street (2022)</u></p> <p>This project will begin the reconstruction of a former MDOT trunkline that was turned back to the City in 2017. The project includes reconstruction of the street, curb and gutter, bulbouts to aid traffic calming/pedestrian safety, ADA sidewalk ramps, LEDD street lighting, sanitary sewer separation improvements, water mains and lead water service replacements, rain gardens, additional street trees, and landscaping.</p>																																
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6.3 Demand Management

It is difficult to manage expectations given the condition of our streets, the lack of attention and investment through the years, the length of the program and the limited knowledge by the public of asset management principles.

With the help of our Community Engagement and 311 staffs, we have been able to address many of the questions about when their street may be done. We have also insured that the message of asset management of preserving what is in fair condition, then rehabilitation and finally reconstruction has been communicated at every opportunity. The value of temporary paving in this area cannot be underestimated. The City has used temporary paving by our Public Services crews to overlay the streets in the poorest condition until a more permanent repair can be made. The Public Services department is paid by the ton for temporary asphalt placed through the Vital Streets Fund. Further work and discussion about the preventative maintenance of the temporary paving and the life of the pavement will need to be reviewed in future years. The goal would be to transition the work of Public Services from temporary paving to the preventative maintenance and/or rehabilitation paving that is now done by private contractors.

The temporary paving may also serve the City well as we move from preventative maintenance and rehabilitation to reconstruction. Given the cost of reconstruction versus preventative maintenance and rehabilitation, less work will be able to be done in any given year, possibly increasing the demand.

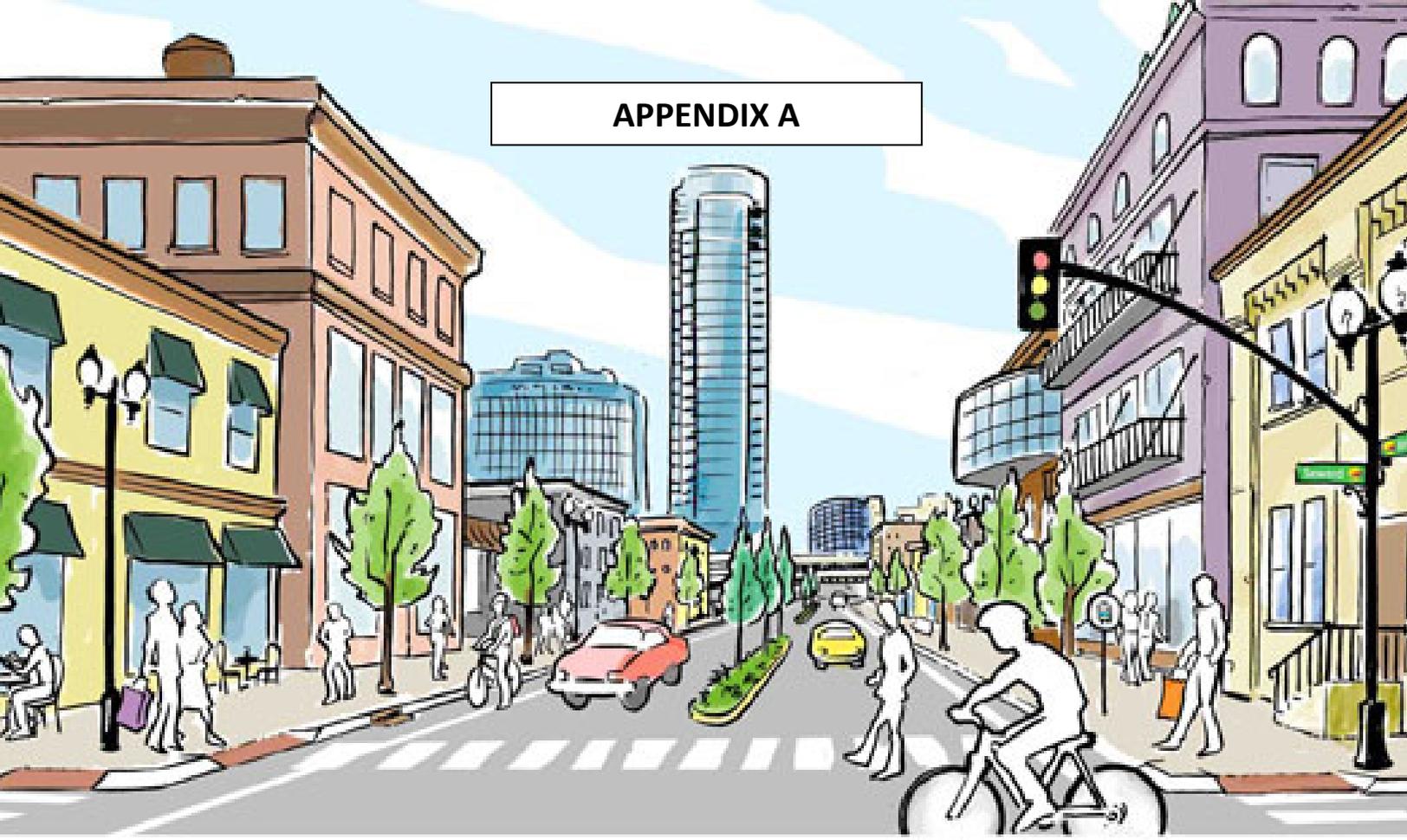
6.4 Emerging Technology

The City continually monitors new methods and materials that may increase the life and/or reduce the costs of the investment. The City takes a conservative approach by researching similar applications with similar climates, but has included test sections of promising materials. Recently, on a busy truck hub (Steele Avenue), the City redid the street using different cross-sections including roller compacted concrete. The City plans to evaluate the results of this application as well as other trials before adding any treatment to the City's toolbox of treatments.

7 Conclusion

The City of Grand Rapids has been on a long journey of reestablishing the investment in our infrastructure. This journey for our street assets with lessons learned and continuous improvement is not over. We have learned much, beginning with our 21st Century Infrastructure Task Force setting a framework that included asset management, the painful, yet necessary Transformation Advisors emphasis of asset management and the Sustainable Streets Task Force setting a clear vision for reaching a goal of 70% good and fair condition by 2030 utilizing asset management and RoadSoft and with the invaluable support of Transportation Asset Management Council and Center for Technology and Training. This City of Grand Rapids Asset Management Plan for Streets compiles the information of the journey and the vision for the future. The goal is to update the asset management plan annually. The best time to do this is late in the calendar year when information is completed on the work done that year as well as the current condition of all our streets. This is also the time when the Capital Plan is developed for the City and includes all assets. The work completed and condition of the streets will inform the recommended investment for the Five Year Capital plan which can then be used to update this Asset Management plan. It will also be the time that this information will be submitted to the Transportation Asset Management Council via the Investment Reporting Tool. A link to the current City of Grand Rapids information as well as the State and other communities can be found here: <http://tamc.mcgi.state.mi.us/tamc/#/>

APPENDIX A



Sustainable Streets Task Force Report

August 13, 2013

August 13, 2013

Dear Mayor, City Commissioners, City Employees and Citizens of Grand Rapids,

We, as your Sustainable Streets Task Force, have been studying the dilemma of how to create Vital Streets in a time of economic challenge. In many respects, we feel like a fish trying to swim upstream in a flood. The City has struggled to provide important services and transform, residents have seen declines in their property values, and businesses have struggled as we have all been impacted by the Great Recession. There will be some people who say “it is what it is” about the condition of our streets. We have learned over the past 18 months that we have no luxuries in terms of time, money, or options. Streets are vital to our shared future success as a community and must be a priority. Delay in addressing this issue is not an option.

If we want Grand Rapids to remain the great city we know it to be and to have a prosperous future, our infrastructure must be able to support the various needs of neighborhoods, businesses, residents and visitors. Our streets have daily impacts on our lives, jobs, economy and families. Decisions made by businesses and homeowners on where to locate or relocate are swayed by the condition of the public infrastructure they see. Property values are impacted by negative “curb appeal” when street infrastructure is crumbling and car repair bills mount with every pothole.

The City’s street system is a vital asset of more than \$1 billion in value. We know we can extend the useful life of this investment through a planned approach utilizing asset management. And, by designing in all the appropriate features for a particular street, we also create value - value that is shared by everyone in Grand Rapids and throughout the region. We must begin to take the necessary action that preserves this investment or else our streets will deteriorate from 60% in poor condition today to nearly 90% poor in 6 years if no new investment occurs.

In 2011, the City’s Transformation Advisors recommended that our community tackle tough issues, such as the sustainability of our streets, “with data, discussion, and deliberate decision-making.” The Sustainable Streets Task Force has done just that. We could not agree more that “Our community cannot afford to debate for years the best approach to resolve our fiscal challenges or else our problems will only grow larger.” To date, State leaders have not been willing, or able, to lead us to a viable transportation funding solution. Local action is required.

It is clear to us that the City’s operational transformation will be complete by June 30, 2015 and that the temporary income tax increase will no longer be needed for that purpose. For the same investment we are already making, we can transform our street system from 60% poor to 70% in good repair over the next 15 years, improve our sidewalk system and eliminate property owners’ responsibility for the repair or replacement of sidewalks in front of their parcels. The best near-term option is ask voters to extend the current City Income Tax rate beyond June 30, 2015, and to invest those resources to achieve vital street and sidewalks outcomes. A special election held in May, 2014, would allow the time needed to inform voters prior to the election and for income tax forms to be amended (the cost of a special election is less than the cost of an out-of-cycle adjustment to income tax rates). We simply cannot afford to wait for others to fix our problems.

Respectfully Submitted,
The Sustainable Streets Task Force

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Mark De Clercq (*City Engineer*)

Scott Buhner (*Chief Financial Officer*)

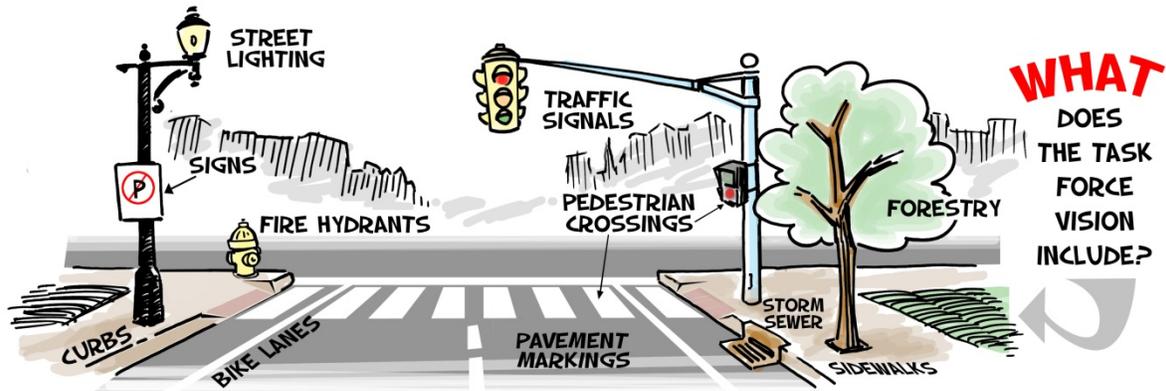
Michael Moore (*Graphic Illustrator*)

Alicia Bernt (*Administrative Secretary*)

Vaughn Umphrey (*Public Services, retired*)

Executive Summary

This report was prepared by the Sustainable Streets Task Force. We are a citizen’s task force representing diverse community interests created by the Grand Rapids City Commission, to provide recommendations about the crisis currently facing our public streets. “Streets” were central to our evaluation; however, as we explored the community’s vision, the scope of our work expanded to include critical infrastructure assets within our rights-of-way, particularly sidewalks and green infrastructure. A “sustainable” street is one that is not only in good or fair condition at a reasonable cost, but one that serves a variety of critical functions. Our streets will fulfill a vital role in meeting the economic, social and environmental needs of our city.



Problem

On February 22, 2011 the City’s [Transformation Advisors’ final report](#) strongly urged city leaders to focus on four key areas to position Grand Rapids for a successful future: address the structural deficit; reform public safety; invest in streets and infrastructure; and focus on quality of life. Investment in streets and infrastructure has been a significant issue for more than a decade. The 21st Century Infrastructure Task Force provided recommendations in 2002 regarding the amount of investment needed to restore and maintain our streets. Their recommendations relied upon others taking action first, before significant local investment was requested of the voters. Those pre-conditions were never met, so as a result, no progress was made. Grand Rapids’ streets deteriorated from approximately 60% in Fair to Good condition in 2002 to over 60% in Poor condition today.

Purpose

The Task Force was charged with identifying solutions to Grand Rapids’ funding and maintenance crisis for public streets. Our work to achieve a sustainable street system included:

- Review and update the work of the [21st Century Infrastructure Task Force](#);
- Create a future vision for the role of our streets;
- Determine desirable street condition and asset management approaches;
- Identify alternatives and recommend options for future investment; and
- Listen to community interests.

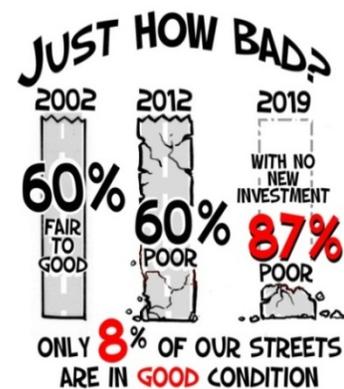
Process

Our charge began in February, 2012 with meetings twice monthly. We worked diligently with city staff to understand the current funding structure for 588 miles of public streets, how levels of condition are determined, and what realistic approaches might be used to develop an implementable solution. Nearly a dozen scenarios on street condition and levels of investment were evaluated. A great deal of discussion ensued. We focused on pragmatic approaches that would achieve our vision while also balancing the community's economic reality. Presentations in each City Ward, stakeholder meetings, and periodic updates to the City Commission were provided to "check in" with the community for accountability and to gain insight.

Findings

Three illustrative summaries depicting the Vision, Condition, and Investment findings and recommendations have been provided at the end of this Executive Summary. A number of findings that were made during the task force process informed our recommendations. The following summarizes notable concepts.

- **Businesses and residents understand that poor public infrastructure has real costs.** We heard complaints about car repairs, frustrated statements from people who take pride in their homes - but their streets look abandoned, stories from real estate and economic development professionals that purposely choose routes to avoid the worst streets when trying to show the "best" of Grand Rapids to prospective new residents and businesses.
- **Good design is important.** Designing public streets with appropriate features, such as bike lanes, ADA curb cuts, sidewalks, and low impact development, in the appropriate places plays a significant role in meeting desired community outcomes. The amount of acreage devoted to our street right-of-way is three times larger than our park acreage and is deserving of thoughtful design for all people in our city.
- **Immediate action is required to bring our streets back to acceptable conditions.** We have bad streets now and they will only get worse in the future. The longer we wait, the more expensive the fix. If we are to be responsible stewards of our city then action is needed now.
- **Comprehensive asset management is a necessity, not an option.** Repair or replacement of infrastructure without managing how it is done on a systematic basis with adequate resources will not provide desired results. Early investments in preventive maintenance and rehabilitation in order to save those streets that could be in Good or Fair condition, whereas other streets must be reconstructed, is desperately needed. The current Point-of-sale sidewalk program, however, provides an ineffective shot-gun approach and is need of an overhaul.



- ***Investing now will transform our city.*** Our vision is about moving people – to shops, jobs, education, health care, recreation and places of worship - not just vehicles. Vital streets serve everyone, create value of place and protect the natural resources our city. Foundations for our vision are present in the City’s [Master Plan](#), [Green Grand Rapids](#), the [Sustainability Plan](#) and in the [report of the Transformation Advisors](#).
- ***Grand Rapids must continue to take charge of its own destiny.*** State and Federal agencies have a transportation funding role and have been partners in the past. While there is agreement that increased investment in transportation is needed, there is no agreement on a method to provide that funding. We can’t wait any longer to see what others will do. Action is required now in order to avoid further deterioration of our streets and ensure Grand Rapids remains a vital city.
- ***We must think long-term.*** Available funding mechanisms for public streets at the local level are very limited. Structural solutions are necessary to create viable transportation funding options for our city. We must continue to advocate for long-term change while using the tools available to us now to solve our immediate and pressing problem.
- ***Grand Rapidians are ready to invest in their streets.*** Task Force members were encouraged in community conversations to provide a reasonable solution that would be affordable yet provide enough investment that would make a difference. Citizens shared a desire to see work on city streets start sooner than later.

Recommendations

The specific recommendations of the Sustainable Streets Task Force are intended to preserve and improve city streets and rights-of-way as a vital asset of our city. Grand Rapids’ ability to achieve desired economic, environmental, and quality of life outcomes are dependent upon how fully these recommendations are implemented. Additional detail is provided in the full report.

1. Maintain 70% of streets in a “State of Good Repair” (either in Good or Fair condition) within the next 15 years.
2. Invest \$22 million per year in streets, sidewalks and public rights-of-way; with approximately \$3.4 million from current Gas Tax Revenue, \$3 million from grants; \$9 million from local sources and approximately \$6 million from new State monies.
3. Provide the opportunity for citizens to choose to continue the current income tax rate beyond June 30, 2015, for an additional 15 years and direct that 0.2% of funds be used only to invest in our street system, including sidewalks.
4. Advocate to both State and Federal legislators for increased transportation investments at the local level.



5. Ensure streets and sidewalks are accessible for everyone.
6. Investment in sidewalk repair and replacement should be the responsibility of the City.
7. Amend the City Charter to remove the provision regarding property owner responsibility for repair and replacement of sidewalk fronting their property; sunset the current Point-of-Sale Program.
8. Establish a citizen's oversight group to monitor performance of street investments and progress toward Vital Streets; report to taxpayers on outcomes. Tax revenue raised through the continued 0.2% income tax should be deposited in a separate Sustainable Street Fund for maximum transparency.
9. Continue research and implementation of new methods for street maintenance and construction to ensure that best practices are being followed. Research and implement new methods of investment as they become available and are found to be acceptable and reliable funding sources.
10. Use a comprehensive Asset Management Program to manage street and sidewalk infrastructure investments.
11. Evaluate all streets recommended for improvement for the suitability of green infrastructure to manage stormwater. Green infrastructure should be implemented where site conditions allow as outlined in the City's Technical Reference Manual.
12. Partner, whenever practically feasible, with other agencies, non-profits and community groups to advance the vision and desired outcomes of the Sustainable Streets Task Force.

Conclusion

It is critical that action be taken immediately to stop the deterioration of our streets and reverse years of disinvestment. Asset management requires resources. We have learned from past mistakes that our community must be responsible stewards of our infrastructure and that we need to try to find a local solution first. Our Task Force believes that the most reasonable and equitable option would be to provide citizens with the opportunity to extend the current City Income Tax rate beyond June 30, 2015. Collections for additional investment in streets and rights-of-way would commence at that time. An amendment to the City Charter to remove owner responsibility for the repair of sidewalks should also be placed on the ballot.

Enacting these changes will take months; an election would need to be scheduled in 2014. Information will need to be provided to voters and additional community discussions must occur. A special election held in May, 2014, would allow this needed time while still providing ample notice to prepare income tax forms for amendment following the election. (Note: The cost of a special election is less than the cost of an out-of-cycle adjustment to income tax rates.)

Sustainable Streets Task Force

Who We Are

The Grand Rapids City Commission appointed 35 business, neighborhood and community leaders to the Sustainable Streets Task Force in early 2012.

Represented stakeholder groups included:

- 21st Century Infrastructure Task Force
- Disability Advocates of Kent County
- Transformation Advisors
- Businesses
- Neighborhoods
- Grand Rapids Bicycle Coalition
- Grand Rapids Area Chamber of Commerce
- Grand Rapids City Commission
- State of Michigan Office of Urban Initiatives
- MI Dept. of Transportation
- Grand Valley Metro Council
- ITP – The RAPID
- Kent County Road Commission
- West Michigan Hispanic Chamber of Commerce
- West Michigan Environmental Action Council (WMEAC)

Sustainable Streets Task Force Membership

A complete listing of Task Force members is provided below:

City Commissioner Ruth Kelly

City Commissioner Elias Lumpkins

Rick Baker/Joshua Lungert (*GR Area Chamber of Commerce*)

Johnny Brann, Jr. (*Brann's Steakhouse and Transformation Advisor*)

David Bulkowski/Kim Frost (*Disability Advocates of Kent County*)

Steven Elliott (*Materials Testing Consultants and 21st Century Task Force*)

Cherie Giles (*Neighborhood Advocate*)

Jack Hoffman (*Attorney, Kuiper Orlebeke PC and 21st Century Task Force*)

Harvey Hollins/Erika Rosebrook (*MI Office of Urban Initiatives*)

Rachel Hood/Elaine Sterrett Isely (*West Michigan Environmental Action Council*)

Cindy Irving (*Fishbeck, Thompson, Carr & Huber*)

Johannah Jelks (*Neighborhood Advocate*)

Mary Kenyon (*Neighborhood Advocate*)

Erick Kind (*MI Dept. of Transportation*)

Joshua Leffingwell (*The Salon, bicycle & neighborhood advocate*)

Theresa Petko (*URS Corporation and 21st Century Task Force*)

Paul Plotkowski (*Grand Valley State University and 21st Century Task Force*)

Father Mark Przybysz (*Catholic Diocese of Grand Rapids*)

Christopher Reader (*Green Grand Rapids co-chair*)

Milt Rohwer (*Transformation Advisor and 21st Century Task Force*)

Darell Ross, II (*LINC-Community Revitalization Inc.*)

Carlos Sanchez (*previously of Hispanic Chamber of Commerce*)

Scott Steiner (*Attorney, Rhoades McKee PC*)

Rick Treur (*Calvin College and Planning Commission*)

Peter Varga (*The RAPID*)

Steve Warren (*Kent County Road Commission*)

John Weiss (*Grand Valley Metro Council*)

Deborah Johnson Wood (*Alpha2Omega Writing Services*)

Bob Zylstra (*Feyen Zylstra, LLC*)

Our Charge

The Sustainable Streets Task Force was charged with identifying solutions to Grand Rapids' streets funding and maintenance crisis. Our work to achieve a sustainable street system included:

- Review and update the work of the [21st Century Infrastructure Task Force](#);
- Create a future vision for the role of our streets;
- Determine desirable street condition and asset management approaches;
- Identify alternatives and recommend options for future investment; and
- Listen to community interests.

Process

Our charge began in February, 2012 with meetings twice monthly. We worked diligently with city staff to understand the current funding structure for 589 miles of public streets and other infrastructure, how levels of condition are determined, and what realistic approaches might be used to develop an implementable solution. Nearly a dozen scenarios on street condition and levels of investment were evaluated. A great deal of discussion ensued. We focused on pragmatic approaches that would achieve our vision while also balancing the community's economic reality.

In May 2012, we presented our findings on the *State of the Streets* to the community. Three community meetings (one held in each of the 3 city wards) and sessions with the Transportation and Legislative Committees of the Grand Rapids Area Chamber of Commerce followed to share this information. In February, 2013, we presented our preliminary findings and recommendations to the City Commission. Eight focus group meetings and additional presentations were then held throughout the community to gather feedback.

Community engagement was an important part of finalizing our recommendations on investment and investment outcomes. We felt that it was important to “check in” periodically with the community for accountability and to gain insight. These meetings reached a total audience of well over 150 residents or business owners.

Public Assets in the Right-of-Way

Streets:

Principal Arterials	35 miles
Minor Arterials	74 miles
Collectors	48 miles
Local/Neighborhood	<u>432 miles</u>
Total All Streets	589 miles

Other Considerations:

Bridges	22
Alleys	63.59 miles
Brick Streets	4.33 miles
Cobblestone St.	1/8 mile
Sidewalks	1,134 miles
Sidewalk Ramps	25,000+
Intersections	4,800
Street Trees	62,000+
Street Lights	20,000+
Pavement Markings	
Signs	



Information on our work and our presentations were made available to the community on the City’s website as well as on the Grand Rapids Sustainable Streets Task Force Facebook page. Visitors to these sites were encouraged to provide us with their comments and ideas.

Task Force members have testified before House and Senate Legislative Committees and participated in the Rebuild our Region Transportation Summit sponsored by Grand Valley Metropolitan Council and the Grand Rapids Area Chamber of Commerce.

Members of the Task Force and City staff also participated in local radio and cable television shows to provide information on the condition of our streets, the work of the Task Force, and preliminary recommendations. We have learned that our businesses and citizens are ready to invest in a quality transportation system. They are tired of poor streets and understand the need to take immediate action to bring our streets back to an acceptable condition.

City Commission Presentations

- [5/22/12 State of the Streets Report](#) presented to City Commission by SSTF
- [2/12/13 Vital Streets – A Vital Component of a Vibrant City](#) – Interim Report of the SSTF presented to the City Commission

Community Engagement

- Community Meetings held:
 - 6/21/12 – Harrison Park School
 - 6/25/12 – Kroc Center
 - 6/26/12 – Congress Elementary
- [7/26/12 Presentation to Transportation Committee of the Chamber of Commerce](#)
- 3/15/13 Presentation to West MI Regional Planning Commission
- [4/8/13 GVMC/GRACC “Rebuild our Region” Transportation Summit](#)
- [10/30/12 State Senate Transportation Task Force](#)
- Stakeholder Focus Group Meetings held:
 - 5/06/13 - Monday Group (minority and majority contractors organization)
 - 6/06/13 - Area Agency on Aging
 - 6/19/13 - Neighborhood Business Alliance
 - 6/19/13 - Hispanic Center of West Michigan
 - 6/20/13 - Disability Advocates
 - 6/20/13 - Rapid Growth – *Not Your Average Speaker Series*



6/25/13 - New Hope Baptist Church – Community Meeting
6/27/13 - Harrison Park School – Community Meeting
7/12/13 – Monroe North Business Association
8/06/13 – Kiwanis Club

- Transportation Town Hall Meeting:
6/10/13 – Grand Rapids Town Hall meeting organized by Rep. Rob VerHeulen
- Testimony to Michigan State Legislature: [Grand Rapids and Michigan’s Transportation System](#) | by Eric R. DeLong, City of Grand Rapids Deputy City Manager | January, 2013
- Radio & Cable Channel Appearances:
2/14/13 [Hispanic Radio Station Interview](#)
5/21/13 [Focus on Issues](#) with Sister Barbara Hansen (GR Community Media Ctr)
6/05/13 [Bliss for GR](#) with Commissioner Rosalynn Bliss (GRCMC)
- Sustainable Streets Task Force [Facebook Page](#) – view the presentation used at the 2013 Focus Group Meetings



Sustainable Streets Task Force “In the News”

- [Grand Rapids streets in 'crisis' prompt call for millage and Michigan gas tax hike](#) M-Live, by [Matt Vande Bunte](#) | [mvandebu@mlive.com](#) | May 22, 2012
- [Task force: Most Grand Rapids streets rated "poor"](#) WZZM 13 | by [Matt Campbell](#), Executive Producer | May 22, 2012
- [Report: 61% of GR streets labeled 'poor'](#)-Could cost more than \$11 million per year to fix WOOD TV-8 | May 22, 2012
- [Leaders in pothole-ridden Grand Rapids anxious for Gov. Rick Snyder's roads funding plan](#) M-Live | by [Zane McMillin](#) | [zmcmilli@mlive.com](#) | January 16, 2013
- [G-Sync: Taking It to the Streets](#) Rapid Growth | by Tommy Allen, Lifestyle Editor | February 07, 2013
- [GR roads task force: Invest \\$9M/year](#) - 63% of Grand Rapids roads rated 'poor' WOOD TV-8 | February 12, 2013
- ['Citizens of Grand Rapids, we must invest in our streets, and we must do it now'](#) (Guest column) M-Live | by [Dave Murray](#) | [dmurray@mlive.com](#) | February 22, 2013
- [Grand Rapids 'may very well need additional resources'](#) M-Live | by [Matt Vande Bunte](#) | [mvandebu@mlive.com](#) | February 22, 2013
- [Sustainable Streets?](#) Rapid Growth | Thursday, June 06, 2013

Our Predecessors: The 21st Century Infrastructure Task Force

In 2001, another City Commission-appointed task force, the 21st Century Infrastructure Task Force, was charged with developing recommendations to achieve a comprehensive street repair and reconstruction program that would ensure high quality streets requiring only routine, systematic maintenance. In 2002, the 21st Century Infrastructure Task Force recommended that \$12.5 million dollars should be invested annually to maintain and upgrade Grand Rapids' street system in order to achieve that goal.

A total of \$8 million was invested in streets from the City's General Operating Fund (GOF) in FY 2002. This was the largest annual investment in streets made over this past decade, but only 2/3rds of what was needed. GOF contributions were reduced to roughly one-quarter of the resources required to maintain and construct a quality system in FY11 (~\$3 million). Today, the City's GOF investment in streets has dropped to zero. Drastic reductions in State revenue sharing payments, declining property tax and income tax receipts, and other economic factors have directly impacted our ability to maintain hundreds of millions of dollars in infrastructure. The City now receives approximately \$11 million less in State revenue sharing annually while costs continue to rise.



21st Century Infrastructure Task Force recommendations for investment of \$12.5 million per year were not achieved because of General Operating Fund (GOF) struggles, declining gas tax payments to the City, reduced state revenue sharing, no new sources of investment, and worsening Federal, State and local economic conditions.

The Task Force, at that time, felt the City had met many necessary conditions to seek more resources -- most importantly, that the City's "house was in order." Still, they wanted every effort to be made to seek other, broad-based resources before seeking increases from local resources. The key conditions set by the 21st Century Infrastructure Task Force before additional resources were to be requested through a proposed income tax or millage included:

1. Initiate an increase of GOF subsidy to 25% of Gas & Weight Tax revenues;
2. Make a significant and good faith effort to establish a county-wide surcharge; and,
3. If still needed, go to voters as a last resort.

The first two precursors, before going to voters, never came to pass. The State has not increased its investment in streets and enabling legislation for a county-wide registration fee could not be

introduced or passed through the legislature. New local resources were never requested from voters. As a result, as state and local investment in streets has continued to decline, the City's ability to properly maintain its important assets has been substantially impaired; resulting in streets that are in poor condition and an incomplete sidewalk network.

The Executive Summary of the 21st Century Infrastructure Task Force is included as Appendix B. The full report may be accessed [here](#).

Transformation Advisors

The Transformation Advisors, a collective of insightful community leaders, were called upon in March of 2010 to provide guidance as the City worked its way through very challenging economic times. Members were selected by the Mayor and Commissioners as persons who demonstrated a deep passion for their community and a commitment to ensuring a bright future for Grand Rapids. The intent was to establish a forum where the wisdom and counsel of the group would help define and drive transformative change.

On February 22, 2011 the City's [Transformation Advisors' final report](#) strongly urged city leaders to focus on four key areas to position Grand Rapids for a successful future:

- address the structural deficit;
- reform public safety;
- invest in streets and infrastructure; and
- focus on quality of life.

“For many communities, street beautification has been viewed as an unnecessary expense. But as cities compete for investment, new residents, and tourists, there can be a substantial return on design dollars. . . . And indeed, cities that have invested in their public realm are seeing improved property values and increased retail sales.”

[Why Street Design Matters - www.planetizen.com](#)

The Advisors stated: *“Deferred investment and disinvestment in our physical infrastructure cannot continue. Revenues must be increased to pay for maintenance and reconstruction of our community's streets, alleys, and bridges. The State of Michigan should be encouraged to increase the state gas tax or, failing that, a dedicated local tax proposal should be examined to ensure proper maintenance and management to avoid exponentially higher replacement costs. Following a Complete Streets strategy so that all citizens have access to meet daily needs by bike, car, walking, or transit is important. Neighborhood infrastructure assets, such as housing stock and streetscapes, are the foundation of our community. Investment is necessary to prevent deterioration of our infrastructure, encourage economic development activities, and position our citizens and city for the future.”*

In regard to streets, it was recommended that the City:

1. Support the recommendations of the 21st Century Infrastructure Task Force and consider updating the Task Force report to more accurately reflect the current state of streets funding, rising materials costs, and maintenance and construction needs.
2. Identify the financial resources to improve the condition of Grand Rapids' streets; if not through state action that re-evaluates the 1997 State Gas Tax, then through a targeted local tax proposal.
3. Focus on "Complete Streets" design when making future investments based upon Green Grand Rapids recommendations.

The City's [Master Plan](#), [Green Grand Rapids Report](#), and [Sustainability Plan](#) were noted as the guiding documents for decision-making as the city transforms. It was felt that the hundreds of meetings with thousands of city residents and stakeholders which contributed to the creation of these documents should be honored and respected.

It was based on these recommendations that the Mayor and City Commission appointed the Sustainable Streets Task Force as a means of identifying solutions to the City's street crisis. A copy of the Executive Summary of the Transformation Advisors final report is included in Appendix C. The full report may be accessed [here](#).

The City's Transformation Journey

The Mayor and City Commission sought to implement the recommendations of the Transformation Advisors by appointing us, the Sustainable Streets Task Force, in February of 2012. We have tracked with the work of the City's Transformation Investment Plan¹ and find that significant progress has been made in eliminating the city organization's structural deficit. This important work sets the stage to create a sustainable asset management strategy for our community's infrastructure, including our streets. Our work has been to assess the current condition of streets and other infrastructure within the public rights-of-way to determine the level of investment required to maintain and/or improve these important public assets. This effort is the next logical step in our City's transformation journey.

In three short years, the City has worked its way from a series of General Operating Fund (GOF) operating deficits to a point where in Fiscal Year 2013, the first deposit of operating surpluses since FY2005 was made to the Budget Stabilization Fund. The five-year GOF budget projection indicates that the City Commission and City Manager will be able to continue to build both the

¹ The essence of the Transformation Investment Plan is to create the quality of life outcomes required to support a thriving regional urban center within available resources. Each department has undergone a thorough examination in order to determine how to simultaneously meet expenditure and outcome targets.

Budget Stabilization Fund and GOF Fund Balance to the targets set by fiscal policy. This has been accomplished by reducing total compensation for all staff members by 12.5% over two contracts, achieving GOF operational savings that will approach 10% by Fiscal Year 2015, and benefiting from improved economic performance.

Commitments made when voters approved the temporary income tax have been honored. The City's Transformation Investment Plan Dashboard includes a [Transformation Fund Overview](#), a report on investments made from the Transformation Fund. Support for community policing, an additional fire rescue squad, and use of the balance of funds to invest in transformative projects are detailed.

Transformation Plan Phases

The City's Transformation Plan is designed to achieve a sustainable operations and asset management platform in three phases:

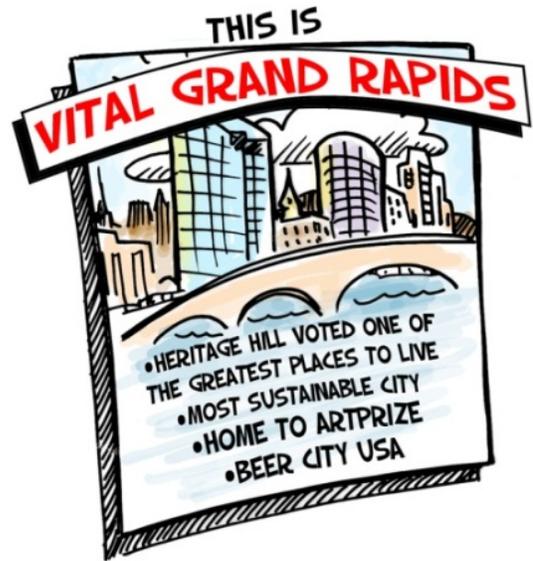
- **Phase I - Operations**
Desired Outcome: Achieve solid operating performance; General Operating Fund revenues will equal or exceed General Operating Fund expenditures on an ongoing basis.
- **Phase II - Asset Management**
Desired Outcome: Preserve public infrastructure assets; use planned, consistent, strategic investment strategies to insure the infrastructure necessary for urban life (such as streets, parks, buildings, and stormwater) is in good repair.
- **Phase III – Sustaining Best Practices**
Desired Outcome: Never go back to former state; continuous improvement must never cease. The organization shall use effective tools and practices, like Lean Thinking, to keep positive momentum.

The [Fiscal Year 2014 Fiscal Plan](#) Management Letter describes the need to focus on sustainable asset management as the City enters into Phase II of its Transformation Plan. In September of 2013, a detailed plan for Phase II will be released. Our report recommendations are a critical component of this work. We agree that transformation will provide a solid foundation for residents, businesses and neighborhoods to achieve their potential. Their success can be supported by a sustainable city that is not a financial or physical distraction. This important work must continue.

Basis

Our Vision

Grand Rapids is recognized regionally and nationally as a vital community. It is this vitality that attracts new residents and businesses to the City and makes them want to locate and remain here. The current condition of our streets threatens to weaken the very foundation on which our successes have been built - those elements that make this a great city in which to live, work and play.



One of our oldest neighborhoods, Heritage Hill, was named "One of the great places to live in America" by the American Planning Association. We're known for our work in Sustainability and, in 2010, were named the Most Sustainable Mid-size City in the U.S. by the U.S. Chamber of Commerce and Siemens Corporation. Grand Rapids is also home to ArtPrize, the world's largest open art competition that turns the City into a public art venue where visitors roam among the artists' work and vote for their favorites. Streets and other infrastructure within the public right-of-way such as trees, sidewalks and bike lanes, create the context for a healthy and vibrant community. Walkable neighborhoods require sidewalk ramps and shade. Animated business districts demand on-street parking, wide sidewalks and attractive landscaping - even better if stormwater is also managed where it falls.

Will Grand Rapids continue to be a great place to invest in a home or business? To visit? To attract and retain a high-quality work force and their employers? If our street system fails, so will we. Grand Rapids must be able to provide the infrastructure needed to drive important outcomes. Our vision for the future of our streets system is described below.

Our Vision

City Streets and rights-of-way will be accessible, attractive, and safe, serving all people of our community, contributing to the livability of our neighborhoods and business districts and increasing economic opportunity to individuals, businesses, and new development.

Infrastructure assets will be maintained and well-managed, using a multi-faceted funding strategy and innovative approaches to preserve our investment.

Our Desired Outcomes

The City's [Master Plan](#), [Green Grand Rapids Report](#), and [Sustainability Plan](#) were noted by the Transformation Advisors as the guiding documents for decision-making as the city transforms. Our Task Force relied on these plans, task force discussions, and community input to create the following guiding principles and to define desired outcomes. The framework for desired outcomes is derived from themes of the City's 2002 Master Plan:

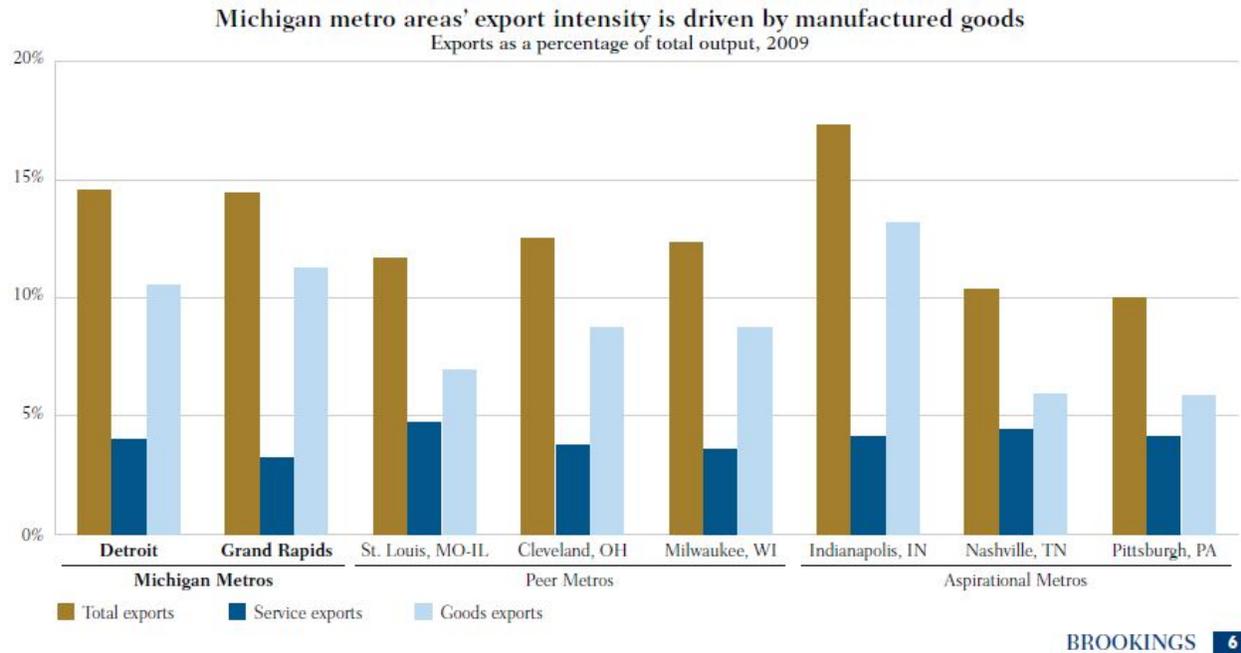
- A Strong Economy
- Vital Business Districts
- Great Neighborhoods
- Balanced Transportation
- A City that Enriches our Lives
- A City in Balance with Nature
- Partnerships

Guiding Principles

- Well-maintained city streets contribute to the economic vitality and sustainability of our community.
- We want to establish partnerships and leverage other infrastructure investment where possible.
- The city's transportation system should be interconnected, multimodal and designed as Vital Streets.
- We must efficiently move goods and people throughout the region.
- We want to regard city streets as "places" that are walkable, attractive, green, accessible and safe for all.
- We must continuously manage and invest in our street assets.
- We must continuously explore and test new practices and applications as they emerge (e.g. green infrastructure, financing methods, pavement techniques, etc.).

A Strong Economy

We know businesses care about the quality of our streets. Streets are essential for getting retail and manufacturing products to companies, then distributed to customers. We need to ensure that our streets will allow businesses to get their products and services to, and from, all markets.



The chart, above, from the Brookings Institution Report on Michigan's Economic Condition depicts export intensity and shows that Grand Rapids is right on par with our counterparts in the Midwest. The report finds that Detroit and Grand Rapids are among the most export-intensive large metropolitan areas in the nation, sending just under 15% of their total output abroad in 2009. Not surprisingly, Canada is the top trading partner for these two large metropolitan areas. We export most of our goods to Canada by truck - and these trucks use our streets.

Vital Business Districts

When we ask a simple question of citizens - which of our business districts do you like to shop in? The consistent answer involves districts with good streets, walkable sidewalks, shade, curb ramps, cross walks, lighting and interesting amenities. In other words, comfortable and interesting places. Occupancy rates in business districts reflect this simple preference. Districts with broken down infrastructure struggle.²

² Neighborhood Ventures - Mind the Gap Retail Market Study for the Uptown, Southtown and South West Micro-Regions of Grand Rapids. June 2007. Camoin Associates

Is there a positive economic impact when we reconstruct a street? Our experience here in Grand Rapids shows that there is. Examples of good results include Cherry Street, East Fulton, Ionia Avenue, Diamond Avenue, Grandville Avenue, Wealthy Street, Plainfield Avenue and Monroe Center. Neighborhood areas such as those around Madison, Logan, Sherman, Lake Drive and Ethel have all seen the benefits.

Empirical research also shows that property values increase when you have better streets. “For many communities, street beautification has been viewed as an unnecessary expense. But as cities compete for investment, new residents, and tourists, there can be a substantial return on design dollars. . . . And indeed, cities that have invested in their public realm are seeing improved property values and increased retail sales.”³

Great Neighborhoods

“Complete streets boost the economy by increasing property values, including residential properties, as generally homeowners are willing to pay more to live in walkable communities.”⁴

Grand Rapidsians take pride in their neighborhoods. Community pride is reflected in homes, yards and neighborhood associations. The quality of our streets and public rights-of-way directly affects the quality of neighborhood life. During community meetings, neighbors told us stories about how they have tried to mitigate an obvious problem. Examples included:

- A homeowner described providing guests with specific directions to her home in order to avoid the worst streets.
- A realtor told us how he used circuitous routes in order to avoid bad streets in the neighborhood for house showings.
- One West Side resident told us of the pride he had in his home and all the care he took to make it special. Then, he showed us a picture of the broken down curb in front of his house. His simple statement was that this missing curb directly affected his quality of life and property value.



³ *Why Street Design Matters* - www.planetizen.com

⁴ Complete Streets - www.completestreets.org

ACCESSIBILITY
 WE NEED TO PROVIDE
 QUALITY ACCESSIBLE TRANSPORTATION OPTIONS
 FOR ALL MODES SO PEOPLE CAN GET TO WORK,
 SCHOOL, HEALTHCARE, SHOPPING AND PLACES OF WORSHIP.

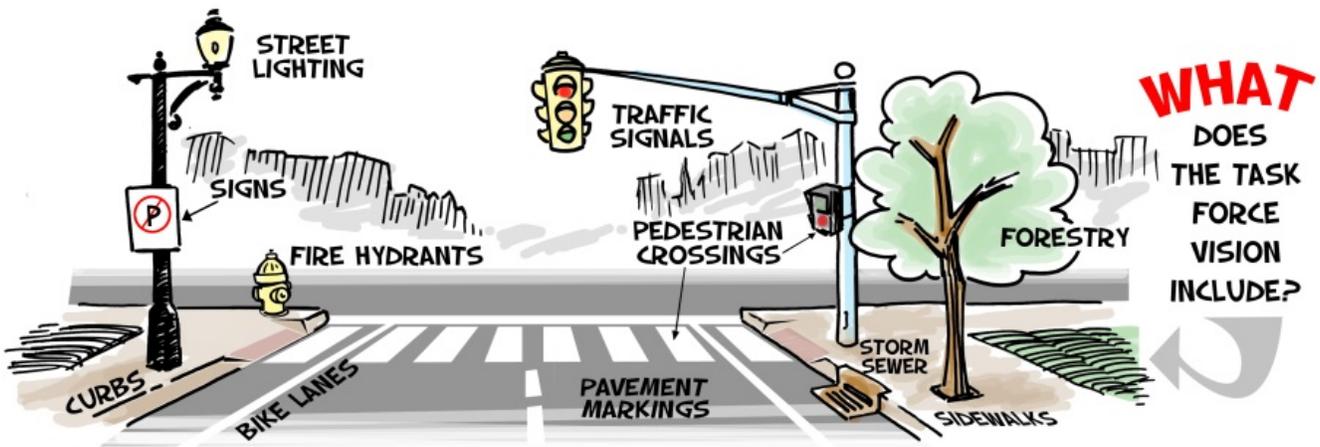


Balanced Transportation

We want to accomplish a vision that works for all people in our community. Our vision is for our streets and sidewalks to be accessible to all people and to all modes of transportation so people can get where they need to go independently - to work, school, healthcare, shopping and places of worship. Properly designed infrastructure, inclusive of all modes, assists in placemaking and encourages redevelopment. We need “Complete Streets” – a quality transportation network that serves all modes, for everyone. It’s about moving people, not just vehicles.

Our streets and street rights of way are our community’s single most important public space in terms of size, visibility and use. The total acres of street right-of-way is three times greater than the total of all the City’s parks. It’s an asset that we shouldn’t take for granted and that we need to maintain.

A community’s streets are a defining characteristic of place and include many elements, such as the roadway or street itself, curbs and curb cuts, landscaping, sidewalks, bike facilities, pavement markings, and the relationship of buildings and sites to the street.



Our vision includes all of these features. However, we understand that every feature may not be appropriate on every street or in every neighborhood. **The ability to design and provide the right features in the right place is key.** There are many unmet needs for mobility and access of people throughout the city currently; and, for some, it’s not a matter of convenience—it’s necessity.

A City that Enriches our Lives

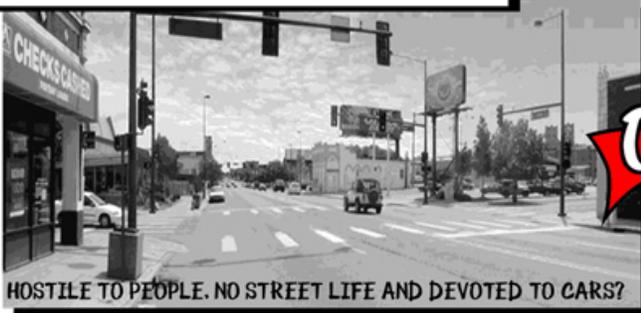
A walkable community can increase housing values and add to the richness, health and wealth of our city. People make decisions about where to live and work and and/or locate their business based on the quality of life and access to opportunities a location offers. Families check the “Walk Score”⁵ of a neighborhood before deciding to move in.

Throughout the U.S., chronic diseases and obesity are on the rise, pointing to a need for a more active and mobile society. There is also a focus on sustainability and the environment today which leads more and more residents to want to park or abandon their vehicle for a more environmentally friendly mode of transportation.

Sidewalks

Our street system includes over 1,100 miles of sidewalks. If you add our trail system to that, the mileage begins to approach 1,200 miles. This is twice the length of our street system of 588 miles and is equivalent to taking a trip to Minneapolis and back!

IS THIS WHAT WE WANT OUR STREETS TO LOOK LIKE?



OR



One of the first things we, as a Task Force, were asked to do was list our favorite and least favorite streets. The streets we liked best were more vital, walkable, bikeable, in balance with nature and accessible. And, the ones we liked least were more vehicle focused, wide streets, narrow sidewalks, and not as people-friendly. Citizens who attended the community meetings that the Task Force held in 2012 gave similar responses when asked the same question. Residents routinely advocate for traffic calming and beautification. Business districts value on-street parking, outdoor cafes, decorative street lighting and inviting streetscapes.

⁵ Walk Score is a website (www.walkscore.com) that takes a physical address and computes, using proprietary algorithms and various data streams, a measure of its walkability. More recently it's started tracking how transit-friendly neighborhoods are too. What drives the score is choice and proximity—the more amenities (restaurants, movie theaters, schools) you have around you, and the closer they are, the higher your Walk Score.

A City in Balance with Nature

Our investment in Vital Streets provides a valuable opportunity to improve asset management of our stormwater infrastructure, also known as “Green Infrastructure”, to reduce the quantity and improve the quality of stormwater as it is released into the Grand River – our most important natural resource.



In Grand Rapids, it takes only 15 to 30 minutes for rain and stormwater to reach the Grand River and comparable waterways via the municipal stormwater sewer or by flowing directly into the river or its tributaries. This stormwater runoff is the leading source of water pollution in West Michigan. It is also a significant contributor to critical environmental and economic issues such as erosion and infrastructure decline. Impervious surfaces including streets and walkways contribute to stormwater runoff.

One way to combat this issue is to utilize “Green Streets” where possible to effectively capture and filter stormwater close to the source. Green streets have proven to provide multiple benefits along the street right-of-way including:

- Creating a better integrated system of stormwater management within the right-of-way at lower total cost and higher value for the overall stormwater system;
- Volume reductions in stormwater, which reduce the volume of water discharged via pipe into receiving streams, rivers and larger bodies of water;
- Linking component in community efforts to develop local green infrastructure networks;
- Aesthetic enhancement within the public right-of-way;
- Improved local air quality, by intercepting airborne particulates and shade for cooling;
- Enhanced attractiveness for economic development; and
- Improved pedestrian experience along the street right-of-way.

Adding Green Streets to Complete Streets equals a Vital Street System that meets the triple bottom line for our community’s economy, environment and people. This approach is entirely consistent with the City’s 2013 Stormwater Master Plan, the 2011 [Green Grand Rapids Master Plan Update](#), the City’s [Sustainability Plan](#) and the City’s [Master Plan](#). An added bonus is that also assists with State and Federal regulatory compliance, particularly for stormwater.

The West Michigan Environmental Action Council has stated, “The development of Complete and Green Streets is a smart investment for long-term prosperity of our local economy and natural resources that compliments place making throughout the community. The Grand Rapids Sustainable Streets Task Force has an opportunity to include green streets as part of the plan to address the city’s street crisis.” We concur fully.

Partnerships

Grand Rapids is known for its success with both public/private and public/public partnerships. The evidence is all around us and continues to grow. The City's 2002 [Master Plan](#) helped formalize and accentuate the role of partnerships in our community and predicted that "collaboration among city departments, residents, property owners, businesses and institutions will be essential in bringing the [Master Plan's](#) recommendations to fruition. Both regional and community partnerships are needed."

During Transformation, the City has looked at consolidation of operations both internally and externally. Examples include combining assessing certain services with Kent County to consideration of regional fire service models. The best resource on efforts in this regard is the latest report to the State of Michigan on the City's collaborative efforts. This report may be accessed [here](#). Continuous evaluation of operations and maintenance practices, combined with relationship building efforts and dialogue amongst agencies that share similar services, is critically important to our city's future.

Partnerships have been essential to the City's investment in street infrastructure and will continue under this plan. A sample of partners include the Michigan Department of Transportation, Grand Valley Metropolitan Council, Downtown Development Authority, Brownfield Redevelopment Authority, Kent County Road Commission, Grand Rapids neighborhood and business districts, neighboring communities, and development partners and business owners who opt to pay special assessments for extra street features. By working together, we can leverage additional improvement to our street system. It all adds up.

The Current State

Investment

Investment in streets and infrastructure has been a significant issue for more than a decade. The 21st Century Infrastructure Task Force provided recommendations in 2002 regarding the amount of investment needed to restore and maintain our streets. Their recommendations relied upon others taking action first, before significant local investment was requested of the voters. Those pre-conditions were never met; so, as a result, no progress was made.

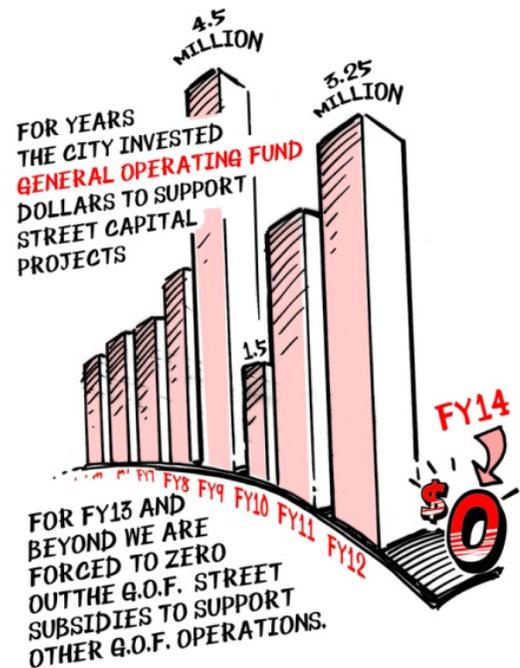
Grand Rapids' streets deteriorated from approximately 60% in Fair to Good condition in 2002 to over 60% in Poor condition today because investment just was not enough to keep up. The personal cost in terms of damage to our cars (estimated at \$374 avg/year⁶) and reduced property values will continue to worsen each year. If we want a different and better outcome all of us must commit to action now. We believe it is time to invest with local and state resources.

General Operating Fund (GOF)

A priority of Phase I of the City's Transformation process is to ensure that General Operating Fund (GOF) revenues support GOF operating expenditures. The City used to invest GOF monies to support public streets. It can't anymore. The General Operating Fund pays for services such as Police and Fire; parks; City Clerk, City Attorney and other functions that are required per State mandate or City Charter; and other normal and necessary business functions such as Human Resources, IT, and accounting.

Street investments are capital in nature and are not typically supported by the GOF. The 21st Century Infrastructure Task Force recommended that the City invest GOF dollars in streets and then seek other sources of funding before asking for additional local investment. The level of GOF support they recommended was not sufficient by itself to support required asset management investments.

It has become clear that an expectation of GOF support for streets has no long-term sustainability. Core GOF services cannot be sacrificed in the name of paving a street. Over the past decade the Mayor, City Commission, and City Manager have had to make very difficult budgetary decisions about community priorities. City leaders removed the allocation for streets funding from



⁶ Michigan Contractor & Builder, *The State of Michigan Roads*, by Monica Ware – May, 2013

the GOF for Fiscal Year 2013 and beyond as they faced the painful reality that, without a sufficiently funded dedicated stream of investment, the work required to maintain one of the city's greatest infrastructure assets will always be insufficient. GOF dollars are for core services not streets. We were charged with finding a solution.

***AREN'T MY CITY TAXES USED FOR STREETS?
ANSWER: NO**

**PROPERTY TAX
DISTRIBUTION FY12**

**34% GENERAL
29% VOTED LIBRARY MILLAGE
22% REFUSE
15% CAPITAL IMPROVEMENT**

**INCOME TAX
DISTRIBUTION FY12**

**83% GENERAL
13% TRANSFORMATION
4% CAPITAL IMPROVEMENT**

Many people think that the taxes they pay to the City include maintenance of the streets. In reality, City Property and Income Taxes are not used for street funding.

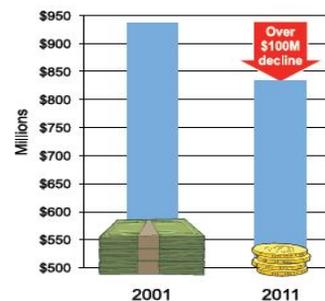
The General Operating Fund receives the largest percentage of these taxes and, again, this fund is used to pay for public safety (which received approximately 2/3 of total GOF funding), parks and other mandated or business functions of the organization. The Library Millage is a set percentage that citizens previously voted to set aside to support library operations and capital improvements. The Refuse Fund is currently set at 1.6 mils. By State law, the City is allowed to collect up to 3 mils for this purpose.

In relation to the amount and value of City-owned facilities and other infrastructure, a relatively small amount of property and income taxes (15% and 4%, respectively) are set aside for capital improvements on physical assets. This capital improvement funding is strictly used for City-owned facilities, stormwater, parks, and street lighting. As stated earlier, although street investments are capital in nature this asset is no longer supported by the GOF. Financial needs are too great to adequately support the city's streets, alleys, sidewalks, bridges and other important infrastructure within the public right-of-way.

State and Federal Monies

The main source of funding currently available for street operations, maintenance and construction is the State Gas Tax. The State Gas Tax is an excise tax not a sales tax and is calculated based on a flat rate per the number of gallons sold. The 6% sales tax on gas goes to the State General Operating Fund, not transportation. The Gas Tax has not kept pace with inflation and revenues have actually decreased due to the use of more fuel efficient vehicles and drivers purchasing less gas due to increasing fuel prices.

Michigan Gas Tax Revenue

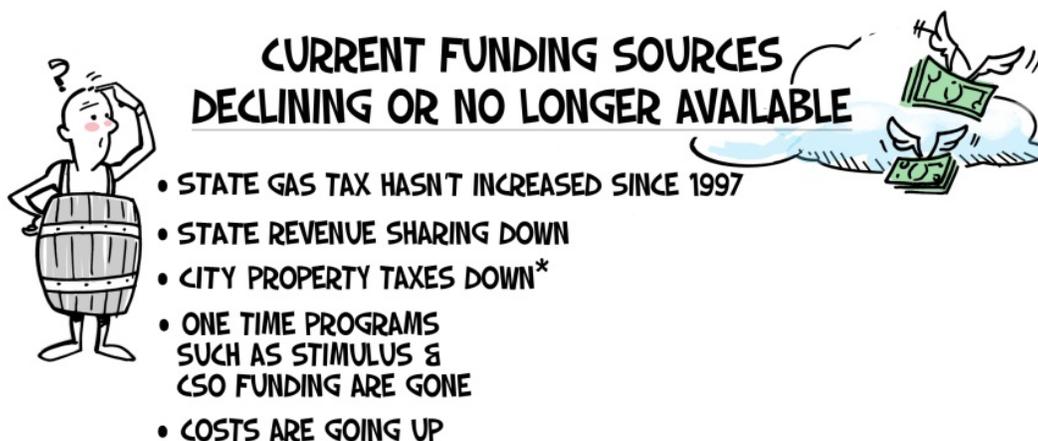


Michigan's gas tax revenue declined over \$100 million from 2001 to 2011.

The gas tax was last increased in 1997. Inflation has far outstripped this increase as costs for materials, labor, and associated services continue to go up. Fewer resources drive increasingly poor conditions for us all. This has left a system in disrepair and desperately in need of new revenue.

“The four-cent per gallon increase enacted in 1997 was not adequate to pay for both system-expansion projects and preserve existing pavements and bridges. The long-term costs to restore bridges and pavements to good condition will increase once they become deteriorated. Accidents also tend to increase on poor pavements because the surface provides less friction, which increases rear-end and run-off-the road crashes. The lessons from 1997 are that any new investment for the trunkline system should be adequate to ensure the long-term condition of its pavements and bridges. To ensure that Michigan has a highway network that is sustainable for the long term will require a substantial investment significantly greater than in 1997. Otherwise, Michigan will be on a path to return to the pot-holed pavements and load-limited bridges of the 1990s.”¹

In addition to shrinking State Gas Tax monies, the State of Michigan has also substantially cut revenue sharing payments to the City. These payments have been declining since 2002; the City’s General Operating Fund now receives \$11 million less per year than a decade ago. These dollars have been partially replaced by the State’s Economic Vitality Incentive Program (EVIP) payments, but these amounts remain uncertain from year to year and currently are being deposited in the City’s Transformation Fund and used for that purpose.



**CURRENT FUNDING SOURCES
DECLINING OR NO LONGER AVAILABLE**

- STATE GAS TAX HASN'T INCREASED SINCE 1997
- STATE REVENUE SHARING DOWN
- CITY PROPERTY TAXES DOWN*
- ONE TIME PROGRAMS SUCH AS STIMULUS & CSO FUNDING ARE GONE
- COSTS ARE GOING UP

One-time programs that helped sustain streets investment in the recent past are no longer available. American Recovery and Rehabilitation Act (ARRA) Federal stimulus funds are gone. The Combined Sewer Overflow (CSO) project which was undertaken citywide to separate the storm from the sanitary sewers is nearly complete. Public infrastructure was reconstructed in neighborhoods covering an area of approximately 6.5 square miles - an area larger than the entire City of

Grand Haven. Unfortunately, many of the first CSO project streets on Grand Rapids' west side were completed in the late 1990's and are already in need of rehabilitation or reconstruction due to lacking investment in maintenance.

As was done during the Combined Sewer Overflow work, the City has leveraged funding through other projects whenever and wherever possible to stretch our dollars. Leveraging other resources is essential and staff has demonstrated that this is accomplished on a routine basis. Grants are an important part of the funding mix but they are limited and must be matched. Our Task Force evaluated whether pursuing grants was a distraction to asset management or if they contributed to achieving asset management goals. We concluded that grants are an important part of the funding mix and that matching dollars should be applied whenever possible.

Efficiencies

The City has tried to squeeze every ounce of efficiency from operating funds, including the Major and Local Street fund. The City has:

- Negotiated staff-wide reductions in total compensation totalling 12.5%
- Reduced staff by 19% over the last 10 years (12 persons) in the Streets Department and eliminated nearly 500 positions organization-wide
- Reduced the truck fleet by over 10% (most in winter maintenance)
- Changed salt spreading protocols to reduce costs and reduce salt's effects on street surfaces
- Reduced staff time allocated to routine street maintenance
- Adjusted guard rail replacement standards
- Eliminated street maintenance resurfacing



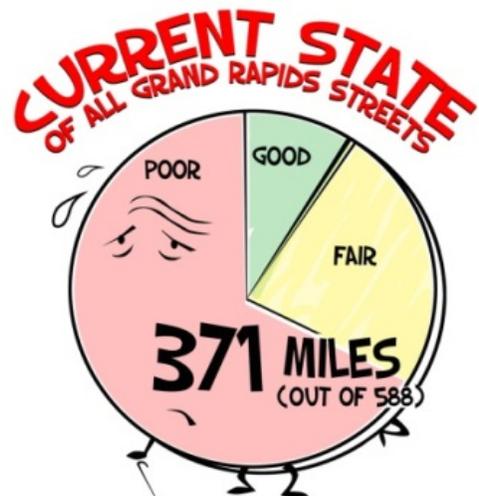
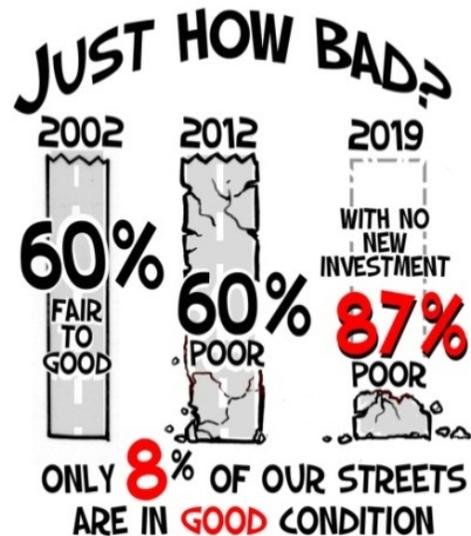
These efficiencies are important and operations are tighter, however, the clear result has been survival at a lower level of service. We have learned that we can't bring our streets back to an acceptable level by finding efficiencies alone. Cutting additional staff or further reducing salting protocols will not provide the amount of investment needed to rebuild our infrastructure. The total operational budget for all street services is just under \$10 million per year. As you'll see, the amount we need to invest is more than twice that amount.

The total acreage of Grand Rapids' streets and rights-of-way is almost three times that of the total acreage of city parks; making streets one of our largest and most valuable public assets. The City has accurate, up-to-date condition data on each street segment in our 588 mile inventory. Staff undertakes extensive planning to ensure that they apply the right fix at the right time for the right result when they have the right resources. This information was critically important to the Task Force as we assessed the degree to which we could improve our streets at the best price.

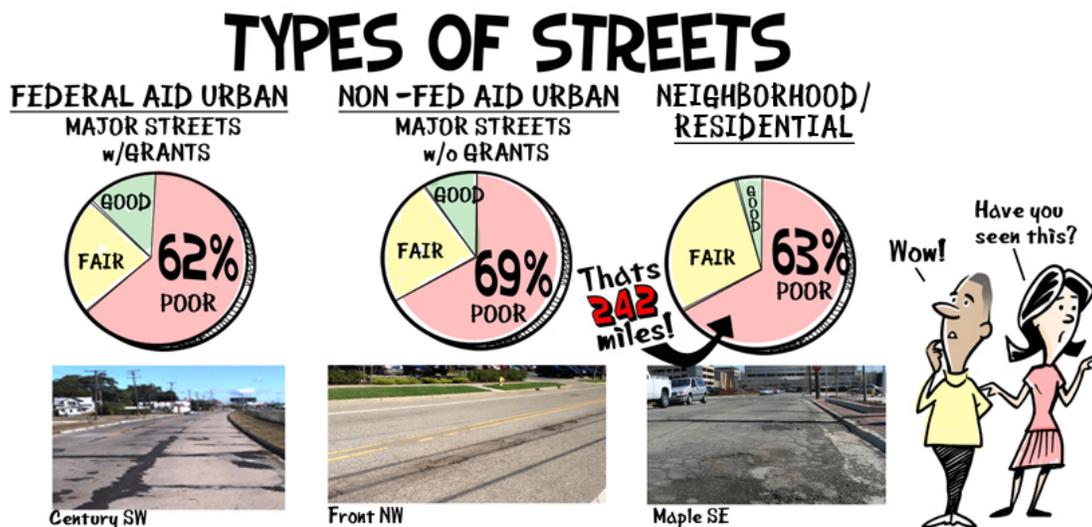
Our Streets

In 2002, the 21st Infrastructure Task Force determined that on average 60% of our streets were in good or fair condition but most were at that critical point where intervention was needed in order to preserve our investment. Improvements were made, but the City was never able to reach the level of investment recommended by the 21st Century Infrastructure Task Force in order to maintain, or improve, existing conditions. Costs rose and revenues fell, creating a perfect storm with disastrous results that will cost exponentially more to fix. Our streets deteriorated from 60% fair to good to 60% poor in just 10 years. With no new investment, nearly all of our streets will be in poor condition by 2019.

Today, over 60% of our streets are in poor condition, less than one-third are fair and only 8% can be considered as good. Out of a total of 588 miles of streets, 371 miles are in poor condition. The deterioration is spread throughout the system and is not confined to one type of street. An alarming 242 miles of those in poor condition are our local, or neighborhood, streets. Each of these classifications has a significant percentage of streets that are in poor condition and in need of major reconstructive work. More of our "fair" streets will continue to fall to poor if action is not taken in the very near future to save them from slipping into "poor" condition.



There are numerous different ways to classify streets depending upon the funding source and regulatory authority. As we tried to discern between them, the best approach seemed to be to classify street type by funding source to ascertain the city’s ability to invest. Streets fell into three major categories: Federal Aid Urban (FAU), Non-Federal Aid Urban (Non-FAU) and Neighborhood Streets. The majority of all of these streets are in poor condition. However, it should be noted that where there is at least some dedicated monies towards a certain type of facility, a greater number of streets are in good condition than for neighborhood streets – which only receive one-quarter of the funding that other street types receive through the State Gas Tax.



Major, FAU (Federal Aid Urban) Street- A street in an urban area eligible for federal assistance under Title 23 of the U.S. Code. These streets are essential for getting to work or home, and traveling to and from business districts and commerce. They move more people, visitors and goods than other streets. There are 156 miles of FAU streets in the City.

Major, Non-FAU (Federal Aid Urban) Street - A Major or Collector street not eligible for Federal Aid. Non-FAU Major Streets serve as critical connectors between FAU Streets and Local Streets. There are 48 miles of Non-FAU Streets in the City.

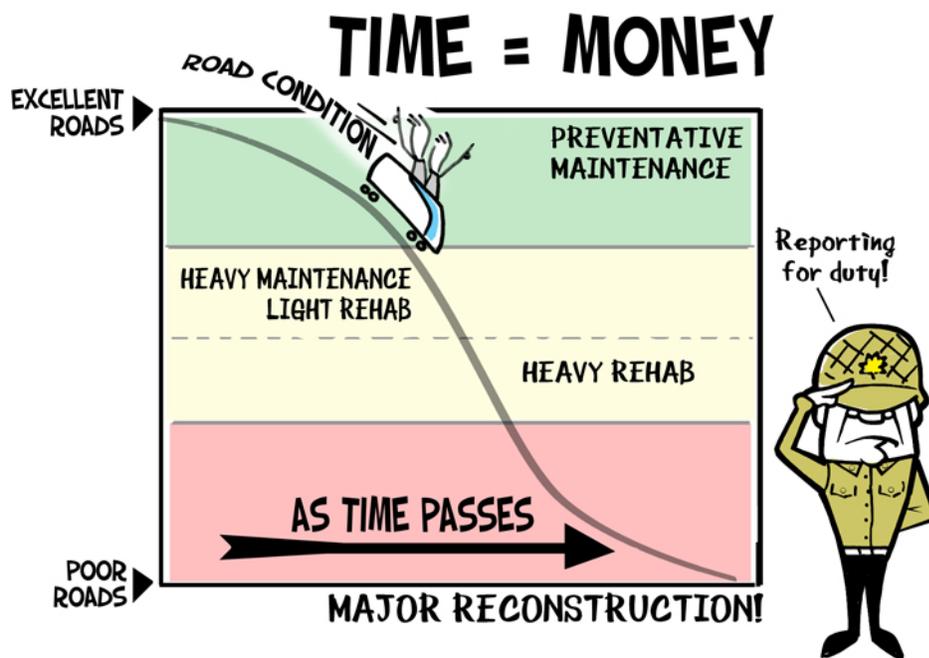
Neighborhood/Residential Street (sometimes considered “local” streets) – These streets provide access to property and host our homes. They support our quality of life and make a neighborhood better—or worse. Over 2/3 of Grand Rapids’ total street system is made up of neighborhood or residential streets (384 miles out of a total 588 miles).

Please note that *Appendix D* contains examples of street types and the PASER ratings.

Time Equals Money

Waiting has expensive, hard-cost consequences. Preventive maintenance is least expensive and the most effective. Heavy rehabilitation can return most streets to good condition at less than the cost of reconstruction. Major reconstruction should be the last resort. The chart below illustrates that the more time passes the more significant the fix needs to be.

Generally speaking, streets that have a PASER rating of 1-3 (in red) are in need of complete reconstruction and are considered in “Poor” condition. Streets that have a PASER rating of 4-7 (in yellow) are regarded in “Fair” condition. Those that are rated 8-10 are in “Good” condition (in green and yellow). “Fair” condition streets are those critical streets that benefit the most from asset management interventions. Within the yellow, there is a dotted line that signifies the “point of no return” – where those most at risk if no action is taken to preserve them require heavy rehabilitation and a greater cost.

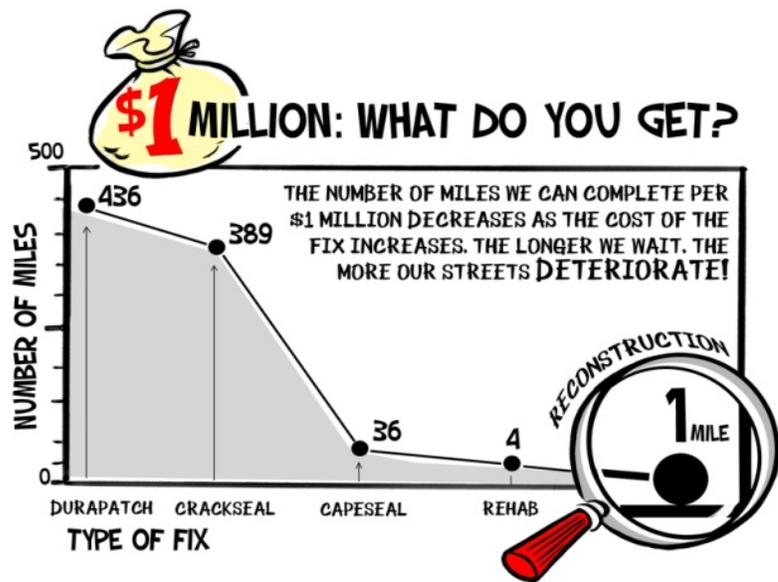


The longer we wait, the more our streets deteriorate, and the more expensive the repair treatment. Even preventive maintenance fixes can be costly. To repair one lane mile of street it can cost:

- crack sealing @ \$2,600;
- Dura-patching @ \$2,300;
- Resurfacing/rotomilling @ \$266,000;
- Full reconstruction of asphalt street @ \$872,000; and
- Full reconstruction of concrete street @ \$1 million per lane mile.

We know that our money can go farther if we can get in and make improvements to extend the life of our streets rather than waiting until they are in such bad condition that they require full reconstruction.

This chart shows how far each \$1 million spent will go to preserve or maintain a street. The number of lane miles on the left-hand side shows what type of fix can be accomplished for \$1 million invested. The more expensive the fix, the fewer number of lane miles we are able to repair or replace. As the number of streets in Poor condition rises, the price tag to fix them climbs.



COST OF STREET CONSTRUCTION

- **PREVENTIVE MAINTENANCE**

- CAPE SEAL = @ \$4.21/sq. yd. = \$27,200/lane mile. **We could do 36 lane miles for every \$1M dollars allotted (this is contracted work)**
- SPRAY PATCHING / DURA PATCH = 3-staff crew average (could be 2 or 4 depending on traffic needs). \$2300/lane mile. **We could do 436 lane miles for every \$1M allotted.**
- CRACK SEALING = 5-staff avg. (could be 4-6 depending on traffic needs). \$2600/lane mile. **We could do 389 lane miles for every \$1M allotted.**

- **REHABILITATION**

- RESURFACING/ROTOMILLING (Mill & Overlay 3" Thick) = \$265,672/lane mile*. **We could do 4 lane miles for every \$1M allotted (this is contracted work)**

- **RECONSTRUCTION**

- RECONSTRUCTION = For a 12" sand subbase; 4" 21AA gravel and 8" hot mix asphalt. \$871,904/lane mile*. **We could do 1 lane mile for every \$1 million allotted (this is contracted work)**
 - The average cost for reconstruction of a brick street is \$193/square yard or \$1.7 million/lane-mile.
 - The average cost for reconstruction of an asphalt street is \$99/square yard or \$872,000/lane-mile.
 - The average cost for reconstruction of a concrete street is \$161/square yard or \$1.4 million/per lane-mile.

*Based on actual costs from 2011 projects.

Note: For the purposes of the software, we use 15' wide lanes and only two lanes per street. The 30' width is the average of all of our streets.

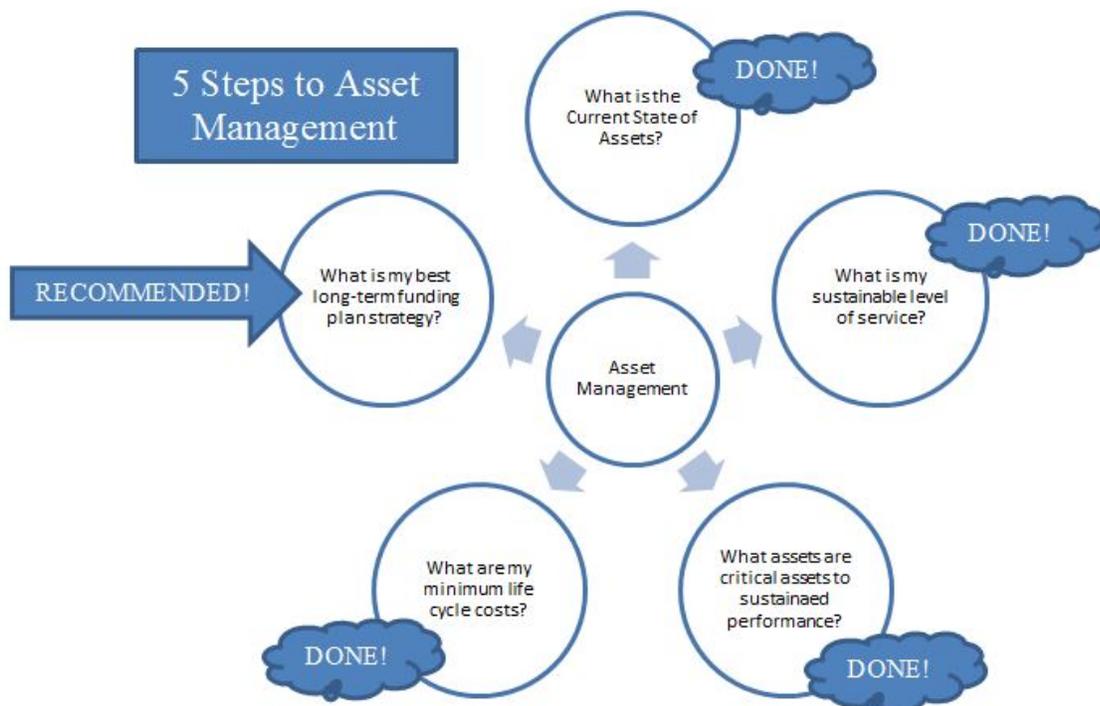
Asset Management

Grand Rapids' street system is a vital asset of at least \$1 billion in value and is key to our regional transportation network, our neighborhoods and our economy. We know we can extend the "life" of this investment through a planned approach utilizing asset management.

Everyone knows that if you own a home, you will need to invest in that home in order to maintain it in good repair. It's a responsibility you commit to when you purchase that home. Every so many years you will need to fix or replace your roof or paint your home. These are investments that you make and you understand that making the investment sooner, before the roof starts leaking or before the paint starts to chip off, will save you money in the long run.

It is the same concept with our streets. Routine repairs have not been made on a regular basis because the resources needed for investment have not been there. The condition of our streets has deteriorated over the last decade due to a lack of sustainable State and local funding sources to support asset management.

We learned that the City has produced good outcomes by developing and investing in asset management plans for the Water and Sewer utilities and the Parking System. As demonstrated in the inset, the City has taken Asset Management planning for streets to implementation. The principles of Asset Management are being used to deliver the current street program, but adequate resources are not available for full implementation. We are confident that, with the right level of resources, the City will produce exceptional outcomes for our street and sidewalk infrastructure which match our quality of life.



Considerations for Investment

Balancing Condition with Investment

It is critically important that future investments are sufficient to produce visible results and achieve desired outcomes. As noted earlier, city staff provided critical data about our street system. This analysis provided the real-time condition of each street segment in the city. Staff then calculated the cost of achieving certain levels of service depending upon desired street condition and duration of investment. Many of the charts prepared for review as various scenarios were researched are included for review in Appendix E.

In setting a goal, we attempted to balance the condition we want our streets to be with the cost of getting there. Some of the options reviewed included looking at what it would cost per year, for 15 years, to get to various percentages of the system in a State of Good Repair, which is considered in either in Good or Fair condition on the PASER scale. We also looked at stretching this over 30 years but found that 15 years provided the best planning horizon.

Preferred Condition Goal

It was determined that 70% of our streets should be in a State of Good Repair (either in Good or Fair condition) after an exhaustive review and months of discussion. This seemed to be the right balance point and provided enough room to include the opportunity to create a beneficial change to the current asset management practices of the sidewalk system. We determined that if we sought to invest more in streets, then we would be impairing other important community needs. On the other hand, if we were to invest less, the conditions necessary to support the valued quality of life in our neighborhoods and business districts would not be realized.

Investing to achieve 70% of our streets in a State of Good Repair and improving our sidewalk system will cost \$22 million per year over the next 15 years. This is significantly higher than our current level of investment, but our Task Force believes that it is achievable. Options for reaching the necessary level of investment were then carefully reviewed. It was important to keep in mind that no one funding source could be responsible for the entire investment. As we reviewed investment options, the 70% target confirmed that the proper balance point had been chosen as the best alternative to achieve the best results at attainable price.



Preferred Local Investment Option

There are many potential street investment options, but the Task Force found that most are not available due to the need for State enabling legislation, like a local registration fee or additional local sales tax used elsewhere in the United States. Other options are currently in the pilot test phase and are not a viable near-term solution, such as a Vehicle Miles Traveled (VMT) Fee.

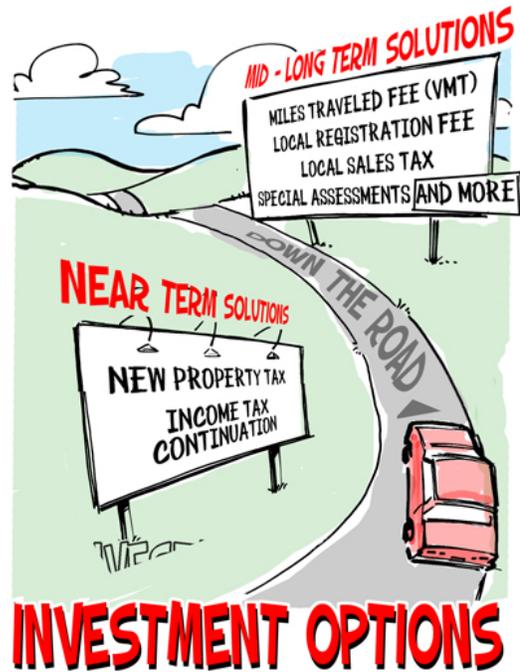
We also researched the possibility of using Parking fees to pay for street infrastructure. We found that there may be limited opportunities to use parking fees to invest in parking lanes on streets where metered parking is present. This would not provide a significant source of support for streets.

The most readily available local options for streets funding are an increase in City Property Tax rates or a continuation of the current City Income Tax rate, both of which would require voter approval.

If Property Tax were used, an additional 2.25 mils would be needed to generate \$9 million per year. That's an increase of approximately \$100 for the average residential property in Grand Rapids with a taxable value of \$44,592.

If Income Tax were used, citizens could choose to continue the current Income Tax rate and not see any increase from what is already being collected. Citizens generously voted to increase the Income Tax rate by 0.2% for five years to allow the City organization time to transform its operations. The transformation is on schedule and will be completed by the time the increase is set to expire on June 30, 2015. This sunset provides the opportunity for voters to consider extending the income tax rate they currently pay to get the value of better streets and sidewalks.

The current, temporary amount of income tax costs the average taxpayer in Grand Rapids about \$2 per every \$1,000 of income subject to tax. For example, a family with a combined taxable income of \$30,000 is paying approximately an additional \$60 in City income taxes currently. This additional income tax provides the City with approximately \$9 million per year. Citizens could choose to continue the Income Tax at its current level and dedicate by designation that those funds would only support streets and sidewalks. Everyone would continue to pay what they are currently paying while also wisely investing in the maintenance and repair of one of the city's largest assets. Vital Streets are critically important if we desire to see our Master Plan realized and to witness the bright future of our community.



State Investment Options

State and local governments must provide a stable platform for economic success. Street infrastructure is a key element of this platform. It is imperative, therefore, that the State act quickly to provide additional investment for street infrastructure for Grand Rapids and throughout the state. The Governor's \$1.2 billion Transportation Package would restore the State's role as our investment partner for streets and would translate to approximately \$6 million for Grand Rapids if passed as proposed.

Several varying versions of the transportation package are being discussed currently by the State legislature. It is our belief that a package will eventually be settled upon, and our hope is that it provides Grand Rapids with an amount that is at least close to the \$6 million upon which we have based our work. The addition of funding sources from the State would move us down the path to restoring our streets to the target condition.



Other Financing Options

We learned from the 21st Century Infrastructure Task Force that we could not wait for others to take action. Grand Rapids needs to invest in itself now. We also concluded that continuous innovation is required. The Sustainable Streets Task Force resolves to continue to work with the City and State to explore additional resources and investment options. The landscape for transportation investment is evolving rapidly, and we are committed to continuing to seek viable and sustainable alternatives, including State accountability and investment.

Other options that were researched, but determined to be not ready for use in Grand Rapids at this time for a variety of reasons, included:

- County-wide vehicle registration fee (requires State authorizing legislation and a County-wide vote)
- Local vehicle registration fee (requires State authorizing legislation and a city-wide vote)
- Local sales tax (not currently permitted by the Michigan Constitution)
- Parking surcharge fees (not currently enabled by Michigan law)
- Road utility fee (not currently enabled by Michigan law)
- Special assessment (most applicable for new construction, not reconstruction or maintenance)
- Surcharge on ticket sales/entertainment (not currently enabled by Michigan law)
- Toll roads/bridges (not currently enabled by Michigan law)

Asset Management

Asset management is a systematic process of operating, maintaining, upgrading, and disposing of assets cost-effectively⁷. City staff has been doing asset management to the best of their ability. Leveraging, writing successful grant applications and creative problem solving has been a relatively effective approach in very lean times. However, this piece-meal approach leaves a significant number of assets behind simply because there is not the flexibility or resources to make system-wide improvements. Knowing what needs to be done to maintain our street system and having the investment resources available to take action are two different things. There is a long list of needs but only a few projects are completed every year.

Providing the investment necessary for a balanced asset management program is essential to ensure that our desired outcomes are achieved. The City's approach to managing our street system must include heavy early investments in preventive maintenance and rehabilitation in order to save those streets currently in the best condition and return those on the brink of Poor condition into a state of either Good or Fair condition. Time equals money; the longer street maintenance is deferred the more financial resources are needed to restore it. More extensive reconstruction of those streets that can't be saved should occur after assets in Good and Fair condition are appropriately triaged.

Sidewalks

Knowing that accessibility and mobility throughout our city hinges not only on a quality street system but also on a quality sidewalk system, our Task Force determined that we needed to find an effective way to address sidewalks. The saying goes "everyone at some point is a pedestrian". Whether you traverse by car or transit, at some point you must walk or use your wheelchair to get to the front door of a home, business, doctor's office, school, job or neighborhood park.



The City Engineer's Office worked with us to evaluate better asset management options. Our city has more than 1,100 miles of sidewalk. The current Point-of-Sale Program requires that a homeowner pay the cost of replacing or repairing any damaged sidewalk area abutting their property before closing on any sale of that property. This program has had limited success and there are many administrative and asset management drawbacks.

⁷ [American Association of State Highway and Transportation Officials](#)

The current sidewalk replacement program is reactive rather than proactive. City staff cannot manage the sidewalk system in a way that makes the best use of their time or that of a contractor. In addition to the POS program, City staff will act upon complaints reported by the public. Inspectors, tree trimmers and contractors must move throughout the entire city based on property sales or complaints rather than executing deployment of their services strategically.

And, unfortunately, no resources are available to fill in missing network gaps without conducting a special assessment of an affected home or business. The underlying premise of the current program is that a property owner will benefit from the presence of a sidewalk on their property. While this is indeed true, it neglects a Complete Streets perspective that benefits everyone in our community. We wouldn't build dead-end streets through the city; for a person in a wheelchair on a sidewalk it can certainly feel that we do. If we are truly going to be effective at meetings the needs of all of our citizens and recognize their right to an accessible and safe community, as stated in the Sustainable Street Task Force's vision, then we must do better.

An A3 (see Definitions in Appendix A) prepared by City staff provides several options for better sidewalk management. The document ultimately recommends a city-wide, systematic sidewalk program to proactively address this need. Costs for the entire program are estimated to be \$1,625,000 per year. The City would facilitate citywide inspections and repair or build sidewalks over a 15-year cycle. This projected dollar amount has already been calculated into the proposed total need of the street system at \$22 million per year for 15 years. The A3 completed for this work is included in Appendix F.

Approximately 60% of sidewalk repairs are caused by tree roots. Coordination with Forestry staff is needed for trimming or removing roots from City trees. A proactive asset management program would allow Forestry to plan its work in a more systematic manner, saving both time and money. It is expected that eliminating the Point-of-Sale Program would also allow the City to reduce sidewalk inspection staffing and consolidate with other inspections staff.

This investment would be for sidewalk repair and construction only. Homeowners would still be responsible for snow and ice removal from sidewalks abutting their property and for keeping the sidewalk free from obstruction.

Systematic Asset Management Approach for Sidewalks

- Eliminates property owner responsibility for sidewalk repair costs
- Inspect / repair all City sidewalk in a 15- year revolving cycle
- 73 miles of sidewalk inspected annually
- 250% increase in miles of sidewalk repaired annually
- Provides continuous funding for ADA ramp installation
- Provides for sidewalk and non-motorized connectivity improvements

Enacting a systematic asset management approach for sidewalks will:

- Save property owners hundreds of dollars by eliminating the POS program;
- Save city dollars by allowing staff to proactively and efficiently manage the network;
- Improve the condition and connectivity of the sidewalk system;
- Significantly improve accessibility and mobility for all users;
- Allow for completion of ADA sidewalk ramps;
- Connect missing links in our sidewalk and trails system; and
- Assure access to transit stops.

We recommend that property owners no longer be burdened with the cost of repairing or replacing those portions of the sidewalk abutting their property in need of repair and that a new, more effective and equitable approach be used.

Vital Streets

Vital Streets are a combination of Complete Streets and Green Streets concepts. This approach is essential for our city to become an attractive, walkable, dense, urban community. In the recent past streets were viewed as conduits for the sole purpose of moving vehicles. Similarly, the goal of our stormwater infrastructure system was to move rain water as fast as possible to the Grand River. We have learned that neither one of these design approaches best serves our community.

Benefits of Vital Streets

- ❖ Economic
 - Fewer and less severe crashes
 - Access to jobs, education, and businesses
 - Livability and placemaking
- ❖ Environment
 - Reduced greenhouse gas emissions
 - Reduced carbon footprint
 - Less oil dependency
- ❖ Social
 - More active lifestyle (health)
 - Equity: Increased mobility and independence
 - Quality of life
- ❖ Access (interconnected networks)
- ❖ Mobility (on-street bike facilities, sidewalks, pathways, trails, transit, etc.)
- ❖ Safety – facilitates safe movement along and across streets (crosswalks, access management, traffic signals time for people, not vehicles, etc.)
- ❖ Character – matches street design to user needs and context (includes everything in the right-of-way)

Complete Streets

The State of Michigan provides a definition of Complete Streets as “A system of streets . . . planned, designed, and constructed to provide appropriate access to all legal users in a manner that promotes safe and efficient movement of people, and goods whether by car, truck, transit, assistive device, foot or bicycle.”⁸ All users are defined to include:

- Pedestrians
- Bicyclists
- Transit users
- Motorists
- Trucks
- People with various abilities
- Children
- Elderly

Design Team

The City’s Design Team is a multi-disciplinary, collaborative effort, involving Design Engineers, Planning, Traffic Safety, Fire, Water, Sewer, The Rapid, and other interested parties. This team works with citizens and provides in-house research on the best means and methods for coordination of construction projects. The team reviews project design features to arrive at the best design solution, seeking to balance multiple, and sometimes competing, needs and wants with limited Right of Way space and limited resources.

We want to accomplish a vision that works for all people in our community. Streets and sidewalks shall be accessible to all people and to all modes of transportation so people can get where they need to go independently - to work, school, healthcare, shopping and places of worship. Properly designed infrastructure, inclusive of all modes, assists in placemaking and encourages redevelopment.

Green Streets

Green Streets address stormwater mitigation through better street design. Stormwater management in an urban area is a challenge given that there are so many impervious surfaces in roof tops, parking lots, and streets. There are few places for stormwater to go. Water, by its very nature, causes infrastructure decline and must be managed properly to extend the life of our streets investments. If we properly manage our stormwater we can stretch our dollars.

Higher intensity rain events are expected in the future. The Spring of 2013 provided a potential glimpse of what this future might look like when the Grand River crested past the city’s highest recorded flood level. Combined Sewer Overflow (CSO) work completed over the past 20 years has helped create capacity in the system, however, the system was designed to move water and nothing else. It is a series of pipes that connect to other pipes which directly channel water to the Grand River and its tributaries. In Grand Rapids, it only takes 15 to 30 minutes for contaminated rain and stormwater to reach the river.

⁸ P.A. 135 of 2010

Green infrastructure holds and manages stormwater where it falls. This approach provides multiple benefits for the infrastructure system and our community because it:

- Reduces downstream flows and opportunities for erosion;
- Alleviates strain on the system during peak rain events;
- Improves water quality by filtering trash and particulates before entering the river;
- Improves air quality by intercepting airborne particulates and provides shade for cooling;
- Provides aesthetic enhancement of the right-of-way with trees and plants – improving the pedestrian experience and attractiveness of an area for businesses.

City Initiatives that Support Green Infrastructure Investments

2013 Stormwater Master Plan Goals (selected)

- Protect human life, health and safety through stormwater management.
- Minimize the need for rescue and relief efforts associated with flooding.
- Reduce the level of pollutants discharged by the Grand Rapids Stormwater System.
- Ensure a functional drainage system that will not result in excessive maintenance costs.
- Encourage the use of best management practices to improve water quality.
- Encourage the reduction of existing flooding problems in conjunction with new development.
- Comply with Federal and State laws regarding stormwater discharges, floodplain management, and erosion and sediment control.

2011-2012 Green Infrastructure Portfolio Standard

Progression toward achieving reduction of stormwater volume by 1% per year.

2012 Green Grand Rapids Master Plan Update

The design approach to all city streets should include improved stormwater management, wherever possible. These “green street” strategies manage stormwater at its source and include, for example:

- Reducing paved area (by decreasing lane widths where possible).
- Using permeable pavement in alleys, and parking lanes.
- Landscaping areas parallel to the curb, in curb bumpouts, traffic islands or medians (can also be expanded and designed to capture and infiltrate runoff from streets and sidewalks).
- Additional street tree plantings will clean and absorb rainfall.

FY2011-2015 Sustainability Plan*

ENV 2.2 - Outcome: Improve the quality of the Grand River and its tributaries. The Grand River is the city’s single most precious natural resource. It provides a site for economic development and recreation, as well as important ecological processes that support fish populations, vegetation, wetlands, and birdlife. The Grand River and the areas surrounding it provide a natural method of stormwater containment during the spring thaw and significant rain events.

- Target 1: Achieve 100% compliance with NPDES permit requirements annually.
- Target 2: Achieve water quality index of 70 or higher on Grand River annually.
- Target 3: Achieve 100% compliance with Stormwater Pollution Prevention Initiative (SWPPI), Public Education Program (PEP), and Illicit Discharge Elimination Program (IDEP) permits annually.
- Target 6: Increase the number and square footage of green roofs within the city by June 30, 2015.
- Target 7: Reduce stormwater discharge by at least 50,000 gallons per rain event by June 30, 2013.
- Target 9: At least 5% of reconstructed streets, alleys, and City parking lots to be constructed of pervious or porous pavement by June 30, 2015.

Recommendations of the Sustainable Streets Task Force

These recommendations provide a clear path to transform Grand Rapids' streets and rights-of-way into Vital Streets – streets that serve everyone, increase value to homes and businesses, create place and protect the natural resources of our community. Foundations for our vision are present in the City's [Master Plan](#), [Green Grand Rapids](#), the [Sustainability Plan](#) and in the [report of the Transformation Advisors](#).

We have the opportunity to make progressive changes to a broken system. Grand Rapids' ability to achieve desired economic, quality of life, and environmental outcomes are dependent upon how fully these recommendations are implemented.

Prosperity isn't free and never has been. A community's ability to build new things was once viewed as a measure of prosperity. The new paradigm is to view prosperity as having the ability to invest and improve existing assets. We need to responsibly take care of what we have. Effectively managing our infrastructure assets is only possible with community support. We believe that the citizens of Grand Rapids understand that investment in our streets is necessary. The time to invest is now.

Recommendation #1- Target Condition

Maintain 70% of streets in a "State of Good Repair" (either in Good or Fair condition) within the next 15 years.

Our Vision

City Streets and rights-of-way will be accessible, attractive, and safe, serving all people of our community, contributing to the livability of our neighborhoods and business districts and increasing economic opportunity to individuals, businesses, and new development.

Infrastructure assets will be maintained and well-managed, using a multi-faceted funding strategy and innovative approaches to preserve our investment.

Reaching 70% of our streets in a State of Good Repair within the next 15 years represents the best balance between the need for a quality street system and the amount of investment required. The Task Force determined that if we sought a higher condition target then other important community needs would be impaired. On the other hand, if we were to invest less, the conditions necessary to support the valued quality of life in our neighborhoods and business districts would not be realized.

Recommendation #2 – Total Investment

Invest \$22 million per year in public streets, sidewalks and rights-of-way.

Combined local and State investments in public streets, sidewalks and rights-of-way should equal \$22 million per year. Numerous scenarios and potential funding sources were tested by the Task Force to find the best approach that would achieve 70% streets in a “State of Good Repair” and implement other important priorities, such as sidewalks. The table below depicts the various funding sources that must be assembled to achieve a sustainable streets system. All of these sources are needed to properly fund an effective asset management program.

SOURCES	INVESTMENT
<ul style="list-style-type: none"> • Current Major and Local Street Fund dollars already being invested in street capital and street rehabilitation. 	\$ 3.4 million
<ul style="list-style-type: none"> • Grants received through Grand Valley Metropolitan Council (our Metropolitan Planning Organization). An average of \$3 million over each of the last five years has been awarded. It is anticipated that revenues will continue at approximately this same level. 	\$ 3.0 million
<ul style="list-style-type: none"> • State investment – We have determined our recommendations relying on the State to invest at the level requested by the Governor, or \$1.2 billion annually statewide. This would provide approximately \$6 million annually to Grand Rapids. 	\$ 6.0 million
<ul style="list-style-type: none"> • Local investment –a gap of approximately \$9 million to be filled from local sources was identified. 	\$ 9.0 million
TOTAL	\$21.4 million*

***\$22 million/yr. is needed. The recommended local investment source could provide additional amounts as our economy grows.**

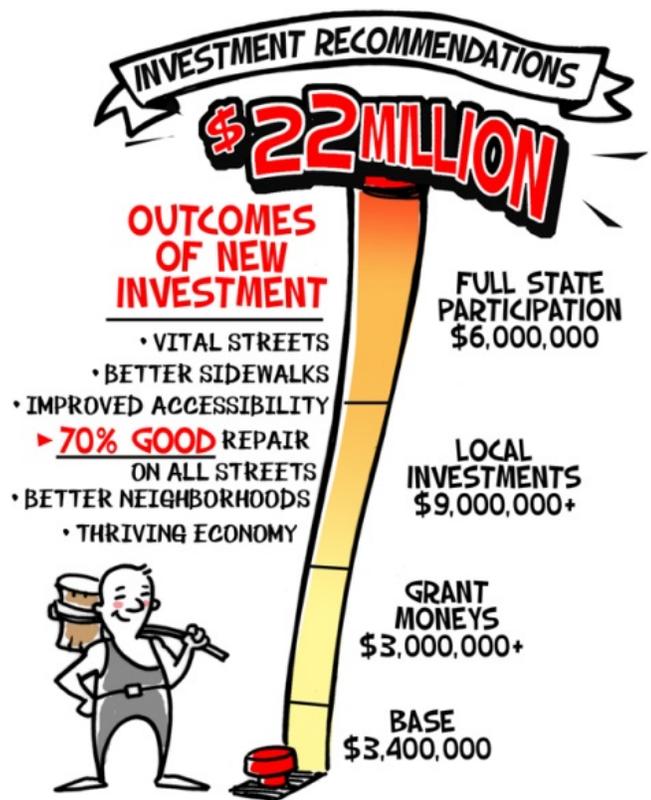
Recommendation #3 – Local Investment

Provide the opportunity for citizens to choose to continue the current income tax rate beyond June 30, 2015, for an additional 15 years and direct that 0.2% of funds be used only to invest in our street system, including sidewalks.

We are sensitive to the financial difficulties that some of our citizens have experienced, and may continue to experience, after the recession. In spite of this, many of these same citizens agreed that an additional investment in streets was necessary and encouraged us to continue our work. We believe that Grand Rapids is “house proud” – we take great pride in our ability to take care of ourselves and those around us. The economic and quality of life benefits derived from investing in our city are apparent when compared to other communities.

We recognize that our community also has its limits. In reviewing funding strategies, we desired to find a way to provide enough money to make significant improvements to streets assets, but to do it in a way that community investment would not be a burden. The Task Force is not recommending a tax increase. Instead, we recommend citizens be asked to continue their current income tax rate beyond June 30, 2015⁹, for an additional 15 years and dedicate that 0.2% to Grand Rapids’ street system, including sidewalks. This approach would provide \$9 million annually to properly manage our public streets and other assets within the right-of-way.

It is recommended that the City Commission schedule an election in May, 2014 to ask voters to support this tax renewal request. This election would allow for the continuation of the current income tax rate and avoid an out-of-cycle rate adjustment. We found that the cost for a special election was substantially less than the administrative costs that would be incurred to adjust rates within the second half of the year.



⁹ In 2010, the citizens of Grand Rapids agreed to allow the City time to transform operations and become sustainable. At that time they approved a five-year, 0.2% income tax increase with the intent that at the end of five years General Operating Fund revenues will equal or exceed General Operating Fund expenditures on an ongoing basis. Transformation funds have been used to support community policing, add an additional fire rescue squad, and transform city operations to become more effective and efficient.

Recommendation #4 - State and Federal Investment

Advocate to both State and Federal legislators for increased transportation investments at the local level.

Local investment alone is not sufficient to support our streets. The State of Michigan must be an investment partner. The State gas tax has not been increased since 1997. It is imperative that State legislators understand that local units of government have very few options to adequately support the maintenance and operation of the public's infrastructure assets. In Grand Rapids, we currently receive \$6.4 million per year for street operation and maintenance from the Gas and Weight tax and grants. An additional \$6 million is needed from the State in order to meet our Total Investment goal of \$22 million.

Governor Snyder proposed a transportation strategy that would raise an additional \$1.2 billion statewide per year to improve our streets. State legislators must step up and realize that our infrastructure is crumbling. The longer we wait to fix the problem the more we, and our children, will need to pay. The City has engaged, and will continue to engage, with State legislators to advocate for State transportation investment. Every City resident and business owner needs to do the same. The Legislature and Governor need to come to terms with the fact that their failure to invest threatens our economic future.

We recommend continued advocacy for State investment but that local investment should not be delayed. Grand Rapidians cannot wait for State legislative changes, a critical lesson learned from the experience of the 21st Century Infrastructure Task Force. Finally, opportunities should be taken to engage Federal legislators regarding the need for transportation investments on the national level as well.

Recommendation #5 – Accessibility

Ensure streets and sidewalks are accessible for everyone.

Many citizens, especially younger persons, prefer to use public transportation, bicycles or other modes of transportation. As baby boomers age, retirees and the elderly are finding they will need or want to park their vehicle and travel via alternative methods. The abandonment of a

driver's license is oftentimes viewed as a loss of independence. For many, accessibility and mobility are not just a convenience—they are a necessity. Some of the impediments to access include:

- bus stops with no sidewalks to reach them;
- sidewalks with no accessible curb cuts available for those confined to wheelchairs;
- obstacles in sidewalks;
- potholes in crosswalks; and
- many other things that many of us take for granted are obstacles that many people struggle with on a daily basis.

These obstacles can make it difficult or sometimes impossible to travel to the grocery store, to the physician, to work or to school.

Fewer motor vehicles on our streets decreases the amount of air pollution from emissions and is good for our environment and our health. Walking, biking and other physical activity blended in with daily life are simple way to reduce obesity and other chronic illnesses. Improved public health has real economic savings. Lower insurance premiums, less government resources dedicated to Medicare and Medicaid, and fewer doctor visits are possible by encouraging people to get out of their cars. Proper infrastructure is required, however, to get people to regularly walk, bike or use transit.



Recommendation #6 - Sidewalks

Investment in sidewalk repair and replacement should be the responsibility of the City.

Accessibility and mobility throughout our city hinges not only on a quality street system, but on a quality sidewalk system. The current Point-of-Sale program that requires property owners to repair or replace sidewalk during real estate transactions is not proactive asset management. We

worked with the City Engineer's Office to evaluate alternative solutions. Based on that work, we recommend that homeowners no longer be burdened with the cost of repairing or replacing portions of sidewalk abutting their property that are in need of repair. Removing this responsibility from the property owner would provide the following benefits:

- Property owners would save hundreds of dollars in repair costs;
- City staff can inspect / repair all sidewalks in a 15- year revolving cycle;
- 73 miles of sidewalk would be inspected annually;
- 250% increase in miles of sidewalk repaired annually;
- Continuous funding for ADA ramp installation would be provided; and
- Improved sidewalk and non-motorized connectivity by filling in missing gaps.

Recommendation #7 - Charter Amendment for Sidewalks

Amend the City Charter to remove the provision regarding property owner responsibility for repair and replacement of sidewalk fronting their property; sunset the current Point-of-Sale Program.

It is our recommendation that the Charter amendment be tie-barred to Recommendation #3, local investment, and be in effect only as long as the citizens of Grand Rapids agree to continue the 0.2% income tax dedicated for the street system, including sidewalks.

Better sidewalks, lower cost and better value are what these changes will provide. The City Charter currently requires property owners to pay the cost of repairing the sidewalks that front their property. This can be a costly expense – ranging from a few hundred to several thousand dollars. It is time for a change that will provide lower cost for property owners and better outcomes for all of us.

The recommended changes will allow the City to operate an efficient and systematic sidewalk program without the barrier of significant cost to property owners. This change will allow the City to reduce staff and almost triple the amount of sidewalk repaired each year. The City will also be able to accelerate installation of sidewalk ramps throughout the city.

Our recommendation includes investment in completing sidewalk connections and completion of the trail system when possible in addition to the sidewalk repair. It is expected that this will produce a more walkable and accessible community and will do so at a lower cost and a faster rate than would otherwise be possible.

Recommendation #8 - Transparency

Establish a citizen's oversight group to monitor performance of streets investments and progress toward Vital Streets; report to taxpayers on outcomes. Tax revenue raised through the continued 0.2% income tax should be deposited in a separate Sustainable Street Fund for maximum transparency.

A citizen's oversight group should be established. The role of the citizen's oversight group is recommended to include:

- Monitoring progress
- Monitoring activity and allocation of funds
- Ensuring revenue diversity, including investigation and provision of recommendations on new or emerging revenue sources
- Advocating for resources on the Federal, State, and regional levels
- Ensuring vision is being implemented, including that appropriate activities are undertaken to accomplish the vision of Complete Streets and Green Streets
- Ensuring adherence to asset management planning
- Ensuring equity throughout all areas of the city
- Ensuring annual reporting and dashboarding on progress/outcomes is available to citizens

Some Task Force members have indicated an interest in continuing involvement and participation on an oversight committee. Due to the time and energy members have spent in learning about our streets, various resource options, and asset management, it is recommended that Task Force members be given consideration for appointment to the oversight committee.

Recommendation #9 - Continuous Improvement

Continue to research and implement new methods for street maintenance and construction to ensure that best practices are being followed. Research and implement new methods of investment as they become available and are found to be acceptable and reliable funding sources.

One of our Guiding Principles is that “innovative practices, applications and materials will be continuously explored and tested to provide value to the community.” We expect technology to evolve over time with new methods for users to pay for consuming transportation resources

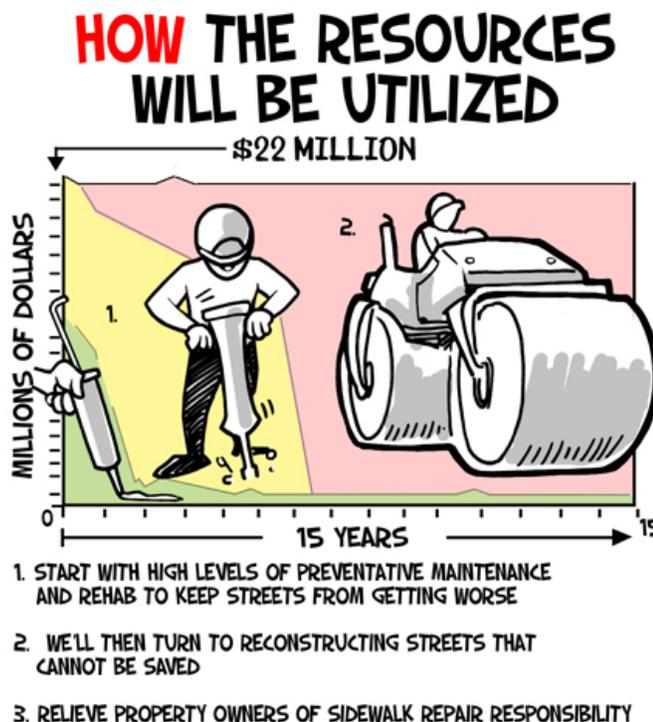
emerging and new technologies and best practices for street maintenance and construction being developed. We intend to continue to advocate for these improvements as they become available.

We were frustrated by the very limited number of near-term funding options available within the State of Michigan to support streets. A variety of tools are used in other states that have the potential to be effective here. Still more options, such as a Vehicle Miles Traveled tax, are being piloted. We encourage that a long-term view of potential funding options is continued to recognize future opportunities as they arise.

Recommendation #10 - Asset Management

Use a comprehensive Asset Management Program to manage street and sidewalk infrastructure investments.

A systematic, data-driven asset management approach using best practices is recommended in order to bring our street system, including sidewalks, to a State of Good Repair within 15 years. Providing the investment necessary for a balanced asset management program is essential to ensure that our desired outcomes are achieved. The City's approach to managing our street system must first include heavy early investments in preventative maintenance and rehabilitation. This will save those streets currently in the best condition and return those on the brink of Poor condition into a state of either Good or Fair condition. Then, those streets that cannot be saved would be reconstructed over a period of time.



Recommendation #11 - Green Infrastructure

Evaluate all streets recommended for improvement for the suitability of green infrastructure to manage stormwater. Green infrastructure should be implemented where site conditions allow, as defined in the City's Technical Reference Manual.

Green streets have proven to provide multiple benefits along the street right-of-way, as defined earlier in this report. Green infrastructure holds and manages stormwater where it falls – keeping it from going into gray infrastructure (pipes) and straight to the Grand River. Wherever possible, the use of green infrastructure such as trees, bioswales, porous pavement, and rain gardens should be integrated into street design. A minimum of 10% of all monies used for stormwater capital improvements should be devoted to green infrastructure.

Recommendation #12 - Partnerships

Partner, whenever practically feasible, with other agencies, non-profits and community groups to advance the vision and desired outcomes of the Sustainable Streets Task Force.

Grand Rapids is known for its success with both public/private and public/public partnerships. The evidence is all around us and continues to grow. The City's 2002 [Master Plan](#) helped formalize and accentuate the role of partnerships in our community and predicted that “collaboration among city departments, residents, property owners, businesses and institutions will be essential in bringing the [Master Plan's](#) recommendations to fruition. Both regional and community partnerships are needed.”

Partnerships have been essential to the City's investment in street infrastructure and will continue under this plan. Partners such as the Michigan Department of Transportation, Grand Valley Metropolitan Council, Downtown Development Authority, Brownfield Redevelopment Authority, Kent County Road Commission, Grand Rapids neighborhood and business districts, neighboring communities, and development partners and business owners who opt to pay special assessments for extra street features are all partners. By working together, we can leverage additional improvement to our street system. It all adds up.

Conclusion

It is time invest in our streets. Grand Rapidians are faced with one choice: maintain and rebuild our streets or do nothing. If we act, it is possible to improve our street system from 60% poor to 70% in a State of Good Repair over 15 years. If we do nothing, 90% of city streets will decline to a poor condition in ten short years. The City's street system is a vital asset which exceeds \$1 billion in value and is central to the region's transportation network.

Investing now will transform our city. A vision of Vital Streets – streets that serve everyone, increase value to homes and businesses, create place, and protect the natural resources of our community – can be realized by investing in our infrastructure. The vision's basis is found in the City's [Master Plan](#), [Green Grand Rapids](#), the [Sustainability Plan](#) and in the [report of the Transformation Advisors](#). The City's infrastructure is the foundation we leave for future generations to build on.

Our streets, sidewalks and other infrastructure within the public right-of-way must be able to support the various needs of neighborhoods, businesses, residents and visitors. The daily impacts of streets disinvestment can be felt in car repair bills, flat tires, traffic delay, pedestrian trails along the roadside and opinions about our community. In numerous public meetings Task Force members heard how our streets are not meeting citizen needs. It is within the community's control to take action.

The investment required to attain 70% of our streets in a State of Good Repair (either in Good or Fair condition) is approximately \$22 million per year over a 15-year period. This level of investment would be sufficient to include rebuilding our sidewalk system - allowing property owners to avoid hundreds of dollars in sidewalk repair costs. A voter-approved amendment to the City Charter will be needed to eliminate a provision that requires property owners pay for sidewalk repairs.

This report does not recommend a tax increase. Instead, citizens should be asked to continue their current income tax rate¹⁰ beyond June 30, 2015 for an additional 15 years and dedicate that

¹⁰ Task Force members have tracked with the City's Transformation Investment Plan; finding that significant progress has been made in eliminating the General Operating Fund (GOF) structural deficit. Research has shown that the City has made good use of the 2010 Income Tax increase to date. As a result of the transformational activities undertaken with this investment, the City is on schedule to meet ongoing operating expenses with available resources by June 30, 2015. This crucial step sets the stage for a comprehensive asset management approach that makes capital investments rather than funding operations. Local action to solve local problems has been the hallmark of transformation.

0.2% to Grand Rapids' street system, including sidewalks. This approach would provide \$9 million annually to properly manage our public streets and other assets within the right-of-way. Asking voters to continue the current City Income Tax rate and extend it an additional 15 years is the best local funding option. There is no additional financial burden for citizens and the investment produces significant value for us all.

Grand Rapids citizens, however, cannot shoulder more than this amount of the total investment in streets and sidewalks. Our State partners need to step up. Pressure must be maintained on the State to enact a statewide transportation investment solution consistent with the dollar value of the Governor's plan to produce an additional \$6 million for Grand Rapids' streets. Having learned from the experience of the 21st Century Infrastructure Task Force in 2002, our community cannot wait any longer to see what others will do or nothing just might happen.

The problems of street condition and funding must be resolved now in order to rebuild and preserve our street and sidewalk systems, however, we also know we cannot stop looking long-term as the transportation landscape evolves. Citizens must continue to advocate for long-term change while using the tools that are available now to solve the immediate and pressing problem.

We have issued 12 specific recommendations that will move Grand Rapids' streets and sidewalks forward to a sustainable future. Every one of these recommendations is implementable in the near-term. Given the extent to which our transportation system has suffered from disinvestment, it is strongly recommended that there be little delay in moving to action. A special election should be held in May, 2014. The cost of a special election is less than the cost of an out-of-cycle adjustment to income tax rates.

The evidence is overwhelming. It is time to invest.

APPENDIX

APPENDIX A

Definitions

A3 - The A3 Report is a Lean, Toyota-pioneered practice of getting the problem, the analysis, the corrective actions, and the action plan down on a single sheet of large (A3) paper, often with the use of graphics. A3 paper is the international term for a large sheet of paper, roughly equivalent to the 11-by-17-inch U.S. sheet.

ADA (Americans with Disabilities Act) - [The Americans with Disabilities Act \(ADA\)](#) prohibits discrimination against people with disabilities in employment, transportation, public accommodation, communications, and governmental activities. The ADA also establishes requirements for telecommunications relay services.

Asset Management - The combination of management, financial, economic, engineering, and other practices applied to physical assets with the objective of providing the required level of service in the most cost-effective manner. It includes the management of the whole life cycle (design, construction, commissioning, operating, maintaining, repairing, modifying, replacing and decommissioning/disposal) of physical and infrastructure assets.

CSO (Combined Sewer Overflow) - These occur when a sanitary sewer becomes overloaded due to stormwater. The sanitary sewer overflows to a nearby storm sewer and the untreated mixture of stormwater and sanitary sewage overflows to the Grand River. Grand Rapids has been a leader in the State of Michigan in eliminating combined sewer overflow (CSO). Combined Sewers were a common construction practice until the 1920s. In the late 1980s the City of Grand Rapids embarked on a comprehensive program to eliminate all combined sewer overflows (CSO) in the City. The result of these efforts has been a 99.8% + reduction in CSOs to date with less combined sewer overflow every year. There were 59 CSO locations prior to corrective work started in the early 1990s. Today, only 4 need to be completed.

Complete Streets – (*see also Vital Streets*) - A system of streets . . . planned, designed, and constructed to provide appropriate access to all legal users in a manner that promotes safe and efficient movement of people, and goods whether by car, truck, transit, assistive device, foot or bicycle.”¹¹ All users are defined to include:

- Pedestrians
- Bicyclists
- Transit users
- Motorists
- Trucks
- People with various abilities
- Children
- Elderly

¹¹ P.A. 135 of 2010

Major, FAU (Federal Aid Urban) Street- A street in an urban area eligible for federal assistance under Title 23 of the U.S. Code. These Major Streets serve regional assets and are essential for getting to work or home, and traveling to and from business districts and commerce. They move more people, visitors and goods than other streets.

Major, Non-FAU (Federal Aid Urban) Street - A Major or Collector street not eligible for Federal Aid. Non-FAU Major Streets serve as critical connectors between FAU Streets and Local Streets.

Neighborhood/Residential Street (sometimes considered “local” streets) – These streets provide access to property and host our homes. They support our quality of life and make a neighborhood better—or worse. Over 2/3 of Grand Rapids’ total street system is made up of neighborhood or residential streets (384 miles out of a total 588 miles).

PASER (PAvement Surface Evaluation and Rating) – A system for visually rating the surface condition of a pavement on a scale of 1 to 10, with 1 being a pavement in a failed condition and 10 being a pavement in excellent condition. The PASER system is the preferred method for Michigan agencies to rate their road pavements. Grand Valley Metro Council collects PASER information on Grand Rapids and the region’s pavement conditions provides timely information to assist jurisdictions in making wise investment decisions.



PASER RATING SCALE:

- | | |
|----------------------------|--|
| 10 - No Treatment Required | 5 - Sealcoat/Non-Structural Overlay less than 2 inches |
| 9 - No Treatment Required | 4 - Structural Overlay, 2 inches or more |
| 8 - No Treatment Required | 3 - Patching with Major Overlay |
| 7 - Routine Crack Filling | 2 - Reconstruction with Extensive Base Repairs |
| 6 - Sealcoat | 1 - Total Reconstruction |

State of Good Repair – Streets in Grand Rapids will be determined to be in a “state of good repair” if their PASER rating places them in either good or fair condition—rated from a 4 through a 10 on the PASER scale.

Vital Streets – (*see also* Complete Streets) – The Sustainable Streets Task Force determined that Grand Rapids’ needed a Vital Street system, including sidewalks. Their vision is to provide accessibility and mobility for all in a system that moves people, not just vehicles.

APPENDIX B

21st Century Infrastructure Task Force Report – Executive Study

EXECUTIVE SUMMARY - 2002

The 21st Century Infrastructure Task Force was charged with the task of creating a strategy for assessing the condition of the City's Street system; developing construction and maintenance standards required to systematically achieve an improved system and developing a plan to finance the required investment (See City Commission Resolutions in Appendix A).

The 30 members appointed to the Task Force by the City Commission established three working teams.

Team I and Team II were charged to establish maintenance and construction standards, develop the construction and maintenance methods required to achieve the desired quality of street infrastructure and calculate the investment required to create a quality street system.

Team III was charged with the task of identifying resources to provide financing for the investment required over time to return the City's street infrastructure to acceptable standards.

Research indicates that an investment of up to \$100 million will be required to meet community standards. Meeting community standards over 20 years would require annual investments of up to \$11.5 million. Meeting community standards over 15 years would require annual investments of up to \$12.5 million. Current investments in construction and maintenance total about \$8 million per year. The \$4 million gap in fiscal resources explains the gap in desired street quality.

Infrastructure is the backbone of civic life. Residents and businesses depend on the support provided by such basic systems as sewer, water, storm drainage and street networks. The City's street network totals nearly 600 miles of major and local streets and represents about 20% of the County's transportation network. City streets connect to the regional network and form the backbone of our region's economy. In fact, the City's street system is the core of this system. There is a growing recognition at the state and local level that transportation solutions require a coordinated mix of local, regional and state solutions. Each has a key role to play and must engage in crafting a solution.

The City previously established a framework to guide development, redevelopment and maintenance of the street system, known as the Street Classification Policy. This Plan facilitates investment decisions by suggesting design standards based upon their location. The Plan recognizes that streets serve many functions—only one of which is moving traffic. It also acknowledges that design elements are critical to the success of residential and business neighborhoods. The 21st Century Infrastructure Task Force built upon this system when developing their recommendations.

The City of Grand Rapids has excelled at planning, operating, maintaining and financing sewer and water systems. Both systems are supported by enterprise funds that have as their foundation an innovative user charge system that establishes rates on an annual basis. This user charge system has not failed, even under severe tests, to provide adequate resources.

In addition, the City has invested almost \$200 million to eliminate combined sewers (CSO) in Phase I of its CSO Elimination Program. In the process, sewer, water, storm drainage and street infrastructure in an area of 3.1 square miles on the City's west side has been reconstructed. This work has eliminated 96% of the City's CSO discharge. Another \$100 million will be invested over the next 17 years to eliminate CSO discharges on the City's East Side.

The City's street system has benefited and will continue to benefit from these investments in underground utilities. This relationship is planned, and its execution helps to significantly stretch very limited Street Fund dollars. The cost estimate of \$100 million anticipates a reduction in the amount required from Street Fund sources due to the \$9 million value of work to be done in conjunction with the East Side CSO Project.

The Street Fund has not been as robust as the Water and Sewer Funds. Where the Water and Sewer Systems benefit from an annual rate study that is controlled locally, the Street Fund languishes with an irregular source of revenue.

State Gas and Weight Tax payments make up approximately 71% of the Street Fund's annual revenue. The State gas tax rate was increased in 1983 and not again until 1997. While the number of vehicles registered and miles traveled increased, revenues were relatively stagnant and in no way kept pace with demands evidenced by a crumbling state and local street infrastructure. We are entering another period of State resource stagnation due to inflation since 1997 and diversion of Motor Vehicle Transportation Funds (MTF) to State General Fund uses.

The City has invested the new revenues resulting from the 1997 State Gas Tax increase directly into street reconstruction projects. Budgeting changes have directed more Street Fund resources to capital investments. Recognizing that this level of investment was still not sufficient, the Street Financing Priority Team, consisting of City Commissioners and Staff, recommended a significant and continuing General Operating Fund (GOF) subsidy to the Street Fund. The City Commission approved this recommendation and, in 1999, approved using the subsidy to support a \$9 million Transportation Bond issue that has improved City street conditions.

The combination of new Gas and Weight Tax receipts and a consistent GOF subsidy has made a perceptible difference in the condition of streets but has still fallen short of the level of investment required to recover from years of forced disinvestment. An additional level of investment will be required if additional progress is to be made.

The Task Force has completed a condition assessment of the City's street system. It has researched maintenance and construction methods and has determined how to achieve the desired level of quality. It has investigated past and present financial strategies and inspected alternative models in an effort to accumulate the resources needed.

The Task Force makes these recommendations based upon its research:

- That an Asset Management system be developed to guide investments in street infrastructure.
- That an evolving “mix of fixes” be utilized to upgrade and maintain the street system and that the mix be based upon objective condition assessment.
- That, while maintenance and construction methods now used by the City have passed the examination of Team I and II, an evaluation by an engineering consultant should be completed for maintenance operations.
- That the City increase inspection and adjustment of utility castings and inspection and repair of utility trenches to maintain the rideability of our streets.
- That a process of continuing education and evaluation of emerging practices be implemented.
- That options be developed and evaluated that would involve policy decisions to implement.
- That a maintenance and capital plan of approximately \$12.5 million annually be funded in order to upgrade and maintain the street system.
- That the General Fund Subsidy of the Street Fund be increased over 5 years to the level of 25% of Gas and Weight Tax Receipts.
- That amendments be sought to Act 51 to improve the flexibility of the use of state funds and conserve local resources.
- That voter approval of a county-wide license surcharge be sought.
- That maintenance of the existing regional street system be prioritized over “expand- and-improve” projects by the Metropolitan Planning Organization (MPO).
- That development approval requirements be reviewed to increase opportunities for improving the street system.
- That if the other steps noted above are not successful or do not produce the required \$4 million per year in additional resources, a voter approved increase in the City income tax of up to 0.1% be pursued.

The sections that follow will describe the work of the Task Force and its recommendations in detail.

APPENDIX C

Transformation Advisors Report – Executive Summary

EXECUTIVE SUMMARY – 2/22/11

In March, 2010 the Transformation Advisors was formed; we are a collective of dedicated citizens that have demonstrated vision in our work and passion for our community. We are also strongly committed to creating a successful and sustainable future for Grand Rapids. This report establishes a baseline assessment of the City's primary fiscal challenges, calls attention to our community's most significant challenges, identifies principles for success, and recommends next steps for implementation.

Achieving a financially sound budget that sustains the important values and visions of our community will be extremely difficult, but this work is absolutely necessary for our community's prosperity. The City of Grand Rapids must become a more nimble organization unburdened by legacy costs and focused on systemic change if the outcomes required by our community, as we know them, are to endure. We believe that the following areas should receive immediate attention:

Address the Structural Deficit: Costly pension and unfunded retiree healthcare obligations have contributed to the creation of a structural imbalance that will reduce services across all levels of City government and impair the ability of the City to address important community outcomes. City management and employees have made significant progress on reducing and controlling the costs of retiree health care. Now the annual required contribution for retiree health care must be funded to consolidate these important gains. The cost of benefits for future retirees and fringe benefits for current employees must become consistent with those of the private and nonprofit sectors.

Reform Public Safety: Following current best management practices will not be enough to prevent future cuts in staff or services for the two largest City departments. Police and fire comprise 63% of the General Operating Fund budget. Entirely new models of service delivery that keep the community safe and produce the same, or better, outcomes are essential. Data and information sharing must be a high priority to understand and modernize these departments in order to preserve our community's safety and capture savings for other valued community priorities. We support consolidation of police and fire services with local partner communities.

Invest in Streets and Infrastructure: Deferred investment and disinvestment in our physical infrastructure cannot continue. Revenues must be increased to pay for maintenance and reconstruction of our community's streets, alleys, and bridges. The State of Michigan should be encouraged to increase the state gas tax or, failing that, a dedicated local tax proposal should be examined to ensure proper maintenance and management to avoid exponentially higher replacement costs. Following a Complete Streets strategy so that all citizens have access to meet daily needs by bike, car, walking, or transit is important. Neighborhood infrastructure assets, such as housing stock and streetscapes, are the foundation of our community. Investment is necessary to prevent deterioration of our infrastructure, encourage economic development activities, and position our citizens and city for the future.

Focus on Quality of Life: A comprehensive strategy for improved parks and green space, great neighborhoods, crime prevention, recreation, and culture must be devised and implemented to position our community for a successful future. It is important to constantly examine and concentrate on these issues to discover consolidation opportunities, public/private partnerships, and new methods of service delivery. Our city's ability to attract and

retain residents, workers, and businesses over time will rely heavily on quality of life as the economy continues to shift to knowledge-based industries.

Decision-making must be outcomes-based for measurable success. A focus on rebalancing existing resources must be made first, with an understanding of the inherent trade-offs that will be made in serving the public. Existing resources such as the City's Master Plan, Green Grand Rapids, and Sustainability Plan provide guidance on priorities. The City's fiscal capacity to invest in and maintain public infrastructure and provide quality of life services is determined by its economic health. Continued poor health of our City's finances will assuredly deter our community's ability to maintain or encourage investment in the future without intentional and immediate bold action. We believe these recommendations are the path to a sustainable future, however, we cannot emphasize enough that time is of the essence.

APPENDIX D

Condition Examples – PASER 10 & PASER 9

PASER/PCI Rating Photo Examples.
PCI 95-100 - PASER 10



Patterson – North of 28th Street



Monroe – North of Leonard

PCI 90-94 –PASER 9



Baldwin Extension – West of I-196



Balsam – North of Rosewood

APPENDIX D

Condition Examples – PASER 8 & PASER 7

PCI 85-89 - PASER 8



M-6 – East of US-131



36th Street East of East Paris

PCI 79-84 - PASER 7



Leonard Street – East of Remembrance



Market Ave – East of Freeman

APPENDIX D

Condition Examples – PASER 6 & PASER 5

PCI 71-78 - PASER 6



East Beltline Ave – South of Burton



29th Street – West of East Beltline

PCI – 65-70 - PASER 5



East Beltline Ave – South of Michigan



Woodworth Ave – East of Coit

APPENDIX D

Condition Examples – PASER 4 & PASER 3

PCI 46-64 - PASER 4



Burton Street – Near US-131



Belmont Ave – North of Rogue River

PCI 31-45 - PASER 3



Chicago Drive – West of 32nd



14th Avenue – South of 44th Street

APPENDIX D

Condition Examples – PASER 2 & PASER 1

PCI 16 – 30 - PASER 2



Century Avenue North of Burton



Lakeside Drive – South of Robinson

PCI 1 – 15 - PASER 1



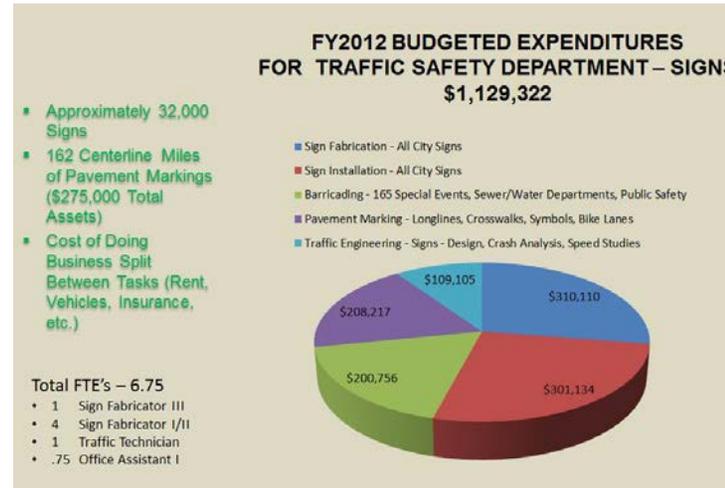
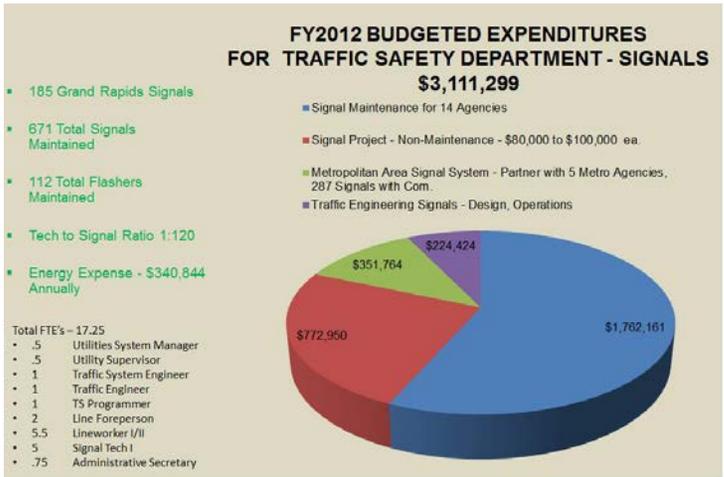
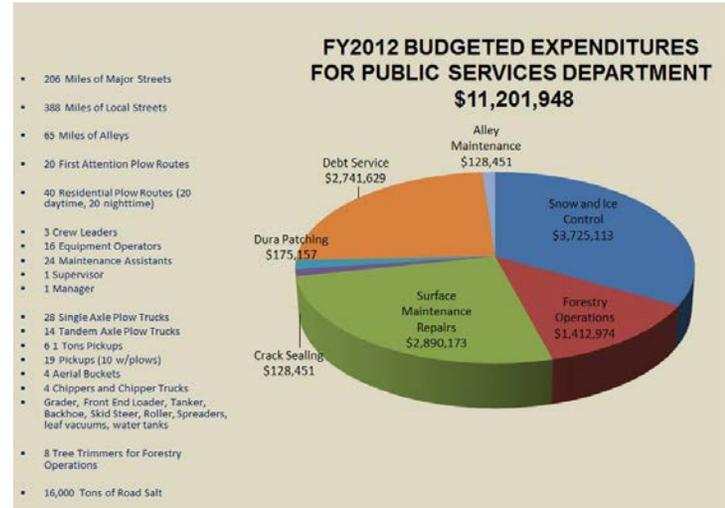
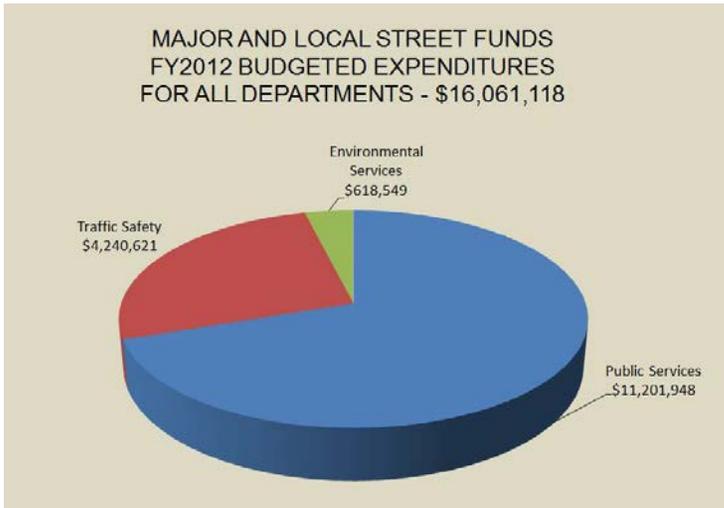
Seward – South of Richmond



Sweet Street – East of Plainfield (2008)

APPENDIX E

Review of Target and Investment Options – Current Investment / Major and Local Streets Funding



APPENDIX E

Review of Target and Investment Options – Current Condition

CURRENT CONDITION OF OUR STREETS

Federal Aid Urban (FAU) (Major Streets for which the City receives grant funding)

There are 156 miles of FAU streets in the City.

- 62%, or 96 miles are in Poor condition
- 21% or 32 miles are in Fair condition
- 17% or 28 miles are in Good condition

Non-Federal Aid Urban (Non-FAU) (Major streets for which the City does not receive grants)

There are 48 miles of Non-FAU Streets in the City.

- 69% or 33 miles are in poor condition
- 21% or 10 miles are in Fair condition
- 10% or 5 miles are in Good condition

Local Streets (our neighborhood or residential streets)

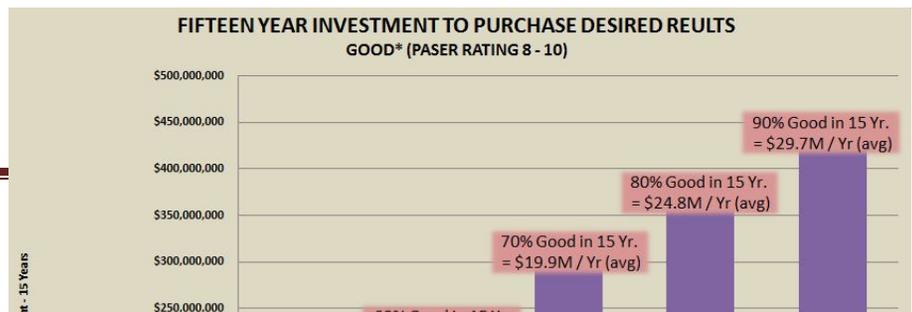
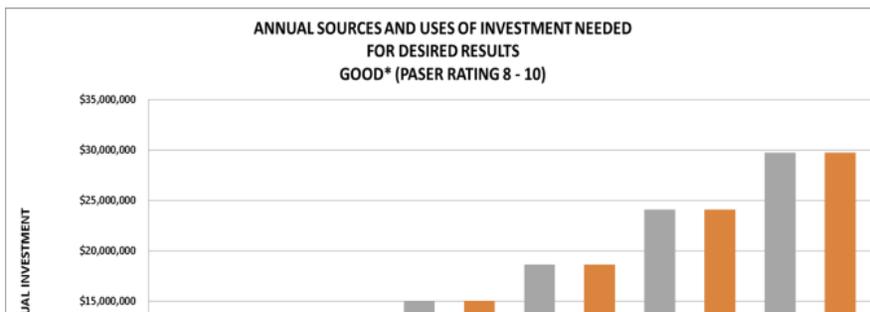
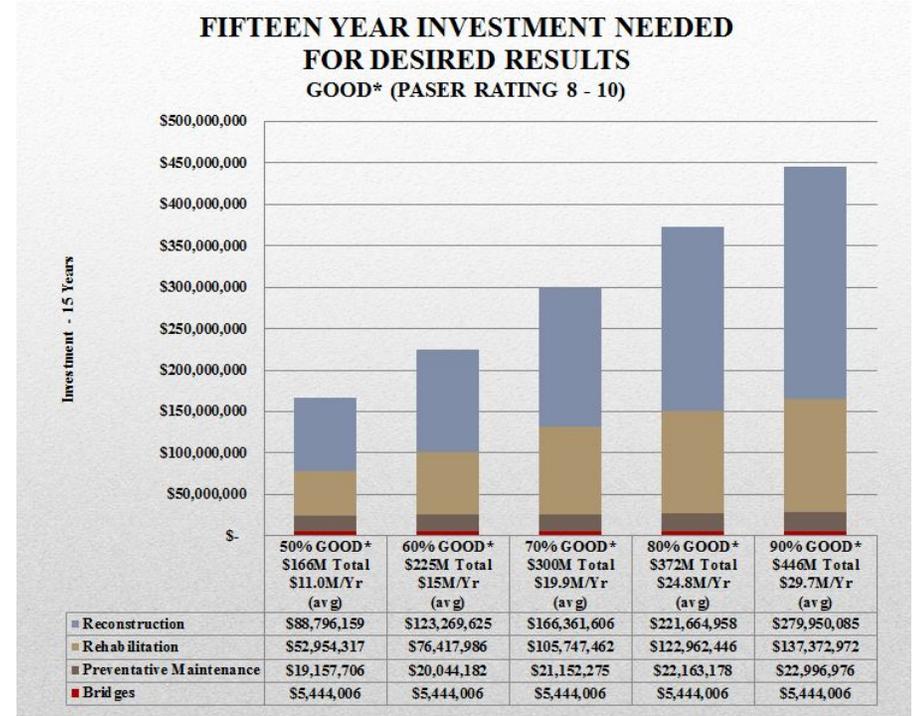
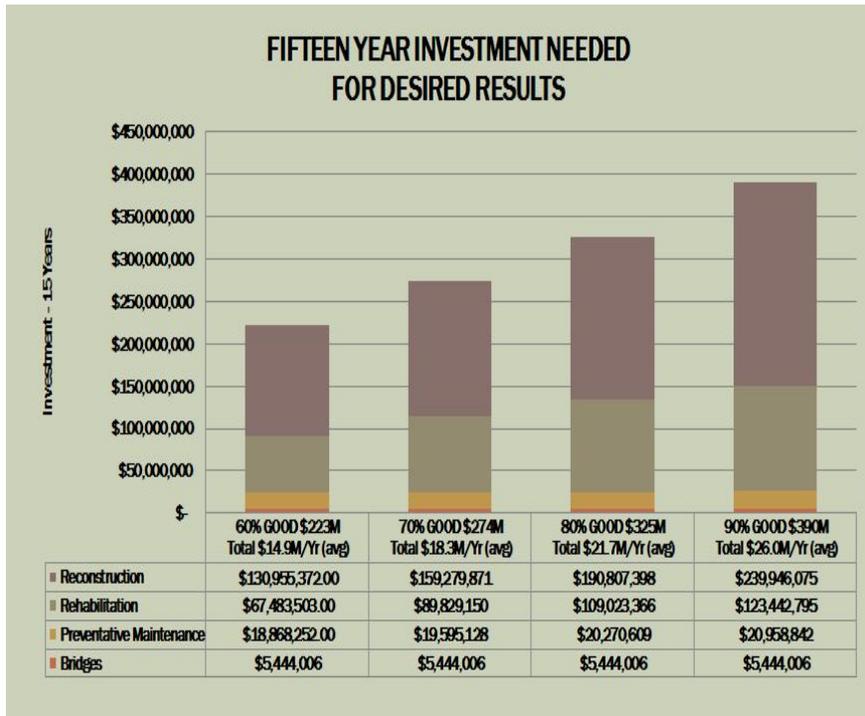
There are 384 miles of Local streets in the City.

- 63% or 242 miles are in Poor condition
- 33% or 125 miles are in Fair condition
- 4% or 17 miles are in Good condition

APPENDIX E

Review of Target and Investment Options

Below are various options we reviewed for targets and investment periods. Different scenarios such as reaching a percentage of good streets versus reaching a percentage of good plus fair streets were looked at as well as spreading the cost over 30 years rather than 15 years.



APPENDIX E

Review of Target and Investment Options

Below are various options we reviewed for targets and investment periods. Different scenarios such as reaching a percentage of good streets versus reaching a percentage of good plus fair streets were looked at as well as spreading the cost over 30 years rather than 15 years.

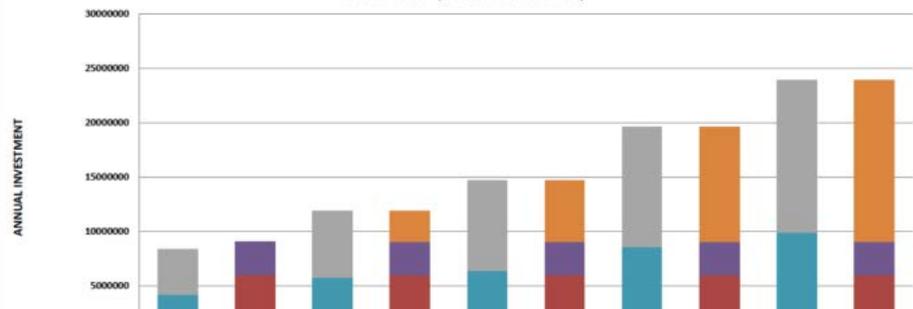
Investment Needed to Reach 70% Good by Year 15 and Maintain 70% Good to Year 30
 \$274M for years 1 – 15 and \$118M for Years 16 - 30



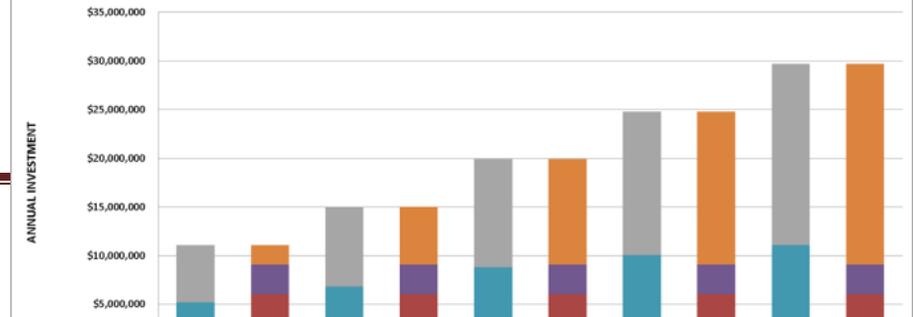
ANNUAL SOURCES AND USES WITH BASE OPERATING & MAINTENANCE EXPENDITURES



ANNUAL SOURCES AND USES OF INVESTMENT NEEDED FOR DESIRED RESULTS IF WE RECEIVE \$6M IN NEW STATE INVESTMENT GOOD + FAIR* (PASER RATING 5 - 10)



ANNUAL SOURCES AND USES OF INVESTMENT NEEDED FOR DESIRED RESULTS GOOD* (PASER RATING 8 - 10)



APPENDIX E

Review of Target and Investment Options – Final Scenarios

	SCENARIO	ANNUAL INVESTMENT	15 YEAR INVESTMENT					STATE OF GOOD REPAIR AT YEAR 15 (GOOD + FAIR)			
			LOCAL 384 MILES	MAJOR NON-FAU 48 MILES	FAU 157 MILES	GRANTS	TOTAL 589 MILES	LOCAL 384 MILES	MAJOR NON-FAU 48 MILES	FAU 157 MILES	TOTAL 589 MILES
1	<u>FUNDING:</u> Current Funding with no new investment. <u>ALLOCATION:</u> Throughout the system based on mileage. <u>GRANT FUNDING:</u> Where RH/RC is recommended in analysis, allocate to FAU streets (first).	\$ 3,483,608	\$29.81M	\$3.66M	\$19.02M	\$7.09M	\$52.50M	33.0%	34.5%	43.3%	35.8%
2	<u>FUNDING:</u> Current funding with no new investment. <u>ALLOCATION:</u> Maximize grant funding for FAU to \$3M. Prorate remaining PM funds to Major Non-FAU and Local streets by mileage. <u>GRANT FUNDING:</u> Where RH/RC is recommended in analysis, allocate to FAU streets (first).	\$ 3,483,608	\$2.37M	\$321K	\$88.36M	\$45.39M	\$91.25M	13.0%	11.8%	66.9%	27.6%
3	<u>FUNDING:</u> Current Funding with no new investment. <u>ALLOCATION:</u> Optimize all funding to Local first. <u>GRANT FUNDING:</u> No grant (STPU) funding available	\$ 3,483,608	\$47.01M	0	0	0	\$47.01M	44.9%	0.0%	0.7%	29.4%
4	<u>FUNDING:</u> Current Funding with no new investment. <u>ALLOCATION:</u> Optimize all funding with 75% Major-25% Local. <u>GRANT FUNDING:</u> Where RH/RC is recommended in analysis, allocate to FAU streets (first).	\$ 3,483,608	\$11.22M	\$7.96M	\$42.38M	\$15.91M	\$61.55M	23.4%	41.4%	31.1%	32.3%
5	<u>FUNDING:</u> Current Funding with no new investment. <u>ALLOCATION:</u> Optimize all funding with 50% Major-50% Local. <u>GRANT FUNDING:</u> Where RH/RC is recommended in analysis, allocate to FAU streets (first).	\$ 3,483,608	\$22.38M	\$5.30M	\$31.90M	\$14.76M	\$39.77M	32.4%	37.7%	48.3%	37.1%
6	<u>FUNDING:</u> Current Funding with an additional \$6M in new State investment. <u>ALLOCATION:</u> Throughout the system based on mileage. <u>GRANT FUNDING:</u> Where RH/RC is recommended in analysis, allocate to FAU streets (first).	\$ 9,483,608	\$80.36M	\$10.02M	\$60.07M	\$27.37M	\$130.45M	48.6%	43.5%	63.5%	51.2%
7	<u>FUNDING:</u> Current Funding with an additional \$6M in new State investment. <u>ALLOCATION:</u> Maximize grant funding for FAU to \$3M. Prorate PM funds of \$483,608 to FAU (26.7%), Major Non-FAU (8.1%) and Local streets (65.2%) by mileage. <u>GRANT FUNDING:</u> Where RH/RC is recommended in analysis, allocate to FAU streets (first).	\$ 9,483,608	\$54.84M	\$6.80M	\$100.22M	\$45.00M	\$161.86M	41.2%	37.4%	76.2%	50.2%
8	<u>FUNDING:</u> Current Funding with an additional \$6M in new State investment. <u>ALLOCATION:</u> Optimize all funding to Local first. <u>GRANT FUNDING:</u> No grant (STPU) funding available	\$ 9,483,608	\$123.18M	0	0	0	\$123.18M	61.5%	0.0%	0.7%	40.3%
9	<u>FUNDING:</u> Current Funding with an additional \$6M in new State investment. <u>ALLOCATION:</u> Optimize all funding with 75% Major-25% Local. <u>GRANT FUNDING:</u> Where RH/RC is recommended in analysis, allocate to FAU streets (first).	\$ 9,483,608	\$30.63M	\$21.37M	\$112.90M	\$45.00M	\$164.91M	34.2%	61.2%	88.3%	50.8%
10	<u>FUNDING:</u> Current Funding with an additional \$6M in new State investment. <u>ALLOCATION:</u> Optimize all funding with 50% Major-50% Local. <u>GRANT FUNDING:</u> Where RH/RC is recommended in analysis, allocate to FAU streets (first).	\$ 9,483,608	\$62.92M	\$14.60M	\$84.44M	\$45.00M	\$161.96M	43.4%	50.6%	75.4%	52.5%

APPENDIX E

Review of Target and Investment Options – Preferred Scenarios

SCENARIO	ANNUAL INVESTMENT	15 YEAR INVESTMENT					STATE OF GOOD REPAIR AT YEAR 15 (GOOD + FAIR)				
		LOCAL 384 MILES	MAJOR NON-FAU 48 MILES	FAU 157 MILES	GRANTS	TOTAL 589 MILES	LOCAL 384 MILES	MAJOR NON-FAU 48 MILES	FAU 157 MILES	TOTAL 589 MILES	
4	FUNDING: \$1.88 million Streets Capital, \$175,157 Dura Patching, \$128,451 Crack Sealing, \$900,000 for Asphalt Overlay and \$400,000 for Cops Seal (part of the Surface Maintenance Repair \$2,890,173 in FY2012). ALLOCATION: Optimize all funding with 75% Major-25% Local. Prorate Major portion to FAU and Non-FAU. Use 5% (\$175,000) for preservation/maintenance of bridges. GRANT FUNDING: Include in analysis where RHRC is recommended for FAU streets.	\$ 3,309,428	\$10.66M	\$7.54M	\$43.62M	\$18.21M	\$61.82M	22.9%	38.7%	54.2%	32.6%
4 to 60%	FUNDING: Amount needed to reach 60% State of Good Repair (Good + Fair) in <i>Local, Non-FAU Major, and FAU Streets</i> from the \$3,309,428 allocated by 75% Major-25% Local.		\$155.35M	\$25.05M	\$61.05M	\$27.20M	\$241.45M	60.0%	60.0%	60.1%	60.0%
4 to 70%	FUNDING: Amount needed to reach 70% State of Good Repair (Good + Fair) in <i>Local, Non-FAU Major, and FAU Streets</i> from the \$3,309,428 allocated by 75% Major-25% Local.		\$224.26M	\$35.66M	\$90.94M	\$42.64M	\$359.86M	70.0%	70.0%	70.0%	70.0%
4 to 80%	FUNDING: Amount needed to reach 80% State of Good Repair (Good + Fair) in <i>Local, Non-FAU Major, and FAU Streets</i> from the \$3,309,428 allocated by 75% Major-25% Local.		\$293.17M	\$45.86M	\$120.83M	\$45.00M	\$459.86M	80.0%	79.9%	80.0%	80.0%
4 to 90%	FUNDING: Amount needed to reach 90% State of Good Repair (Good + Fair) in <i>Local, Non-FAU Major, and FAU Streets</i> from the \$3,309,428 allocated by 75% Major-25% Local.		\$363.05M	\$55.68M	\$162.89M	\$45.00M	\$581.63M	90.0%	90.0%	90.0%	90.0%
4 to 100%	FUNDING: Amount needed to reach 100% State of Good Repair (Good + Fair) in <i>Local, Non-FAU Major, and FAU Streets</i> from the \$3,309,428 allocated by 75% Major-25% Local.		\$363.05M	\$55.68M	\$162.89M	\$45.00M	\$581.63M	90.0%	90.0%	90.0%	90.0%
4 to 100% for Locals, 70% for FAU and Non-FAU Majors	FUNDING: Amount needed to reach 100% State of Good Repair (Good + Fair) in <i>Local</i> and 70% State of Good Repair (Good + Fair) in <i>Non-FAU Major and FAU Streets</i> from the \$3,309,428 allocated by 75% Major-25% Local.		\$389.70M	\$35.66M	\$90.94M	\$42.64M	\$559.30M	100.0%	70.0%	70.0%	89.6%

APPENDIX E

Review of Target and Investment Options – Preferred Scenarios

SCENARIO	ANNUAL INVESTMENT	15 YEAR INVESTMENT					STATE OF GOOD REPAIR AT YEAR 15 (GOOD + FAIR)				
		LOCAL 384 MILES	MAJOR NON-FAU 48 MILES	FAU 157 MILES	GRANTS	TOTAL 589 MILES	LOCAL 384 MILES	MAJOR NON-FAU 48 MILES	FAU 157 MILES	TOTAL 589 MILES	
9	FUNDING: \$1.88 million Streets Capital, \$175,157 Dura Patching, \$128,451 Crack Sealing, \$900,000 for Asphalt Overlays and \$400,000 for Cope Seals (part of the Surface Maintenance Repair \$2,890,173 in FY2012) and an additional State investment of \$6M ALLOCATION: Optimize all funding with 75% Major-25% Local. Prorate Major portion to FAU and Non-FAU. Use 5% (\$475,000) for preservation/retreatment of bridges. GRANT FUNDING: Include in analysis where RH/RG is recommended for FAU streets.	\$ 9,009,428	\$30.63M	\$21.37M	\$112.90M	\$45.00M	\$164.91M	34.2%	61.2%	88.3%	50.8%
9 to 60%	FUNDING: Amount needed to reach 60% State of Good Repair (Good + Fair) in <i>Local, Non-FAU Major, and FAU Streets</i> from the \$9,009,428 allocated by 75% Major-25% Local.		\$130.26M	\$21.37M	\$112.90M	\$45.00M	\$264.54M	59.9%	61.2%	88.3%	67.6%
9 to 70%	FUNDING: Amount needed to reach 70% State of Good Repair (Good + Fair) in <i>Local, Non-FAU Major, and FAU Streets</i> from the \$9,009,428 allocated by 75% Major-25% Local.		\$199.69M	\$29.75M	\$112.90M	\$45.00M	\$342.35M	70.0%	70.0%	88.3%	74.9%
9 to 80%	FUNDING: Amount needed to reach 80% State of Good Repair (Good + Fair) in <i>Local, Non-FAU Major, and FAU Streets</i> from the \$9,009,428 allocated by 75% Major-25% Local.		\$268.46M	\$39.23M	\$112.90M	\$45.00M	\$420.59M	80.0%	80.0%	88.3%	82.2%
9 to 90%	FUNDING: Amount needed to reach 90% State of Good Repair (Good + Fair) in <i>Local, Non-FAU Major, and FAU Streets</i> from the \$9,009,428 allocated by 75% Major-25% Local.		\$354.45M	\$48.84M	\$156.19M	\$45.00M	\$559.47M	90.0%	90.0%	90.0%	90.0%
9 to 100%	FUNDING: Amount needed to reach 100% State of Good Repair (Good + Fair) in <i>Local, Non-FAU Major, and FAU Streets</i> from the \$9,009,428 allocated by 75% Major-25% Local.		\$375.08M	\$57.80M	\$162.12M	\$45.00M	\$595.00M	99.9%	99.9%	99.9%	99.9%
9 to 100% for Locals, 70% for FAU and Non-FAU Majors	FUNDING: Amount needed to reach 100% State of Good Repair (Good + Fair) in <i>Local</i> and 70% State of Good Repair (Good + Fair) in <i>Non-FAU Major and FAU Streets</i> from the \$9,009,428 allocated by 75% Major-25% Local.		\$375.08M	\$29.75M	\$112.90M	\$45.00M	\$517.74M	99.9%	70.0%	88.3%	94.4%

APPENDIX F

Sidewalk Program – A3

Affordable Safe Sidewalks – How to Reduce Inefficiencies and Maintain Sidewalk Assets Background



1998 % of Inspection w/ repairs

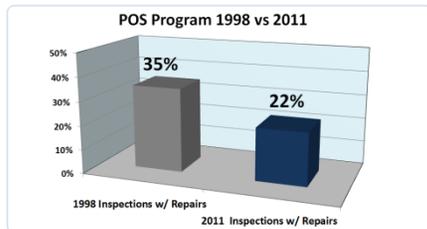
1998 Staffing Levels = 7 FTE's
1998 35% of all properties inspected required repairs.



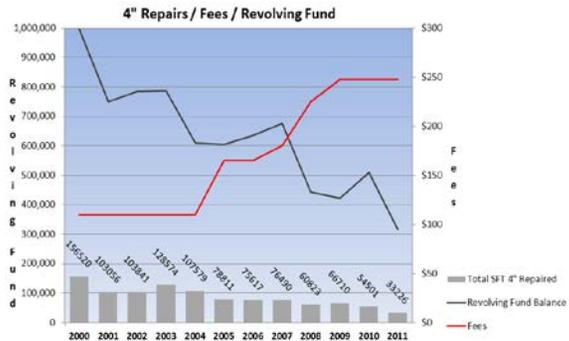
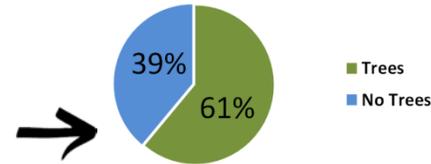
2011 % of Inspections with Repairs

2011 Staffing Levels = 3.5 FTE's
2011 22% of all properties inspected required repairs

Current State

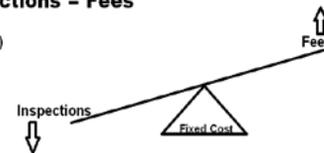


2011 Violations Caused by City Trees



Fixed Operating Costs* ÷ Inspections = Fees

- *Staff wages / Benefits (Staff Reduced to Skeleton)
- IT Charges - Fixed
- Rent - Fixed
- Vehicle / Equipment Rental - Fixed
- Operating Transfer - Fixed
- Misc. Charges - Fixed



CURRENT PROBLEMS

- Current POS Model Does Not Allow for Asset Management Approach
- Declining Inspections = Increased Fees
- 13 Point Decline in Inspection to Repair Ratio

Goals/Targets

GT1- Improved Walkability GT2 - Minimized Claims GT3 - Minimize Cost to Citizens

Option Comparison				
	Staffing Level (FTE's)	Estimated Revenue	Estimated 4" Sidewalk Repaired (SF)	Fee Cost per 4" Sidewalk Repaired (\$/SF)
Option 1 - POS	4.2	\$446,875	54,000	\$9.23
Option 2 - Complaint /Project	0.6	\$79,750	10,000	\$7.86
Option 3 - Systematic	2.6	\$308,500	80,000	\$5.00
Option 4 - Systematic (SSTF)*	2.5	\$20,000	140,000	\$2.85

* Evaluating repairs only.

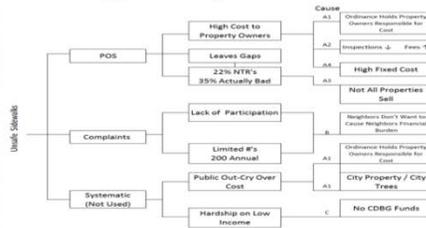
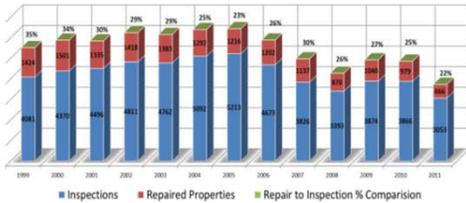
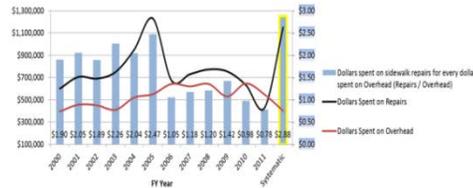
SSFT Funding Option

Construction Sources and Uses Budget*			
Sources		Uses	
Sidewalks Builders License Fee	\$ 2,700	ADA Ramps	\$ 200,000
Snow Complaint Enforcement	\$ 2,000	Sidewalk / Non-motorized Connectivity	\$ 250,000
Sidewalk Permits (50@ \$150.00)	\$ 7,500	Sidewalk Repairs	\$ 700,000
E&I Snow Plowing	\$ 7,800	Inspection / Indirect Cost/ Admin	\$ 400,000
Sidewalks SSFT Fund	\$ 1,605,000	Snow Complaint Inspection	\$ 75,000
Total Sources	\$ 1,625,000	Total Uses	\$ 1,625,000

*SSFT Funding of Sidewalk Repair and Maintenance

Analysis

1997 Estimates	Current
4500 Properties Sold / 1800 Repairs (40%)	FY 2011 - 3053 Properties Sold / 666 Repairs (22%)
40% of Inspections Would Yield Repairs	22-25% of Inspections Yield Repairs
50% of Violations Caused by City Trees	61% of Violations Caused by City Trees
Average Repair = 170 Sft = \$400 / \$510 with fees	Average Repair = 50 Sft = \$275 / \$522.50 with fees
Initial Fees - \$50/30/30 = \$110.00	FY 2012 Fees for Repair = \$82.50 / \$82.50 / \$82.50 = \$247.50
No Accounting for Snow Complaint Enforcement	2010-2011 Snow Complaints Inspected = 2400
25 Inspection Miles Driven for Every POS Repair Made (Miles Driven / Repairs)	



Countermeasure Options and Evaluation

Cause	Counter Measure	Description	Evaluation		Benefit
			POS	AM*	
A1	Change Ordinance	Change Charter to not hold property owners responsible - City maintains (Complete Streets)	Yellow	Green	Lower Cost
A2	Eliminate the POS Program / Alt. Funding	Eliminate or Sunset the POS Program or Develop Another Funding Source (DDA / Act 51 / Forestry)	Yellow	Green	Eliminate High Cost for Repairs
A3	No Counter Measure	No Ability to Control Which Homes Sell	Red	Red	None
A4	City Subsidize Sidewalk Dept. Acquire More	City To Subsidize Sidewalk Dept. to Lower Fixed Cost	Yellow	Green	Lower Fees Charged
B	CDBG Funds Repair All Walks	Apply for more CDBG Funds to help low income Repair all walks throughout the City / Fill Missing Gaps	Yellow	Yellow	Eliminate Cost to Poor. Avoid Tax Leans
			Red	Green	Structured Systematic Approach

Green Excellent Yellow Questionable but Possible Red Not Good

* AM - Asset Management Approach Funded by Special Millage

Options

Option 1: Maintain Current POS Program, Complaint and Project Inspection

Pros	Cons
Non-complaint sidewalks are repaired	Random inspections and repairs create a patch-work network of compliant sidewalk not allowing for a complete street design
Automated work-flows & work queuing will decrease Clerical labor related to data entry	High fees required to off-set expense of running program. Property not inspected unless requested (POS, Project, Complaint)
Citizen/Requestor Transparency on Status of Inspection/Repair when request submitted on-line	Large clerical effort required to process compliancy certificates on 75% of properties that do not require repairs
Inspection/Repair expense paid at time of sale allowing sale proceeds to fund repairs of properties with equity if available	Many homes no longer have equity to fund repairs from sale proceeds.

Option 2: Eliminate POS Program; Maintain Complaint and Project Inspection

Pros	Cons
Eliminate paperwork and inspections connected with 2800 properties which are issued Compliance Certificates annually	Reduction in amount of annual sidewalk repairs
Efficiency gained by not battling snow to inspect sidewalk due to pending closing	Loss of POS fee related subsidy for snow complaint inspection
Reduce Treasurer Department workload related to escrow funds for repairs	Assessment management based inspection plan is not possible
Decrease fees due to reduced staffing and overhead costs	Largest source of revenue is lost

Option 3: Eliminate POS Program; Proposed Systematic Asset Management

Pros	Cons
Inspect/Repair full network of City sidewalks over a 15 year cycle providing a safer sidewalk network	Additional collection effort may be needed due to increase in 10-pay plans
Reduce contract price per sidewalk square due to increase in contractor efficiency by consolidating repairs in one area	Fixed/Low income property owners may not be able to afford repair without CDBG funding availability
Increase Customer Satisfaction by reducing need for POS and payment of 'high fees'	Loss of POS fee related subsidy for snow complaint inspection
Reduce carbon emissions by focusing inspections/repairs in cohesive quadrants	
Provides for an Assessment Management based approach to repair all City sidewalk	
Reduce Treasurer Department workload related to escrow funds for repairs	

Option 4: Eliminate POS Program; Proposed Systematic Asset Management - SSTF Funded

Pros	Cons
Inspect/Repair full network of City sidewalks over a 15 year cycle providing a safer sidewalk network	Required Millage or Income Tax for a funding source
Reduce contract price per sidewalk square due to increase in contractor efficiency by consolidating repairs in one area	Required change to current City's Charter
Increase Customer Satisfaction by reducing need for POS and payment of 'high fees'	
Reduce carbon emissions by focusing inspections/repairs in cohesive quadrants	
Provides for an Assessment Management based approach to repair all City sidewalk	
Reduce Treasurer Department workload related to escrow funds for repairs	

Recommendation

SSTF- Funded Systematic Asset Management Approach

- Inspect / repair all City sidewalk in a 15 year revolving cycle
- 73 miles of sidewalk inspected annually
- 250% increase in miles of sidewalk repaired annually
- Provides continuous funding for ADA ramp installation
- Provides for sidewalk and non-motorized connectivity improvements

APPENDIX G

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The Institute of Asset Management

<http://theiam.org/>

MEMORANDUM

CITY OF GRAND RAPIDS

APPENDIX B

Date: August 14, 2014

To: Top Management

From: Gregory A. Sundstrom, City Manager *GS*

Subject: **Executive Order 2014-01— Vital Streets Implementation**

Summary

On May 6, 2014, Grand Rapids voters overwhelmingly approved investing in Vital Streets. This decision will provide investment resources that, when coupled with existing resources, grants, and anticipated new State resources will enable the City to achieve a rating of “Good” and “Fair” for 70% of the streets over the next 15 years.

The Sustainable Streets Task Force created the Vital Street framework for this investment that was approved by the City Commission and endorsed by the voters.

Vital streets and rights-of-way are accessible, attractive, environmentally responsible, and safe, serving all people of our community. Vital streets embrace the entire right-of-way through design that provides safe access for all users.

Vital streets manage stormwater in place through low impact development practices.

Vital streets enhance the urban tree canopy, quality of life in neighborhoods, and economic vitality in business districts.

Vital streets will be the default design approach for street, sidewalk, and right-of-way repair, improvement, and reconstruction, and shall be used unless clear engineering difficulties prevents its use.

This Executive Order delegates the responsibility and authority for coordinated implementation of investment in vital streets and all related infrastructure.

Section 1 – Purpose

The purpose of this Executive Order is to ensure investment occurs in accordance with an integrated strategy based on the asset management plan to produce Sustainable Asset Management outcomes.

Section 2 – Investment Guidelines

Implementation shall be conducted in accordance with the Vital Street and Sidewalk Investment Guidelines adopted by the City Commission on February 11, 2014:

1. The City shall continue to invest \$3.4 million of Major and Local Street Fund revenues to pay for base level street repair, improvement and reconstruction.

Executive Order 2014-01

August 14, 2014

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2. At least 84% (estimated at \$8,300,000 annually) of the revenue from the income tax continuation would be dedicated to Vital Street investments and up to 16% (estimated at \$1,600,000 annually) would be dedicated to systematic sidewalk investments.

3. If future reductions are necessary in the City's Major and Local Street Fund budget during any of the years of this income tax continuation, beginning with Fiscal Year 2016, as the result of a decrease in State payments, the Major and Local Street Fund budget supporting the base level street repair, improvement and reconstruction and stormwater for that year shall be reduced by a percentage no greater than the percentage reduction of the total State payments to the Major and Local Street Fund.

4. Any increase in State payments as the result of a change in the transportation formula and/or increase in State revenue for street repair and maintenance will be dedicated to Vital Street investments in the year received. In fiscal years after such an increase in State payments, any increase in state payments for street repair and maintenance will be allocated between capital investment and operations based upon the percentage amount of the increase.

5. All capital projects planning for investing the revenue from the income tax continuation shall engage citizens, neighborhoods and business districts.

6. The City Commission shall establish and appoint the Vital Streets Oversight Commission to make recommendations to the City Manager and City Commission on the expenditure of revenue from the income tax continuation, report to the City Commission on achievement of Vital Street and Sidewalk outcomes and advise on asset management strategies. The annual capital budget for proposed expenditures of the revenue from the income tax continuation shall be reviewed by the Vital Streets Oversight Commission and approved by the City Commission prior to any spending.

7. All expenditures from the revenue from the income tax continuation shall be audited by a professional auditing firm. The annual investments shall be reported to the Vital Streets Oversight Commission, Stormwater Oversight Commission and City Commission and posted on the City's website.

8. The portion of revenue from the income tax continuation devoted to street repair, improvement and reconstruction shall be deposited in a specially designated capital fund and shall only be subject to shared services costs of the City related to capital projects. The portion of revenue from the income tax continuation devoted to sidewalk repair, improvement and reconstruction shall be subject to shared services costs, consistent with all City services.

9. Vital Streets will be the default design approach for street, sidewalk and right-of-way repair, improvement and reconstruction and shall be used unless clear engineering difficulties prevent its use. City Commission shall cause appropriate ordinances, City Commission policies practices, and plans to be adopted or amended as required to guide implementation of Vital Streets and Sidewalks.

10. Low impact design will be the default design approach for street, sidewalk and right-of-way repair, improvement and reconstruction and shall be used unless clear engineering difficulties prevent its

use in order to enable the City to achieve a minimum of Stormwater Management Level C investment by FY2022 as depicted in the 2013 Stormwater Asset Management Plan.

11. The City will consider asset management, balance and distribution, outcomes from engagement, maintaining access, completion of safe walking and bicycle routes and coordination with other projects when making annual investments in order to ensure conditions improve in all areas of the City.

12. Beginning in fiscal year 2016 (July 1, 2015), the City Commission will commit to \$13 million of General Operating Fund support for sustainable streets over the next fifteen years with a minimum of \$500,000 per year. In addition, in fiscal years where General Operating Fund financial results are more favorable than the December 2013 projections, the City Commission will make additional strategic investments with a goal of an additional \$1 million per year in sustainable streets.

13. Vital Street and Sidewalk investments will be guided by this definition and framework: Vital Streets and rights-of-way are accessible, attractive, environmentally responsible and safe; serving all people of our community. Vital Streets embrace the entire right-of-way through design that provides safe access for all users, manages stormwater in place through low impact development practices, enhances urban tree canopy and quality of life in neighborhoods and economic vitality in business districts.

Section 3 – Finance and Accounting

Revenues from the voter approved dedicated City income tax will be accounted for separately in accordance with the fund structure recommended by the Chief Financial Officer and approved by the City Commission. This funding shall be allocated to Vital Streets and Sidewalks as provided for in the investment guidelines. Projects shall be accounted for independently in sufficient detail to permit development of Key Performance Indicators and metrics. The Chief Financial Officer shall recommend and implement practices and procedures for financing the program of projects for Vital Street and Sidewalk investments.

Section 4 – Dashboard

A Dashboard shall be established and incorporated into the City's current financial dashboard.

Section 5 – Vital Streets Oversight Commission

The Vital Streets Oversight Commission was established by the City Commission on May 20, 2014. The Vital Street and Sidewalk Investment Guidelines provide for establishment of a Vital Streets Oversight Commission and states:

The City Commission shall establish and appoint the Vital Streets Oversight Commission to make recommendations to the City Manager and City Commission on the expenditure of revenue from the income tax continuation, report to the City Commission on achievement of Vital Street and Sidewalk outcomes and advise on asset management strategies. The annual capital budget for proposed expenditures of the revenue from the income tax continuation shall be reviewed by the Vital Streets Oversight Commission and approved by the City Commission prior to any spending.

The Vital Streets Oversight Commission will work with the City Manager and City Commission to recommend how the income tax revenue is to be invested. The Oversight Commission will report actual expenditures and results to the City Commission and the public each year.

Executive Order 2014-01

August 14, 2014

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The role of Vital Streets Oversight Commission includes:

1. Monitoring progress
2. Monitoring activity and allocation of funds
3. Reporting to the City Commission on achievement of Vital Street and Sidewalk outcomes
4. Ensuring revenue diversity, including investigation and provision of recommendations on new or emerging revenue sources
5. Advocating for resources on the Federal, State, and regional levels
6. Ensuring vision is being implemented, including that appropriate activities are undertaken to accomplish the vision of Complete Streets and Green Streets
7. Advising on asset management strategies to ensure adherence to asset management planning
8. Ensuring balance, distribution, and equity throughout all areas of the city
9. Ensuring annual reporting and dashboarding on progress/outcomes is available to citizens

Section 6 – Leadership, Authority, and Direction

The Assistant City Engineer for Design Services is designated Vital Street and Sidewalk Project Leader. This leadership role shall include:

1. Serving as Chairperson of the Design Team, the Assistant City Engineer for Design Services shall be responsible for and have authority to resolve all conflicts to assure that investment outcomes are optimized
2. Ensuring Vital Street and Sidewalk Investment Guideline provisions are incorporated into investment decisions
3. Coordinating the development of the 5-Year Capital Improvement Program
4. Working with the managers of each asset class to ensure coordinated investment on a project by project basis and an integrated basis according to evolving asset management plans
5. Consider balance, distribution, and equity outcomes from engagement, sustainable asset management principles, maintaining access, completion of safe walking and bicycle routes, and coordination with other projects when making annual investments to ensure conditions improve in all areas of the City.
6. The Assistant City Engineer for Design Services will coordinate with the City Engineer.

Section 7 – Role of the Deputy City Manager

The Deputy City Manager shall lead staff from: City Engineer's Office, Traffic Safety, Planning, Public Services, Fiscal Group and others as needed to facilitate the work of the Vital Streets Oversight Commission. The Deputy City Manager shall provide overall guidance and direction in situations where required.

cc: Mayor and City Commission
Vital Streets Oversight Commission

APPENDIX C

SUSTAINABLE STREETS TASK FORCE FUNDING RECOMMENDATION

SOURCES	USES
<u>BASE</u>	<u>BRIDGE INVESTMENT</u> \$474,180/YEAR
<ul style="list-style-type: none"> • \$1,880,000 Streets Capital (retired bond principle and interest) • \$175,157 Dura Patching • \$128,451 Crack Sealing • \$900,000 Asphalt Overlays • <u>\$400,000</u> Cape Seals 	<u>FAU STREET INVESTMENT</u> \$6,500,000/YEAR RESULT: 70% in STATE OF GOOD REPAIR
<ul style="list-style-type: none"> • \$3,483,608 TOTAL - BASE 	<u>MAJOR NON-FAU STREET INVESTMENT</u> \$5,600,000 in YEAR 1 and 2 \$140,000 in YEAR 3 through 15 RESULT: 70% in STATE OF GOOD REPAIR
<u>STATE INVESTMENT</u> \$6,000,000	<u>LOCAL STREET INVESTMENT</u> \$7,909,428 in YEAR 1 and 2 \$13,369,428 in YEAR 3 through 15 RESULT: 70% in STATE OF GOOD REPAIR
<u>INCOME TAX – 0.2%</u> \$8,000,000 +	<u>SIDEWALKS</u> \$1,600,000/YEAR RESULT: Eliminate Point of Sale
<u>GRANTS</u> \$3,000,000 +	<u>TOTAL ALL USES - \$22 MILLION</u>
<u>TOTAL ALL SOURCES - \$22 MILLION</u>	

APPENDIX D

**SUSTAINABLE STREETS TASK FORCE
INVESTMENT NEEDED TO REACH 70% GOOD AND FAIR IN 15 YEARS**

TREATMENT	FAU Preventive Maintenance	FAU Rehabilitation	FAU Reconstruction	FAU Total	PROJECTED % GOOD + FAIR - FAU
Year 1	\$1.52M	\$4.13M	\$1.87M	\$7.52M	43.32%
Year 2	\$0.1M	\$6.01M	\$0.M	\$6.11M	50.36%
Year 3	\$0.32M	\$3.91M	\$1.91M	\$6.15M	55.42%
Year 4	\$0.07M	\$.91M	\$5.8M	\$6.78M	58.43%
Year 5	\$0.41M	\$0.M	\$5.93M	\$6.35M	60.42%
Year 6	\$0.13M	\$0.M	\$6.21M	\$6.34M	59.55%
Year 7	\$0.51M	\$0.M	\$5.84M	\$6.35M	60.09%
Year 8	\$0.15M	\$0.M	\$6.19M	\$6.34M	60.36%
Year 9	\$0.51M	\$0.M	\$5.84M	\$6.35M	59.68%
Year 10	\$0.17M	\$0.M	\$6.17M	\$6.35M	61.56%
Year 11	\$0.18M	\$0.M	\$6.16M	\$6.35M	63.35%
Year 12	\$0.82M	\$0.M	\$5.53M	\$6.34M	64.96%
Year 13	\$0.2M	\$0.M	\$6.14M	\$6.34M	66.73%
Year 14	\$0.21M	\$0.M	\$6.13M	\$6.34M	68.45%
Year 15	\$0.82M	\$0.M	\$5.52M	\$6.34M	69.97%

TOTAL

\$96.36M

SUSTAINABLE STREETS TASK FORCE
INVESTMENT NEEDED TO REACH 70% GOOD AND FAIR IN 15 YEARS

TREATMENT	Major Non-FAU Preventive Maintenance	Major Non-FAU Rehabilitation	Major Non-FAU Reconstruction	Major Non- FAU Total	PROJECTED % GOOD + FAIR - MNF
Year 1	\$.74M	\$4.66M	\$0.M	\$5.4M	48.62%
Year 2	\$0.14M	\$5.82M	\$0.M	\$5.96M	69.69%
Year 3	\$0.14M	\$0.M	\$0.M	\$.14M	69.69%
Year 4	\$0.09M	\$0.M	\$0.M	\$.09M	69.69%
Year 5	\$0.04M	\$0.M	\$0.M	\$.04M	69.69%
Year 6	\$0.05M	\$0.M	\$0.M	\$.05M	69.69%
Year 7	\$0.07M	\$0.M	\$0.M	\$.07M	69.69%
Year 8	\$0.03M	\$0.M	\$0.M	\$.03M	69.69%
Year 9	\$0.03M	\$0.M	\$0.M	\$.03M	69.69%
Year 10	\$0.08M	\$0.M	\$0.06M	\$.14M	69.75%
Year 11	\$0.03M	\$0.M	\$0.11M	\$.14M	69.85%
Year 12	\$0.07M	\$0.M	\$0.07M	\$.14M	69.91%
Year 13	\$0.03M	\$0.M	\$0.1M	\$.14M	70.00%
Year 14	\$0.03M	\$0.M	\$0.1M	\$.14M	70.07%
Year 15	\$0.09M	\$0.M	\$0.05M	\$.14M	70.11%

TOTAL

\$12.63M

**SUSTAINABLE STREETS TASK FORCE
INVESTMENT NEEDED TO REACH 70% GOOD AND FAIR IN 15 YEARS**

TREATMENT	Local Preventive Maintenance	Local Rehabilitation	Local Reconstruction	Local Total	PROJECTED % GOOD + FAIR- LOCAL
Year 1	\$9.11M	\$0.07M	\$0.00M	\$9.17M	36.76%
Year 2	\$0.44M	\$7.05M	\$0.00M	\$7.48M	40.10%
Year 3	\$1.55M	\$11.54M	\$0.00M	\$13.09M	45.49%
Year 4	\$1.59M	\$12.78M	\$0.00M	\$14.37M	51.34%
Year 5	\$0.27M	\$12.84M	\$0.00M	\$13.11M	57.09%
Year 6	\$0.44M	\$0.00M	\$12.63M	\$13.07M	58.79%
Year 7	\$0.32M	\$0.00M	\$12.71M	\$13.03M	60.46%
Year 8	\$0.50M	\$0.00M	\$12.57M	\$13.07M	62.07%
Year 9	\$0.47M	\$0.00M	\$12.60M	\$13.07M	63.60%
Year 10	\$0.63M	\$0.00M	\$12.43M	\$13.06M	65.14%
Year 11	\$0.45M	\$0.00M	\$12.60M	\$13.05M	66.64%
Year 12	\$0.69M	\$0.00M	\$12.37M	\$13.06M	67.10%
Year 13	\$0.55M	\$0.00M	\$12.50M	\$13.06M	68.55%
Year 14	\$0.58M	\$0.00M	\$12.48M	\$13.06M	69.98%
Year 15	\$0.78M	\$0.00M	\$12.27M	\$13.05M	71.36%

TOTAL

\$125.17M

**SUSTAINABLE STREETS TASK FORCE
INVESTMENT NEEDED TO REACH 70% GOOD AND FAIR IN 15 YEARS**

TREATMENT	Total Preventive Maintenance	Total Rehabilitation	Total Reconstruction	Total - All Street Types and Treatments	PROJECTED % GOOD + FAIR - ALL
Year 1	\$11.37M	\$8.86M	\$1.87M	\$22.1M	39.47%
Year 2	\$.67M	\$18.88M	\$0.M	\$19.55M	45.24%
Year 3	\$2.01M	\$15.45M	\$1.91M	\$19.38M	50.10%
Year 4	\$1.75M	\$13.69M	\$5.8M	\$21.24M	54.72%
Year 5	\$.73M	\$12.84M	\$5.93M	\$19.5M	59.00%
Year 6	\$.61M	\$0.M	\$18.85M	\$19.46M	59.88%
Year 7	\$.9M	\$0.M	\$18.55M	\$19.45M	61.12%
Year 8	\$.68M	\$0.M	\$18.76M	\$19.44M	62.24%
Year 9	\$1.01M	\$0.M	\$18.44M	\$19.45M	63.06%
Year 10	\$.88M	\$0.M	\$18.66M	\$19.54M	64.57%
Year 11	\$.67M	\$0.M	\$18.87M	\$19.54M	66.03%
Year 12	\$1.57M	\$0.M	\$17.97M	\$19.54M	66.76%
Year 13	\$.79M	\$0.M	\$18.75M	\$19.54M	68.19%
Year 14	\$.82M	\$0.M	\$18.71M	\$19.54M	69.58%
Year 15	\$1.69M	\$0.M	\$17.84M	\$19.54M	70.89%

TOTAL

\$296.8M

APPENDIX E

VITAL STREETS FY2018 – FY2022 Capital Plan

SOURCES - VITAL STREETS						
FISCAL YEAR		FY2018	FY2019	FY2020	FY2021	FY2022
Act 51 Revenues		\$ 3,483,608	\$ 3,483,608	\$ 3,483,608	\$ 3,483,608	\$ 3,483,608
Income Tax Support		\$ 12,835,499	\$ 13,220,564	\$ 13,551,078	\$ 13,889,855	\$ 14,237,101
GOF Support		\$ 900,000	\$ 850,000	\$ 850,000	\$ 850,000	\$ 850,000
Grants (estimated)		\$ 6,900,157	\$ 3,369,614	\$ 5,239,000	\$ 3,798,902	\$ 3,039,618
Bond Principal Repayment - Sidewalks		\$ 1,272,824	\$ 64,883	\$ 64,891	\$ 64,784	\$ 64,784
State Investment		\$ 3,854,577	\$ 5,028,717	\$ 6,104,470	\$ 6,578,543	\$ 6,867,565
		\$ 29,246,665	\$ 26,017,386	\$ 29,293,047	\$ 28,665,692	\$ 28,542,676
USES - VITAL STREETS						
FISCAL YEAR		FY2018	FY2019	FY2020	FY2021	FY2022
Transfer - Sidewalks (Share of Income Tax)		\$ 2,053,680	\$ 2,115,290	\$ 2,168,172	\$ 2,222,377	\$ 2,277,936
Bond/Interest Payments		\$ 4,591,617	\$ 8,765,700	\$ 8,710,974	\$ 5,173,176	\$ 2,123,950
Traffic Safety/Signals		\$ 277,000	\$ 277,000	\$ 277,000	\$ 277,000	\$ 277,000
Trunkline - Act 51		\$ 218,333	\$ 25,000	\$ 25,000	\$ 25,000	\$ 25,000
Bridges		\$ 50,626	\$ 50,000	\$ 85,000	\$ 50,000	\$ 85,000
FAU		\$ 6,783,521	\$ 3,386,820	\$ 3,531,245	\$ 3,252,777	\$ 2,792,853
Preventative Maintenance		\$ 761,760	\$ 147,544	\$ -	\$ 943,835	\$ -
Rehabilitation		\$ 2,423,440	\$ 1,698,454	\$ 2,724,990	\$ 1,107,579	\$ 1,962,728
Reconstruction		\$ 3,598,321	\$ 1,540,822	\$ 806,255	\$ 1,201,363	\$ 830,125
MNF		\$ 683,299	\$ 734,252	\$ 71,554	\$ 130,000	\$ 49,119
Preventative Maintenance		\$ -	\$ -	\$ -	\$ 130,000	\$ 49,119
Rehabilitation		\$ 483,807	\$ -	\$ 71,554	\$ -	\$ -
Reconstruction		\$ 199,492	\$ 734,252	\$ -	\$ -	\$ -
LOCAL		\$ 7,365,285	\$ 4,399,790	\$ 5,741,792	\$ 10,078,643	\$ 14,085,079
Preventative Maintenance		\$ 5,477,695	\$ 1,988,174	\$ 2,571,623	\$ 5,725,015	\$ 4,949,600
Rehabilitation		\$ 1,537,085	\$ 1,895,016	\$ 2,851,024	\$ 4,017,945	\$ 8,682,089
Reconstruction		\$ 350,505	\$ 516,600	\$ 319,146	\$ 335,683	\$ 453,390
GRANTS		\$ 6,900,157	\$ 3,369,614	\$ 5,239,000	\$ 3,798,902	\$ 3,039,618
CIPP Lining of Storm Sewers		\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
ROW/Green Infrastructure Maintenance		\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000
Contingency Account		\$ -	\$ 2,514,359	\$ 3,052,235	\$ 3,289,272	\$ 3,433,783
		\$ 29,223,519	\$ 25,937,825	\$ 29,201,973	\$ 28,597,146	\$ 28,489,338
Sources Less Uses		\$ 23,146	\$ 79,561	\$ 91,074	\$ 68,546	\$ 53,339

APPENDIX E

VITAL STREETS

FY2019 – FY2023 Capital Plan

SOURCES - VITAL STREETS

FISCAL YEAR	FY2019	FY2020	FY2021	FY2022	FY2023
Act 51 Revenues	\$ 3,483,608	\$ 3,483,608	\$ 3,483,608	\$ 3,483,608	\$ 3,483,608
Income Tax Support	\$ 13,220,564	\$ 13,551,078	\$ 13,889,855	\$ 14,237,101	\$ 14,237,101
GOF Support	\$ 850,000	\$ 850,000	\$ 850,000	\$ 850,000	\$ 850,000
Grants (estimated)	\$ 1,746,625	\$ 7,161,989	\$ 3,998,902	\$ 2,839,618	\$ 3,179,419
Bond Principal Repayment - Sidewalks	\$ 64,883	\$ 64,891	\$ 64,784	\$ 64,784	\$ 64,784
State Investment	\$ 5,028,717	\$ 6,104,470	\$ 6,578,543	\$ 6,867,565	\$ 6,867,565
	\$ 24,394,397	\$ 31,216,036	\$ 28,865,692	\$ 28,342,676	\$ 28,682,477

USES - VITAL STREETS

FISCAL YEAR	FY2019	FY2020	FY2021	FY2022	FY2023
Transfer - Sidewalks (Share of Income Tax)	\$ 2,115,290	\$ 2,168,172	\$ 2,222,377	\$ 2,277,936	\$ 2,277,936
Bond/Interest Payments	\$ 8,765,700	\$ 8,710,974	\$ 5,173,176	\$ 2,123,950	\$ 2,123,950
Traffic Safety/Signals	\$ 277,000	\$ 277,000	\$ 277,000	\$ 277,000	\$ 277,000
Trunkline - Act 51	\$ -	\$ -	\$ -	\$ -	\$ -
Bridges	\$ 70,000	\$ 65,000	\$ 50,000	\$ 85,000	\$ 30,000
FAU	\$ 4,770,515	\$ 4,656,483	\$ 4,010,359	\$ 3,344,194	\$ 4,329,437
Preventative Maintenance	\$ 322,071	\$ 122,970	\$ 1,372,462	\$ -	\$ 405,451
Rehabilitation	\$ 2,567,887	\$ 1,830,166	\$ 1,107,579	\$ 3,344,194	\$ 744,158
Reconstruction	\$ 1,880,557	\$ 2,703,347	\$ 1,530,318	\$ -	\$ 3,179,828
MNF	\$ 639,470	\$ 218,997	\$ 448,997	\$ -	\$ 107,834
Preventative Maintenance	\$ -	\$ -	\$ -	\$ -	\$ 107,834
Rehabilitation	\$ -	\$ -	\$ -	\$ -	\$ -
Reconstruction	\$ 639,470	\$ 218,997	\$ 448,997	\$ -	\$ -
LOCAL	\$ 5,705,026	\$ 4,579,681	\$ 9,062,110	\$ 13,655,717	\$ 12,622,733
Preventative Maintenance	\$ 3,747,010	\$ 1,892,230	\$ 5,008,712	\$ 6,127,969	\$ 6,844,658
Rehabilitation	\$ 482,371	\$ 1,788,286	\$ 3,717,715	\$ 7,074,358	\$ 5,526,236
Reconstruction	\$ 1,475,645	\$ 899,165	\$ 335,683	\$ 453,390	\$ 251,838
GRANTS	\$ 1,746,625	\$ 7,161,989	\$ 3,998,902	\$ 2,839,618	\$ 3,179,419
CIPP Lining of Storm Sewers	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
ROW/Green Infrastructure Maintenance	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000
Contingency Account	\$ -	\$ 3,052,235	\$ 3,289,272	\$ 3,433,783	\$ 3,433,783
	\$ 24,389,626	\$ 31,190,532	\$ 28,832,193	\$ 28,337,197	\$ 28,682,091
Sources Less Uses	\$ 4,771	\$ 25,504	\$ 33,499	\$ 5,479	\$ 386

APPENDIX E

VITAL STREETS

FY2020 – FY2024 Capital Plan

SOURCES - VITAL STREETS						
FISCAL YEAR		FY2020	FY2021	FY2022	FY2023	FY2024
Act 51 Revenues		\$ 3,483,608	\$ 3,483,608	\$ 3,483,608	\$ 3,483,608	\$ 3,483,608
Income Tax Support		\$ 13,729,629	\$ 14,565,763	\$ 15,002,736	\$ 15,452,818	\$ 15,916,403
GOF Support		\$ 850,000	\$ 850,000	\$ 850,000	\$ 850,000	\$ 850,000
Grants (estimated)		\$ 6,886,989	\$ 4,097,090	\$ 2,705,967	\$ 3,445,000	\$ 4,470,000
Bond Principal Repayment - Sidewalks		\$ 64,891	\$ 64,784	\$ 64,784	\$ 64,870	\$ 64,793
State Investment		\$ 6,886,989	\$ 6,578,543	\$ 6,867,565	\$ 6,891,059	\$ 6,891,059
		\$ 31,902,106	\$ 29,639,788	\$ 28,974,661	\$ 30,187,355	\$ 31,675,863
USES - VITAL STREETS						
FISCAL YEAR		FY2020	FY2021	FY2022	FY2023	FY2024
Transfer - Sidewalks (Share of Income Tax)		\$ 2,262,346	\$ 2,330,216	\$ 2,400,123	\$ 2,472,126	\$ 2,546,290
Bond/Interest Payments		\$ 8,710,974	\$ 5,173,176	\$ 2,123,950	\$ 2,126,750	\$ 2,124,250
Traffic Safety/Signals		\$ 550,000	\$ 550,000	\$ 550,000	\$ 550,000	\$ 550,000
Trunkline - Act 51		\$ -	\$ -	\$ -	\$ -	\$ -
Bridges		\$ 65,000	\$ 50,000	\$ 85,000	\$ 30,000	\$ 30,000
FAU		\$ 6,557,248	\$ 4,189,661	\$ 3,440,692	\$ 3,506,680	\$ 3,542,716
Preventative Maintenance		\$ 691,651	\$ 532,364	\$ 606,812	\$ 1,633,198	\$ 1,498,828
Rehabilitation		\$ 2,453,268	\$ 566,731	\$ 2,457,038	\$ 802,113	\$ 361,593
Reconstruction		\$ 3,412,330	\$ 3,090,567	\$ 376,843	\$ 1,071,369	\$ 1,682,295
MNF		\$ 330,601	\$ 448,997	\$ 100,158	\$ 437,696	\$ 411,206
Preventative Maintenance		\$ -	\$ -	\$ -	\$ -	\$ -
Rehabilitation		\$ -	\$ -	\$ 100,158	\$ -	\$ -
Reconstruction		\$ 330,601	\$ 448,997	\$ -	\$ 437,696	\$ 411,206
LOCAL		\$ 2,067,908	\$ 9,251,447	\$ 453,390	\$ 601,108	\$ 4,254,382
Preventative Maintenance		\$ -	\$ 6,958,330	\$ -	\$ -	\$ -
Rehabilitation		\$ 1,168,743	\$ 1,957,434	\$ -	\$ 349,270	\$ 3,355,767
Reconstruction		\$ 899,165	\$ 335,683	\$ 453,390	\$ 251,838	\$ 898,615
GRANTS		\$ 6,886,989	\$ 4,097,090	\$ 2,705,967	\$ 3,445,000	\$ 4,470,000
CIPP Lining of Storm Sewers		\$ -	\$ -	\$ 200,000	\$ 140,000	\$ -
ROW/Green Infrastructure Maintenance		\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000
Contingency Account		\$ -	\$ 3,289,271	\$ 3,433,783	\$ 3,445,530	\$ 3,445,530
		\$ 27,631,067	\$ 29,579,858	\$ 15,693,063	\$ 16,954,890	\$ 21,574,374
Sources Less Uses		\$ 4,271,039	\$ 59,930	\$ 13,281,597	\$ 13,232,465	\$ 10,101,489

APPENDIX E

VITAL STREETS

FY2021 – FY2025 Capital Plan

SOURCES - VITAL STREETS						
FISCAL YEAR	FY2021	FY2022	FY2023	FY2024	FY2025	
Act 51 Revenues	\$ 3,483,608	\$ 3,483,608	\$ 3,483,608	\$ 3,483,608	\$ 3,483,608	\$ 3,483,608
Income Tax Support	\$ 14,565,763	\$ 15,002,736	\$ 15,452,818	\$ 15,916,403	\$ 16,393,895	\$ 16,393,895
GOF Support	\$ 850,000	\$ 850,000	\$ 850,000	\$ 850,000	\$ 850,000	\$ 850,000
Grants (estimated)	\$ 3,542,477	\$ 2,705,967	\$ 3,398,924	\$ 3,580,000	\$ 6,831,760	\$ 6,831,760
Bond Principal Repayment - Sidewalks	\$ 64,784	\$ 64,784	\$ 64,870	\$ 64,793	\$ 64,740	\$ 64,740
State Investment	\$ 6,578,543	\$ 6,867,565	\$ 6,891,059	\$ 6,914,788	\$ 6,938,575	\$ 6,938,575
	\$ 29,085,175	\$ 28,974,660	\$ 30,141,279	\$ 30,809,592	\$ 34,562,578	\$ 34,562,578
USES - VITAL STREETS						
FISCAL YEAR	FY2021	FY2022	FY2023	FY2024	FY2025	
Transfer - Sidewalks (Share of Income Tax)	\$ 2,330,522	\$ 2,400,438	\$ 2,472,451	\$ 2,546,624	\$ 2,623,023	\$ 2,623,023
Bond/Interest Payments	\$ 2,123,950	\$ 2,123,950	\$ 2,126,750	\$ 2,124,250	\$ 2,122,500	\$ 2,122,500
Traffic Safety/Signals	\$ 550,000	\$ 550,000	\$ 550,000	\$ 550,000	\$ 550,000	\$ 550,000
Trunkline - Act 51	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Bridges	\$ 115,000	\$ 85,000	\$ 30,000	\$ 30,000	\$ 30,000	\$ 30,000
FAU	\$ 4,170,161	\$ 4,667,604	\$ 6,343,248	\$ 4,920,235	\$ 6,008,761	\$ 6,008,761
Preventative Maintenance	\$ 605,319	\$ 285,120	\$ 3,564,157	\$ 1,658,448	\$ 3,056,087	\$ 3,056,087
Rehabilitation	\$ 264,994	\$ 4,005,641	\$ 1,157,129	\$ 125,000	\$ 2,300,872	\$ 2,300,872
Reconstruction	\$ 3,299,849	\$ 376,843	\$ 1,621,962	\$ 3,136,787	\$ 651,802	\$ 651,802
MNF	\$ 667,995	\$ 558,990	\$ 437,696	\$ 411,207	\$ -	\$ -
Preventative Maintenance	\$ -	\$ 458,832	\$ -	\$ -	\$ -	\$ -
Rehabilitation	\$ -	\$ 100,158	\$ -	\$ -	\$ -	\$ -
Reconstruction	\$ 667,995	\$ -	\$ 437,696	\$ 411,207	\$ -	\$ -
LOCAL	\$ 12,075,770	\$ 12,166,847	\$ 11,072,676	\$ 12,951,511	\$ 12,608,149	\$ 12,608,149
Preventative Maintenance	\$ 9,259,830	\$ 9,186,542	\$ 5,541,375	\$ 9,117,845	\$ 9,364,283	\$ 9,364,283
Rehabilitation	\$ 2,465,258	\$ 2,144,621	\$ 5,294,463	\$ 3,171,889	\$ 2,143,866	\$ 2,143,866
Reconstruction	\$ 350,683	\$ 835,683	\$ 236,838	\$ 661,777	\$ 1,100,000	\$ 1,100,000
GRANTS	\$ 3,542,477	\$ 2,705,967	\$ 3,398,924	\$ 3,580,000	\$ 6,831,760	\$ 6,831,760
CIPP Lining of Storm Sewers	\$ -	\$ 50,000	\$ 50,000	\$ -	\$ 100,000	\$ 100,000
ROW/Green Infrastructure Maintenance	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000
Contingency Account	\$ 3,289,272	\$ 3,433,783	\$ 3,445,530	\$ 3,457,394	\$ 3,469,287	\$ 3,469,287
	\$ 29,065,146	\$ 28,942,578	\$ 30,127,275	\$ 30,771,221	\$ 34,543,481	\$ 34,543,481
Sources Less Uses	\$ 20,029	\$ 32,083	\$ 14,004	\$ 38,371	\$ 19,097	\$ 19,097

APPENDIX E

VITAL STREETS FY2022 – FY2026 Capital Plan

SOURCES - VITAL STREETS - REVISED						
FISCAL YEAR	FY2022	FY2023	FY2024	FY2025	FY2026	
Act 51 Revenues	\$ 3,483,608	\$ 3,483,608	\$ 3,483,608	\$ 3,483,608	\$ 3,483,608	\$ 3,483,608
Income Tax Support	\$ 12,829,464	\$ 13,086,054	\$ 13,347,775	\$ 13,614,730	\$ 13,887,025	\$ 13,887,025
GOF Support	\$ -	\$ -	\$ -	\$ 850,000	\$ 850,000	\$ 850,000
Grants (estimated)	\$ 2,959,109	\$ 3,676,082	\$ 3,767,336	\$ 4,945,147	\$ 5,810,000	\$ 5,810,000
Bond Principal Repayment - Sidewalks	\$ 64,784	\$ 64,870	\$ 64,793	\$ 64,740	\$ 64,854	\$ 64,854
State Investment	\$ 6,867,565	\$ 6,891,059	\$ 6,914,788	\$ 6,938,575	\$ 6,891,059	\$ 6,891,059
	\$ 26,204,530	\$ 27,201,673	\$ 27,578,300	\$ 29,896,800	\$ 30,986,546	\$ 30,986,546
USES - VITAL STREETS - REVISED						
FISCAL YEAR	FY2022	FY2023	FY2024	FY2025	FY2026	
Transfer - Sidewalks (Share of Income Tax)	\$ 2,052,445	\$ 2,093,494	\$ 2,135,364	\$ 2,178,071	\$ 2,221,924	\$ 2,221,924
Bond/Interest Payments	\$ 2,123,950	\$ 2,126,750	\$ 2,124,250	\$ 2,122,500	\$ 2,164,950	\$ 2,164,950
Traffic Safety/Signals	\$ 675,000	\$ 675,000	\$ 675,000	\$ 675,000	\$ 675,000	\$ 675,000
Trunkline - Act 51	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Bridges	\$ 82,600	\$ 30,000	\$ 30,000	\$ 30,000	\$ 30,000	\$ 30,000
FAU	\$ 7,507,697	\$ 6,569,329	\$ 5,802,249	\$ 7,269,653	\$ 7,119,295	\$ 7,119,295
Preventative Maintenance	\$ 652,454	\$ 4,076,773	\$ 2,540,462	\$ 3,056,087	\$ 5,155,748	\$ 5,155,748
Rehabilitation	\$ 3,684,393	\$ 1,229,725	\$ 125,000	\$ 2,137,789	\$ 125,000	\$ 125,000
Reconstruction	\$ 3,170,850	\$ 1,262,831	\$ 3,136,787	\$ 2,075,777	\$ 1,838,547	\$ 1,838,547
MNF	\$ -	\$ 668,866	\$ 411,207	\$ -	\$ 1,833,268	\$ 1,833,268
Preventative Maintenance	\$ -	\$ -	\$ -	\$ -	\$ 1,833,268	\$ 1,833,268
Rehabilitation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Reconstruction	\$ -	\$ 668,866	\$ 411,207	\$ -	\$ -	\$ -
LOCAL	\$ 7,107,044	\$ 7,556,545	\$ 8,859,784	\$ 8,701,491	\$ 7,227,259	\$ 7,227,259
Preventative Maintenance	\$ 3,269,458	\$ 3,784,548	\$ 6,690,347	\$ 5,561,282	\$ 5,550,924	\$ 5,550,924
Rehabilitation	\$ 1,153,249	\$ 3,535,159	\$ 2,056,089	\$ 2,040,209	\$ 1,676,336	\$ 1,676,336
Reconstruction	\$ 2,684,337	\$ 236,838	\$ 113,348	\$ 1,100,000	\$ -	\$ -
GRANTS	\$ 2,959,109	\$ 3,676,082	\$ 3,767,336	\$ 4,945,147	\$ 5,810,000	\$ 5,810,000
CIPP Lining of Storm Sewers	\$ -	\$ 50,000	\$ -	\$ 100,000	\$ 100,000	\$ 100,000
ROW/Green Infrastructure Maintenance	\$ 250,000	\$ 275,000	\$ 300,000	\$ 325,000	\$ 350,000	\$ 350,000
Contingency Account	\$ 3,433,783	\$ 3,445,530	\$ 3,457,394	\$ 3,469,287	\$ 3,445,530	\$ 3,445,530
	\$ 26,191,628	\$ 27,166,595	\$ 27,562,583	\$ 29,816,149	\$ 30,977,226	\$ 30,977,226
Sources Less Uses	\$ 12,902	\$ 35,077	\$ 15,718	\$ 80,651	\$ 9,320	\$ 9,320

APPENDIX E

VITAL STREETS FY2023 – FY2027 Capital Plan

SOURCES - VITAL STREETS						
FISCAL YEAR	FY2023	FY2024	FY2025	FY2026	FY2027	
Act 51 Revenues	\$ 3,483,608	\$ 3,483,608	\$ 3,483,608	\$ 3,483,608	\$ 3,483,608	\$ 3,483,608
Income Tax Support	\$ 13,349,115	\$ 13,729,589	\$ 14,121,477	\$ 14,525,121	\$ 14,940,875	\$ 14,940,875
GOF Support	\$ -	\$ -	\$ 850,000	\$ 850,000	\$ 850,000	\$ 850,000
Grants (estimated)	\$ 4,162,857	\$ 4,265,000	\$ 4,695,000	\$ 4,190,000	\$ 5,420,000	\$ 5,420,000
Bond Principal Repayment - Sidewalks	\$ 64,870	\$ 64,793	\$ 64,740	\$ 64,854	\$ 64,854	\$ 64,854
State Investment	\$ 7,097,487	\$ 7,123,281	\$ 7,149,332	\$ 7,175,644	\$ 7,202,218	\$ 7,202,218
	\$ 28,157,937	\$ 28,666,271	\$ 30,364,157	\$ 30,289,227	\$ 31,896,701	\$ 31,896,701
USES - VITAL STREETS						
FISCAL YEAR	FY2023	FY2024	FY2025	FY2026	FY2027	
Transfer - Sidewalks (Share of Income Tax)	\$ 2,135,583	\$ 2,196,454	\$ 2,259,150	\$ 2,324,019	\$ 2,390,540	\$ 2,390,540
Bond/Interest Payments	\$ 2,126,750	\$ 2,124,250	\$ 2,122,500	\$ 2,164,950	\$ 2,164,950	\$ 2,164,950
Traffic Safety/Signals	\$ 675,000	\$ 675,000	\$ 675,000	\$ 675,000	\$ 675,000	\$ 675,000
Trunkline - Act 51	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Bridges	\$ 210,000	\$ 30,000	\$ 30,000	\$ 30,000	\$ 30,000	\$ 30,000
FAU	\$ 7,173,175	\$ 5,389,637	\$ 7,535,781	\$ 6,453,570	\$ 4,968,069	\$ 4,968,069
Preventative Maintenance	\$ 1,198,104	\$ 856,916	\$ 2,210,711	\$ 1,502,258	\$ 1,028,469	\$ 1,028,469
Rehabilitation	\$ 1,293,324	\$ 1,982,917	\$ 2,927,570	\$ 125,000	\$ 330,812	\$ 330,812
Reconstruction	\$ 4,681,746	\$ 2,549,804	\$ 2,397,500	\$ 4,826,312	\$ 3,608,788	\$ 3,608,788
MNF	\$ 427,203	\$ -	\$ 411,207	\$ 660,083	\$ -	\$ -
Preventative Maintenance	\$ -	\$ -	\$ -	\$ 660,083	\$ -	\$ -
Rehabilitation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Reconstruction	\$ 427,203	\$ -	\$ 411,207	\$ -	\$ -	\$ -
LOCAL	\$ 7,370,669	\$ 10,121,167	\$ 8,628,895	\$ 9,750,279	\$ 14,334,884	\$ 14,334,884
Preventative Maintenance	\$ 4,477,130	\$ 8,244,503	\$ 5,859,472	\$ 8,736,884	\$ 10,123,653	\$ 10,123,653
Rehabilitation	\$ 969,705	\$ 1,763,316	\$ 1,569,423	\$ 1,013,394	\$ 4,211,231	\$ 4,211,231
Reconstruction	\$ 1,923,834	\$ 113,348	\$ 1,200,000	\$ -	\$ -	\$ -
GRANTS	\$ 4,162,857	\$ 4,265,000	\$ 4,695,000	\$ 4,190,000	\$ 5,420,000	\$ 5,420,000
CIPP Lining of Storm Sewers	\$ 50,000	\$ -	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
ROW/Green Infrastructure Maintenance	\$ 275,000	\$ 300,000	\$ 325,000	\$ 350,000	\$ 375,000	\$ 375,000
Contingency Account	\$ 3,548,744	\$ 3,561,641	\$ 3,574,666	\$ 3,587,822	\$ 3,601,109	\$ 3,601,109
	\$ 28,154,980	\$ 28,663,148	\$ 30,357,199	\$ 30,285,723	\$ 31,894,602	\$ 31,894,602
Sources Less Uses	\$ 2,956	\$ 3,123	\$ 6,958	\$ 3,504	\$ 2,099	\$ 2,099

APPENDIX E

VITAL STREETS FY2024 – FY2028 Capital Plan

SOURCES - VITAL STREETS						
FISCAL YEAR	FY2024	FY2025	FY2026	FY2027	FY2028	
Act 51 Revenues	\$ 3,483,608	\$ 3,483,608	\$ 3,483,608	\$ 3,483,608	\$ 3,483,608	\$ 3,483,608
Income Tax Support	\$ 15,709,378	\$ 15,149,863	\$ 15,877,526	\$ 16,333,852	\$ 16,803,868	\$ 16,803,868
GOF Support	\$ -	\$ 850,000	\$ 850,000	\$ 850,000	\$ 850,000	\$ 850,000
Grants (estimated)	\$ 5,343,361	\$ 4,118,665	\$ 3,288,826	\$ 6,255,091	\$ 5,935,000	\$ 5,935,000
Bond Principal Repayment - Sidewalks	\$ 64,793	\$ 64,740	\$ 64,854			
State Investment	\$ 7,588,511	\$ 7,702,240	\$ 7,804,020	\$ 7,908,218	\$ 8,014,884	\$ 8,014,884
Cash Available (FY2022)	\$ 10,200,000	\$ -	\$ -	\$ -	\$ -	\$ -
	\$ 42,389,652	\$ 31,369,116	\$ 31,368,834	\$ 34,830,769	\$ 35,087,360	\$ 35,087,360
USES - VITAL STREETS						
FISCAL YEAR	FY2024	FY2025	FY2026	FY2027	FY2028	
Transfer - Sidewalks (Share of Income Tax)	\$ 2,513,171	\$ 2,423,660	\$ 2,540,071	\$ 2,613,383	\$ 2,688,266	\$ 2,688,266
Bond/Interest Payments	\$ 2,124,250	\$ 2,122,500	\$ 2,164,950			
Traffic Safety/Signals	\$ 675,000	\$ 675,000	\$ 675,000	\$ 675,000	\$ 675,000	\$ 675,000
Trunkline - Act 51	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Bridges	\$ 30,000	\$ 30,000	\$ 30,000	\$ 30,000	\$ 30,000	\$ 30,000
FAU	\$ 14,602,275	\$ 8,873,360	\$ 6,932,570	\$ 7,523,450	\$ 8,858,011	\$ 8,858,011
Preventative Maintenance	\$ 2,593,243	\$ 1,970,711	\$ 1,719,135	\$ 1,078,178	\$ 4,988,712	\$ 4,988,712
Rehabilitation	\$ 3,894,135	\$ 2,861,430	\$ 125,000	\$ 330,812	\$ 1,198,872	\$ 1,198,872
Reconstruction	\$ 8,114,898	\$ 4,041,219	\$ 5,088,435	\$ 6,114,460	\$ 2,670,427	\$ 2,670,427
MNF	\$ 364,667	\$ 411,207	\$ 660,083	\$ -	\$ 377,200	\$ 377,200
Preventative Maintenance	\$ -	\$ -	\$ 660,083	\$ -	\$ 377,200	\$ 377,200
Rehabilitation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Reconstruction	\$ 364,667	\$ 411,207	\$ -	\$ -	\$ -	\$ -
LOCAL	\$ 12,585,683	\$ 8,359,169	\$ 10,644,776	\$ 13,281,009	\$ 11,940,235	\$ 11,940,235
Preventative Maintenance	\$ 7,751,258	\$ 5,918,080	\$ 9,631,382	\$ 9,957,859	\$ 6,027,680	\$ 6,027,680
Rehabilitation	\$ 1,735,700	\$ 1,541,089	\$ 1,013,394	\$ 3,323,150	\$ 5,912,555	\$ 5,912,555
Reconstruction	\$ 3,098,725	\$ 900,000	\$ -	\$ -	\$ -	\$ -
GRANTS	\$ 5,343,361	\$ 4,118,665	\$ 3,288,826	\$ 6,255,091	\$ 5,935,000	\$ 5,935,000
CIPP Lining of Storm Sewers	\$ -	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
ROW/Green Infrastructure Maintenance	\$ 300,000	\$ 325,000	\$ 350,000	\$ 375,000	\$ 400,000	\$ 400,000
Contingency Account	\$ 3,794,256	\$ 3,851,120	\$ 3,902,010	\$ 3,954,109	\$ 4,007,442	\$ 4,007,442
	\$ 42,332,664	\$ 31,289,680	\$ 31,288,286	\$ 34,807,042	\$ 35,011,153	\$ 35,011,153
Sources Less Uses	\$ 56,988	\$ 79,436	\$ 80,548	\$ 23,727	\$ 76,207	\$ 76,207



CITY OF GRAND RAPIDS

Vital Streets

PLAN



December 2016

December 2016

Dear Mayor and City Commissioners,

On behalf of the Vital Streets Oversight Commission I am pleased to submit to you the proposed Vital Streets Plan.

The Vital Streets Oversight Commission is charged with advising and assisting City staff to wisely invest our Vital Streets resources to achieve the envisioned complete streets outcome of safe, accessible, attractive, and multimodal streets that serve all people and improve the livability and economic prosperity of our great city.

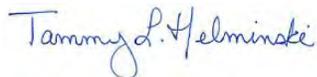
We take this charge seriously and we have worked hard over the past year to develop this Plan and accompanying design guidelines through broad input and collaboration with many stakeholders. We believe it will be a valuable tool in helping our city make informed, asset management-based decisions about our streets and sidewalks. It provides a cohesive network approach with clear objectives and measurable outcomes.

In addition to our 25-member Commission, scores of individuals participated in working groups and other meetings contributing their time, expertise, and diverse perspectives. These partners included residents, residents, local businesses, freight haulers, education and health care institutions, stormwater and green infrastructure specialists, state and regional partners, safety and mobility advocates, and many more. They represented the needs of people of all ages, abilities, and economic statuses to ensure this plan and its resulting outcomes are prudent, holistic, and inclusive.

Grand Rapids is setting the bar high. This plan is ambitious, but achievable and necessary. It will improve the safety of our streets, the connectivity of our networks, and the predictability of street design. It is an important cornerstone in achieving and maintaining the vision of a great Grand Rapids that we all hold.

On behalf of my fellow Vital Streets Oversight Commissioners, I thank you for the opportunity to serve our city and advance this important work.

Sincerely,

A handwritten signature in blue ink that reads "Tammy D. Helminski". The signature is written in a cursive style with a blue ink color.

Tammy Helminski

Vital Streets Oversight Commission Chair, 2016

ACKNOWLEDGEMENTS

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Karen Mendez

ACKNOWLEDGEMENTS *(continued)*

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OVERVIEW

Quality streets and effective transportation networks are critical to the health, safety, enjoyment, and economic strength of the Grand Rapids community and the preservation of the Grand River watershed.

Grand Rapids has defined Vital Streets as “complete streets with green infrastructure.” In 2014, city voters approved Vital Streets funding and made a bold commitment to improving the quality of city streets and providing equitable access and mobility for all people.

The Vital Streets Oversight Commission (VSOC) was established to oversee the investment of these resources and implement the Vital Streets vision. In addition to approving the Capital Improvement Plan, the VSOC is charged with monitoring progress, reporting on achievements and outcomes, and recommending necessary course corrections.

Street design is complex, involving and affecting many stakeholders and disciplines. While the VSOC provides strategic vision and direction, and evaluates outcomes, the City’s “Design Team” oversees project design and decision making. The interdisciplinary Design Team provides holistic project review and is comprised of representatives from multiple City departments including water, public services, mobility and parking, economic development, environmental services, fire, and planning. Other departments and/or agencies may join as project demands require.

Urban street space in Grand Rapids is limited and the needs of pedestrians, bicycles, transit, personal vehicles, and commercial vehicles often compete with one another. The intention of the Vital Streets Plan is to promote consistency and provide a framework, much like a soundboard, to use best practices in project-based decision-making. By establishing this Plan, the City aspires to ensure that Vital Streets projects serve the City’s overall vision and deliver a complete and viable network that sustains Grand Rapids over time.

OBJECTIVES

- » Provide a reasonable and predictable set of processes and outcomes while minimizing conflict
- » Increase coordination and planning with stakeholders to reduce “re-work” (measure twice, cut once)
- » Provide consistent guidelines for facility and element design and operational strategies
- » Incorporate life-cycle thinking into the design and development process (considering street design choices and maintenance implications)
- » Provide sound and defensible methods for project definition and prioritization
- » Define measures for evaluation that are simple, consistent, and meaningful
- » Improve the understanding and knowledge of the street design process among the public, community leaders, transportation agencies, and other organizations.

COMPONENTS

This framework:

- » Establishes a **street typology** that unites street design with local land use context and community objectives;
- » Defines an integrated, **multimodal network** that provides quality mobility choices for pedestrians, bicyclists, transit services, motorists, and the movement of freight;
- » Provides current and state-of-the-practice **guidance** and considerations for the use and design of numerous potential street elements and components;
- » Presents a clear **methodology** for street design decision-making to balance competing uses and improve the consistency and transparency of decisions; and
- » Provides a structure for **performance measurement** and evaluation of outcomes so that the city may continually learn, adapt, and improve.

INTENDED USERS

This Plan is intended for a number of different audiences who have a stake in the critical decisions made in the street design process.

The Vital Streets Plan, including street types and mode emphasis overlays, is expected to be of interest to all street stakeholders including community members, business interests, general travelers, elected leadership, funders, and city staff.

The Vital Streets Design Guidelines may be of general interest to many and thus are accessible to all. However, the guidelines are specifically produced for street design professionals to use for their technical project design and development.

Measures of success for Vital Streets are a topic of broad interest and detailed in this Plan. The Vital Streets Design Guidelines include detailed performance measures specifically intended to aid City staff in assembling the information necessary for review by the Vital Streets Oversight Commission, so that it may effectively assess progress toward desired outcomes.



The Vital Streets Plan is intended as a companion to the Master Plan of the city. A thorough review and update of the plan should be done in concert with major updates to the Master Plan.

CONSISTENCY WITH ADOPTED STANDARDS AND POLICIES

The Vital Streets Plan is consistent with and complements adopted national guidance represented in both the *National Association of City Transportation Officials (NACTO) Urban Street Design Guidelines* and the *American Association of State and Highway Transportation Officials (AASHTO) Policy on Street Design*. Additionally, guidance is in conformity with the standards of the *Michigan Manual of Uniform Traffic Control Devices (MMUTCD)*.

The Vital Streets Plan is an update to the City's *1996 Street Classification Policy*. The Vital Streets Plan, however, shall supersede conflicting guidance in the former *Street Classification Policy*. Conventional street types of the *Street Classification Policy* will continue to be used to provide the consistency necessary in interactions with the Michigan Department of Transportation.

The Vital Streets Plan is a complement to the Grand Rapids *Standard Construction Specifications* (also known as the "Red Book"). In cases of conflict in guidance, the Vital Streets Design Guidelines augment and supersede the guidance and standards provided in the Red Book.

UPDATES, AMENDMENTS, AND MODIFICATIONS

The Vital Streets Plan works in concert with other key adopted city policies and plans including the City of Grand Rapids Master Plan, Green Grand Rapids, Green Infrastructure Standards, and GR Forward. The Vital Streets Plan incorporates established or planned bicycle, transit and truck route networks of the city and region.

However, the Plan is intended to serve as a living framework. The City will revise Street designations and modal networks over time as the city and technology continues to evolve. The City will also modify its street design controls and guidelines as street design advances and innovates. Performance measures will be revised and amended to best capture and evaluate the outcome of Vital Streets investments.

The VSOC will review any changes to street type or modal emphasis overlays, after consultation with City staff and stakeholders. Such changes will be transmitted to the City Commission for formal modification of the Vital Streets Plan. Additions, deletions, or other changes to the design guidelines will be done administratively through the Design Team.

The Vital Streets Plan is intended as a companion to the City Master Plan. A thorough review and update of this Plan, if necessary, should be done in concert with major updates to the Master Plan.





VISION, VALUES, AND PRINCIPLES

BACKGROUND

The economic downturn of the mid 2000s severely reduced public resources, including the ability to invest adequately in the maintenance and repair of city streets. Simultaneously, the City of Grand Rapids and the whole of the Grand Valley metropolitan region continued to grow, increasing demands for travel on the relatively narrow rights of way of city streets and increasing tension between the buses, bicyclists, private and commercial vehicles, and pedestrians forced to compete for safe accommodation in this limited space.

In 2012, the City Commission established the Sustainable Streets Task Force to assess the level of need and identify resources to restore the city's road infrastructure. Although 60% of city streets were in good and fair condition in 2002, fewer than 40% were in fair condition in 2012 and 87% were predicted to be in poor condition by 2019 without critical new investment.

In May 2014, Grand Rapids voters approved a Vital Streets dedicated funding measure, providing essential resources needed to repair, rehabilitate, and reconstruct city streets. It was promised that streets would be sustainably maintained over the long term, provide safety and accessibility for all people, and incorporate green infrastructure to protect water quality.

In 2015, the Vital Streets Oversight Commission (VSOC) was convened with the responsibility to oversee new tax revenue investment, ensuring funds serve the original purpose and monitoring results. The VSOC sought expert assistance to

develop the strategy and provide the tools needed for efficient, consistent, and transparent Vital Streets implementation. The Commission formed five working groups, each focused on a different aspect of Vital Streets—pedestrians, bicycles, transit and freight, parking and transportation demand management, and green infrastructure in coordination with the Stormwater Oversight Commission. This Vital Streets Plan is the product of over a year of discussions by the Commission and working group members who represented a diverse group of citizens, businesses, civic organizations, and advocates who contributed their unique perspectives to ensure a viable strategy.

A NEW APPROACH

Under the guidance of the VSOC, Grand Rapids is revolutionizing its approach to street design. The city recognizes that roads aren't just for moving vehicular traffic. Rather, streets are complex environments that must serve varied modes and users that intermingle.

In 1996, the City adopted its *Street Classification Policy*. This policy established the hierarchy of streets and approach to street design in general practice today. The City, with the help of its residents, has recognized the limitations of this current policy and the need to introduce more sensitivity to street context and greater accommodation of non-auto users. This Plan updates the *Street Classification Policy* to incorporate street design focusing on multi-modal transportation that recognizes that the city will continue to evolve.

THE VISION FOR VITAL STREETS

The network of city streets and rights-of-way **will be accessible, attractive, multimodal and safe; serving all people** of our community, **contributing to the livability** of our neighborhoods and business districts, protecting the quality of our river, and **increasing economic opportunity** for individuals, businesses, and new development.

Infrastructure assets will be **maintained and well-managed**, using a multi-faceted funding and educational strategy and innovative approaches to preserve our investment.

PRINCIPLES

Streets reflect the fundamental values of a community. In Grand Rapids, Vital Streets shall:

- » Be **safe and accessible** for all members of the community.
- » Be soundly designed and well maintained for **lasting investment**.
- » Be developed in **partnership** among city agencies, communities, and other stakeholders.
- » Promote **equitable access** to the amenities of the city
- » Expand travel options to **increase mobility** and improve public health.
- » **Strengthen community** by promoting human interaction and reflecting local character.
- » Protect and enhance the **environment**.
- » **Embrace innovation** and support continuous learning through measurement and evaluation.

VALUES

The Vital Streets investments should advance the ambitious goals and targets established by the City of Grand Rapids. Specifically:

- » **Mode Share:** Reduce single-occupant vehicle travel from a 95% drive-alone commute rate to 45% by 2035 by providing efficient transit corridors, safe walking and bicycle facilities, and smart solutions for ride-sharing to achieve a mode split of 20% transit, 12% walking, 5% biking, and 20% ridesharing.
- » **Equity:** Ensure transportation options are available, affordable, and reliable for all people to meet their travel needs regardless of age, ability, race, ethnicity, or economic status.
- » **Vision Zero:** Eliminate all traffic related serious injuries and fatalities on Grand Rapids city streets.
- » **Health:** Promote and enable walking, bicycling and other forms of active transportation. Vital Streets should, over time, contribute to reductions in childhood and adult obesity and improve public health outcomes.
- » **Age-Friendly Community:** Serve and accommodate people through their many phases of life, from an infant to student to active adult to aging senior.
- » **Climate Change:** Reduce transportation related emissions by reducing Vehicle Miles Travelled (VMT) through the increased use of transit, shared vehicles, and non-motorized transportation.

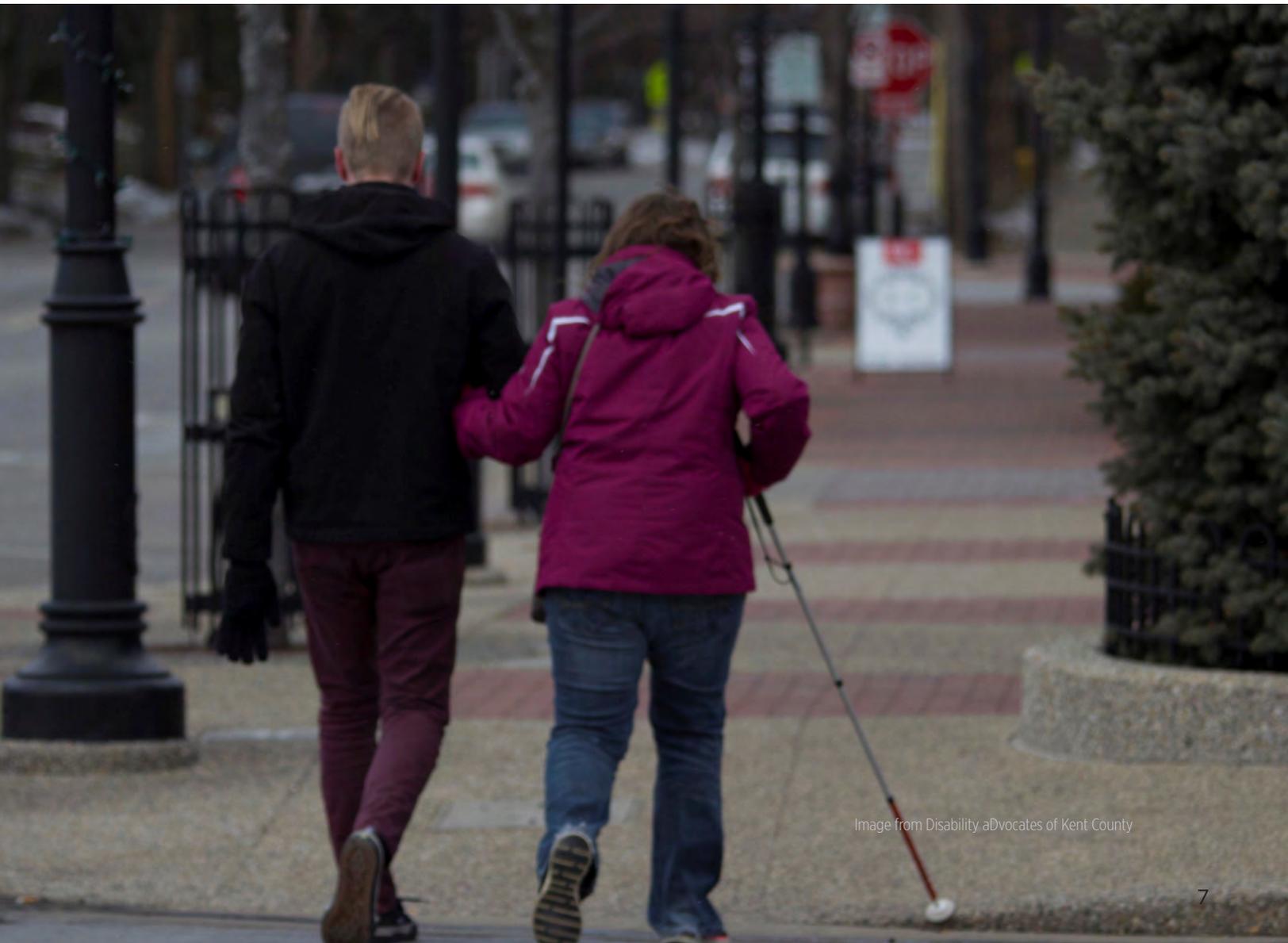


Image from Disability aDvocates of Kent County



MEASURES OF SUCCESS

City staff will collect and analyze metrics as they relate to measures of project success. In addition, the VSOC will then be charged with monitoring the results of Vital Streets investments. The VSOC shall use the following performance measures to monitor the overall health and performance of the street system and check that investments are making progress toward the Vital Streets goals. In addition, the street types established in this framework each have objectives and desired outcomes. Vital streets projects will also be evaluated on project-based metrics to ensure a continuous cycle of performance monitoring.

- » **TRAFFIC-RELATED SERIOUS INJURIES + FATALITIES** It is the intent and desire of the Vital Streets program to provide safe street design and maintain the quality of infrastructure to eliminate serious injuries and fatalities on city streets (Vision Zero).
 - 3-year running average crashes involving pedestrians
 - 3-year running average crashes involving bicyclists
 - 3-year running average traffic-related serious injuries and fatalities
- » **OPERATIONS AND MAINTENANCE** Streets reconstructed with Vital Streets resources will remain in a state of good repair with only standard preventive maintenance. Asset conditions are measured by street conditions and pavement quality.
 - Condition rating for Vital Street sidewalk projects
 - PASER rating for Vital Street projects (heavy rehabilitation or reconstruction)
 - PASER rating for all streets (percent good and fair streets)
- » **NETWORK CONNECTIVITY** Vital Streets will improve the functionality of the larger city and regional network for all modes of travel to provide increased access for all persons.
 - Percent of gaps in connectivity filled for pedestrians
 - Percent of dwelling units within 1/2 mile of a dedicated bicycle facility
 - Centerline miles of connected and accessible designated routes or facilities for pedestrians



- » **MODE SHARE** Vital Streets will reduce single-occupant auto travel and will improve public health by providing people of all ages and abilities with opportunities for active living:
 - Grand Rapids city mode distribution from American Community Survey (compared year on year).
- » **PERSON THROUGHPUT** Vital Streets will increase the number of person-trips through the incorporation of pedestrian, bicycle, and transit accommodations, as appropriate, that will be designed to invite and attract additional non-auto users.
 - Total daily trips made within the City of Grand Rapids (derivation of National Household Travel Survey)
 - Select corridors/cordons peak hour counts ((vehicles * 1.1 occupants) + transit riders + observed pedestrians + observed bicyclists)
- » **PERSON DELAY** Vital Streets value all travelers and shall be designed to minimize the overall delay experienced by all persons traveling through a critical intersection(s).
 - Percent reduction in person delay at improved intersections—Former to Improved (Highway Capacity Manual methodology for calculating vehicle, pedestrian and bicycle delay and adapted to apply transit passenger volumes)
- » **STORMWATER RUNOFF** Vital Streets are green streets and a measure of their ability is the reduction of stormwater immediately flowing to the City's stormwater system and waterways.
 - Volume infiltrated per year (gallons) by green infrastructure
 - Acreage from which the first inch of rain is treated for water quality by green infrastructure
- » **PUBLIC SATISFACTION** Many aspects of street design success cannot be quantitatively measured. However the qualitative assessment of residents, businesses, workers, and other stakeholders regarding the street's aesthetic is a critical measure of Vital Street success.
 - Annual Vital Streets web-based voluntary survey



287

E. WOODLAND



FORM AND FUNCTION

The Vital Streets Plan uses each street’s transportation function and community and environmental context to inform street design decisions. The plan includes two maps—a street typology map and a mode emphasis map—to aid City staff when making road design decisions.

STREET TYPOLOGY

The Vital Streets Plan assigns a street type to all City streets based on a street’s land use characteristics and transportation function. A street may not have the same typology for its entire length. For example, a street may travel through a low-density residential neighborhood to a neighborhood business district to an area of industry.

Street types are outcome-oriented, driven by an overall vision for the intended future state—both localized and network wide. All types of streets must support a high quality residential environment and provide network connectivity for all modes.

MODE EMPHASIS

Many City streets are also assigned a modal emphasis that refers to the user: pedestrian, bicyclist, auto driver, truck driver, or transit operator. The modal overlays generally continue for the whole street corridor to provide a continuous modal network. How that mode is emphasized in a particular segment—how the street is design—may deviate along the length of a corridor in response to the street typology. For example, a corridor designated for transit emphasis may, in some portions, require a designated travel lane exclusively for transit use, while in other segments only need modest changes to signal operations or intersection design.

STREET TYPES

STREET TYPE MAP

NW

NE

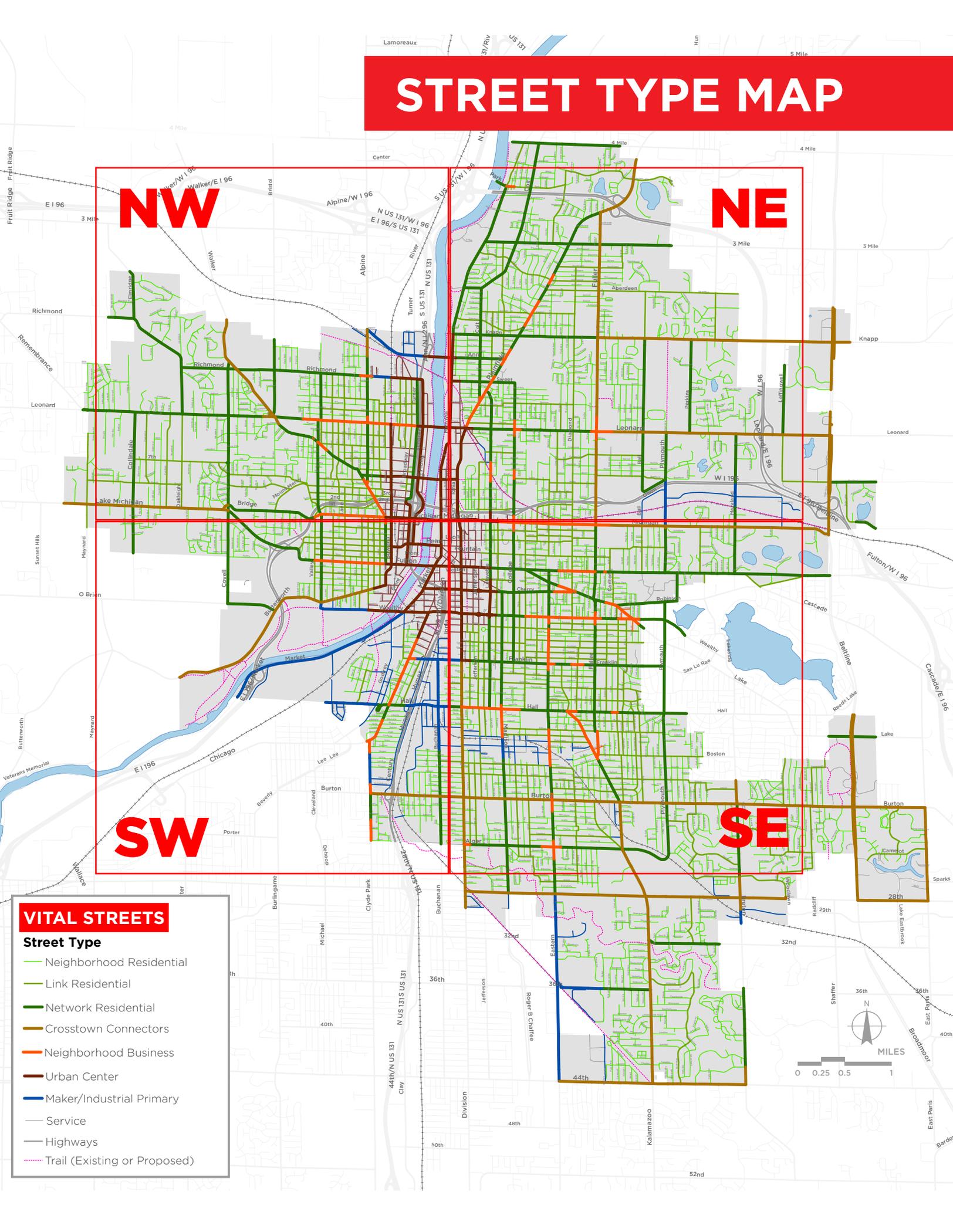
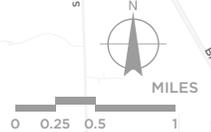
SW

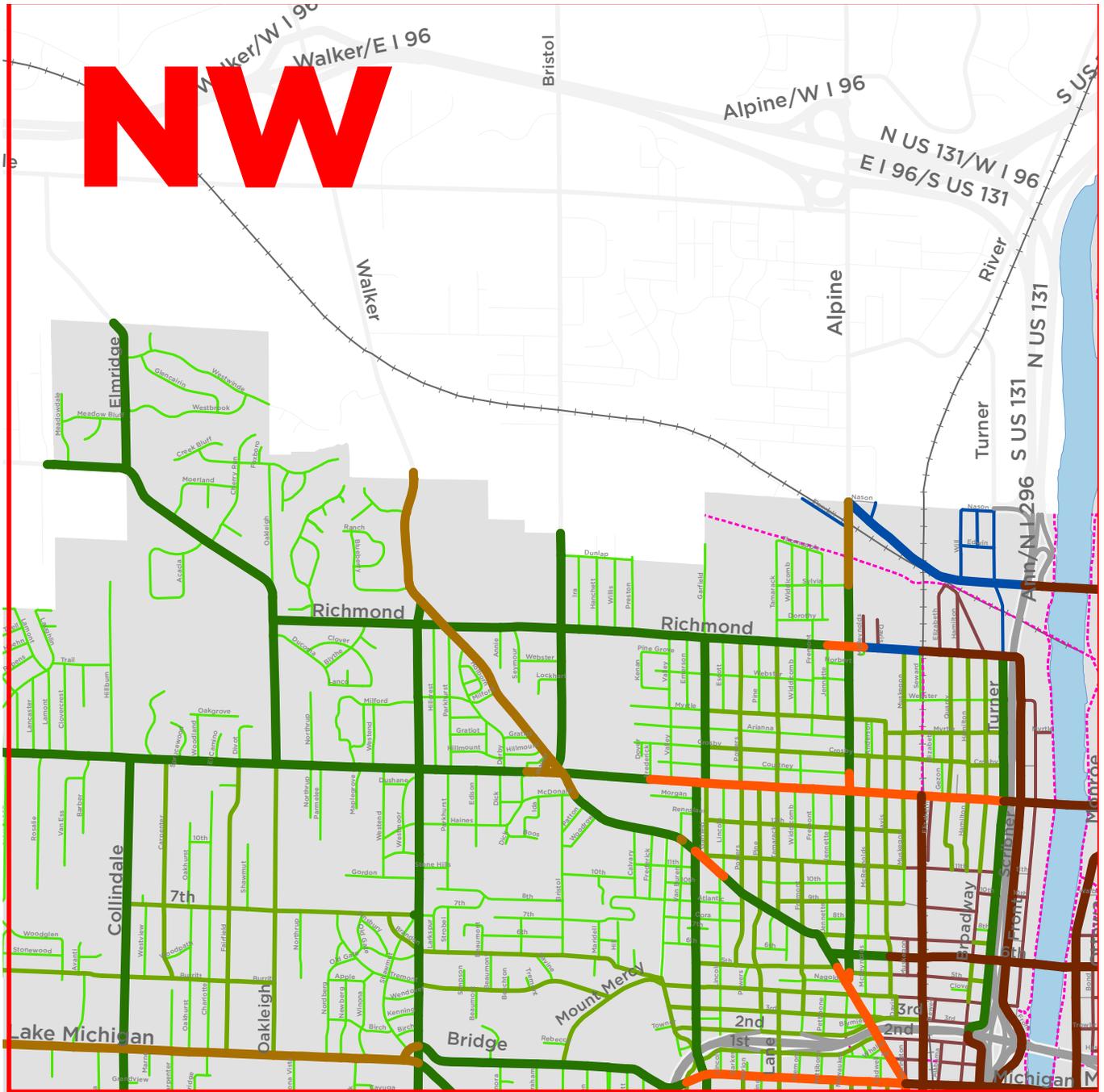
SE

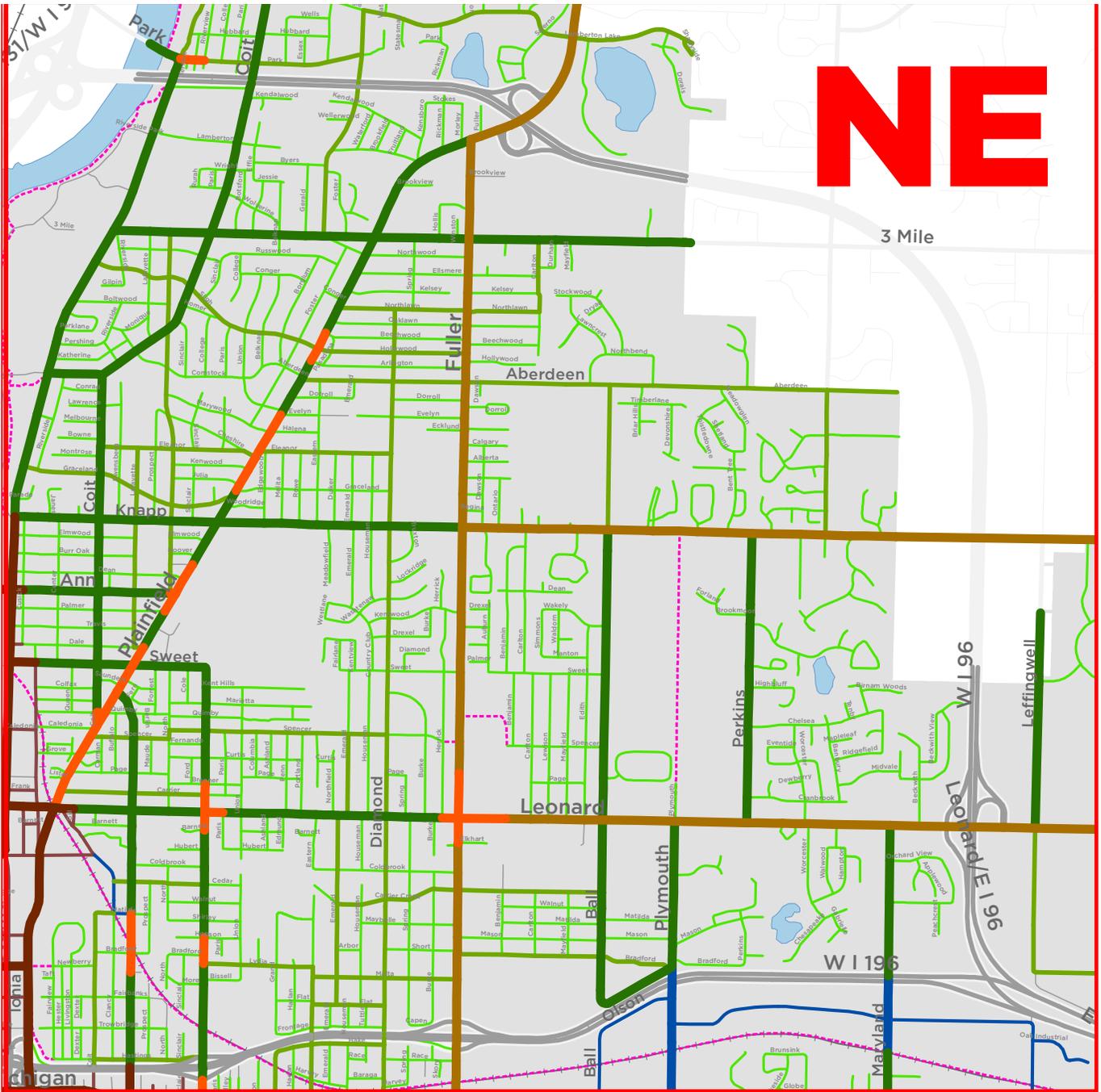
VITAL STREETS

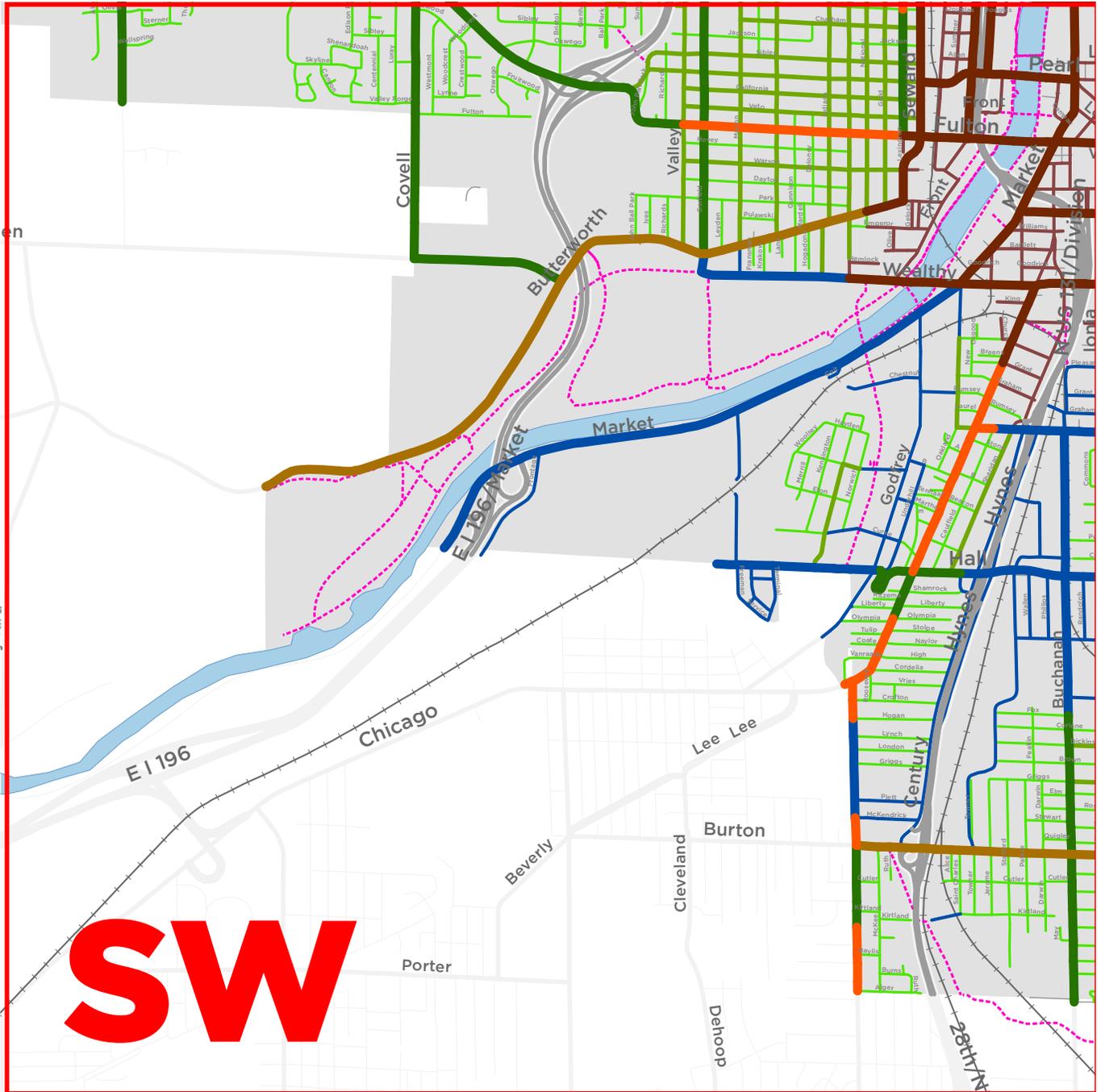
Street Type

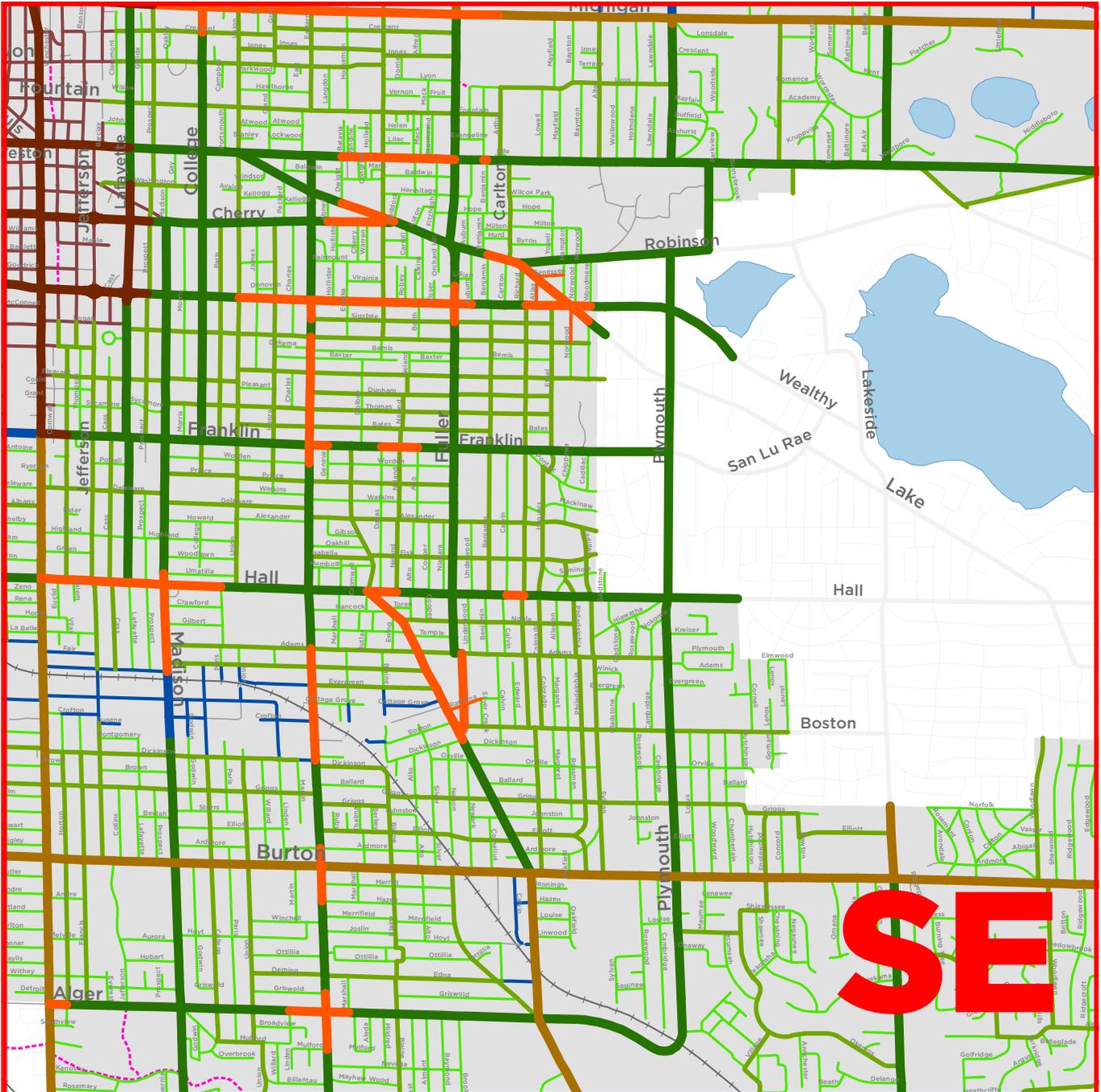
- Neighborhood Residential
- Link Residential
- Network Residential
- Crosstown Connectors
- Neighborhood Business
- Urban Center
- Maker/Industrial Primary
- Service
- Highways
- - - Trail (Existing or Proposed)



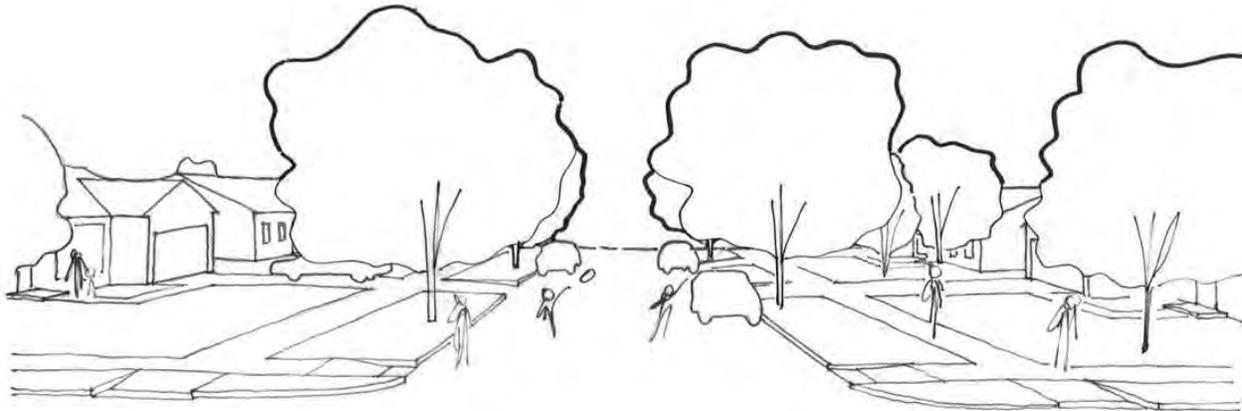








NEIGHBORHOOD RESIDENTIAL



1. Narrow travel ways, slow speeds
2. Abundant green space
3. Driveways are common
4. On-street parking

Neighborhood Residential streets invite residents to use the streets as common gathering places and linear green space.

Much of Grand Rapids consists of quiet residential communities characterized as “Modern,” “Mid-Century” or “Traditional” in the City’s Neighborhood Pattern Book.

Land use along these streets is primarily low-to-moderate density in nature, generally with single-family detached or duplex style homes.

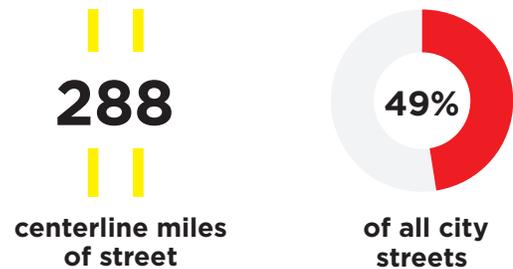
Neighborhood Residential streets are not principal streets in the regional vehicular transportation network, although they may serve as an important link for pedestrians and community bicyclists who generally travel at lower speeds. Neighborhood Residential streets generally do not feature transit service. Additionally, truck traffic may be restricted on these streets.

These streets typically have limited connectivity to the larger network.

EXAMPLE STREETS:

- » Oakleigh Avenue, Westend Avenue, or Jackson Street NW.
- » Lamberton, Graceland, or Mason Streets NE.

PREVALENCE OF NEIGHBORHOOD RESIDENTIAL STREET TYPE:



- » Morris Avenue, Griswold Street, or Meadowbrook Street SE.
- » Dayton Street, Caulfield Avenue, or Olympia Street SE.

ANTICIPATED AND DESIRED USES:

- » Community interactions in the public rights-of-way such as visiting neighbors.
- » Shared use of the street as an extension of recreational space.
- » Community low-stress non-motorized travel by foot or bicycle.
- » Property access through driveways and on-street parking.
- » Short distance (last block) vehicle travel.
- » Grey and green infrastructure (utility corridors).

PRIORITY USERS:

- » **Pedestrians** of all type and abilities but with particular attention to **vulnerable users** including young children, seniors, and persons with disabilities.

DESIGN OBJECTIVES:

- » Maintain low vehicle volumes and low travel speeds.
- » Design streets as linear greenways and open spaces.
- » Provide access to homes and residences.

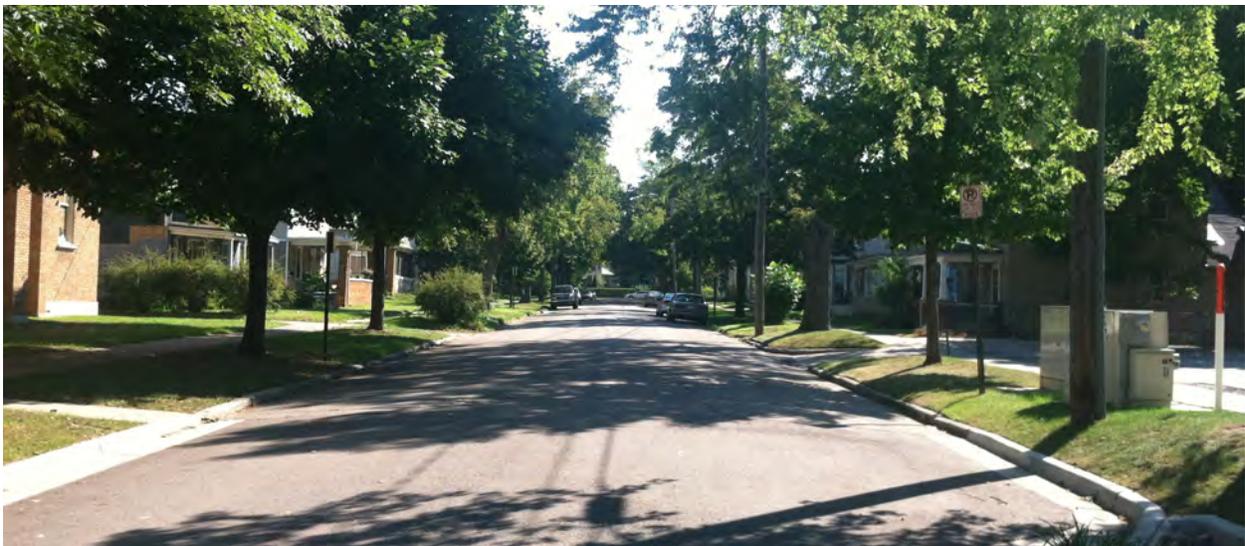
TYPICAL DESIGN FEATURES AND TREATMENTS:

- » Narrow street travel ways that are most commonly bi-directional “yield” streets without a marked center line. Vehicles must pull to the side and slow or stop to enable an approaching vehicle to pass.
- » The limited connectivity and narrow travel lanes generally manage speeds and deter non-local traffic, however in some cases active speed control or traffic deterrents may be needed.
- » Intersections may be stop-controlled, yield-controlled or uncontrolled. Intersections may have diverters, neck downs, or other traffic calming treatments.
- » Crosswalks generally are not marked. Pedestrians may comfortably cross the street at any point along its length.
- » Properties may be accessed from the street or by way of alleys. Multiple access points and driveways are common.

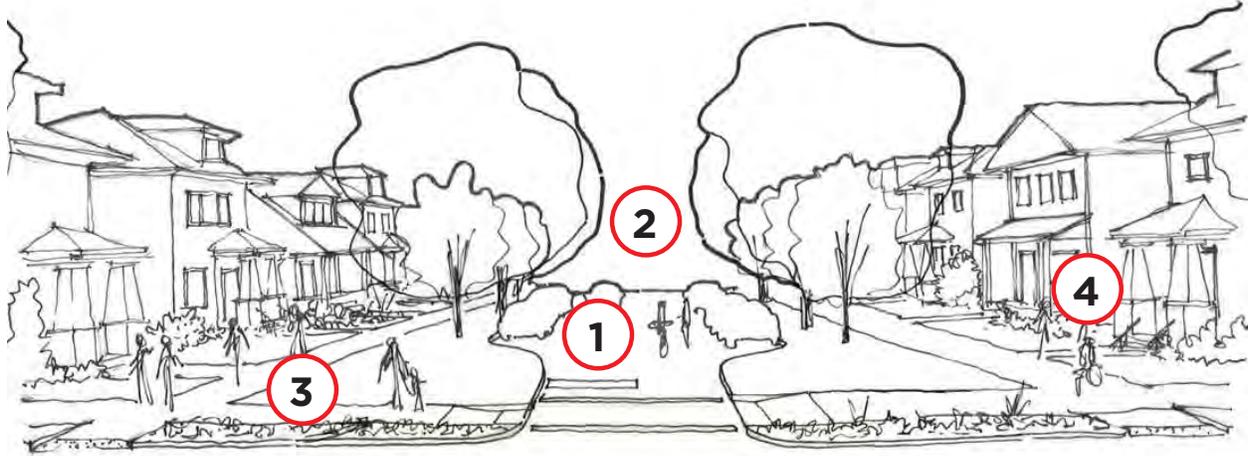
- » Adequate front yards and parkways to support large street trees and dense canopies.
- » Sidewalks on both sides of the street are preferred unless the street is a shared street. A shared street is a street where pedestrians and other users share and mix together using the entire streetscape. Shared streets are typically single block streets with limited connectivity and very few vehicles.
- » Impervious surfaces are minimized.
- » On-street parking is generally provided on one or both sides of the street.
- » Separate bicycle facilities are generally not provided. Vehicle speeds and volumes are low enough to provide safe and low-stress bicycle accommodation within the street.
- » For streets included in the low stress bicycle network, traffic calming, diverters, wayfinding, and other treatments should be provided.

TYPICAL/TARGET METRICS:

- » Vehicle volumes below 2,000 vehicles per day
- » Vehicle speeds <25 MPH
- » Face-to-face of curb 26’ to 30’



LINK RESIDENTIAL



1. Active speed control and traffic calming
2. Narrow, two-way street
3. Substantial yards & parkways
4. Comfortable design for persons on bicycles

Link Residential streets serve a larger network function, providing connectivity between nearby neighborhoods or local destinations. They are most typical in areas with traditional neighborhood character and a connected grid of streets, but may be in any neighborhood type.

Link Residential streets are predominantly low-to-moderate density residential in character and must be designed to support a high quality of residential life. Link Residential streets are commonly the location of local community facilities such as parks or recreational facilities, schools, or houses of worship.

Although Link Residential streets may have a slightly higher volume of vehicular traffic than the Neighborhood Residential street, vehicle travel must be maintained at a low speeds to respect and enable the local community uses common on these streets.

Link Residential streets are not principal streets in the regional vehicular transportation network. They play an important role in the local transportation network for all modes of travel, with an emphasis on pedestrians, bicyclists, and local area vehicle travel. Link Residential streets

PREVALENCE OF NEIGHBORHOOD LINK RESIDENTIAL STREET TYPE:



may be ideal as designated bicycle corridors and may, or may not, provide designated and marked bicycle facilities. Fixed route bus transit may be provided on some Link Residential streets. Link Residential streets may accommodate a modest amount of local delivery truck traffic but are not designated truck routes.

EXAMPLE STREETS:

- » Marion Avenue NW and SW from Butterworth to Bridge St.
- » Crescent Street NW from Lafayette to Fuller.
- » Logan Street SE from Lafayette to Glenwood.
- » Griggs Street SE from Buchanan to Newton.

ANTICIPATED AND DESIRED USES:

- » Community interactions in the public rights-of-way that characterize and reflect a quality residential neighborhood environment.
- » Modest pedestrian volumes.
- » City or regional low-stress bicycle travel.
- » Lower frequency bus transit.
- » Modest distance (last mile) vehicle travel.

PRIORITY USERS:

- » Link Residential streets prioritize **pedestrian movement and bicycle travel** in addition to accommodating local vehicle access and circulation.
- » Link Residential streets are true complete streets that provide safe accommodation for all users.
- » Link Residential streets explicitly designated as key components of the bicycle network emphasize bicycle accommodation for both experienced and less experienced bicyclists.

DESIGN OBJECTIVES:

- » Maintain modest vehicle volumes and low travel speeds.
- » Design streets as linear greenways and open space.
- » Provide access to residences and community facilities.
- » Connect to local destinations.

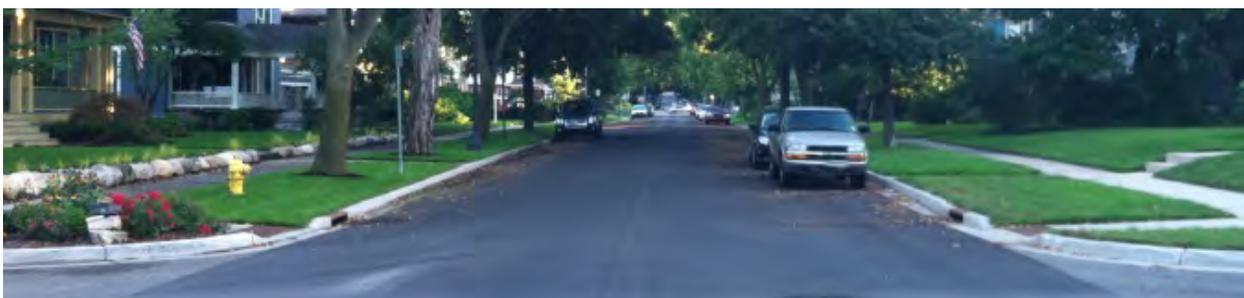
TYPICAL DESIGN FEATURES AND TREATMENTS:

- » Narrow travel lanes. Larger vehicle types such as transit vehicles or trucks, although permitted, are fairly infrequent on Link Residential streets. Narrow lane widths provide adequate accommodation for movement of these vehicles.

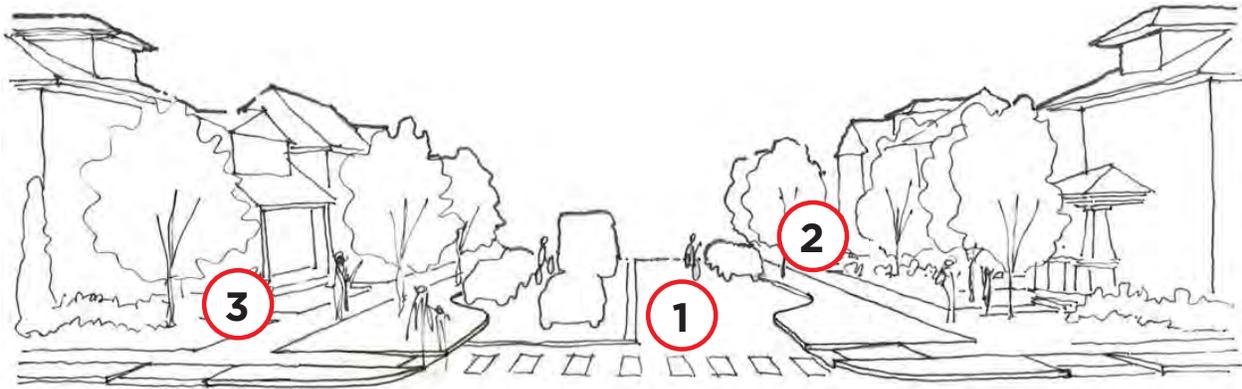
- » Narrow travel lanes generally manage speeds; in some cases active speed control and traffic calming may be needed.
- » Bi-directional streets are preferred. The center line may or may not be marked. Streets may be “yield” streets requiring vehicles to move to the side to permit oncoming traffic to pass.
- » Intersections are frequent. Stop controls and/or neighborhood traffic circles at many intersections are acceptable to deter high volumes of longer distance vehicle travel.
- » Crosswalks may or may not be marked. Pedestrians may typically comfortably cross the street at any point along its length.
- » Consolidated curb cuts or shared alleys are encouraged and preferred, but multiple access points and driveways may be common.
- » Adequate front yards and parkways to support large street trees and dense canopies.
- » Streets should provide sidewalks on both sides. Sidewalk dimensions should be scaled to accommodate the modest pedestrian volumes using these link streets.
- » On-street parking is generally provided on at least one side of the street.
- » Link streets are key for bicycle and pedestrian networks. Designated bicycle facilities may or may not be provided, but for streets specifically designated as components of the low stress bicycle network, traffic calming, diverters, wayfinding and other treatments should be provided.

TYPICAL/TARGET METRICS:

- » Vehicle volumes between 2,000 and 5,000 vehicles per day
- » Vehicle speeds approaching 25 MPH
- » Face-to-face of curb 28' to 36'



NETWORK RESIDENTIAL



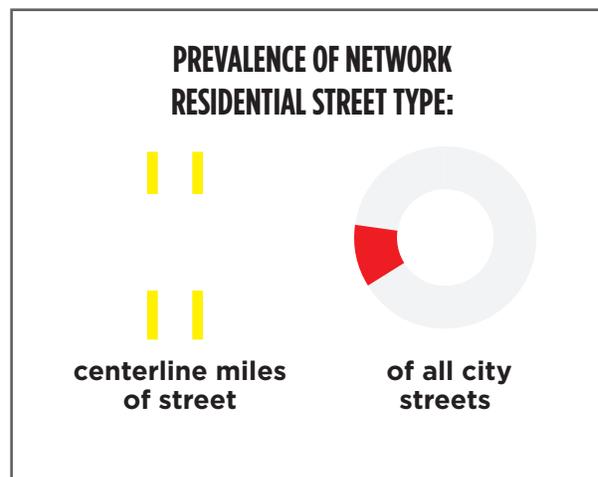
1. Marked centerline
2. Shared access points; few driveways
3. Sidewalks on both sides

Network Residential streets are quality residential corridors that also serve critical roles in the larger transportation network by efficiently and safely moving regional vehicle and non-motorized users.

Network Residential streets are similar to arterial roadways in the standard street classification system used by State and Federal agencies. However, the design of Network Residential streets is more sensitive and attentive to non-auto users than is typical in traditional arterial roadway design.

While family homes are the predominant land use, residential density may be higher along these corridors than is typically found in the Neighborhood or Link Residential and Crosstown Connector street types. Local community facilities such as parks or recreational facilities, schools or houses of worship are common on these streets and may be interspersed with some industrial or production space, or very small commercial uses.

Despite their regional network role, Network Residential streets should still be designed to contribute to and enhance the residential character and support typical neighborhood activities including active use of front yards for play or leisure, active use of sidewalks, and safe accommodation of community bicyclists—including very young, less experienced, or less confident riders. These uses and interactions are typically contained behind the curb and separated from vehicle traffic.



These streets may have moderate to higher volumes of traffic—particularly during peak travel hours. As with other residential streets, however, vehicle travel must be maintained at modest speeds in respect to the residential community, their quality of life, and resident safety.

Network Residential streets are primary streets in the regional transportation network for all modes of travel including pedestrians, bicyclists, private vehicles, transit, and trucks. Network Residential streets often have some level of transit service and some may feature frequent transit service. Network Residential streets are generally included in the city's truck route network. They may also, however, serve as critical backbones to the regional bicycle network. Given the higher vehicle volumes, streets designated as critical to the bicycle network generally require at least designated bicycle facilities (such as bike lanes) and may require separated or protected bicycle facilities.

EXAMPLE STREETS:

- » Covell Avenue SW and NW from O'Brien to Walker.
- » Fulton Street from Arthur to East Beltline.
- » Leonard Street NW from Benning to Frederick and Leonard Street NE from Coit to Herrick, excepting areas of local business concentration.
- » Buchanan Avenue from Cottage Grove to the city boundary.

ANTICIPATED AND DESIRED USES:

- » Community travel, uses and interactions in the public rights-of-way typical of a strong and healthy residential community.
- » Moderate-to-high pedestrian volumes.
- » City or regional commuter bicycle travel and community bicyclists.
- » Moderate-to-high frequency bus transit.
- » Modest truck volumes.
- » Moderate-to-significant local and longer distance (crosstown) vehicle travel.

PRIORITY USERS:

- » Network Residential streets are complete streets and must provide safe accommodation for **all users**.
- » Some streets may be designated as key links in a modal network (bicycle, transit, or crosstown vehicle) and thus be designed with a slight prioritization for accommodation and efficient travel of that mode.

DESIGN OBJECTIVES:

- » Protect residential quality of life.
- » Accommodate safe and efficient crosstown connectivity via a diversity of modes.

- » Provide a quality street, natural environment, and the unique sense of place.

TYPICAL DESIGN FEATURES AND TREATMENTS:

- » Narrow travel lanes with marked center line. Streets are commonly bidirectional.
- » Curb or center lanes may be slightly wider on streets that have demonstrated higher volumes of larger vehicle types, such as transit vehicles or trucks. Narrow lanes should be used to effectively manage traffic speeds while maintaining safety.
- » Certain traffic calming design interventions may be used to maintain vehicle speeds that are consistent with a safe and quality residential environment. Speed humps are generally not used on Network Residential streets.
- » Intersections are commonly signal controlled or uncontrolled along the Network Residential street (side streets are stop controlled).
- » High visibility crosswalks should be provided at signalized intersections. Typical (continental) crosswalks may be provided at higher volume or otherwise significant unsignalized locations. Crossings may be unmarked at intersections. Regardless of the presence or absence of markings, these remain legal pedestrian crossing locations.
- » Shared driveways or alleys are preferred. Curb cuts and other access points should be limited, where possible.
- » While large canopy trees are desired, creative solutions are encouraged where the demands of the street compromise the amount of space that can be provided for tree growth in the parkway.



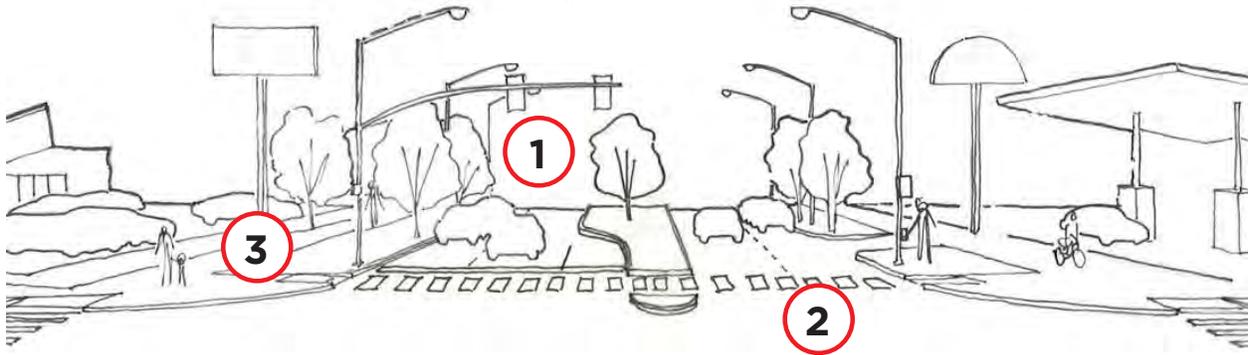
- » Highly visible gateway or identity elements that mark the transition into or out of distinct neighborhoods and to celebrate and highlight unique character or identity should be considered.
- » Streets must provide sidewalks on both sides. Sidewalk width is generally wide. Pedestrians should be buffered from the curb of the street by a generous parkway or amenity zone.
- » On-street parking on one or both sides of the street is generally desired.
- » Network Residential streets are key links for bicycles and pedestrians, as well as for vehicles (transit, trucks, and private vehicles). Given the higher volumes and speeds, key bicycle corridors must have designated marked and/or protected bicycle facilities.

TYPICAL/TARGET METRICS:

- » Vehicle volumes greater than 5,000 vehicles per day
- » Vehicle speeds 25 MPH
- » Face-to-face of curb 36' to 58'



CROSTOWN CONNECTORS

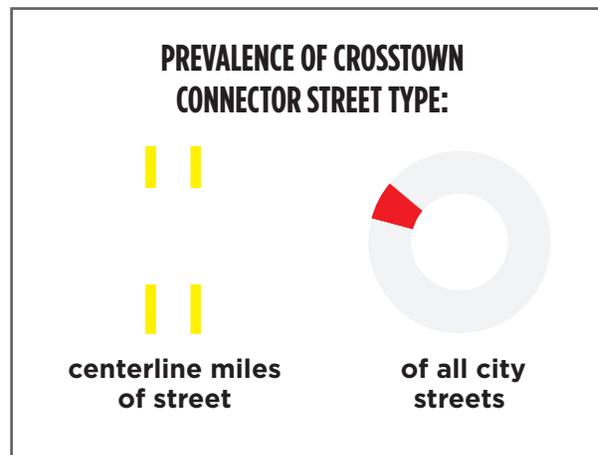


1. Greater vehicle capacity and efficiency
2. Well marked pedestrian crossings
3. Parkways buffer sidewalks from moving travel lanes

Grand Rapids has several larger, regionally significant streets that move a high volume of motor vehicle traffic, while accommodating transit stops, pedestrians, Adequate front yards and parkways to support large street trees and dense canopies, and bicycle activity. Given high traffic volumes traveling at somewhat higher speeds, these streets typically require that bicyclists and pedestrians be physically separated from traffic. Crossings must be safe and well-marked with adequate crossing time.

Generally serving low density, commercial, parkland, institutional, and residential land uses, street environments at present often lack a distinctive character. The current character of Crosstown Connectors varies from the sprawling strip retail character of 28th Street to the traditional built form of Division Street to the parklike boulevard of East Beltline.

Crosstown Connector streets are critically important in the regional travel network and are generally continuous from one end of the city to another. They may also connect from a point in the city to travel corridors that continue further into the region. Crosstown Connectors commonly have heavy vehicle volumes and may feature a significant number of commercial vehicles. In addition to automobiles, streets often have significant demands by transit users and bicyclists. While the pedestrian environment



on Crosstown Connector streets is often challenging, pedestrian mobility is imperative. Given the high traffic volumes and relatively high speeds, non-motorized users should be well protected and buffered from moving traffic.

Tree canopies and landscaping currently vary from greener, more boulevard-like streets such as East Beltline to streets with less distinctive green edges such as 28th Street. Regardless of existing conditions, street trees along the curb line are important to establish an attractive character and improve the overall environment.

EXAMPLE STREETS:

- » Lake Michigan Drive NW from the city line to Covell.
- » Fuller Avenue NE from the city limit to Michigan (excluding the small nodes of Neighborhood Business).
- » Burton Street SE.

ANTICIPATED AND DESIRED USES:

- » Significant through vehicle travel.
- » Access to major employment and commercial destinations.
- » Safe non-auto travel options both day and night through all seasons.

PRIORITY USERS:

- » Through vehicle travel.
- » **Through person travel** via all modes.
- » Worker and patron access.

DESIGN OBJECTIVES:

- » Improve street character while maintaining critical connectivity for through travel.
- » Support current and planned land uses.
- » Improve safety and operation for all users.

TYPICAL DESIGN FEATURES AND TREATMENTS:

- » Appropriately scaled travel lanes to support through travel as well as safe pedestrian crossings.
- » Medians and pedestrian refuges for pedestrian safety and safe vehicular movement.
- » High visibility lane markings.
- » Frequent pedestrian crossings to minimize crossing at uncontrolled locations. Marked crosswalks must be provided at all transit stops.

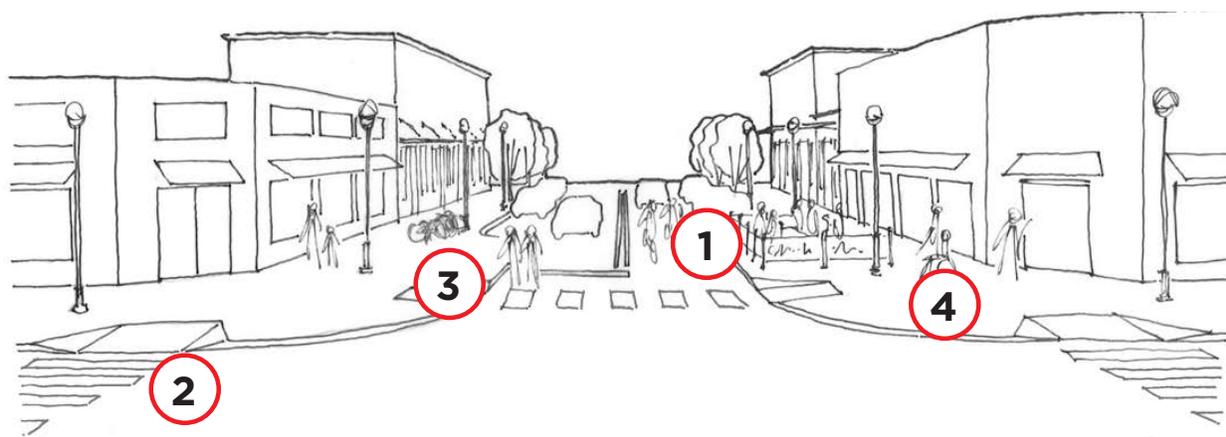
- » Continuous sidewalks on both sides of the street. Sidewalks may be widened to serve as shared use paths for pedestrians and community bicyclists.
- » Streets generally do not have on-street parking, though temporal (rush hour prohibited) parking may be provided.
- » Bicycle parking in the sidewalk zone of the street should be provided.
- » If transit service is provided, transit stops should be well lit and contain appropriate amenities.
- » Streets may either have abundant access points or strictly limited access controls.
- » Intersections are signalized.
- » Large canopy trees along the curb line help delineate the street edge and provide a sense of enclosure to the street.
- » Street lighting is critical for the safety of all. Both the pedestrian zone and the travelway should be well illuminated. Special attention is necessary at intersections and pedestrian crossings.

TYPICAL/TARGET METRICS

- » Vehicle volumes greater than 15,000 vehicles per day
- » Vehicle speeds ≥ 25 MPH
- » Face-to-face of curb 36' to 58' or more



NEIGHBORHOOD BUSINESS



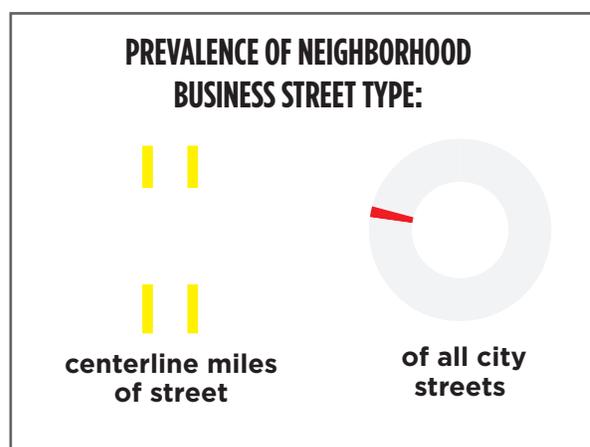
1. Narrow travel lanes
2. Frequent pedestrian crossings
3. Parking for both vehicles and bicycles
4. Generous sidewalks

The **Neighborhood Business** streets are typically compact areas that occupy only a segment along a longer street corridor. Neighborhood business districts are unique areas within Grand Rapids neighborhoods. They provide dining, shopping and employment opportunities while adding character and commerce to the Grand Rapids economy. Neighborhood Business districts are not just destinations for local residents, they are visited by patrons from across the region.

Neighborhood Business streets are generally moderate to higher volume multimodal streets.

The quality of the pedestrian environment is of paramount importance. Inviting sidewalk zones correspond positively with higher retail sales and greater commercial value of properties along Neighborhood Business streets. Pedestrians must be able to cross the street safely at multiple points to access the many offerings of the district. The pedestrian zone is buffered from roadway traffic by curbside parking or a generous amenity zone to increase pedestrian comfort. Formal or informal seating is common to invite pedestrians to gather, visit and linger along the street. Pedestrian scaled street lighting increases the attractiveness of the street during evening hours.

Access for delivery vehicles, patrons and workers is equally critical to the success



of Neighborhood Business streets. These users may arrive by foot, bicycle, transit, or personal vehicle, and all modes should be comfortably accommodated.

Street vehicle speeds should be slow and well managed.

Robust tree canopies contribute positively to the economic productivity of these streets and districts. Studies have shown that patrons will stay longer and spend more on tree-lined streets compared to those bereft of tree coverage.

Neighborhood Business streets are critical segments in the larger city or regional street network. They accommodate travel demands both to and through the business district and must provide safe access and mobility for all modes of travel, although they may be prioritized for one or more modal emphases. It is often difficult to provide separated or protected bicycle facilities on these streets given the variety and volume of mobility demands. However, when the segment is a component of the bicycle priority network, designated and marked facilities must be accommodated.

EXAMPLE STREETS:

- » Wealthy Street SE from Union to Auburn
- » Michigan Street NE from Prospect to Fuller
- » Grandville Ave SW from Hall to Grant

ANTICIPATED AND DESIRED USES:

- » Commercial activities such as café dining or outdoor retail.
- » Residential uses both at the ground and upper levels.
- » Patron, client, and employee access by way of vehicle and bicycle parking, quality transit stops, and inviting pedestrian zones.
- » Moderate-to-high pedestrian volumes.
- » Moderate-to-high frequency bus transit service and access.
- » Delivery truck access.

PRIORITY USERS:

- » **Commercial patrons and visitors.**
- » Delivery vehicles.
- » Workers and proprietors.

DESIGN OBJECTIVES:

- Support and strengthen economic productivity and value.
- Enable efficient and unobtrusive delivery of goods and/or high frequency and brief commercial transactions (e.g. short duration stops).
- Enhance street quality and image.
- Enhance access via all modes (pedestrian, bicycle, transit, personal vehicle).
- Accommodate multimodal through travel.

TYPICAL DESIGN FEATURES AND TREATMENTS

- » Narrow travel lanes to slow traffic speeds and minimize pedestrian crossing distance.
- » Bi-directional street operations are preferred. Center line may or may not be marked.
- » Short block lengths and frequent intersections are preferred. Intersections may be stop or signal controlled, or uncontrolled.
- » Pedestrian crossings along the length of the segment should be anticipated.

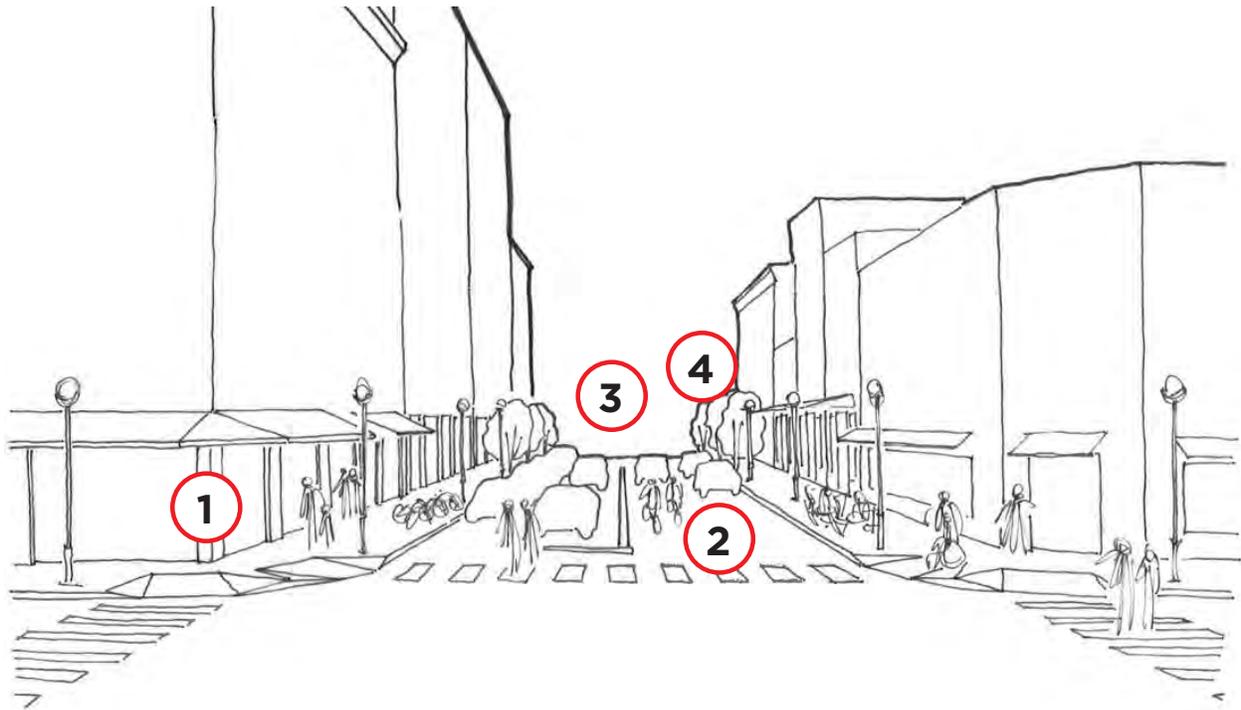
Crosswalks may or may not be marked at uncontrolled locations. Midblock crossings connect trip generators on opposing sides of the street and minimize out of direction travel for pedestrians. Crosswalks should be marked at controlled intersections.

- » Streets must provide generous sidewalks on both sides, adequately buffered from vehicle traffic. Pedestrian seating is recommended.
- » On-street parking on one or both sides of the street is preferred. Sufficient and convenient bicycle parking is required.
- » Parking should be well managed to optimize occupancy while concurrently providing a limited but continuous amount of available access. Parking may or may not be metered.
- » Adequately scaled and spaced loading zones are required to support commercial needs. Loading periods may be managed and loading zone usage enforced.
- » Transit service is common and encouraged on Neighborhood Business streets. Transit stops should provide adequate amenities for a quality rider experience. Transit amenities must not constrain the minimum required pedestrian clear zone.
- » Curb cuts and driveways should be discouraged and minimized in favor of alleys and shared access points from minor and intersecting streets.
- » Large canopy trees are desired. Creativity is encouraged to promote green infrastructure.
- » Streetscape should provide a quality environment. Standard materials, installed with quality workmanship, are acceptable and in many cases encouraged. Special materials may be used if maintenance agreements are provided.
- » Public art, wayfinding, and other unique features of place are appropriate and encouraged.

TYPICAL/TARGET METRICS

- » Vehicle volumes greater than 5,000 vehicles per day
- » Vehicle speeds <25 MPH
- » Face-to-face of curb 36' to 58'

URBAN CENTER

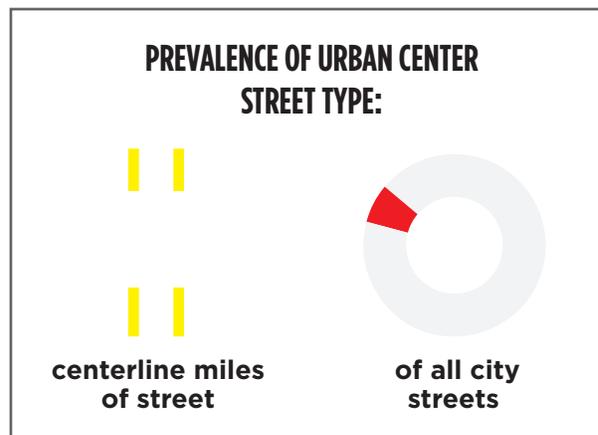


1. Generous sidewalks
2. Well managed loading zones
3. Enhanced streetscape
4. Relatively slow traffic speeds

Grand Rapids' downtown core is a vibrant, mixed-use area with a well-connected street network. Travel demands are intense in the downtown core, with travelers using a variety of different modes. Pedestrian volumes are high, as people travel through downtown streets, window shop, and simply linger as they enjoy the wonderful spaces and offerings.

Urban Center streets represent a wide spectrum—from the highly pedestrianized Monroe Center to the transit-intensive Fulton to the high vehicular demands on Ottawa and Monroe. Downtown streets are Grand Rapids' principal employment and entertainment streets. The streets also support a number of residents, institutions, students, and workers.

Urban Center streets often face the greatest challenges in balancing traveler and land use demands. The streets are active places with outdoor retail, shopping, festivals, public art, parks, and plazas.



Urban Center streets have specific design requirements to provide a high quality public realm that contributes to the city's identity and sense of place. Street trees, elaborate landscaping, and hardscaping are all important components of street design. All must be well maintained with clear responsibilities for maintenance and programming.

Streets may be designated as Urban Center streets in areas that are not currently considered downtown. These designations are aspirational and will encompass many transitioning areas adjacent to the traditional downtown core.

Urban Center streets are important links in the local and regional transportation network. Most have high travel demands by all modes. Even though private vehicle travel is significant, people traveling by transit, bicycle, and on foot well outnumber those traveling in personal vehicles. Parking is important, though is not always provided on street. The supply of off-street parking available to Urban Center streets generally dwarfs the on-street supply.

Traffic speeds should be kept generally slow. This not only makes a more comfortable, inviting street environment, but also commonly increases the vehicle throughput and allows for smooth and reliable traffic flow.

EXAMPLE STREETS:

- » Wealthy Street from Lafayette to Straight Avenue.
- » Seward Street from Leonard to Fulton.
- » Monroe Avenue from Knapp to Wealthy.
- » La Grave Avenue from Fulton to Logan.

ANTICIPATED AND DESIRED USES:

- » Pedestrian activity, both traveling along streets and lingering in the public space dining, window shopping, visiting or gathering.
- » Significant employment, commercial activity, entertainment, institutions, and residences.
- » Intensive multimodal travel—particularly during peak travel periods.
- » Major public events and festivals and signature public spaces.

PRIORITY USERS:

- » Pedestrians.
- » Workers, patrons, students, and visitors arriving via a variety of modes.
- » Active uses of the public space such as outdoor dining, retailing, and community gatherings.

DESIGN OBJECTIVES:

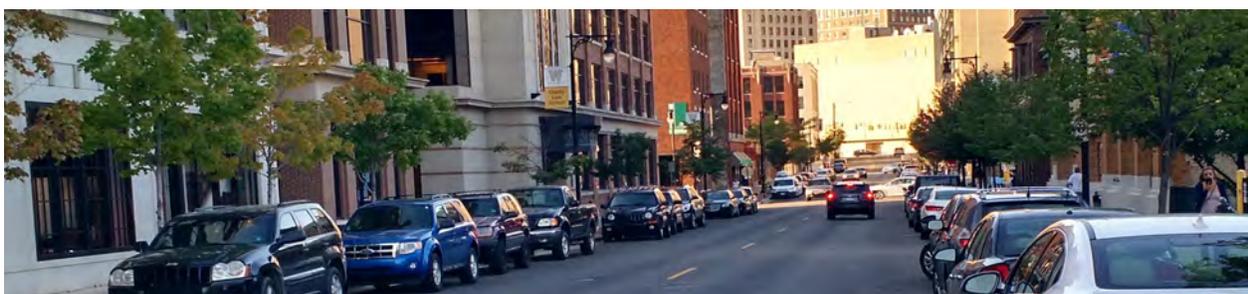
- » Create a distinctive and appealing sense of place for Grand Rapids.
- » Promote access to destinations via a variety of modes.
- » Provide smooth and efficient movement with minimum circling and congestion.

TYPICAL DESIGN FEATURES AND TREATMENTS

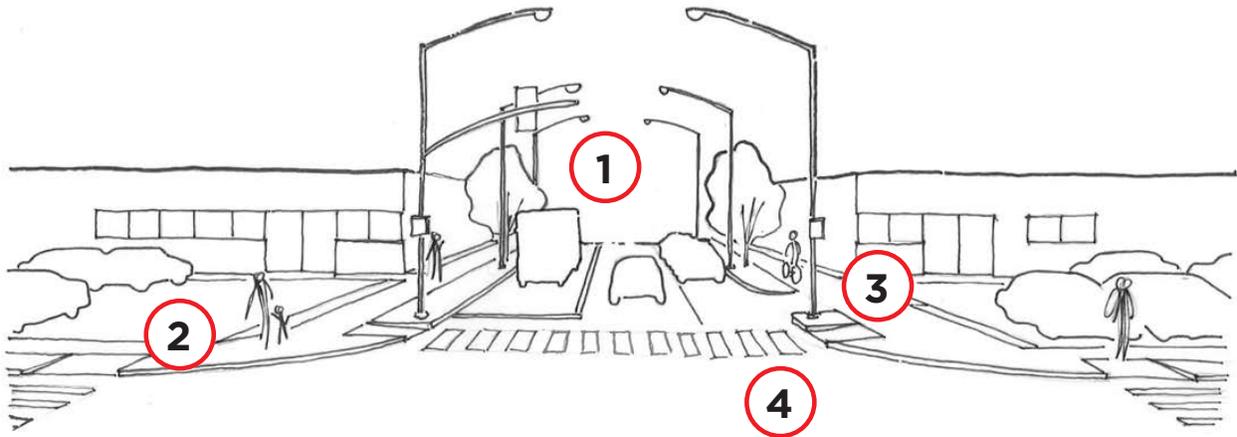
- » Travel lanes scaled appropriate to common users of the street.
- » High visibility lane markings and major pedestrian crossings.
- » Generously scaled sidewalks on both sides of the street. Sidewalks of adequate scale to support both stopped and through pedestrian movements.
- » Abundant vehicle and bicycle parking both on and off street. Well managed loading zones.
- » Frequent transit service should be anticipated. Transit stops suitable for higher rider volumes.
- » Strictly limited curb cuts and access points. Shared alleys are to be encouraged and supported.
- » Large canopy trees and robust landscaping add to streetscape quality. Enhanced streetscape materials and fixtures may be used, however maintenance responsibilities should be clear and enhancements well maintained.

TYPICAL/TARGET METRICS

- » Vehicle volumes greater than 5,000 vehicles per day.
- » Significant pedestrian volumes.
- » Vehicle speeds <25 MPH.
- » Face-to-face of curb 36' to 58'.



MAKER/INDUSTRIAL



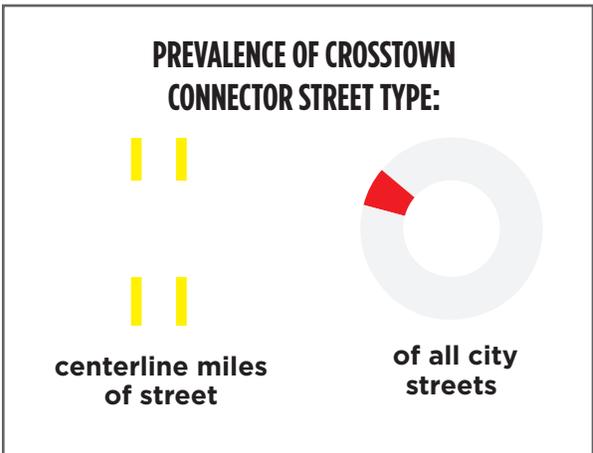
1. Vehicle lanes scaled to accommodate light truck traffic
2. Sidewalks
3. Sidewalks may be widened for use as multiuse paths
4. Curb cuts are common

Maker/Industrial streets are critical to the Grand Rapids economy. They are places of production and innovation. They may manufacture durable goods such as furniture or electronics, consumer goods such as beer, or intellectual goods such as media.

Uniquely, Maker/Industrial streets in Grand Rapids are often located next to residential areas or may have residential or retail uses interspersed with industrial, manufacturing, or warehouse uses. Maker/Industrial streets may be relatively isolated from other streets, may occur in small pockets among other street types, or may comprise an entire distinct district.

Maker/Industrial streets are often places of transition, as they have been for more than a century. Their character ranges from dynamic 24-hour districts to areas with more isolated warehousing or distribution uses.

These streets serve industrial corridors and are built to accommodate commercial trucks. While there may be fewer pedestrians and bicyclists here, these streets may also serve as through-routes for these users to adjacent land uses or connections between destinations.



Tree canopies and landscaping are important to soften the streetscape, reduce noise, and help manage stormwater.

Maker/Industrial streets often have relatively moderate traffic volumes. Because they are locations of significant employment, access via a variety of modes including transit, bicycle, and by foot is critically important. Traffic speeds are generally slow. Streets may have a higher proportion of larger vehicle traffic—in excess of 10% of total vehicle volumes. Given these numbers and the blind spots often present in large vehicles, it is important to provide separated protection for more vulnerable travelers like cyclists and pedestrians.

A subset of the Maker/Industrial street type is the Service street. Service streets typically are not the site of production activity. They may have a variety of different uses along them. Many of these uses do not face the street or are set far back from the street

edge. Service streets are the access point for larger retail or commercial properties or may be smaller streets connecting to larger Maker/Industrial streets.

EXAMPLE STREETS:

- » Wealthy Street SW from Garfield to Straight.
- » Oak Industrial Drive NE.
- » Cottage Grove SE.
- » Turner Avenue NW from Richmond to the city line.

ANTICIPATED AND DESIRED USES:

- » Large and small scale manufacturing and processing, distribution, and warehousing.
- » Other employment such as design, production, office, direct sales retail, or housing.
- » Modest pedestrian volumes.
- » Worker access via all potential modes.
- » Truck access, parking, and operations.

PRIORITY USERS:

- » **Freight and service vehicles.**
- » Workers and proprietors.
- » Customers and clients.

DESIGN OBJECTIVES:

- » Support and strengthen economic productivity and value.
- » Enable efficient industrial, commercial and production activities.
- » Connect workers to jobs and customers or clients to goods and services.
- » Increase safety and decrease opportunities for conflict.
- » Mitigate and minimize environmental impacts such as water runoff, noise, and vibrations.

TYPICAL DESIGN FEATURES AND TREATMENTS:

- » Lanes adequately wide to accommodate larger commercial vehicle travel and movement.
- » Center line may or may not be marked.
- » Larger block lengths are common.
- » Pedestrian crossings should be clearly marked.
- » Streets must provide sidewalks on at least one side. Sidewalks on both sides is preferred.
- » Streets may or may not have on-street parking. Parking may or may not be metered. Parking should be designed to accommodate trucks in addition to typical automobiles. This accommodation may include loading zones as well as restricted parking hours. Bicycle parking in the sidewalk zone of the street should be provided.
- » Transit service may be provided. Transit stops should be well lit and visible from many points.
- » Streets may have many wide curb cuts and driveways. Careful design is necessary to limit conflict between pedestrians and commercial vehicles to the extent possible.
- » Large canopy trees are desired to the extent practical.
- » Street and streetscape materials should be durable, given the presence of large and heavy vehicles.

TYPICAL/TARGET METRICS:

- » Vehicle volumes less than 5,000 vehicles per day
- » Vehicle speeds <25 MPH
- » Face-to-face of curb 36' to 58'



MODE EMPHASES

NW

NE

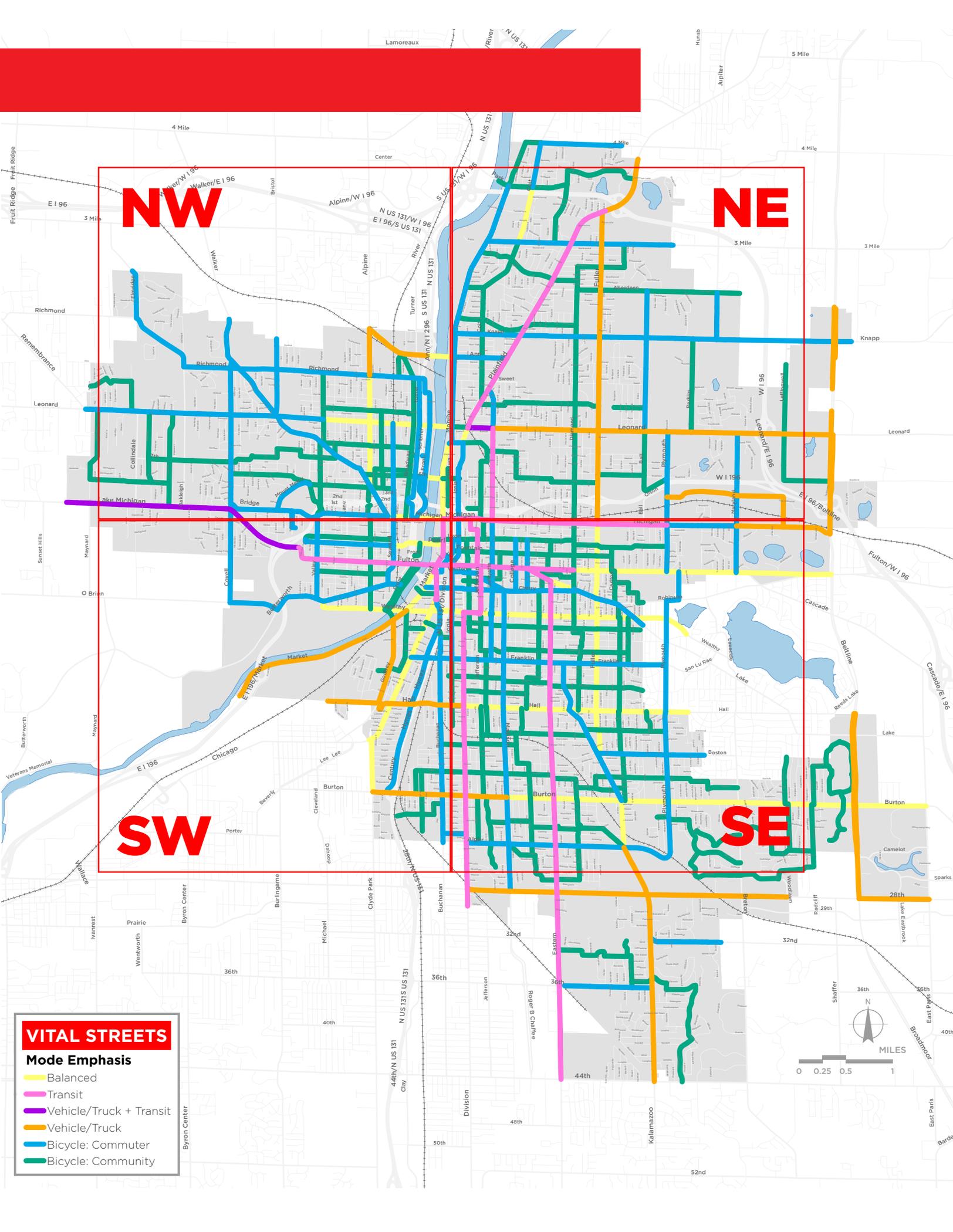
SW

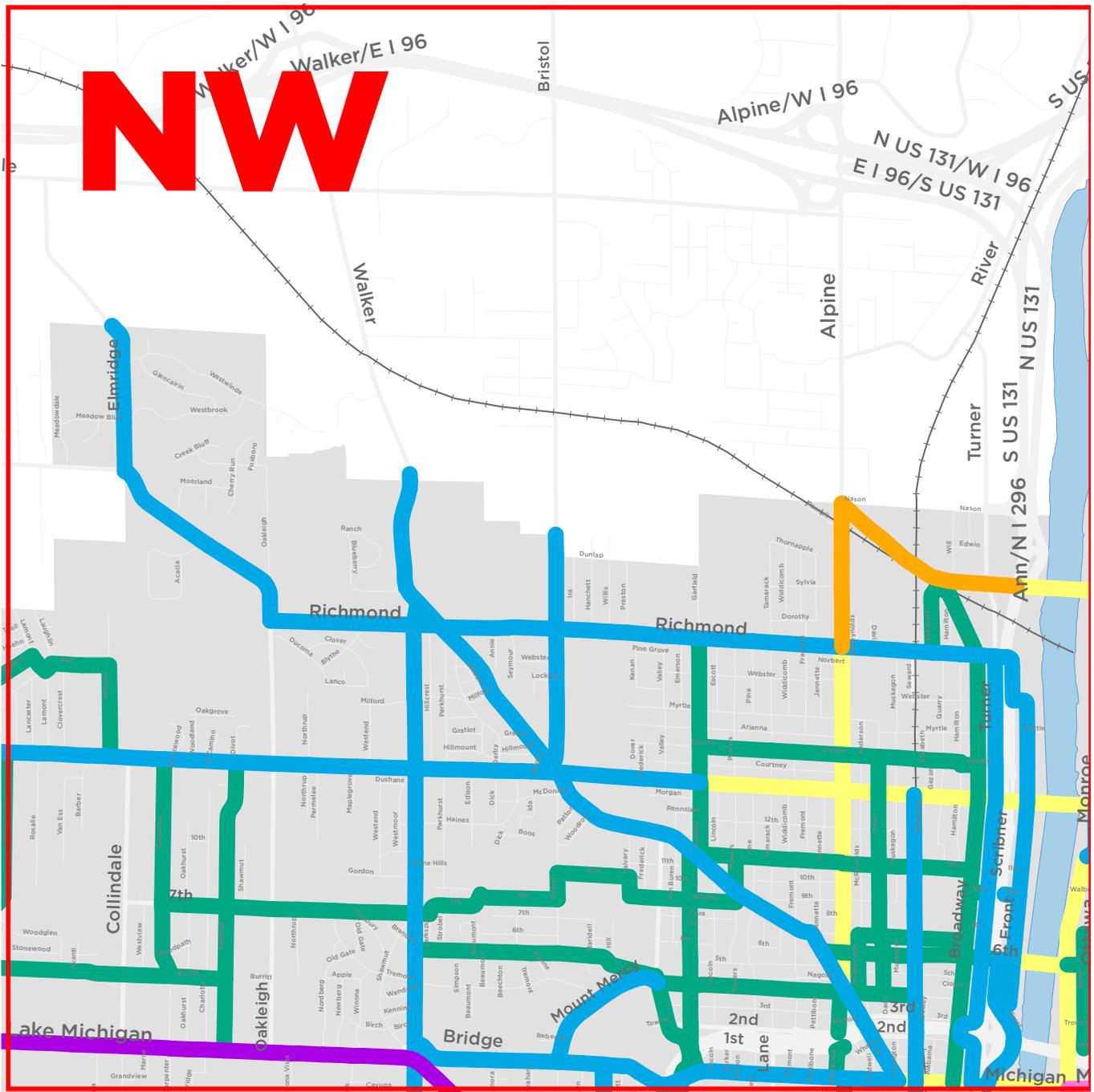
SE

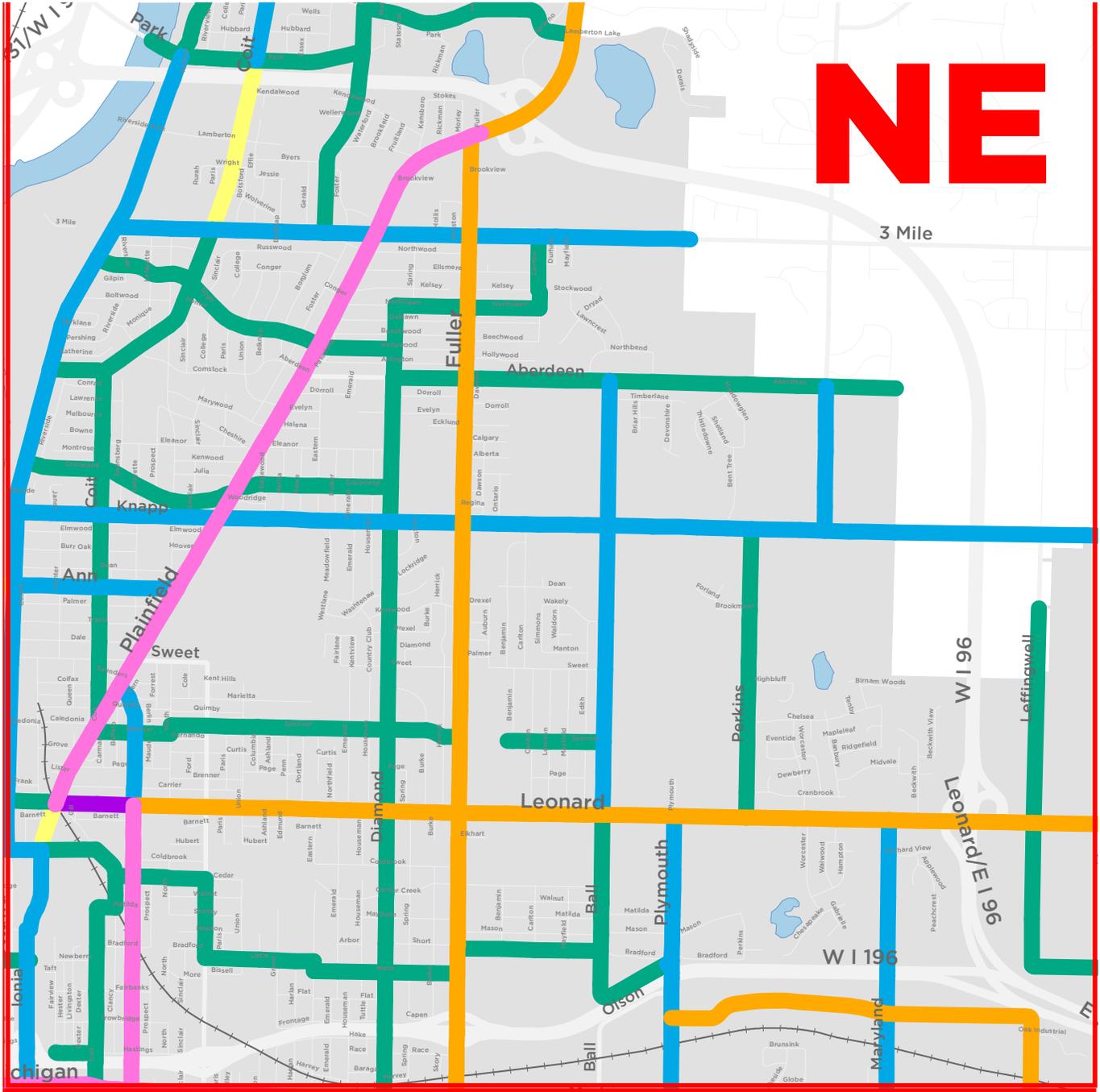
VITAL STREETS

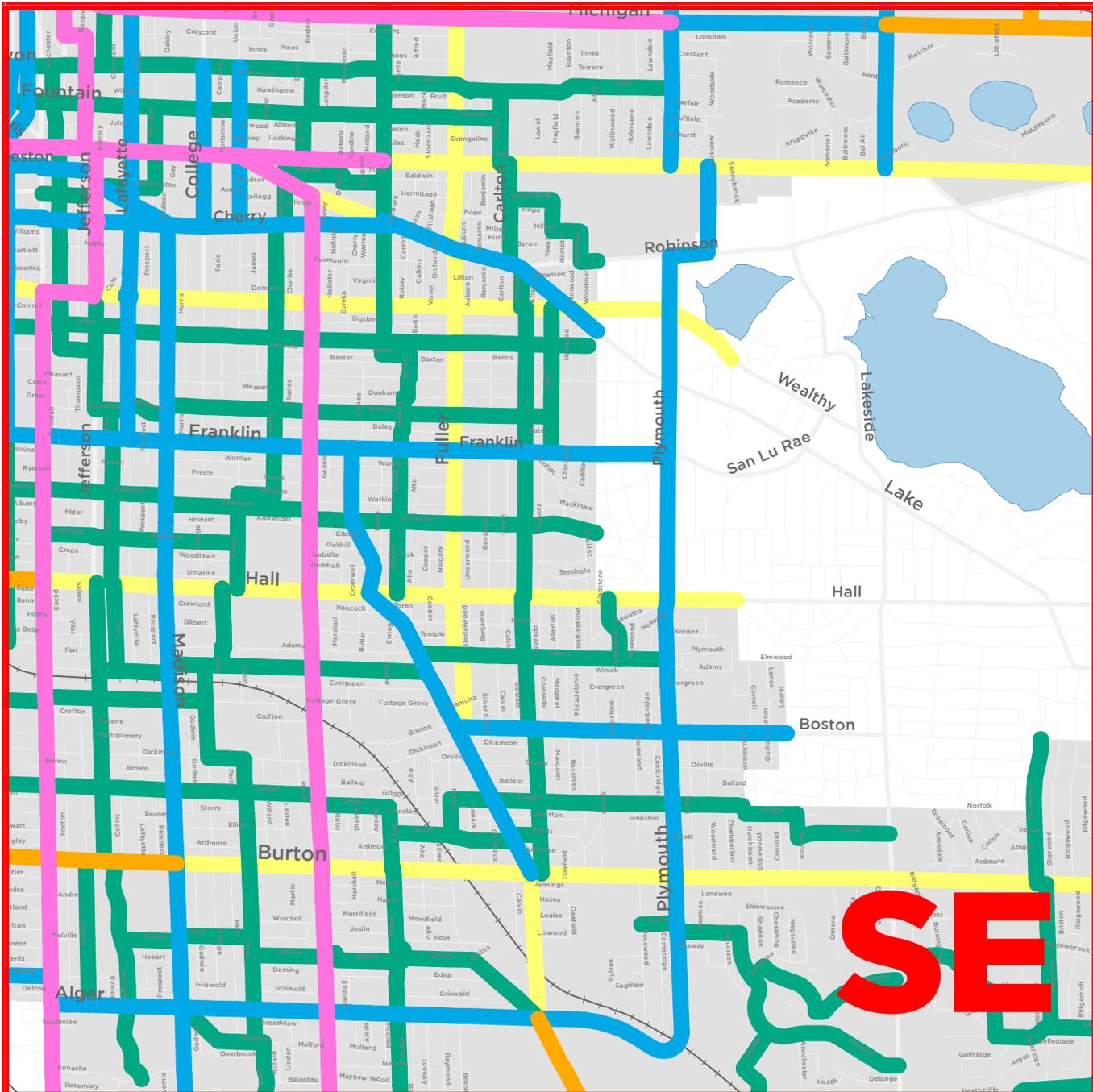
Mode Emphasis

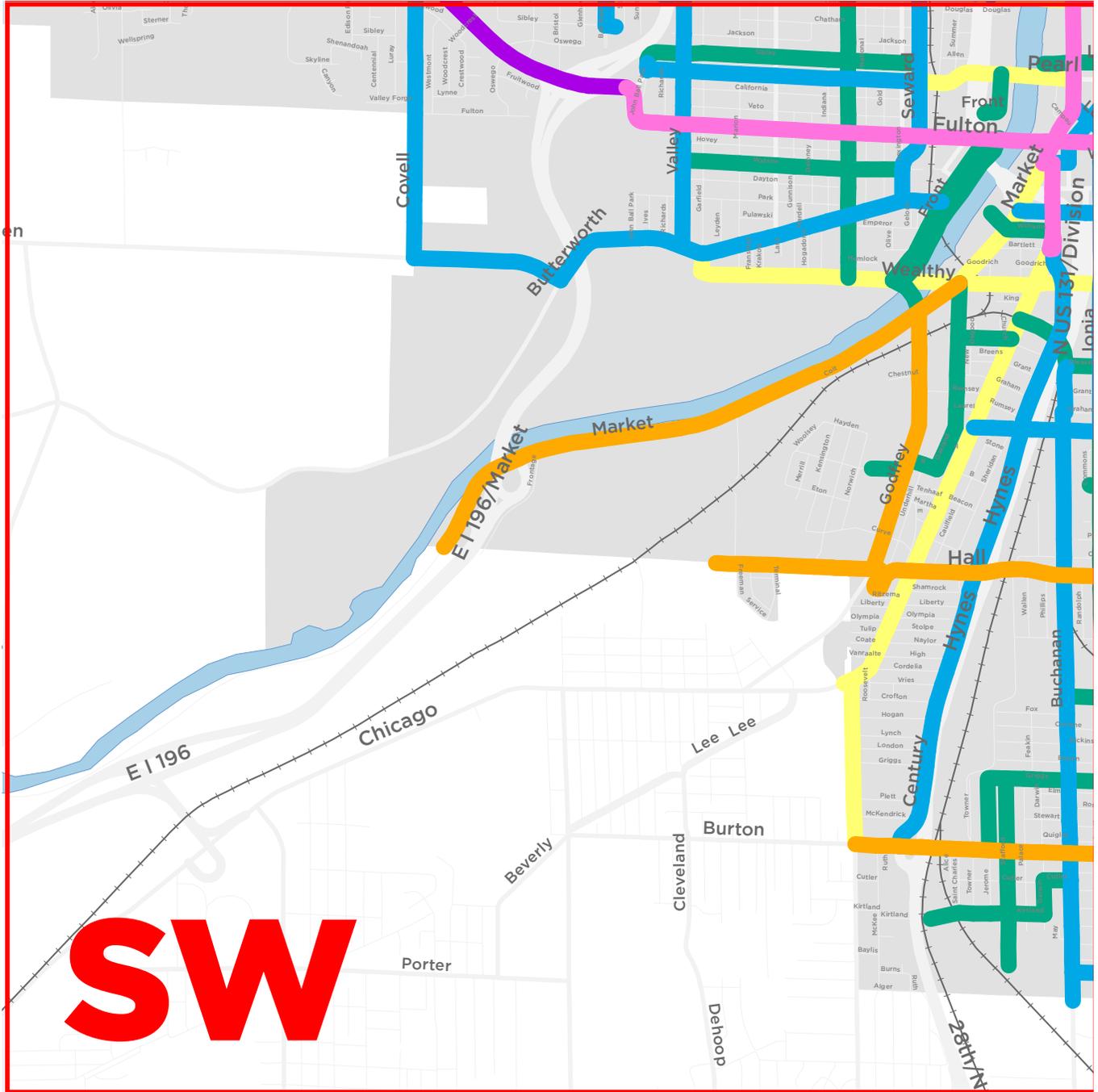
- Balanced
- Transit
- Vehicle/Truck + Transit
- Vehicle/Truck
- Bicycle: Commuter
- Bicycle: Community











All streets must be complete streets.

All streets must be complete streets. All streets must consider how to accommodate all modes of transportation. However, since each street has a finite amount of space, some streets will emphasize and encourage—through design—one mode over another while still recognizing that all modes will have occasional use. All streets must consider how to incorporate green stormwater management best practices. Modal overlays map which specific modes are emphasized.

Streets of all types must provide safe and accessible accommodation for pedestrians of all ages and abilities—both along the street and at street crossings.

“Accommodation” requires adequate space to facilitate and enhance pedestrian demands common for that street type. Because of their fundamental nature, some street types, such as Neighborhood Business and Urban Center streets, feature greater concentrations of pedestrians and thus provide a higher level of pedestrian accommodation. Accommodation generally is not met with a narrow strip of pavement scarcely wide enough for a single individual.

Neighborhood Business and Urban Center streets will generally have even wider sidewalks to accommodate groups of people walking abreast, space for cafes and window shopping, opportunities for public art, and places to sit and linger. These streets need to be treated more like economic engines and gathering places, not thoroughfares.

Balanced streets do not have a mode priority. Rather, they provide critical connections for all types of street users and no one mode should be prioritized. Balanced streets are areas where difficult design tradeoffs may need to be made to ensure safe and accessible facilities are provided for all users.

TRANSIT EMPHASIS



Transit emphasis is generally assigned to streets that carry premium transit services.

Examples include currently planned for bus rapid transit, streetcar service, and high frequency transit service. High frequency transit is generally defined as transit service every 15 minutes or better. Transit emphasis most commonly occurs on streets classified as Urban Center, Network Residential, Neighborhood Business, or Crosstown Connectors.

A limited number of streets are designated for transit emphasis. These are streets with high frequency transit service and/or streets where transit vehicles encounter congestion or delay, causing unreliable transit service.

Streets designated for Transit emphasis may moderately impact the flow of other traffic. These streets may be less appealing to bicyclists as well; however, with careful design bicycles and transit vehicles can share a street with quality and comfortable facilities for each. Pedestrian accommodation should not be compromised on Transit emphasis streets; stop improvements may be needed to enhance pedestrian access to and from transit stops.

Design treatments that emphasize transit include relocated transit stops, enhanced stop amenities, smart signal operations, bus bulbs, queue jump lanes at intersections, and/or dedicated transit lanes.

FREIGHT AND VEHICLE EMPHASIS



Although all streets must be complete streets, the network must continue to provide for the efficient movement of vehicles and freight.

Some streets in the network are explicitly designated to emphasize freight and vehicle movement. These streets must still be designed to safely accommodate pedestrians, bicyclists, and all other travelers.

Grand Rapids has an adopted truck route plan. All streets designated as truck routes must be designed to accommodate at least the occasional large vehicle. However, some streets may be specifically designated for a higher proportion of freight vehicles. Additionally, as the center of the regional economy, Grand Rapids must anticipate and accommodate the efficient movement of regional vehicle travel. Within the city are several MDOT streets designated for Freight and Trucking. To ensure the successful movement of freight and the continued need for efficient vehicle movement, some streets are designated with a Freight and Vehicle emphasis.

As with all other streets, designation as Vehicle and Vehicle emphasis does not mean that other modes can be unacceptably compromised. Safety for all potential users remains paramount. Additionally, these streets, as with all streets, must continue to serve and support their abutting land uses. However, by their nature, Freight and Vehicle emphasis streets may be less attractive to pedestrians and bicyclists who have other route alternatives.

Unless specifically designated with another of the overlays, both Maker/Industrial streets and Crosstown Connectors have an inherent emphasis to safely and efficiently move freight vehicles and automobiles. The Freight and Vehicle emphasis overlay may also be applied to Network Residential, Neighborhood Business, and Urban Center street types.

Among other design approaches, streets overlaid with a Freight and Vehicle emphasis may have signal controlled intersections or free flowing roundabouts, wider curb radii, long signal cycles, long block lengths and many curbside restrictions. Depending on the underlying context of the street, Freight and Vehicle emphasis streets may either have a high number of access points, such as on 28th Street, or very limited access, such as on East Beltline.

COMMUTER BICYCLE EMPHASIS



Commuter Bicycle emphasis streets are generally oriented towards more experienced bicyclists, however novice cyclists should be anticipated and accommodated on these streets.

Certain streets may be designated as critical spines in the larger regional bicycle network. These streets are generally continuous corridors that form a longer distance network.

Commuter Bicycle emphasis most commonly occurs on a subset of Network Residential, Neighborhood Business, and Urban Center and Crosstown Connector streets. However, it may also be applied on Link Residential and Maker/Industrial streets. They generally connect to the downtown, major employment areas, and other destinations.

Streets designated for Commuter Bicycle emphasis generally provide a dedicated bicycle facility such as an on-street bike lane or off-street trail or cycle track. Given the relatively narrow width of many street rights-of-way in Grand Rapids, providing this level of bicycle accommodation may require the removal of on-street parking, the narrowing or conversion of one or more travel lanes, or the narrowing of sidewalk zone features such as parkways. The clear pedestrian zone of the sidewalk must not be narrowed below minimum thresholds.

Selecting the design treatment and/or allocation of the street right of way to accommodate Commuter Bicycle facilities depends significantly on the underlying street type. For example, for a NB street, removing parking may be unacceptable, but narrowing travel lanes may be okay. Meanwhile, for a Maker/Industrial street, the case may be the opposite.

COMMUNITY BICYCLE EMPHASIS



Streets designated for Community Bicycle Emphasis are designed to accommodate casual bicyclists.

Community bicyclists may be children, seniors, less experienced or less confident adults, or any person on a bicycle desiring a more social and less stressful accommodation.

Community Bicycle emphasis streets should be connected with one another to form a network. The Community Bicycle routes may be marginally more circuitous because they weave through and connect the many neighborhoods of the city. Together with the Commuter Bicycle network, Community Bicycle emphasis streets should connect to common community destinations such as neighborhood business districts, schools, libraries, parks, and recreation centers.

Community Bicycle emphasis is generally applied to lower stress streets—streets with lower volumes of traffic and/or lower typical travel speeds. Thus, Community Bicycle emphasis is most common on Link Residential streets, although it may be applied to any street type.

The bicycle facility should be scaled to ensure a comfortable experience for a casual bicyclist. That might mean a relatively low-level facility on a quiet neighborhood residential street and a higher level facility, such as a protected lane, on higher traffic volume streets. Typical design enhancements added to streets designated as Community Bicycle Emphasis include traffic calming and/or traffic diverting features, increased landscaping and stormwater management features, and special signage.



STATE OF MICHIGAN
DEPARTMENT OF TRANSPORTATION
LANSING

RICK SNYDER
GOVERNOR

KIRK T. STEUDLE
DIRECTOR

July 31, 2017

Mr. James Hurt
Street Administrator
City of Grand Rapids
201 Market St.
Grand Rapids, MI 49503

Dear Mr. Hurt,

The Michigan Transportation Asset Management Council (TAMC) Support Division at Michigan Department of Transportation (MDOT) has reviewed the *City of Grand Rapids Asset Management Plan for Pavements, July 2017* and related documentation. I understand that the Grand Rapids City Council was given a thorough presentation on the City's Asset Management Program and has formally adopted this plan by Resolution 86928 on July 25, 2017.

Pursuant to Public Act 338 of 2006, I hereby inform you that MDOT has approved the City of Grand Rapids Asset Management Plan for Pavements effective immediately. This approved plan states in its conclusion that the City of Grand Rapids intends on submitting updates to this plan annually. The expiration date for this approval will be three years (July 31, 2020) if an update to this plan is not approved in advance of this expiration date.

If you have any questions, please don't hesitate to call me at (517) 373-2249.

Sincerely,

Roger A. Belknap, TAMC Coordinator
Michigan Department of Transportation

CC: Lori Cole, Michigan Department of Transportation
Eric DeLong, City of Grand Rapids
Mark DeClercq, PE City of Grand Rapids
Rick DeVries, PE City of Grand Rapids

**2. CITY OF GRAND RAPIDS
2020 BRIDGE ASSET
MANAGEMENT PLAN
2023 UPDATE**

City of Grand Rapids 2020 Bridge Asset Management Plan **2023 Update**



A plan describing the City of Grand Rapids' transportation assets and conditions

Prepared by:
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Grand Rapids, MI 49503
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EXECUTIVE SUMMARY

As conduits for commerce and connections to vital services, bridges are among the most important assets in any community along with other assets like roads, culverts, traffic signs, traffic signals, and utilities that support and affect the road network. The City of Grand Rapids' (Grand Rapids) bridges, other road-related assets, and support systems are some of the most valuable and extensive public assets, all of which are paid for with taxes collected from ordinary citizens and businesses. The cost of building and maintaining bridges, their importance to society, and the investment made by taxpayers all place a high level of responsibility on local agencies to plan, build, and maintain the road and bridge network in an efficient and effective manner. This asset management plan is intended to report on how Grand Rapids is meeting its obligations to maintain the bridges for which it is responsible.

This plan overviews Grand Rapids' bridge assets and conditions and explains how the City of Grand Rapids works to maintain and improve the overall condition of those assets. These explanations can help answer:

- What kinds of bridge assets Grand Rapids has in its jurisdiction and the different options for maintaining these assets.
- What tools and processes Grand Rapids uses to track and manage bridge assets and funds.
- What condition Grand Rapids' bridge assets are in compared to statewide averages.
- Why some bridge assets are in better condition than others and the path to maintaining and improving bridge asset conditions through proper planning and maintenance.
- How agency bridge assets are funded and where those funds come from.
- How funds are used and the costs incurred during Grand Rapids' bridge assets' normal life cycle.
- What condition Grand Rapids can expect of its bridge assets if those assets continue to be funded at the current funding levels
- How changes in funding levels can affect the overall condition of all of Grand Rapids' bridge assets.

Grand Rapids owns and/or manages 23 bridges. A summary of its historical and current bridge asset conditions, projected trends, and goals can be seen in the Figure, below.

It should be noted that there are a total of 47 bridges in the City of Grand Rapids right-of-way. 23 bridges are highway bridges that are included in this asset management plan, 4 bridges are railroad bridges over public right-of-way and 20 are pedestrian structures over the public right-of-way. Since the railroad and pedestrian bridges do not carry vehicular traffic, they are not part of this asset management plan. The railroad and pedestrian bridges are inspected by the City (or owner, if they so choose) on a biannual basis and the information and recommendation are communicated to the bridge owner. More serious concerns require the owner to provide a schedule and plan to address the concern. The pedestrian bridges are allowed through encroachment agreements with the City of Grand Rapids and include the requirements for the biannual inspections.

An asset management plan is required by Michigan Public Act 325 of 2018, and this document represents fulfillment of some of Grand Rapids' obligations towards meeting these requirements. This asset management plan also helps demonstrate Grand Rapids' responsible use of public funds by providing elected and appointed officials as well as the general public with inventory and condition information of Grand Rapids' bridge assets, and gives taxpayers the information they need to make informed decisions about investing in essential transportation infrastructure.

INTRODUCTION

Asset management is defined by Public Act 325 of 2018 as “an ongoing process of maintaining, preserving, upgrading, and operating physical assets cost effectively, based on a continuous physical inventory and condition assessment and investment to achieve established performance goals”. In other words, asset management is a process that uses data to manage and track assets, like roads and bridges, in a cost-effective manner using a combination of engineering and business principles. This process is endorsed by leaders in municipal planning and transportation infrastructure, including the Michigan Municipal League, County Road Association of Michigan, the Michigan Department of Transportation (MDOT), and the Federal Highway Administration (FHWA). The City of Grand Rapids is supported in its use of asset management principles and processes by the Michigan Transportation Asset Management Council (TAMC), formed by the State of Michigan.

Asset management, in the context of this plan, ensures that public funds are spent as effectively as possible to maximize the condition of the bridges in City of Grand Rapids’ road network. Asset management also provides a transparent decision-making process that allows the public to understand the technical and financial challenges of managing infrastructure with a limited budget.

The City of Grand Rapids (Grand Rapids) has adopted an “asset management” business process to overcome the challenges presented by having limited financial, staffing, and other resources while needing to meet safety standards and bridge users’ expectations. Grand Rapids is responsible for maintaining and operating 23 bridges.

This 2023 plan outlines how Grand Rapids determines its strategy to maintain and upgrade bridge asset condition given agency goals, priorities of its bridge users, and resources provided. An updated plan is to be released approximately every three years to reflect changes in bridge conditions, finances, and priorities.

Questions regarding the use or content of this plan should be directed to Rick DeVries, P.E., Assistant City Engineer, 300 Monroe Avenue N.W., Grand Rapids, MI 49503, rdevries@grcity.us, (616) 456-3071. A copy of this plan can be accessed on our website at <https://www.grandrapidsmi.gov/Government/Programs-and-Initiatives/Vital-Streets-Program?BestBetMatch=vital%20streets|d13b95b2-5146-4b00-9e3e-a80c73739a64|4f05f368-ecaa-4a93-b749-7ad6c4867c1f|en-US>.

Key terms used in this plan are defined in Grand Rapids’ comprehensive transportation asset management plan (also known as the “compliance plan”) used for compliance with PA 325 or 2018.

Knowing the basic features of an asset class is a crucial starting point to understanding the rationale behind an asset management approach. The following primer provides an introduction to bridges.

Bridge Primer

Bridge Types

Bridges are structures that span 20 feet or more. These bridges can extend across one or multiple spans.

If culverts are placed side by side to form a span of 20 feet or more (for example, three 6-foot culverts with one-foot between each culvert), then this culvert system would be defined as a bridge. (Note: The Compliance Plan Appendix C contains a primer on culverts not defined as bridges.)

Bridge types are classified based on two features: design and material.

The most common bridge design is the **girder system** (Figure 1). With this design, the bridge deck transfers vehicle loads to girders (or beams) that, in turn, transfer the load to the piers or abutments (see Figure 6).

A similar design that lacks girders (or beams) is a **slab bridge** (Figure 2, and see Figure 6). A slab bridge transfers the vehicle load directly to the abutments and, if necessary, piers.

Truss bridges were once quite common and consist of a support structure that is created when structural members are connected at joints to form interconnected triangles (Figure 4). Structural members may consist of steel tubes or angles connected at joints with gusset plates.

Another common bridge design in Michigan is the three-sided pre-cast box or arch bridge (Figure 4).

Michigan is also home to several unique bridge designs.

Adding another layer of complexity to bridge typing is the primary construction materials used (Figure 5). Bridges are generally constructed from concrete, steel, pre-stressed concrete, or timber. Some historical bridges or bridge components in Michigan may be constructed from stone or masonry.



Figure 1: Girder bridge



Figure 2: Slab bridge



Figure 3: Truss bridge



Figure 4: Three-sided box bridge



Figure 5: Examples of common bridge construction materials used in Michigan

Bridge Condition

Michigan inspectors rate bridge condition on a 0-9 scale known as the National Bridge Inventory (NBI) rating scale (see Table for a summary of the NBI Rating scale). Elements of the bridge’s superstructure, deck, and substructure receive a 9 if they are in excellent condition down to a 0 if they are in failed condition. A complete guide for Michigan bridge condition rating according to the NBI can be found in the MDOT Bridge Field Services’ *Bridge Safety Inspection NBI Rating Guidelines* (https://www.michigan.gov/documents/mdot/BIR_Ratings_Guide_Combined_2017-10-30_606610_7.pdf).

Table 1: Summary of the NBI Rating Scale	
NBI Rating	General Condition
9-7	Like new/good
6-5	Fair
4-3	Poor/serious
2-0	Critical/failed

Bridge Treatments

Replacement

Replacement work is typically performed when a bridge is in poor condition (NBI rating of 4 or less) and will improve the bridge to good condition (NBI rating of 7 or more). The Local Bridge Program, a part of MDOT’s Local Agency Program, defines bridge replacement as full replacement, which removes the entire bridge (superstructure, deck, and substructure) before re-building a bridge at the same location (Figure 6). The decision to perform a total replacement over rehabilitation (see below) should be made based on a life-cycle cost analysis. Generally, replacement is selected if rehabilitation costs more than two-thirds of the cost of replacement. Replacement is generally the most expensive of the treatment options.

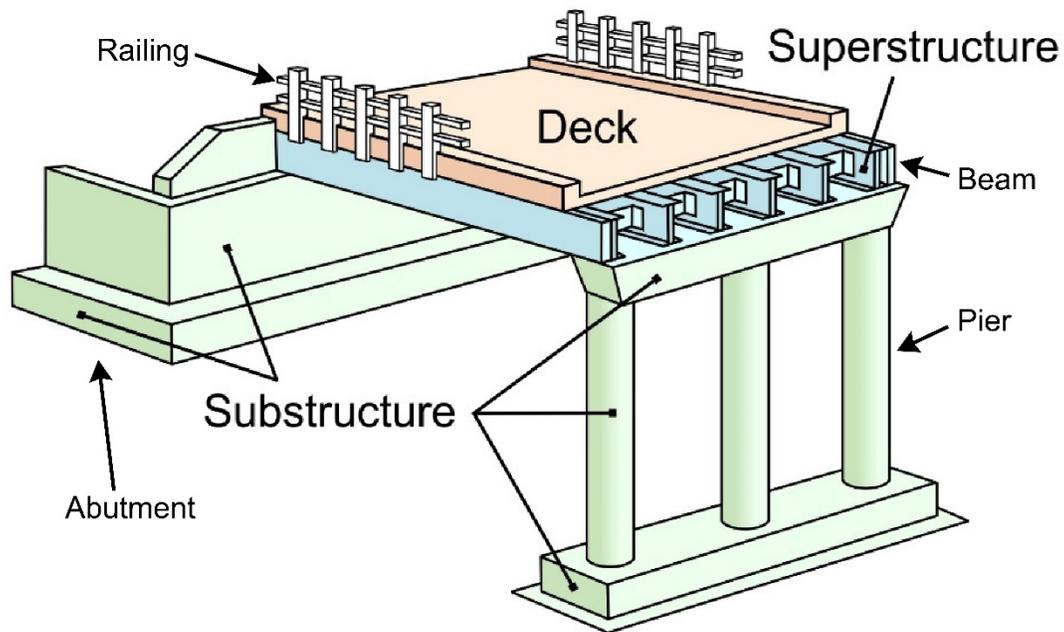


Figure 6: Diagram of basic elements of a bridge

Rehabilitation

Rehabilitation involves repairs that improve the existing condition and extend the service life of the structure and the riding surface. Most often, rehabilitation options are associated with bridges that have degraded beyond what can be fixed with preventive maintenance. Rehabilitation is typically performed on poor-rated elements (NBI rating of 4 or less) to improve them to fair or good condition (NBI rating of 5 or more). Rehabilitation can include superstructure replacement (removal and replacement of beams and deck) or deck replacement. While typically more expensive than general maintenance, rehabilitation treatments may be more cost-effective than replacing the entire structure.

- **Railing retrofit/replacement:** A railing retrofit or replacement either reinforces the existing railing or replaces it entirely (Figure 6). This rehabilitation is driven by a need for safety improvements on poor-rated railings or barriers (NBI rating less than 5).
- **Beam repair:** Beam repair corrects damage that has reduced beam strength (Figure 6). In the case of steel beams, it is performed if there is 25 percent or more of section loss in an area of the beam that affects load-carrying capacity. In the case of concrete beams, this is performed if there is 50 percent or more spalling (i.e., loss of material) at the ends of beams.
- **Substructure concrete patching and repair:** Patching and repairing the substructure is essential to keep a bridge in service. These rehabilitation efforts are performed when the abutments or piers are fair or poor (NBI rating of 5 or 4), or if spalling and delamination affect less than 30 percent of the bridge surface.

Preventative Maintenance

The Federal Highway Administration's (FHWA) *Bridge Preservation Guide* (2018) defines preventive maintenance as "a strategy of extending service life by applying cost-effective treatments to bridge elements...[that] retard future deterioration and avoid large expenses in bridge rehabilitation or replacements."

Preventive maintenance work is typically done on bridges rated fair (NBI rating of 5 or 6) in order to slow the rate of deterioration and keep them from falling into poor condition.

- **Concrete deck overlay:** A concrete deck overlay involves removing and replacing the driving surface. Typically, this is done when the deck surface is poor (NBI rating is less than 5) and the underneath portion of the deck is at least fair (NBI rating greater than 4). A shallow or deep concrete overlay may be performed depending on the condition of the bottom of the deck. The MDOT *Bridge Deck Preservation* matrices provide more detail on concrete deck overlays (see https://www.michigan.gov/mdot/0,4616,7-151-9625_24768_24773---,00.html).
- **Deck repairs:** Deck repairs include three common techniques: HMA overlay with or without waterproof membranes, concrete patching, deck sealing, crack sealing, and joint repair/replacement. An HMA overlay with an underlying waterproof membrane can be placed on bridge decks with a surface rating of fair or lower (NBI of 5 or less) and with deficiencies that cover between 15 and 30 percent of the deck surface and deck bottom. An HMA overlay without a waterproof membrane should be used on a bridge deck with a deck surface and deck bottom rating of serious condition or lower (NBI rating of 3 or less) and with deficiencies that cover greater than 30 percent of the deck surface and bottom; this is considered a temporary holdover to improve ride quality when a bridge deck is scheduled to undergo major rehabilitation within five years. All HMA overlays need to be accompanied by an updated load rating. Patching of the concrete on a bridge deck is done in response to an inspector's work recommendation or when the deck surface is in good, satisfactory, or fair condition (NBI rating of 7, 6, or 5) with minor delamination and spalling. To preserve a good bridge deck in good condition, a deck sealer can be used.

Deck sealing should only be done when the bridge deck has surface rating of fair or better (NBI of 5 or more). Concrete sealers should only be used when the top and bottom surfaces of the deck are free from major deficiencies, cracks, and spalling. An epoxy overlay may be used when between 2 and 5 percent of the deck surface has delaminations and spalls, but these deficiencies must be repaired prior to the overlay. An epoxy overlay may also be used to repair an existing epoxy overlay. Concrete crack sealing is an option to maintain concrete in otherwise good condition that has visible cracks with the potential of reaching the steel reinforcement. Crack sealing may be performed on concrete with a surface rating of good, satisfactory, or fair (NBIS rating of 7, 6, or 5) with minor surface spalling and delamination; it may also be performed in response to a work recommendation by an inspector who has determined that the frequency and size of the cracks require sealing.

- **Steel bearing repair/replacement:** Rather than sitting directly on the piers, a bridge superstructure is separated from the piers by bearings. Bearings allow for a certain degree of movement due to temperature changes or other forces. Repairing or replacing the bearings is considered preventive maintenance. Girders and a deck in at least fair condition (NBI of 5 or

higher) and bearings in poor condition (NBI rating of 4 or less) identifies candidates for this maintenance activity.

- **Painting:** Re-painting a bridge structure can either be done in totality or in part. Total re-painting is done in response to an inspector's work recommendation or when the paint condition is in serious condition (NBI rating of 3 or less). Partial re-painting can either consist of zone re-painting, which is a preventive maintenance technique, or spot re-painting, which is scheduled maintenance (see below). Zone re-painting is done when less than 15 percent of the paint in a smaller area, or zone, has failed while the rest of the bridge is in good or fair condition. It is also done if the paint condition is fair or poor (NBI rating of 5 or 4).
- **Channel improvements:** Occasionally, it is necessary to make improvements to the waterway that flows underneath the bridge. Such channel improvements are driven by an inspector's work recommendation based on a hydraulic analysis or to remove vegetation, debris, or sediment from the channel and banks (Figure 6).
- **Scour countermeasures:** An inspector's work recommendations or a hydraulic analysis may require scour countermeasures (see the *Risk Management* section of this plan for more information on scour). This is done when a structure is categorized as scour critical and is not scheduled for replacement or when NBI comments in abutment and pier ratings indicate the presence of scour holes.
- **Approach repaving:** A bridge's approach is the transition area between the roadway leading up to and away from the bridge and the bridge deck. Repaving the approach areas is performed in response to an inspector's work recommendation, when the pavement surface is in poor condition (NBI rating of 4 or less), or when the bridge deck is replaced or rehabilitated (e.g., concrete overlay).
- **Guardrail repair/replacement:** A guardrail is a safety feature on many roads and bridges that prevents or minimizes the effects of lane departure incidents. Keeping bridge guardrails in good condition is important. Repair or replacement of bridge guardrail should be done when a guardrail is missing or damaged, or when it needs a safety improvement.

Scheduled Maintenance

Scheduled maintenance activities are those activities or treatments that are regularly scheduled and intend to maintain serviceability while reducing the rate of deterioration.

- **Superstructure washing:** Washing the superstructure, or the main structure supporting the bridge, typically occurs in response to an inspector's work recommendation or when salt-contaminated dirt and debris collected on the superstructure is causing corrosion or deterioration by trapping moisture.
- **Drainage system cleanout/repair:** Keeping a bridge's drainage system clean and in good working order allows the bridge to shed water effectively. An inspector's work recommendation may indicate drainage system cleanout/repair. Signs that a drainage system needs cleaning or repair include clogs and broken, deteriorated, or damaged drainage elements.

- **Spot painting:** Spot painting is a form of partial bridge painting. This scheduled maintenance technique involves painting a small portion of a bridge. Generally, this is done in response to an inspector's work recommendation and is used for zinc-based paint systems only.
- **Slope repair/reinforcement:** The terrain on either side of the bridge that slopes down toward the channel is called the slope. At times, it is necessary to repair the slope. Situations that call for slope repair include when the slope is degraded, when the slope has significant areas of distress or failure, when the slope has settled, or if the slope is in fair or poor condition (NBI rating of 5 or less). Other times, it is necessary to reinforce the slope. Reinforcement can be added by installing Riprap, which is a side-slope covering made of stones. Riprap protects the stability of side slopes of channel banks when erosion threatens the surface.
- **Vegetation control and debris removal:** Keeping the area around a bridge structure free of vegetation and debris safeguards the bridge structure from these potentially damaging forces. Removing or restricting vegetation around bridges prevents damage to the structure. Vegetation control is done in response to an inspector's work recommendation or when vegetation traps moisture on structural elements or is growing from joints or cracks. Debris in the water channel or in the bridge can also cause damage to the structure. Removing this debris is typically done in response to an inspector's work recommendation or when vegetation, debris, or sediment accumulates on the structure or channel.
- **Miscellaneous repairs:** These are uncategorized repairs in response to an inspector's work recommendation.

1. BRIDGE ASSETS

Grand Rapids seeks to implement an asset management program for its bridge structures. This program balances the decision to perform reconstruction, rehabilitation, preventive maintenance, scheduled maintenance, or new construction, with Grand Rapids' bridge funding in order to maximize the useful service life and to ensure the safety of the local bridges under its jurisdiction. In other words, Grand Rapids' bridge asset management program aims to preserve and/or improve the condition of its local bridge network within the means of its financial resources.

Nonetheless, Grand Rapids recognizes that limited funds are available for improving the bridge network. Since preservation strategies like preventive maintenance are generally a more effective use of these funds than costly alternative management strategies like major rehabilitation or replacement, Grand Rapids seeks to identify those bridges that will benefit from a planned maintenance program while addressing those bridges that pose usability and/or safety concerns.

The three-fold goal of Grand Rapids' asset management program is the preservation and safety of its bridge network, increase of its bridge assets' useful service life by extending of the time that bridges remain in good and fair condition, and reduction of future maintenance costs. To quantify this goal, Grand Rapids specifically aims to have 100% of the agency's local bridges in fair to good condition and to have 0% classify as structurally deficient over its 10 years.

Thus, Grand Rapids' asset management plan objectives are:

- To establish the current condition of the City's bridges
- To develop a "mix of fixes" that will:
 - Program scheduled maintenance actions to impede deterioration of bridges in good condition
 - Implement selective corrective repairs or rehabilitation for degraded bridge elements order to restore functionality
 - Identify and program those eligible bridges in need of replacement
- To identify available funding sources, such as:
 - Dedicated City resources
 - City funding through Michigan's Local Bridge Program
 - Opportunities to obtain other funding
- To prioritize the programmed actions within available funding limitations

- To preserve bridges currently rated fair (5) or higher in their current condition in order to extend their useful service life.

Inventory

Grand Rapids is responsible for 23 local bridges. Table 2 summarizes Grand Rapids' bridge assets by type, sizes by bridge type, and condition by bridge type. Additional inventory data, condition ratings, and proposed preventive maintenance actions for each bridge are contained in the tables in Appendixes 1 - 5. The bridge inventory data was obtained from MDOT MiBRIDGE and other sources, and the 2023 condition data and maintenance actions are taken from the inspector's summary report (see Appendix 2).

Types

Of the Grand Rapids' 23 structures, 3 are concrete bridges, 7 are steel bridges, and 13 are pre-stressed concrete bridges.

Locations and Sizes

Figure 7 illustrates the locations of bridge assets owned by Grand Rapids. Details about the locations and sizes of each individual asset can be found in Grand Rapids' MiBRIDGE database. For more information, please refer to the agency contact listed in the *Introduction* of this bridge asset management plan.

Grand Rapids Local Bridges

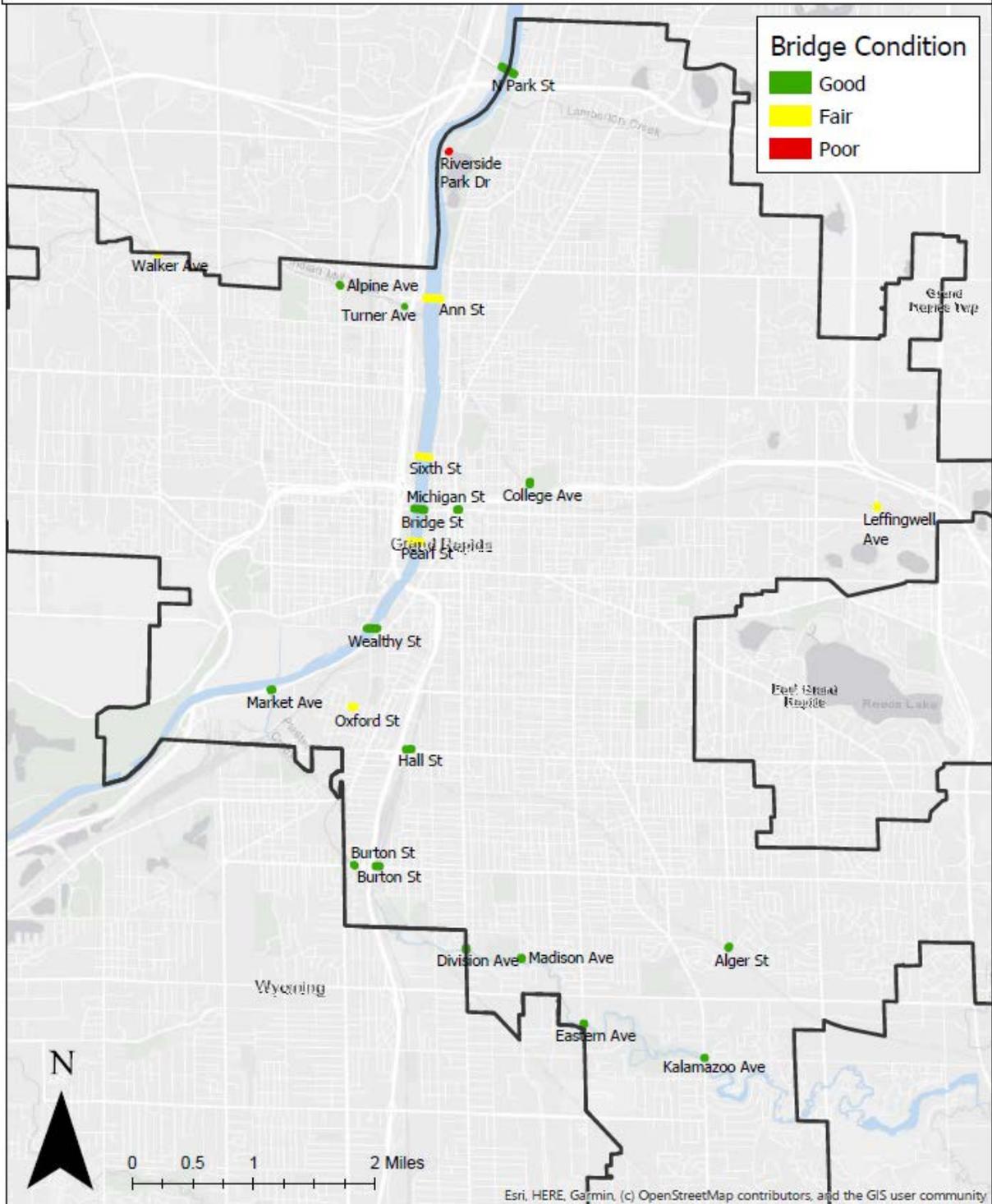


Figure 7: Map illustrating locations Grand Rapids' of bridge assets

Condition

Grand Rapids evaluates its bridges according to the National Bridge Inspection Standards rating scale, with a rating of 9 to 7 being like new to good condition, a rating of 6 and 5 being fair condition, and a rating of 4 or lower being poor or serious/critical condition. The current condition of Grand Rapids' bridge network is 15 (65.22%) are good, 7 (30.43%) are fair, and 1 (4.35%) are poor or lower.

Another layer of classification of Grand Rapids' bridge inventory classifies 1 (4.35%) bridge as structurally deficient, 1 (4.35%) bridge as posted, and no (0.00%) bridges as closed. Structurally deficient bridges are those with a deck, superstructure, substructure, and/or culvert rated as "poor" according to the NBI rating scale, with a load-carrying capacity significantly below design standards, or with a waterway that regularly overtops the bridge during floods. Posted bridges are those that have declined in condition to a point where a restriction is necessary for what would be considered a safe vehicular or traffic load passing over the bridge; designating a bridge as "posted" has no influence on its condition rating. Closed bridges are those that are closed to all traffic; closing a bridge is contingent upon its ability to carry a set minimum live load.

Bridge Type	Total Number of Bridges	Total Deck Area (sq ft)	Condition: Structurally Deficient, Posted, Closed			2019 Condition		
			Struct. Defic	Posted	Closed	Poor	Fair	Good
			Concrete – Culvert	1	4,976	0	0	0
Concrete – Tee beam	1	898	1	0	0	1	0	0
Concrete continuous – Multistringer	1	8,808	0	0	0	0	0	1
Prestressed concrete – Box beam/girders—multiple	7	32,173	0	0	0	0	3	4
Prestressed concrete – Box beam/girders—single/spread	1	5,894	0	0	0	0	0	1
Prestressed concrete – Multistringer	5	123,415	0	0	0	0	2	3
Steel – Multistringer	4	43,309	0	0	0	0	0	4
Steel – Truss—thru and pony	1	19,010	0	1	0	0	1	0
Steel continuous – Multistringer	2	80,249	0	0	0	0	1	1
Total SD/Posted/Closed			1	1	0			
Total	23	318,732				1	7	15
Percentage (%)			4.35	4.35	0.00	4.35	30.43	65.22

Statewide, MDOT’s statistics for local agency bridges show that 14.3% are poor/severe and 85.7% are good/fair, indicating that the Grand Rapids has a lesser percentage of poor bridges compared to the statewide average for local agencies. Correspondingly, Grand Rapids has 96% of its bridges in fair/good condition versus the statewide average of 85.7% for local agency bridges. Statewide, 12.9% of local agency bridge deck area classifies as structurally deficient compared to 4.35% of Grand Rapids’ bridge deck area.

Goals

The goal of Grand Rapids’ asset management program is the preservation and safety of its bridge network; it also aims to extend the period of time that bridges remain in good and fair condition, thereby increasing their useful service life and reducing future maintenance costs.

Specifically, this goal translates into long-range goals of having 100% of its bridges rated fair/good and having 0% classify as structurally deficient within 10 years. These goals are juxtaposed with the historic and current condition and the projected trend in Figure 8.

Several metrics will be used to assess the effectiveness of this asset management program. Grand Rapids will monitor and report the annual change in the number of its bridges rated fair/good (5 or higher) and the annual change in the number of its bridges classified as structurally deficient.

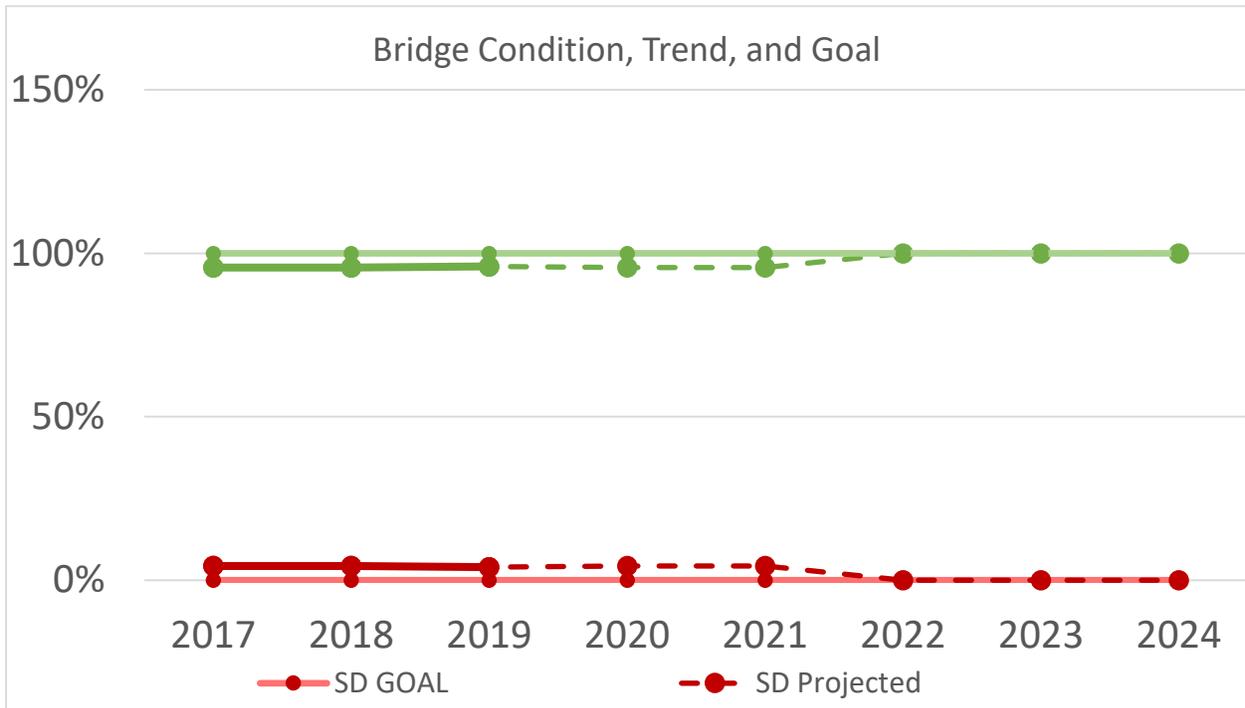


Figure 8: Progress tracking graph indicating Grand Rapids’ historic and current bridge conditions, projected trends, and goals.

Based on past inspection records and condition ratings, Grand Rapids will establish a baseline of past performance by determining the average period of time that a bridge remains in good or fair condition. The performance measure will be the increased average amount of time a bridge is in the good or fair condition status after implementation of the asset management strategy when compared to the baseline time before implementation.

Prioritization, Programmed/Funded Projects, and Planned Projects

Prioritization

Grand Rapids’ asset management program aims to address the structures of critical concern by targeting elements rated as being in poor condition and to improve and maintain the overall condition of the bridge network to good or fair condition through a “mix of fixes” strategy that is made up of preventative maintenance and scheduled maintenance. Therefore, Grand Rapids prioritizes bridges for projects by evaluating five factors and weighting them as follows: condition –20%, load capacity –25%, traffic –25%, safety –25%, and detour –5%. There are several components within each factor that are used to arrive at its score. Each project under consideration is scored, and its total score is then compared with other proposed project to establish a priority order.

Grand Rapids biennially reviews the current condition of each of the its bridges using the NBIS inspection data contained in the *MDOT Bridge Safety Inspection Report* and the inspector’s work recommendations contained in MDOT’s *Bridge Inspection Report*. The inspection inventory and condition data are consolidated in spreadsheet format for Grand Rapids’ bridges in Appendix 1. Grand

Rapids then determines management and preservation needs and corresponding actions for each bridge (2023 Work Recommendations (Appendix 2) and 2023 Follow-up Work (Appendix 3)), as well as FY2024 – FY2030 Proposed Work (Appendix 4). The management and preservation actions are selected in accordance with criteria contained in the *Summary of Preservation Criteria* table (below) and adapted to Grand Rapids’ specific bridge network.

Table 3: Summary of Preservation Criteria		
Preservation Action	Bridge Selection Criteria	Expected Service Life
Replacement		
Total Replacement	<ul style="list-style-type: none"> • NBI rating of 3 or less [1] [2] • OR Cost of rehabilitation exceeds cost of replacement [1] • OR Bridge is scour critical with no counter-measures available [1] 	70 years
Rehabilitation		
Superstructure Replacement	<ul style="list-style-type: none"> • NBI rating of 4 or less for the superstructure [1] [2] • OR Cost of superstructure and deck rehabilitation exceeds cost of replacement [1] 	40 years ^[1]
Deck Replacement Epoxy Coated Steel Black Steel	<ul style="list-style-type: none"> • Use guidelines in MDOT’s Bridge Deck Preservation Matrix [3] [4] • NBI rating of 4 or less for the deck surface and deck bottom [1] [2] • Deck bottom has more than 25% total area with deficiencies [1] • OR Replacement cost of deck is competitive with rehabilitation [1] 	60+ years ^{[3] [4]}
Substructure Replacement (Full or Partial)	<ul style="list-style-type: none"> • NBI rating of 4 or less for abutments, piers, or pier cap [1] [2] • Has open vertical cracks, signs of differential settlement, or active movement [1] • Pontis rating of 3 or 5 for more than 30 percent of the substructure [1] [5] • OR Bridge is scour critical with no counter-measures available 	40 years ^[1*]
Steel Beam Repair	<ul style="list-style-type: none"> • More than 25% section loss in an area of the beam that affects load carrying capacity [1] • OR To correct impact damage that impairs beam strength [1] 	40 years ^[1*]
Prestressed Concrete Beam Repair	<ul style="list-style-type: none"> • More than 5% spalling at ends of prestressed I-beams [1] • OR Impact damage that impairs beam strength or exposes prestressing strands [1] 	40 years ^[1*]
Substructure Concrete Patching and Repair	<ul style="list-style-type: none"> • NBI rating of 5 or 4 for abutments or piers, and surface has less than 30% area spalled and delaminated [1] [2] • OR Pontis rating of 3 or 4 for the column or pile extension, pier wall, and/or abutment wall and surface has between 2% and 30% area with deficiencies [1] [5] • OR In response to inspector’s work recommendation for substructure patching [1] 	
Abutment Repair/Replacement	<ul style="list-style-type: none"> • NBI rating of 4 or less for the abutment [1] [2] • OR Has open vertical cracks, signs of differential settlement, or active movement 	
Railing/Barrier Replacement	<ul style="list-style-type: none"> • NBI rating greater than 5 for the deck [1] [2] • NBI rating less than 5 for the railing with more than 30% total area having deficiencies [1] [2] • OR Pontis rating is 4 for railing [1] [5] • OR Safety improvement is needed [1] 	

Table 3: Summary of Preservation Criteria		
Preservation Action	Bridge Selection Criteria	Expected Service Life
Culvert Repair/Replacement	<ul style="list-style-type: none"> NBI rating of 4 or less for culvert or drainage outlet structure OR Has open vertical cracks, signs of deformation, movement, or differential settlement 	
Preventive Maintenance		
Shallow Concrete Deck Overlay	<ul style="list-style-type: none"> NBI rating is 5 or less for deck surface, and deck surface has more than 15% area with deficiencies [1] [2] NBI rating of 4 or 5 for deck bottom, and deck bottom has between 5% and 30% area with deficiencies [1] [2] OR In response to inspector's work recommendation [1] 	12 years
Deep Concrete Deck Overlay	<ul style="list-style-type: none"> NBI rating of 5 or less for deck surface, and deck surface has more than 15% area with deficiencies [1] [2] NBI deck bottom rating is 5 or 6, and deck bottom has less than 10% area with deficiencies [1] [2] OR In response to inspector's work recommendation [1] 	25 years
HMA Overlay with Waterproofing Membrane	<ul style="list-style-type: none"> NBI rating of 5 or less for deck surface, and both deck surface and bottom have between 15% and 30% area with deficiencies [1] [2] OR Bridge is in poor condition and will be replaced in the near future and the most cost-effective fix is HMA overlay [1] 	
HMA Overlay Cap without Membrane	<ul style="list-style-type: none"> Note: All HMA caps should have membranes unless scheduled for replacement within five years. NBI rating of 3 or less for deck surface and deck bottom, and deck surface and deck bottom have more than 30% area with deficiencies. Temporary holdover to improve ride quality for a bridge in the five-year plan for rehab/replacement. [1] [2] 	3 years
Concrete Deck Patching	<ul style="list-style-type: none"> NBI rating of 5, 6, or 7 for deck surface, and deck surface has between 2% and 5% area with delamination and spalling [1] [2] OR In response to inspector's work recommendation [1] 	5 years
Steel Bearing Repair/Replacement	<ul style="list-style-type: none"> NBI rating of 5 or more for superstructure and deck, and NBI rating 4 or less for bearing [2] 	
Deck Joint Replacement	<ul style="list-style-type: none"> Always include when doing deep or shallow concrete overlays [1] NBI rating of 4 or less for joints [1] [2] OR Joint leaking heavily [1] OR In response to inspector's work recommendation for replacement [1] 	
Pin and Hanger Replacement	<ul style="list-style-type: none"> NBI rating of 4 or less for superstructure for pins and hangers [1] [2] Pontis rating of 1, 2, or 3 for a frozen or deformed pin and hanger [1] [5] OR Presence of excessive section loss, severe pack rust, or out-of-plane distortion [1] 	15 years
Zone Repainting	<ul style="list-style-type: none"> NBI rating of 5 or 4 for paint condition, and paint has 3% to 15% total area failing [1] [2] OR During routine maintenance on beam ends or pins and hangers [1] OR less than 15% of existing paint area has failed and remainder of paint system is in good or fair condition [1] 	10 years
Complete Repainting	<ul style="list-style-type: none"> NBI rating of 3 or less for paint condition [1] [2] 	

Table 3: Summary of Preservation Criteria		
Preservation Action	Bridge Selection Criteria	Expected Service Life
	<ul style="list-style-type: none"> OR Painted steel beams that have greater than 15% of the existing paint area failing [1] 	
Partial Repainting	<ul style="list-style-type: none"> See Zone or Spot Painting 	
Channel Improvements	<ul style="list-style-type: none"> Removal of vegetation, debris, or sediment from channel and banks to improve channel flow OR in response to inspector's work recommendation 	
Scour Countermeasures	<ul style="list-style-type: none"> Pontis scour rating of 2 or 3 and is not scheduled for replacement [1] [5] OR NBI comments in abutment and pier ratings indicate presence of scour holes [1] [2] 	
Approach Repaving	<ul style="list-style-type: none"> Approach pavement relief joints should be included in all projects that contain a significant amount of concrete roadway (in excess of 1000' adjacent to the structure). The purpose is to alleviate the effects of pavement growth that may cause distress to the structure. Signs of pavement growth include: <ul style="list-style-type: none"> Abutment spalling under bearings [1] Beam end contact [1] Closed expansion joints and/or pin and hangers [1] Damaged railing and deck fascia at joints [1] Cracking in deck at reference line (45 degree angle) [1] 	
Guard Rail Repair/Replacement	<ul style="list-style-type: none"> Guard rail missing or damaged^[2*] OR Safety improvement is needed^[2*] 	
Scheduled Maintenance		
Superstructure Washing	<ul style="list-style-type: none"> When salt contaminated dirt and debris collected on superstructure is causing corrosion or deterioration by trapping moisture [1] OR Expansion or construction joints are to be replaced and the steel is not to be repainted [1] OR Prior to a detailed replacement [1] OR In response to inspector's work recommendation [1] 	2 years
Drainage System Clean-Out/Repair	<ul style="list-style-type: none"> When drainage system is clogged with debris [1] OR Drainage elements are broken, deteriorated, or damaged [1] OR NBI rating comments for drainage system indicate need for cleaning or repair [1] [2] 	2 years
Spot Repainting	<ul style="list-style-type: none"> For zinc-based paint systems only. Do not spot paint with lead-based paints. Less than 5% of paint area has failed in isolated areas [1] OR In response to inspector's work recommendation [1] 	5 years
Slope Paving Repair	<ul style="list-style-type: none"> NBI rating is 5 or less for slope protection [1] [2] OR Slope is degraded or sloughed OR Slope paving has significant areas of distress, failure, or has settled [1] 	
Riprap Installation	<ul style="list-style-type: none"> To protect surface when erosion threatens the stability of side slopes of channel banks 	
Vegetation Control	<ul style="list-style-type: none"> When vegetation traps moisture on structural elements [1] OR Vegetation is growing from joints or cracks [1] OR In response to inspector's work recommendation for brush cut [1] 	1 year

Table 3: Summary of Preservation Criteria		
Preservation Action	Bridge Selection Criteria	Expected Service Life
Debris Removal	<ul style="list-style-type: none"> When vegetation, debris, or sediment accumulates on the structure or in the channel OR In response to inspectors work recommendation 	1 year
Deck Joint Repair	<ul style="list-style-type: none"> Do not repair compression joint seals, assembly joint seals, steel armor expansions joints, and block out expansion joints; these should always be replaced. [1] NBI rating is 5 for joint [1] [2] OR In response to inspector's work recommendation for repair [1] 	
Concrete Sealing	<ul style="list-style-type: none"> Top surface of pier or abutments are below deck joints and, when contaminated with salt, salt can collect on the surface [1] OR Surface of the concrete has heavy salt exposure. Horizontal surfaces of substructure elements are directly below expansion joints [1] 	
Concrete Crack Sealing	<ul style="list-style-type: none"> Concrete is in good or fair condition, and cracks extend to the depth of the steel reinforcement [1] OR NBI rating of 5, 6, or 7 for deck surface, and deck surface has between 2% and 5% area with deficiencies [1] [2] OR Unsealed cracks exist that are narrow and/or less than 1/8" wide and spaced more than 8' apart [1] OR In response to inspector's work recommendation [1] 	5 years
Minor Concrete Patching	<ul style="list-style-type: none"> Repair minor delaminations and spalling that cover less than 30% of the concrete substructure [1] OR NBI rating of 5 or 4 for abutments or piers, and comments indicate that their surface has less than 30% spalling or delamination [1] [2] OR Pontis rating of 3 or 4 for the column or pile extension, pier wall and/or abutment wall, and surface has between 2% and 30% area with deficiencies [1] [5] OR In response to inspector's work recommendation [1] 	
HMA Surface Repair/Replacement	<ul style="list-style-type: none"> HMA surface is in poor condition OR In response to inspector's work recommendation 	
Seal HMA Cracks/Joints	<ul style="list-style-type: none"> HMA surface is in good or fair condition, and cracks extend to the surface of the underlying slab or sub course OR In response to inspector's work recommendation 	
Timber Repair	<ul style="list-style-type: none"> NBI rating of 4 or less for substructure for timber members OR To repair extensive rot, checking, or insect infestation 	
Miscellaneous Repair	<ul style="list-style-type: none"> Uncategorized repairs in response to inspector's work recommendation 	
<p>This table was produced by TransSystems and includes information from the following sources: [1] MDOT, <i>Project Scoping Manual</i>, MDOT, 2019. [2] MDOT, <i>MDOT NBI Rating Guidelines</i>, MDOT, 2017. [3] MDOT, <i>Bridge Deck Preservation Matrix - Decks with Uncoated "Black" Rebar</i>, MDOT, 2017. [4] MDOT, <i>Bridge Deck Preservation Matrix - Decks with Epoxy Coated Rebar</i>, 2017. [5] MDOT, <i>Pontis Bridge Inspection Manual</i>, MDOT, 2009. * From source with interpretation added.</p>		

In terms of management and preservation actions, Grand Rapids' asset management program uses a "mix of fixes" strategy that is made up of preventative maintenance and scheduled maintenance.

Replacement involves substantial changes to the existing structure, such as bridge deck replacement, superstructure replacement, or complete structure replacement, and is intended to improve critical or closed bridges to a good condition rating.

Rehabilitation is undertaken to extend the service life of existing bridges. The work will restore deficient bridges to a condition of structural or functional adequacy, and may include upgrading geometric features. Rehabilitation actions are intended to improve the poor or fair condition bridges to fair or good condition.

Preventive maintenance work will improve and extend the service life of fair bridges, and will be performed with the understanding that future rehabilitation or replacement projects will contain appropriate safety and geometric enhancements. Preventive maintenance projects are directed at limited bridge elements that are rated in fair condition with the intent of improving these elements to a good rating. Most preventive maintenance projects will be one-time actions in response to the biannual inspection.

Grand Rapids' **scheduled maintenance** program is an integral part of the preservation plan, and is intended to extend the service life of fair and good structures by preserving the bridges in their current condition for a longer period of time. Scheduled maintenance is proactive and not necessarily condition driven. In-house maintenance crews or contracted forces will perform this work.

Certain of the severely degraded and structurally deficient bridges require replacement or major rehabilitation. Several of the remaining bridges require one-time preventive maintenance actions to repair defects and restore the structure to a higher condition rating. Most bridges are included in a scheduled maintenance plan with appropriate maintenance actions programmed for groups of bridges of similar material and type, bundled by location.

The replacement, rehabilitation, and preventive maintenance projects are generally eligible for funding under the local bridge program, and any requests for funding will be submitted with City of Grand Rapids annual applications.

To achieve its goals, a primary objective of Grand Rapids' asset management program is improvement of one bridge rated poor (4 or lower) to a rating of fair (5) or higher within a five-year time period through management and/or preservation activities. The primary work activities that will be used to meet this improvement objective include the physical removal of the bridge or to work to have the bridge (Riverside Park Drive (#13059) removed from the City's bridge inventory or schedule rehabilitation work. **The City has begun preliminary work to remove the Oxford Street bridge. The project may include a tunnel or be built with embankment.** The remaining work has been prioritized by considering each individual bridge's needs, its importance, the present costs of improvements, and the impact of deferral (i.e., cost increase due to increased degradation). Additionally, Grand Rapids' asset management program incorporates preservation of bridges currently rated fair (5) or higher in their current condition in order to extend their useful service life. Grand Rapids' asset management program incorporates preservation of bridges currently rated fair (5) or higher in their current condition in order to extend their useful service life. A bridge-by-bridge preservation—or maintenance—plan is presented in the Appendix 4.

Programmed/Funded Projects

The City actively pursues Local Bridge Program (LBP) grant funds, primarily for preventative maintenance. In 2019, the City, through MDOT, completed preventative maintenance of the North Park Street, Bridge Street and Ann Street bridges over the Grand River. The City's share of \$172,292 leveraged a \$833,327 Local Bridge Program grant for the project and partnered with the City of Walker (\$37,524) for the work on the North Park Street bridge. In 2022, the City, through MDOT, awarded the needed preventative maintenance work for the Leffingwell Avenue bridge over the Grand Rapids Eastern Railroad, the Division Avenue bridge over Plaster Creek, the Alpine Avenue bridge over Indian Mill Creek and the College Avenue bridge over Grand Rapids Eastern Railroad. The City is currently working on the design for preventative maintenance of the Pearl Street bridge over the Grand River and the Burton Street and Hall Street bridges over the CSX railroad. The expected City share of \$225,000 leverages a \$517,650 Local Bridge Program grant for the project and the project is expected to be in completed in 2024.

Grand Rapids budgeted \$30,000 in total funding per year for the fiscal years 2024 - 2028. This funding provides for our biannual inspection of both the vehicular and non-vehicular bridges and any design services for preventative maintenance work. If grants are received, the local match will be budgeted in an upcoming fiscal year. Grand Rapids does not plan to replace any bridges in the next five years. By performing the aforementioned preventive maintenance and rehabilitation of the Riverside Park bridge structure, Grand Rapids will meet its overall bridge network condition goals.

Grand Rapids computes the estimated cost of each typical management and/or preservation action using unit prices in the latest *Bridge Repair Cost Estimate* spreadsheet contained in MDOT’s *Local Bridge Program Call for Projects*. The cost of items of varying complexity, such as maintenance of traffic, staged construction, scour counter-measures, and so forth, are computed on a bridge-by-bridge basis. The cost estimates are reviewed and updated annually. A summary of the programmed/funded projects and investments can be found in Table 4, the Cost Projection table, below.

Planned Projects

Grand Rapids identifies additional priority projects that remain unfunded. These are identified according to high, medium, and low priority in Table 4.

Gap Analysis

When Grand Rapids compares its funding and its programmed/funded projects with all of its prioritized projects as shown in Table 4, Grand Rapids believes it should be able to achieve all of its asset management goals for the period of this plan. This assumes that Grand Rapids is successful in securing Local Bridge Program grants for the projects. There is dedicated funding for the local share (or if it is funded with only local funds) through Vital Streets.

Table 4: Cost Projection Table

Strategy	2023	2024	2025	2026	2027	2028	2029	2030
New								
Subtotal	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Replacement								
Subtotal	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Rehabilitation								
Subtotal	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Scheduled Maintenance								
Subtotal	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Preventive Maintenance								
5093								\$133,200
5094		\$194,400						
5098								\$109,200
5217								
5199							\$480,000	
5197								
5198					\$414,000			
5201								
5211								
5213			\$537,600					
5204								
5205								\$183,600
5186		\$390,000						
5188								
5192				\$2,271,600				
5200								
5210		\$146,400						
12677								\$120,000
Subtotal	\$0	\$730,800	\$537,600	\$2,271,600	\$414,000	\$0	\$480,000	\$546,000
Other								
13059		\$282,000						
4708						\$153,600		
Subtotal	\$0	\$282,000	\$0	\$0	\$0	\$153,600	\$0	\$0
TOTAL	\$0	\$1,012,800	\$537,600	\$2,271,600	\$414,000	\$153,600	\$480,000	\$546,000

Note: the amounts shown is the total (202 dollars) amount. It is anticipated that the City will successful secure Local Bridge Program grants for this work (or defer the work until such time as a grant is received). The grants typically fund 95% of the eligible costs. The City may increase their share to 20%.

2. FINANCIAL RESOURCES

Anticipated Revenues

Grand Rapids has programmed projects and/or has been granted funding from several sources including, but not limited to MDOT Local Bridge Program, a City appropriation of monies through the Vital Streets Program for bridge preservation, and federal programs, for the purpose(s) of replacement, rehabilitation, preventive maintenance, and scheduled maintenance for the following bridge(s): 5217 (Leffingwell Avenue). This funding is intended for use in the following fiscal year: 2022.

Grand Rapids applies for funding from several sources including, but not limited to MDOT Local Bridge Program, a City appropriation of monies through the Vital Streets Program for bridge preservation, **City Capital Improvement Funds** and federal programs.

The City also submitted grant applications for FY2026 for the recent call for projects for preventative maintenance of Sixth Street bridge over the Grand River, Wealthy Street bridge over the Grand River and Michigan Street bridge over Division Avenue. If successful, the City share of \$440,000 would leverage a Local Bridge Program grant of \$2,744,000.

In future years, Grand Rapids plans to prepare and submit applications for MDOT Local Bridge Program for the purpose(s) of preventive maintenance and scheduled maintenance for the following bridge(s): 5094 (Burton Street), 5098 (Kalamazoo Avenue), 5205 (Eastern Avenue), 12677 (Madison Avenue), 5188 (Market Avenue), 5211 (Alger Street), and 5200 (Walker Avenue). This funding would be intended for use in the following funding year(s): 2027 - 2030

Any projects submitted to the Local Bridge Program that are not selected for funding may be funded with the City's Vital Street funds only.

Anticipated Expenses

Scheduled maintenance activities and minor repairs that are not affiliated with any applications, grants, or other funded projects will be performed by the agency's in-house maintenance forces or contracted for and funded through the agency's annual operating budget.

3. RISK MANAGEMENT

Grand Rapids recognizes that the potential risks associated with bridges generally fall into several categories:

- Personal injury and property damage resulting from a bridge collapse or partial failure;
- Loss of access to a region or individual properties resulting from bridge closures, restricted load postings, or extended outages for rehabilitation and repair activities; and
- Delays, congestion, and inconvenience due to serviceability issues, such as poor quality riding surface, loose expansion joints, or missing expansion joints.

Grand Rapids addresses these risks by implementing regular bridge inspections and a preservation strategy consisting of preventive maintenance.

Grand Rapids administers the biennial inspection of its bridges in accordance with NBIS and MDOT requirements. The inspection reports document the condition of Grand Rapids’ bridges and evaluates them in order to identify new defects and monitor advancing deterioration. The summary inspection report in identifies items needing follow-up, special inspection actions, and recommended bridge-by-bridge maintenance activities.

Bridges that are considered “scour critical” pose a risk to Grand Rapids’ road and bridge network. Scour is the depletion of sediment from around the foundation elements of a bridge commonly caused by fast-moving water. According to MDOT’s *Michigan Structure Inventory and Appraisal Coding Guide*, a scour critical bridge is one that has unstable abutment(s) and/or pier(s) due to observed or potential (based on an evaluation study) scour. Bridges receiving a scour rating of 3 or less are considered scour critical. Grand Rapids has scour critical bridges, which are listed in Table 5.

Table 5

Scour Critical Bridges	
Bridge Structure Number	Scour Critical Rating
5095	3
13059	U

Grand Rapids has posted or closed bridges that are critical to accessing entire areas or individual properties within its jurisdiction. These bridges are listed in Table 6.

Table 6

Posted/Closed Bridges that are Critical Links		
Bridge Structure Number	P/K	Comments
5192	P	Historic (Sixth Street) bridge

The preservation strategy identifies actions in the operations and maintenance plan that are preventive or are responsive to specific bridge conditions. The actions are prioritized to correct critical structural safety and traffic issues first, and then to address other needs based on the operational importance of each bridge and the long-term preservation of the network. The inspection results serve as a basis for modifying and updating the operations and maintenance plan annually.

Appendix 1

City of Grand Rapids 2023 Bridge Inspection Report

Owner	Structure Number	Bridge ID	Facility Carried	Features Intersected	Local Region	Freeway	Inspection Date	Item 41	Deck Rating	Surface Rating	Deck Bottom	Super Str	Sub Str Rating	Channel Rating	Culvert Rating	Scour Rating	NBI	Fracture Critical	SD FO Status	Item 141	MDOT Surface	Truck Type	MI Operating	NBI Rating	Year Built	Year Recon	Paint Rating	Deck Area	NHS	Primary Secondary	Bridge Type	Item 43A	Item 43B	Main Spans	Length	deck width	Expansion Joint	Other Joint	Deck Area 1	ADT	ADT YEAR	Good	Fair	Poor	Structure Eval	Section Loss	
Grand Rapids	4708	414278400	MICHIGAN ST	DIVISION AVE	Grand	Non-Freeway	8/16/2023	A	7	6	6	7	7	N	N	N	Y					18	1.96		2007		7	7996	NHS	Primary		3	2	1	84.7	94.4	6	7	7996	0	0	X				7	3
Grand Rapids	5093	414278400	BURTON STREET	PLASTER CREEK	Grand	Non-Freeway	8/30/2023	A	7	7	N	7	7	6	N	5	Y		Funct Obs				170		1996		N	5587	Non-NHS	Primary		5	5	1	74	75.5	N	7	5587	22635	2016	X				7	3
Grand Rapids	5094	414278400	BURTON STREET	CONRAIL	Grand	Non-Freeway	8/30/2023	A	8	7	N	7	8	N	N	N	Y		Funct Obs			17	1.29		1958	2011	7	13447	NHS	Primary		3	2	2	212.1	63.4	6	6	13447	23692	2009	X				7	2
Grand Rapids	5095	414278400	TURNER AVENUE	INDIAN MILL	Grand	Non-Freeway	8/30/2023	A	N			N	N	6	7	3	Y					18	1.45		1984			4976	Non-NHS	Primary		1	19	1	37.7	132			4976	10251	2015	X				7	
Grand Rapids	5098	414278400	KALAMAZOO AVENUE	PLASTER CREEK	Grand	Non-Freeway	8/18/2023	A	6	7	N	7	7	6	N	5	Y						130		1927	1991	N	3213	NHS	Primary		5	5	1	45	71.4	N	N	3213	20993	2016		X			7	3
Grand Rapids	5186	414278400	PEARL STREET	GRAND RIVER	Grand	Non-Freeway	8/31/2023	A	7	6	6	7	6	8	N	5	Y		Funct Obs				137		1922	1983	N	33002	NHS	Primary		5	2	5	483.9	68.2	8	6	33002	17945	2007		X			6	3
Grand Rapids	5188	414278400	MARKET AVENUE	PLASTER CREEK	Grand	Non-Freeway	8/18/2023	A	7	7	6	7	8	7	N	5	Y						117		1993		N	8808	Non-NHS	Primary		2	2	3	120	73.4	N	7	8808	8016	2016	X				7	N
Grand Rapids	5192	414278400	SIXTH STREET	GRAND RIVER	Grand	Non-Freeway	8/31/2023	P	7	7	8	5	6	7	N	5	Y	X	Funct Obs	03NNNN		1	0.18		1886	2011	4	19010	Non-NHS	Primary		3	10	4	544.7	34.9	7	7	19010	4550	2011		X			3	2
Grand Rapids	5193	414278400	ANN STREET	GRAND RIVER	Grand	Non-Freeway	8/22/2023	A	6	7	6	7	6	7	N	5	Y		Funct Obs				77		1971		6	41808	Non-NHS	Primary		4	2	5	670	62.4	8	8	41808	14834	2018		X			6	2
Grand Rapids	5194	414278400	NORTH PARK STREET	GRAND RIVER	Grand	Non-Freeway	8/22/2023	A	7	7	7	7	8	7	N	5	Y						130		1991		N	45230	Non-NHS	Primary		5	2	6	677.1	66.8	8	6	45230	11091	2018	X				8	3
Grand Rapids	5197	414278400	DIVISION AVENUE	PLASTER CREEK	Grand	Non-Freeway	8/30/2023	A	7	7	N	8	8	8	N	5	Y					17	2.23		2007		N	5894	NHS	Primary		5	6	1	70	84.2	N	5	5894	17251	2021	X				8	3
Grand Rapids	5198	414278400	WEALTHY STREET	GRAND RIVER	Grand	Non-Freeway	8/31/2023	A	7	8	6	7	7	8	N	5	Y						117		1976	2008	N	38441	Non-NHS	Primary		4	2	6	562	68.4	8	7	38441	12230	2006	X				7	1
Grand Rapids	5199	414278400	BRIDGE STREET	GRAND RIVER	Grand	Non-Freeway	8/31/2023	A	7	7	7	7	8	7	N	5	Y		Funct Obs				129		1988		N	30096	Non-NHS	Primary		5	2	5	456	66	7	6	30096	15226	2018	X				7	3
Grand Rapids	5200	414278400	WALKER AVENUE	INDIAN MILL	Grand	Non-Freeway	8/16/2023	A	6	7	N	6	7	6	N	5	Y						104		1985		N	2475	Non-NHS	Primary		5	5	1	49	50.5	N	N	2475	8062	2015		X			6	2
Grand Rapids	5201	414278400	ALPINE AVENUE	INDIAN MILL	Grand	Non-Freeway	8/16/2023	A	7	7	7	8	7	6	N	5	Y		Funct Obs				190		2007		8	3843	NHS	Primary		3	2	1	51.1	75.2	7	6	3843	19510	2021	X				8	3
Grand Rapids	5204	414278400	COLLEGE AVENUE	GRAND TRUNK RR	Grand	Non-Freeway	8/31/2023	A	7	6	N	8	7	N	N	N	Y		Funct Obs			17	3.28		2008		N	4921	Non-NHS	Primary		5	5	1	70	70.3	N	6	4921	11382	2021	X				7	3
Grand Rapids	5205	414278400	EASTERN AVENUE	PLASTER CREEK	Grand	Non-Freeway	8/22/2023	A	7	7	N	7	7	8	N	5	Y						129		1991		N	4973	Non-NHS	Primary		5	5	1	65	76.5	N	6	4973	16890	2016	X				7	3
Grand Rapids	5210	414278410	HALL STREET	NS RR & STEELE	Grand	Non-Freeway	8/30/2023	A	7	7	7	7	7	N	N	N	Y		Funct Obs				77		1960	2008	6	18023	NHS	Primary		3	2	5	306	58.9	7	7	18023	19500	2008	X				7	2
Grand Rapids	5211	414278413	ALGER STREET	CHESAPEAKE KE AND C&O	Grand	Non-Freeway	8/18/2023	A	8	7	N	6	7	N	N	N	Y		Funct Obs			16	1.39		1973	2016	N	8391	Non-NHS	Primary		5	2	3	130.3	64.4	8	7	8391	9000	2015		X			7	3
Grand Rapids	5213	415278400	OXFORD STREET	RAILROAD	Grand	Non-Freeway	8/30/2023	A	5	5	N	5	5	N	N	N	Y		Funct Obs			17	1.17		1973	1986	N	6039	Non-NHS	Secondary		5	5	3	122	49.5	4	4	6039	1325	2003		X			5	2
Grand Rapids	5217	415278402	LEFFINGWELL AVENUE	GRAND TRUNK	Grand	Non-Freeway	8/18/2023	A	7	7	5	7	7	N	N	N	Y		Funct Obs				95		1982		N	6766	Non-NHS	Secondary		5	2	3	139.8	48.4	7	6	6766	3000	2021	X				7	3
Grand Rapids	12677	414278400	MADISON AVENUE	PLASTER CREEK	Grand	Non-Freeway	8/18/2023	A	8	7	N	7	7	7	N	5	Y						95		1994		N	4965	Non-NHS	Primary		5	5	1	75	66.2	N	6	4965	9342	2016	X				7	3
Grand Rapids	13059	415278400	RIVERSIDE PARK DR	GRAND RIVER	Grand	Non-Freeway	8/31/2023	A	6	6	6	3	4	4	N	U	Y		Struct Def						1930		N	898	Non-NHS	Secondary		1	4	1	32.2	27.9	N	N	898	200	2001			X		3	N

Appendix 2

City of Grand Rapids 2023 Work Recommendations

Work Recommendations - Crew
City of Grand Rapids
2023

STR. NO.	FACILITY CARRIED	FEATURES INTERSECTED	DECK PATCHING	JOINT REPAIR	RAILING REPAIR	DETAILED INSPECTION	SLOPE REPAIR	BRUSH CUT	BEARING REPAIR	REMOVE DEBRIS	SIDEWALK REPAIR	SEAL CRACKS	CHANNEL REPAIR	APPROACH REPAIR	HEADER REPAIR	OTHER WORK
4708	MICHIGAN ST	DIVISION AVE	M Seal cracks in deck surface. Repair small spall in ne quad.	H Clean and seal West end joint. Repair spalls at east end joint.	M Repair south rail									L Seal cracks in approaches.		H Replace south side under clearance sign.
5093	BURTON STREET	PLASTER CREEK												M Patch spalling approach curb, NE & SW quadrants		
5094	BURTON STREET	CONRAIL			L Repair railing & approach guardrail											L Seal deck surface and sidewalks. Patch spalls
5095	TURNER AVENUE	INDIAN MILL CREEK														
5097	GRAND RAPIDS EAST	MONROE AVENUE						H remove vegetation along sidewalks.								
5098	KALAMAZOO AVENUE	PLASTER CREEK		M Seal construction joint between west sidewalk extension and original deck												
5186	PEARL STREET	GRAND RIVER									M Additional sidewalk repairs are needed			H Investigate loss of fill from under west approach		
5187	AMWAY PEDESTRIAN	PEARL STREET														L Repair deck cladding.
5188	MARKET AVENUE	PLASTER CREEK			L Replace missing tube along south rail.									M Repair approaches		
5189	CONRAIL	MARKET AVENUE														
5190	AMWAY PEDESTRIAN	LYON AVENUE		M Seal south end.												
5191	JR COLLEGE PED	LYON AVENUE														
5192	SIXTH STREET	GRAND RIVER			H Repair pedestrian rails of missing and loose scrollwork, repaint areas.						H Repair or replace cantilevered sidewalk supports.					
5193	ANN STREET	GRAND RIVER	L Patch spalls									M Continue sealing joints and cracks				
5194	NORTH PARK STREET	GRAND RIVER		H Patch spalls at joints. Reseal joints.		L Investigate and prevent leakage onto S fascia in W span & N fascia in E 2 spans.										
5196	MICH CENTRAL BR	DIVISION AVENUE														
5197	DIVISION AVENUE	PLASTER CREEK		M Reseal joints	L Seal rail end blocks											
5198	WEALTHY STREET	GRAND RIVER	M seal deck cracks	L Clean out joints yearly.				H cut brush overhanging SE sidewalk								L Patch spalls on west abutment

Appendix 2

City of Grand Rapids 2023 Work Recommendations

Work Recommendations - Crew
 City of Grand Rapids
 2023

STR. NO.	FACILITY CARRIED	FEATURES INTERSECTED	DECK PATCHING	JOINT REPAIR	RAILING REPAIR	DETAILED INSPECTION	SLOPE REPAIR	BRUSH CUT	BEARING REPAIR	REMOVE DEBRIS	SIDEWALK REPAIR	SEAL CRACKS	CHANNEL REPAIR	APPROACH REPAIR	HEADER REPAIR	OTHER WORK			
5199	BRIDGE STREET	GRAND RIVER								H	Blow out joints								
5200	WALKER AVENUE	INDIAN MILL CREEK						L	Cut tree in NW Q			M	Seal HMA joint along face of sidewalks						
5201	ALPINE AVENUE	INDIAN MILL CREEK	H Epoxy overlay deck, seal sidewalks and rails	L Clean out joint yearly, reseal E3 joint				H	clean out brush within the floodwalls full length of channel					L	Patch spall in S approach				
5202	GRAND TRUNK RR	ALPINE AVE														H	Check bridge underclearance and replace signing. No advance warning signs.		
5204	COLLEGE AVENUE	GRAND TRUNK RR		M	Reseal E3 joints	L	replace the missing tube in the west rail opening												
5205	EASTERN AVENUE	PLASTER CREEK		M	Clean out and reseal joints.														
5206	RADDISON PED	CAMPAU(FERRY) ST																	
5207	BUTTERWORTH HOSP	MICHIGAN AVENUE		L	Investigate source of water stains on cross beams														
5208	MARY FREE BED HOSP	LAFAYETTE AVENUE																	
5209	FERGUSON HOSPITAL	SHELDON BLVD																	
5210	HALL STREET	NS RR & STEELE AVE		L	Clean out joint yearly	L	Budget to seal cracks in railing		L	Repair West abutment slope pavement							M	epoxy seal sidewalk & Deck	
5211	ALGER STREET	CHISAPPAKI AND OHIO RR																	
5213	OXFORD STREET	C&O RAILROAD	H	Seal cracks in bituminous	H	Replace joints												M	Remove bridge and place embankment, is an option
5214	JR COLLEGE PED	BOSTWICK AVENUE																	
5215	JR COLLEGE PED	RANSOM AVENUE																M	Install low clearance sign (W12-3) on bridge.
5216	JOHN B WIDOLCOMB	FIFTH STREET																	
5217	LEFFINGWELL AVENUE	GRAND TRUNK RAILROAD								H	Heavy brush make it hard to access bridge. Needs to be cut back.								
12677	MADISON AVENUE	PLASTER CREEK								H	loss of embankment occurring behind sidewalk and guardrail in NW quad. Fill Sheeting gap.								

Appendix 2

City of Grand Rapids 2023 Work Recommendations

Work Recommendations - Crew
 City of Grand Rapids
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STR. NO.	FACILITY CARRIED	FEATURES INTERSECTED	DECK PATCHING	JOINT REPAIR	RAILING REPAIR	DETAILED INSPECTION	SLOPE REPAIR	BRUSH CUT	BEARING REPAIR	REMOVE DEBRIS	SIDEWALK REPAIR	SEAL CRACKS	CHANNEL REPAIR	APPROACH REPAIR	HEADER REPAIR	OTHER WORK
12840	GRCC PEDESTRAIN	WINCHESTER AVE														
12841	GRCC PEDESTRAIN	LYON STREET														
12843	BUTTERWORTH PED	BARCLAY STREET														
12844	VAN ANDEL WALKOVER	MARKET AVENUE														
12845	VAN ANDEL WALKOVER	OTTAWA AVENUE														
12846	VAN ANDEL WALKOVER	OTTAWA ALLEY														
12848	VAN ANDEL ARENA	FULTON ST (OLD M-45)														
12947	GRCC PEDESTRIAN	BOSTWICK AVENUE														
13059	RIVERSIDE PARK DR	GRAND RIVER LAGOON											H	Keep patching/wedging settlement areas		
13477	JW MARRIOTT WALKOVR	CAMPAU STREET														
13478	VAI PEDESTRAIN	MICHIGAN AVE														

Appendix 2

City of Grand Rapids 2023 Work Recommendations

Work Recommendations - Contract
 City of Grand Rapids
 2023

STR. NO.	FACILITY CARRIED	FEATURES INTERSECTED	SUBSTRUCTURE REPAIR	BRIDGE REPLACEMENT	SUPERSTRUCTURE REPLACEMENT	DECK REPLACEMENT	PAINT	ZONE PAINT	JOINT REPLACEMENT	FLOODCOAT	HMA OVERLAY	SCOUR REPAIR	DEEP OVERLAY	SHALLOW OVERLAY	SUPERSTRUCTURE REPAIR	CULVERT REPLACEMENT
4708	MICHIGAN ST	DIVISION AVE														
5093	BURTON STREET	PLASTER CREEK								L	Plan to seal deck and sidewalks again					
5094	BURTON STREET	CONRAIL														
5095	TURNER AVENUE	INDIAN MILL CREEK														
5097	GRAND RAPIDS EAST	MONROE AVENUE	M	Protect south pier columns from impact damage.				M	Clean and paint						M	Replace north connector plate at east pier.
5098	KALAMAZOO AVENUE	PLASTER CREEK														
5186	PEARL STREET	GRAND RIVER	L	arch lighting conduit repair Patch spalls on piers under bearing areas, under side of arches.												
5187	AMWAY PEDESTRIAN	PEARL STREET	L	Seal cracks in south pier column.												
5188	MARKET AVENUE	PLASTER CREEK														
5189	CONRAIL	MARKET AVENUE	M	Repair pier spalls.						L	Seal deck and joints.					
5190	AMWAY PEDESTRIAN	LYON AVENUE													L	Patch spalled areas on girders.
5191	JR COLLEGE PED	LYON AVENUE														
5192	SIXTH STREET	GRAND RIVER						H	Clean and coat lower connections, floor beams, sidewalk Supports Wash truss members yearly to remove residual salts.							
5193	ANN STREET	GRAND RIVER														
5194	NORTH PARK STREET	GRAND RIVER													L	Patch facade spalls at abutments.
5196	MICH CENTRAL RR	DIVISION AVENUE	H	Repair pier cross braces. Fix broken concrete at piers to protect from vehicle impacts.			L	Budget for full paint								
5197	DIVISION AVENUE	PLASTER CREEK								M	Seal deck and sidewalks, rescal end joints					

Appendix 2

City of Grand Rapids 2023 Work Recommendations

Work Recommendations - Contract
 City of Grand Rapids
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STN. NO.	FAÇILITY CARRIED	FEATURES INTERSECTED	SUBSTRUCTURE REPAIR	BRIDGE REPLACEMENT	SUPERSTRUCTURE REPLACEMENT	DECK REPLACEMENT	PAINT	ZONE PAINT	JOINT REPLACEMENT	FLOODCOAT	HMA OVERLAY	SCOUR REPAIR	DEEP OVERLAY	SHALLOW OVERLAY	SUPERSTRUCTURE REPAIR	CULVERT REPLACEMENT
5198	WEALTHY STREET	GRAND RIVER														
5199	BRIDGE STREET	GRAND RIVER														
5200	WALKER AVENUE	INDIAN MILL CREEK														
5201	ALPINE AVENUE	INDIAN MILL CREEK														
5202	GRAND TRUNK RR	ALPINE AVE					L									
5204	COLLEGE AVENUE	GRAND TRUNK RR								H						
5205	EASTERN AVENUE	PLASTER CREEK														
5206	RADISON PED	CAMPALUFERRY ST														
5207	BUTTERWORTH HOSP	MICHIGAN AVENUE														
5208	MARY FREE RD HOSP	LAFAYETTE AVENUE														
5209	FERGUSON HOSPITAL	SHELDON BLVD														
5210	HALL STREET	NS RR & STEELE AVE														
5211	ALGER STREET	CHESAPEAKE AND OHIO RR														
5213	OXFORD STREET	C&O RAILROAD	H										H	H		
5214	IR COLLEGE PED	BOSTWICK AVENUE														
5215	IR COLLEGE PED	RANSOM AVENUE	M													
5216	JOHN B WIDDICOMBS	FIFTH STREET														

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City of Grand Rapids 2023 Work Recommendations

Work Recommendations - Contract
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STR. NO.	FACILITY CARRIED	FEATURES INTERSECTED	SUBSTRUCTURE REPAIR	BRIDGE REPLACEMENT	SUPERSTRUCTURE REPLACEMENT	DECK REPLACEMENT	PAINT	ZONE PAINT	JOINT REPLACEMENT	FLOODCOAT	HMA OVERLAY	SCOUR REPAIR	DEEP OVERLAY	SHALLOW OVERLAY	SUPERSTRUCTURE REPAIR	CULVERT REPLACEMENT
5217	LEFFINGWELL AVENUE	GRAND TRUNK RAILROAD														
12677	MADISON AVENUE	PLASTER CREEK														
12840	GRCC PEDESTRAIN	WINCHESTER AVE						L Paint hand rail and bottom chord. Install guard at bottom chord.								
12841	GRCC PEDESTRAIN	LYON STREET	M Patch spall at the base of the pier, paint anchor plate and bolts.													
12843	BUTTERWORTH PID	BARCLAY STREET														
12844	VAN ANDEL WALKOVER	MARKET AVENUE														
12845	VAN ANDEL WALKOVER	OTTAWA AVENUE														
12846	VAN ANDEL WALKOVER	OTTAWA ALLEY						M Paint bolted anchorages at east end.								
12848	VAN ANDEL ARENA	FULTON ST (OLD M-45)						M Paint bearings at north abutment. Paint exterior of bottom chords at pier.								
12947	GRCC PEDESTRIAN	BOSTWICK AVENUE						L Divert drainage away from structural members. Repaint.								
13059	RIVERSIDE PARK DR	GRAND RIVER LAGOON		H Budget for replacement.	H Patch conc beams. Paint resteel.							H Place scour protection.				
13477	JW MARRIOTT WALKOVER	CAMPALU STREET														
13478	VAI PEDESTRAIN	MICHIGAN AVE														

Appendix 3

City of Grand Rapids 2023 Follow-Up Work

Inventory Data											Inspection Items							
Bridge Type	Structure Number	Bridge ID	Facility Carried	Features Intersected	Structure Type Main Span (Item 43A - Material)	Structure Type Main Span (Item 43B)	Number of Main Span (Item 45)	Total Str Length (Item 49)	Total Str Width (Item 52)	Total Str (sq ft)	Initial Inspection	In Depth Steel Inspection	Pin and Hanger Inspection	Diving Inspection	Provide Monitoring	Review Scour Criticality	Load Rating	Update SIA
Steel - Multistringer	4708	411410140005010	MICHIGAN ST	US-131 BR (DIVISION AVE)	3	2	1	84.7	94.4	7996								x
Prestressed concrete - Box beam/girders—multiple	5093	414278400502801	BURTON STREET	PLASTER CREEK	5	5	1	74	75.5	5587								x
Steel - Multistringer	5094	414278400502801	BURTON STREET	CONRAIL	3	2	2	212.1	63.4	13447								x
Concrete - Culvert	5095	414278400514801	TURNER AVENUE	INDIAN MILL CREEK	1	19	1	37.7	132	4976								x
Prestressed concrete - Box beam/girders—multiple	5098	414278400517801	KALAMAZOO AVENUE	PLASTER CREEK	5	5	1	45	71.4	3213								x
Prestressed concrete - Multistringer	5186	414278400154801	PEARL STREET	GRAND RIVER	5	2	5	483.9	68.2	33002								x
Concrete continuous - Multistringer	5188	414278400156801	MARKET AVENUE	PLASTER CREEK	2	2	3	120	73.4	8808								x
Steel - Truss—thru and pony	5192	414278400210801	SIXTH STREET	GRAND RIVER	3	10	4	544.7	34.9	19010				x				x
Steel continuous - Multistringer	5193	414278400267801	ANN STREET	GRAND RIVER	4	2	5	670	62.4	41808				x				x
Prestressed concrete - Multistringer	5194	414278400288801	NORTH PARK STREET	GRAND RIVER	5	2	6	677.1	66.8	45230				x				x
Prestressed concrete - Box beam/girders—single/s/ spread	5197	414278400464801	DIVISION AVENUE	PLASTER CREEK	5	6	1	70	84.2	5894								x
Steel continuous - Multistringer	5198	414278400505801	WEALTHY STREET	GRAND RIVER	4	2	6	562	68.4	38441								x
Prestressed concrete - Multistringer	5199	414278400507801	BRIDGE STREET	GRAND RIVER	5	2	5	456	66	30096								x
Prestressed concrete - Box beam/girders—multiple	5200	414278400509801	WALKER AVENUE	INDIAN MILL CREEK	5	5	1	49	50.5	2475								x
Steel - Multistringer	5201	414278400513801	ALPINE AVENUE	INDIAN MILL CREEK	3	2	1	51.1	75.2	3843								x
Prestressed concrete - Box beam/girders—multiple	5204	414278400558801	COLLEGE AVENUE	GRAND TRUNK RR	5	5	1	70	70.3	4921								x
Prestressed concrete - Box beam/girders—multiple	5205	414278400587801	EASTERN AVENUE	PLASTER CREEK	5	5	1	65	76.5	4973								x
Steel - Multistringer	5210	414278410059801	HALL STREET	NS RR & STEELE AVE	3	2	5	306	58.9	18023								x
Prestressed concrete - Multistringer	5211	414278413000801	ALGER STREET	CHESAPEAKE AND OHIO RR	5	2	3	130.3	64.4	8391								x
Prestressed concrete - Box beam/girders—multiple	5213	415278400389801	OXFORD STREET	C&O RAILROAD	5	5	3	122	49.5	6039								x
Prestressed concrete - Multistringer	5217	415278402200801	LEFFINGWELL AVENUE	GRAND TRUNK RAILROAD	5	2	3	139.8	47.9	6696								x
Prestressed concrete - Box beam/girders—multiple	12677	414278400537801	MADISON AVENUE	PLASTER CREEK	5	5	1	75	66.2	4965								x
Concrete - Tee beam	13059	415278400001801	RIVERSIDE PARK DR	GRAND RIVER LAGOON	1	4	1	32.2	27.9	898								x

Appendix 4: FY2024 – FY2030 Proposed Work

CITY OF GRAND RAPIDS 2023 BRIDGE ASSET MANAGEMENT PROGRAM

ESTIMATED ANNUAL BUDGET			2023		2024		2025		2026		2027		2028		2029		2030	
SN	ROAD NAME	STREAM / ROAD	MDOT	CITY	MDOT	CITY	MDOT	CITY	MDOT	CITY	MDOT	CITY	MDOT	CITY	MDOT	CITY	MDOT	CITY
4708	MICHIGAN STREET	DIVISION AVENUE		\$ -		\$ -		\$ -		\$ -		\$ -	128000	\$ 25,600		\$ -		\$ -
5093	BURTON STREET	PLASTER CREEK		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -	\$ 111,000	\$ 22,200
5094	BURTON STREET	CONRAIL		\$ -	\$ 182,000	\$ 32,400		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -
5095	TURNER AVENUE	INDIAN MILL CREEK		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -
5098	KALAMAZOO AVENUE	PLASTER CREEK		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -	\$ 91,000	\$ 18,200
5188	PEARL STREET	GRAND RIVER		\$ -	\$ 325,000	\$ 65,000		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -
5188	MARKET STREET	PLASTER CREEK		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -
5192	SIXTH STREET	GRAND RIVER		\$ -		\$ -		\$ -	\$ 1,893,000	\$ 378,600		\$ -		\$ -		\$ -		\$ -
5193	ANN STREET	GRAND RIVER		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -
5194	NORTH PARK STREET	GRAND RIVER		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -
5197	DIVISION AVENUE	PLASTER CREEK		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -
5198	WEALTHY STREET	GRAND RIVER		\$ -		\$ -		\$ -		\$ -	\$ 345,000	\$ 69,000		\$ -		\$ -		\$ -
5199	BRIDGE STREET	GRAND RIVER		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -	\$ 400,000	\$ 80,000		\$ -
5200	WALKER AVENUE	INDIAN MILL CREEK		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -
5201	ALPINE AVENUE	INDIAN MILL CREEK		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -
5204	COLLEGE AVENUE	GRAND TRUNK RR		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -
5205	EASTERN AVENUE	PLASTER CREEK		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -	\$ 153,000	\$ 30,600
5210	HALL STREET	PENN RR & STEELE AVE		\$ -	\$ 122,000	\$ 24,400		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -
5211	ALGER STREET	CHESAPEAKE & OHIO RR		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -
5213	OXFORD STREET	C & O RAILROAD		\$ -		\$ -	\$ 448,000	\$ 89,600		\$ -		\$ -		\$ -		\$ -		\$ -
5217	LEFFINGWELL AVENUE	GRAND TRUNK RR		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -
12677	MADISON AVENUE	PLASTER CREEK		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -	\$ 100,000	\$ 20,000
13059	RIVERSIDE PARK DRIVE	GRAND RIVER LAGOON		\$ -	\$ -	\$ 282,000		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -
TOTAL (2023 DOLLAR \$)			\$ -	\$ -	\$ 609,000	\$ 403,800	\$ 448,000	\$ 89,600	\$ 1,893,000	\$ 378,600	\$ 345,000	\$ 69,000	\$ 128,000	\$ 25,600	\$ 400,000	\$ 80,000	\$ 455,000	\$ 91,000
TOTAL (FUTURE DOLLARS WITH 3% INFLATION/YEAR)			\$ -	\$ -	\$ 609,000	\$ 403,800	\$ 461,440	\$ 92,288	\$ 2,008,284	\$ 401,657	\$ 376,991	\$ 75,398	\$ 144,065	\$ 28,813	\$ 463,710	\$ 92,742	\$ 543,294	\$ 108,659
LOCAL BRIDGE PROGRAM PROJECTS MDOT Column = LAP Grant Amt => City Portion 2024 City Portion is 20%, Future shown as 20%					Burton & Hall St - PM (epx ovly Pearl St - PM (exy ovly, SW rep)		Oxford - PM or Removal		8th St - PM Sidewalk board replace, sidewalk steel repairs, rail repairs, zone painting		Wealthy - Epoxy ovly, seal sidewalks and rails		Michigan - PM Epoxy Ovly, Seal Sidewalks & Rails		Bridge - PM Exp Jt replace, Sidewalk Repairs		Burton, Eastern & Madison - PM Epoxy Ovly, Seal Sidewalks and Rails	



STATE OF MICHIGAN
DEPARTMENT OF TRANSPORTATION
LANSING

RICK SNYDER
GOVERNOR

KIRK T. STEUDLE
DIRECTOR

July 31, 2017

Mr. James Hurt
Street Administrator
City of Grand Rapids
201 Market St.
Grand Rapids, MI 49503

Dear Mr. Hurt,

The Michigan Transportation Asset Management Council (TAMC) Support Division at Michigan Department of Transportation (MDOT) has reviewed the *City of Grand Rapids Asset Management Plan for Pavements, July 2017* and related documentation. I understand that the Grand Rapids City Council was given a thorough presentation on the City's Asset Management Program and has formally adopted this plan by Resolution 86928 on July 25, 2017.

Pursuant to Public Act 338 of 2006, I hereby inform you that MDOT has approved the City of Grand Rapids Asset Management Plan for Pavements effective immediately. This approved plan states in its conclusion that the City of Grand Rapids intends on submitting updates to this plan annually. The expiration date for this approval will be three years (July 31, 2020) if an update to this plan is not approved in advance of this expiration date.

If you have any questions, please don't hesitate to call me at (517) 373-2249.

Sincerely,

A handwritten signature in black ink, appearing to read "Roger A. Belknap".

Roger A. Belknap, TAMC Coordinator
Michigan Department of Transportation

CC: Lori Cole, Michigan Department of Transportation
Eric DeLong, City of Grand Rapids
Mark DeClercq, PE City of Grand Rapids
Rick DeVries, PE City of Grand Rapids



CITY OF GRAND RAPIDS AGENDA ACTION REQUEST

DATE: September 29, 2020

TO: Mark Washington, City Manager

COMMITTEE: Community Development Committee
LIAISON: Eric DeLong, Deputy City Manager

FROM: Tim Burkman, City Engineer
Engineering Department

SUBJECT: Resolution adopting the Asset Management Plan for Bridges

On February 11, 2014, (Proceeding No. 83191), the City Commission adopted the Vital Street and Sidewalk Investment Guidelines, which specified the manner in which the dedicated revenues from continued income tax would be used. On December 13, 2016 (Proceeding No. 86342), the City Commission adopted the Vital Streets Plan. A key element of both the guidelines and the plan is to utilize asset management to guide the Vital Streets investment. Investment in the City's bridges is included in the investment strategy.

In 2018, the State of Michigan enacted Act 325 amending the 1951 Public Act 51, which required local agencies to provide an asset management plan to guide the investment in their local street systems, including bridges.

The City has submitted an approved asset management plan to the Transportation Asset Management Council (TAMC) for our streets since 2017. Recently, an asset management plan for our bridges has been developed using the template provided by TAMC to fully meet the requirements of Act 325.

The City is responsible for 23 bridges. These bridges receive a biennial inspection and the information is reported to the Michigan Department of Transportation (MDOT) utilizing the Bridge Management and Inspection System. Twenty-two of the City's 23 bridges are rated in Good/Fair condition. The City has been successful in securing Local Bridge Program grants through MDOT to upgrade our bridges and also to provide preventative maintenance to preserve the condition and investments. The bridge at Riverside Park Drive over the Grand River Lagoon is rated in Serious condition. The bridge services a pavilion parking lot and provides access for maintenance vehicles. A recommendation to address the condition of this bridge will be developed in the next two to three years.

There are also four railroad bridges and 20 pedestrian structures that receive a biennial inspection by the City and the inspection results and recommendations are reported to MDOT and the structure's owner. Since the City does not own these bridges, they are not included in the asset management plan.

The attached resolution would direct the utilization of the asset management process as illustrated by the City of Grand Rapids Asset Management Plan for Bridges, dated September 2020.

YOUR COMMUNITY DEVELOPMENT COMMITTEE recommends adoption of the following resolution adopting the Asset Management Plan for Bridges.

WHEREAS:

1. The City of Grand Rapids has adopted the core principles of asset management in its ongoing process of maintaining, upgrading and operating its physical assets cost-effectively, based on a continuous physical inventory and assessment of its local and major streets networks including bridges; and
2. Act 325 of the State of Michigan Public Acts of 2018 requires that local road agencies submit an asset management plan for roads, bridges and related transportation infrastructure; and
3. The City of Grand Rapids has been following, and will continue to follow, the core principles of asset management in the ongoing maintenance and rehabilitation of its local and major street networks and has an approved Asset Management Plan for Pavements since 2017; and
4. The City of Grand Rapids has developed an Asset Management Plan for Bridges for the process of maintaining, upgrading and operating the physical assets of the bridges under the City's jurisdiction, therefore;

RESOLVED:

1. That the City Commission hereby directs the utilization of an asset management process as provided in the Asset Management Plan for Bridges, September 2020.

Prepared by Rick DeVries


CORRECT IN FORM
DEPARTMENT OF LAW

**3. STORMWATER ASSET
MANAGEMENT AND
CAPITAL IMPROVEMENT
PLAN, MAY 2013
2023 UPDATE**



City of Grand Rapids, MI

STORMWATER ASSET MANAGEMENT AND CAPITAL IMPROVEMENT PLAN

May 2013

Updated March 16, 2016

STORMWATER ASSET MANAGEMENT PLAN

MAY 2013

Updated January 27, 2014

City of Grand Rapids, MI
Environmental Protection Services Department
1300 Market Avenue
Grand Rapids, MI. 49503

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ACRONYMS

BMP	Best Management Practice
BRE	Business Risk Exposure
CDA	Contributing Drainage Area
cfs	cubic feet per second
COF	Consequence of Failure
EEL	Estimated Effective Life
EPA	Environmental Protection Agency
ESD	Environmental Services Department
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
GI	Green Infrastructure
IO	Infrastructure Optimization
KCDC	Kent County Drain Commissioner
LID	Low Impact Development
LOS	Level of Service
MACP	Manhole Assessment Certification Program
MARB	Market Avenue Retention Basin
MDEQ	Michigan Department of Environmental Quality
MDOT	Michigan Department of Transportation
MS4	Municipal Separate Storm Sewer System
NASSCO	National Association of Sewer Service Companies
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
PACP	Pipeline Assessment Certification Program
POF	Probability of Failure
RCP	Reinforced Concrete Pipe
ROW	Right-of-way
RUL	Remaining Useful Life
SCM	Stormwater Control Measure
SDWA	Safe Drinking Water Act
USDOT	United States Department of Transportation

I. EXECUTIVE SUMMARY

A 20 year citywide asset management plan was developed for the public stormwater infrastructure system. The plan demonstrates how the City's goal of establishing and delivering certain levels of service may be achieved through effective and sustainable management of the stormwater system. By developing a proactive long-term plan for stormwater asset management, the City will have a sustainable system ensuring the well-being of the community, environment and future generations.

The general scope of the asset management plan consists of three major items:

- Assessment of the existing stormwater assets
- Evaluation of levels of service the stormwater asset will meet
- Summary of efforts necessary to meet the desired level of service

Following the completion of these items, a Capital Improvement Plan was developed which provides an additional level of detail for projects and activities required to meet the level of service identified in this report.

Existing GIS information was utilized throughout the plan development along with condition assessment information, risk analysis and cost development. To aid in the analysis, the system information was organized and stored in a computer model. The computer model selected for this project was the Infrastructure Optimization (IO) toolset, developed by Woolpert LLC. The IO toolset is an ESRI® ArcGIS extension package. This toolset provides easy access to the information for planning purposes and a mechanism to keep the information updated over time.

The current value of the stormwater drainage system is estimated at \$523 million. Ninety-five percent (95%) of the current investment in the drainage system is represented by the separate storm sewers, manholes and catch basins. The remaining five percent (5%) is attributable to the pump stations, force mains, siphons, culverts, ditches, basins and green infrastructure components. Table I-1 summarizes the quantity and baseline costs of each stormwater asset. Open channels, while utilized as part of the stormwater system, are primary natural watercourses and no original construction costs were available to assign a baseline cost. Baseline future system values for open channels and ditches were based on a proposed operation and maintenance program.

Table I-1 Asset Summary and Cost

System Component	Quantity (unit)	Baseline System Value (Current Cost)	Baseline Future System Value (Replacement Cost at Failure)
Gravity Mains	2,030,660 feet	\$365,757,000	\$933,842,000
Manholes	10,748 each	\$39,051,000	\$105,349,000
Laterals	514,583 feet	\$43,065,000	\$113,942,000
Catch Basins	17,054 each	\$55,910,000	\$136,594,000
Pressurized Mains	664 feet	\$131,000	\$505,000
Siphons	339 feet	\$250,000	\$618,000
Culverts	3,600 feet	\$1,649,000	\$3,530,000
Outfalls	356 each	\$1,669,000	\$3,530,000
Open Channels	39.63 mile	NA	\$2,570,000
Ditches	72 mile	\$5,703,000	\$1,223,000
Detention Basins	5 each	\$1,725,000	\$4,614,000
Pump Stations	11 each	\$12,051,000	\$26,236,000
Green Infrastructure	13 each	\$1,842,000	\$8,451,000
Total		\$528,803,000	\$1,341,004,000

NA = Not Available

The evaluation of risk and consequence of failure is primarily based on the age of the asset due to limited information. The intent is to transition the model from an age-based system to a condition based system as additional investigation and assessment information is collected.

A major factor in the quality of community life is the quality of the community’s facilities, services and amenities. Level of service is a measure of the amount and/or quality of the public facility which must be provided to meet that community’s basic needs and expectations. Three levels of service (LOS) beyond the existing operating procedures were analyzed. Each LOS is defined by criteria established for each asset group found in the system and are briefly summarized below.

- Level of Service A. Assumes complete system replacement at the end of the assets estimated effective life (100-years for sewers and manholes); a 10-year cycle for full system assessment; corrective maintenance on 50 percent of assets currently beyond their effective life; preventative maintenance on 10 percent of inspected assets; and 30 percent of the capital investment is attributed to green infrastructure practices.
- Level of Service B. Assumes extending the effective life of infrastructure by 50 percent through rehabilitation methods before complete system replacement (125-years for sewers and manholes); a 10-year cycle for system assessment on infrastructure over 50-years old; corrective maintenance on 30 percent of assets currently beyond their effective life; preventative maintenance on 10 percent of inspected assets; and 20 percent of the capital investment is attributed to green infrastructure practices.
- Level of Service C. Assumes doubling the effective life of infrastructure through rehabilitation methods before complete system replacement (150-years for sewers and manholes); a 10-year cycle for system assessment on infrastructure over 75-years old; corrective maintenance on 15 percent of assets currently beyond their effective life; preventative maintenance on 10 percent of inspected assets; and 10 percent of the capital investment is attributed to green infrastructure practices.

These criteria are based on standardized best practices that were established by other municipalities, and were designed to meet regulatory requirements, goals for renewal, and operations and maintenance. Table I-2 summarizes the annual funding requirements necessary to meet each level of service.

Table I-2 Level of Service Funding Requirements

Level of Service	Annual Funding Requirement
A	\$22,868,000
B	\$14,726,000
C	\$10,377,000
Existing	\$3,597,000

A 20-year capital improvement plan was developed using an assumed Level of Service B annual funding. The capital plan provides recommendations of priority areas where the funding should be spent on stormwater infrastructure over the next 20 years. The priority areas are based on a risk exposure analysis. Capital stormwater expenditures were aligned with planned spending by other City departments in order to maximize the City’s investment dollars.

1. INTRODUCTION

PURPOSE AND INTENT

The City of Grand Rapids is implementing an asset management program for the stormwater drainage system. Asset management includes the planning, design, construction, operation and maintenance of infrastructure that performs a function for the City. In the case of the stormwater system, that function includes drainage and stormwater quality management. The purpose of asset management is to maintain a desired level of service at the lowest life cycle cost. The lowest life cycle cost refers to the best appropriate cost for rehabilitating, repairing, or replacing an asset. The benefits of asset management include:

- Improved understanding of service level options and costs
- An ability to better communicate and justify investments to stakeholders
- An ability to demonstrate responsible investment in infrastructure
- Improved knowledge of the timing and magnitude of future investments required to operate, maintain, renew, and acquire assets
- An ability to establish and evaluate performance benchmarks
- Coordination with other utilities

The general process of asset management involves defining:

- What are the assets? (Inventory)
- What are the assets worth? (Valuation)
- Where are the assets located? (Geographic Information System)
- How is the system operated? (Level of Service)
- What is the condition? (Probability and Consequence of Failure)
- What is needed to be done? (Construct, Maintain or Replace)
- How much will it cost? (Financial Plan)

Asset management is a continuous improvement process. One of the intents of this plan is to initiate a framework for recording and continuously updating information over time.

ASSET TYPES

This asset plan is focused on the separate stormwater drainage system which is used to manage the stormwater runoff that occurs as a result of rain and snow. The drainage system is comprised of both conveyance and storage components and includes:

- Pipes – gravity sewers and service laterals connecting to the catch basin inlets
- Structures
 - inlets such as catch basins which collect water from surface features (for example, roads and parking lots) and convey it to an underground drainage system
 - outlets which are located at points where the underground drainage system discharges to open channels or other waterbodies and commonly include flared end sections, grates, and gates

- junction chambers, such as manholes, which connect various parts of the underground drainage system together
- Culverts and bridges connecting open channel sections typically under roadways
- Open channels and roadside ditches
- Storage basins including detention and retention basins
- Pump stations
- Green infrastructure practices such as bioretention, pervious pavement, and water harvesting systems

This stormwater asset management plan does not address riverine flood control components or issues. Assets commonly associated with river flood control include floodwalls, berms, levees, dams, and backflow preventers.

PROJECT APPROACH

The approach taken for this project included the following steps:

1. An asset inventory including the component locations.
2. An evaluation and rating of each asset.
3. Determination of unit price replacement and repair costs plus a complete valuation of the system.
4. Defining various levels of service and strategies for asset renewal.
5. Summary of efforts necessary to meet the desired level of service.

The city maintains a Geographic Information System (GIS) of the stormwater drainage system. The current GIS includes components for the storm sewers, pump stations, manholes, catch basins, stream crossings, detention basins, floodwall penetrations, open ditches, green infrastructure, streams, and storm discharge points. The GIS was used as the foundation for an inventory and location of the assets.

Limited information on the condition of the assets was available at the beginning of the project. To assist with the condition assessment the City investigated a sample set (2%) of manholes using a pole-mounted zoom camera. Additional condition assessments were conducted by the consulting team at 51 crossings along the open channel system. Approximately 100-feet of the open channel, upstream and downstream, was included in the stream crossing evaluations. The GIS was also populated with the installation year of each asset. The asset age and generalized condition information were used to determine a weighting factor for the probability of failure. A consequence of failure was determined for each asset, and considered factors such as proximity of the drainage system to buildings, roads, and areas of environmental concern.

A comprehensive unit price database was established for the repair and reconstruction of each asset. This database is the foundation for all of the valuation and costing information.

In order to evaluate options on how the system may be operated, four (4) different levels of service were defined. The various levels of service represent the frequency and strategy for renewal options along with operation and maintenance of the system. The financial impacts of the various levels of service were determined from the asset inventory, rating system, and unit price information. Annual costs were estimated for each level of service.

To aid in the analysis, the system information was organized and stored in a computer model. The computer model provides easy access to the information for planning purposes and a mechanism to keep the information updated over time.

Following the completion of these items, a Capital Improvement Plan was developed which provides an additional level of detail for projects and activities required to meet the level of service identified in this report.

REPORT ORGANIZATION AND RELATIONSHIP WITH OTHER PLANS

Chapter 2 provides an overview on the analysis methodology. Discussion focuses on the risk assessment including the probability and consequences of failure. Also included are reference information regarding the costing approach, the sources of data used, and the assessment procedures.

Chapter 3 includes detailed information for each asset group including an inventory, condition assessment, application of weighting factors, valuation details, and recommendations specific for improving the asset inventory information.

Level of service information is provided in Chapter 4. This includes the definitions for each level of service category defined, the system replacement and lifecycle analysis, along with operation and maintenance information.

Chapter 5 focuses on the sustainability issues associated with the stormwater drainage system. Additional discussion of the sustainability issues are also addressed in the Stormwater Master Plan document.

Chapter 6 provides information on how the asset management information was used to aid in the development of the capital improvement plan.

The capital improvement plan is summarized in Chapter 7..

Chapter 8 summarizes the conclusions and recommendations resulting from the planning efforts.

2. METHODOLOGY

OVERVIEW

The asset management plan was developed in part by utilizing Infrastructure Optimization (IO) Toolset software developed by Woolpert, Inc. This toolset is an ESRI® ArcGIS extension package that leverages the City's GIS data. The IO toolset calculates a business risk exposure (BRE) for the various assets using probability of failure (POF) and consequence of failure (COF) factors established for the asset information. Determining critical components is one of the primary goals of asset management and toolset provides a consistent methodology for evaluating assets. A BRE also aids in predicting and prioritizing maintenance, rehabilitation and replacement activities. The BRE is expressed as follows:

$$\begin{aligned} & \text{Probability of Failure (POF)} \times \text{Consequence of Failure (COF)} \times \text{Redundancy Factor (R)} \\ & = \text{Business Risk Exposure (BRE)} \end{aligned}$$

The redundancy factor (*R*) is set within the program based on the existing system conditions, and is assumed to be equal to 1 for the majority of stormwater assets. Unique POF and COF factors are identified for each individual asset group utilizing attributes available in the GIS system. Each of these factors is assigned a weight with the sum of the weights equaling ten. These weighted factors are then used in calculating the rating. The factor weights for POF are based on the accuracy and level of confidence of the available data. The COF factors are based on characteristics relevant to the failure of an asset such as size and the proximity of the drainage asset to roads and buildings.

The first step was to review the data contained for each asset in the City's GIS database. A core piece of information needed to establish an asset in the system is the initial installation date, as discussed below under the effective life. The City populated the GIS with the install date based on record drawings and made assumptions where no records were available.

MAJOR VARIABLES

Estimated Effective Life

The installation date is used to track the percent consumed of an asset, defined as the age of the asset divided by the estimated effective life (EEL). The EEL is a user-defined value assigned to each asset based on the asset type and material of construction. The EEL for each type of asset was determined through review of existing data, and based on manufacturer recommendations and other studies completed on the subject. References used in the analysis are provided on page 75.

Adjustments may be made to the EEL on an individual asset based on available information. For example, most pipes are assumed to have an EEL of 100-years; if a 95-year old pipe is inspected and found to be in excellent condition, the EEL could be adjusted to 125-years. Preventive maintenance can also impact the EEL. If a sewer is lined with a material that has an EEL of 75-years, the new EEL of the sewer with the liner would be 75-years from the liner installation date.

Using the pipe installation date, the software calculates other information such as the Remaining Useful Life (RUL) and the Required Service Date. Table 2-1 provides the EEL assigned to various assets in the system.

Table 2-1 Estimated Effective Life for Various Assets

Asset	EEL (years)
Gravity Mains /Culverts (Concrete, Brick, Vitrified Clay, Ductile Iron)	100
Gravity Mains (HDPE, PVC, Truss Pipe)	75
Gravity Mains / Laterals /Culverts (Corrugated Metal)	65
Laterals (Concrete, Brick, Vitrified Clay, Ductile Iron)	50
Laterals (HDPE, PVC, Truss Pipe)	50
Pressurized Mains	75
Manholes (Brick and Concrete)	100
Catch Basins (Brick and Concrete)	50
Outfalls	75
Detention Basins - Open *	50
Infiltration Basins *	100
Pump Station – Pumps *	20
Pump Stations – Electrical *	50
Pump Stations – Mechanical *	50
Pump Stations – Structural *	50

*Asset type not in IO toolset

Some assets within the system have already reached or surpassed their EEL. In order to handle these assets within the toolset, the required service date was set to 2013. This reflects a current backlog of assets that have reached the end of their expected effective life and require assessment. Assessment of these assets should be given high priority. As condition assessments are performed, the EEL and required service dates should be adjusted accordingly.

Probability of Failure

The likelihood that an asset will fail is a function of various attributes such as the asset's condition, performance, reliability and maintenance history. Within the IO toolset attributes associated with the probability of failure are selected, assigned a numeric value, and assigned a weighting factor. Each of these factors is assigned a weight with the sum of the weights equaling ten. These weighted factors are then used in calculating the rating. The factor weights for POF are based on the accuracy and level of confidence of the available data. Table 2-2 provides a summary of the attributes, weights, and values assumed by asset types. Predominately the age, condition, and maintenance are used in the rating.

In some cases a weight of zero is applied, for example with the force main condition. This is due to lack of information on the current condition.

An example analysis is provided on page 15. The example illustrates how the weights and values are applied to compute the probability of failure.

Table 2-2 Probability of Failure Weights and Values by Asset Type

Attribute	Weights Linear System					Weights Structures			Values	
	Gravity Sewer	Lateral	Culvert	Force Main	Siphon	Manhole	Catch Basin	Outfall	Rating	Description
Percent Consumed	7.0	7.0	6.0	8.0	7.0	7.0	7.0	10.0	Age/EEL	Actual age divided by estimated effective life
Maintenance Condition	1.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1	Excellent
									2	Good
									3	Fair
									4	Poor
									5	Failure Imminent
Structural Condition	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	1	Excellent
									2	Good
									3	Fair
									4	Poor
									5	Failure Imminent
Shape	NA	NA	1.0	NA	NA	NA	NA	NA	1	Box
									2	Round
									5	Elliptical
End Section	NA	NA	NA	NA	NA	NA	NA	0.0	0	No end section
									1	Has end section
Total	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		

NA = Not Applicable

Consequence of Failure

The COF is treated in a similar fashion as the POF. The COF is the financial or health and human safety cost resulting from asset failure. Examples of factors that might be associated with the COF include the proximity of the asset to critical facilities (e.g. hospitals), or the proximity to other infrastructure such as roads and buildings. The proximity to other infrastructure affects the COF due to the impact on repair costs (i.e. sewer pipes under roads cost more to fix than pipes under grassed fields). Within the IO toolset attributes associated with the COF are selected, assigned a numeric value, and assigned a weighting factor. The mathematics of how the weights and values are applied is the same as for the POF attributes.

A list of the COF factors used is discussed below. The specific attributes, weights, and values are discussed within each asset group beginning on page 11.

- Size – The size of a pipe, channel, or structure impacts the consequence of failure due to the amount of flow the system was intended to convey and cost of repair and replacement materials.
- Depth – The depth of a pipe will increase the consequence of failure due to larger disruption areas impacting roads and private property and higher construction costs due to larger excavations and shoring requirements.

- Proximity to Floodplains – This factor is based on the proximity of the pipe to the FEMA floodplains. A greater weight is given to a pipe found within the floodplain since a failure in this location will have a greater impact during an event, leading to accelerated street flooding and potential property damage.
- Proximity to Environmental Hazards – Environmental impact is based on the proximity to known brownfield sites or sites with known environmental issues such as leaking storage tanks, etc. A greater weight is given to pipes that may require replacement in these areas as contaminated soils may be present and require special handling and disposal during construction activities.
- Proximity to Buildings – Building footprints are available in GIS and were used to identify sewers which crossed beneath or directly adjacent to any buildings. The weight is increased for these pipes as the consequence of failure may have direct impact on nearby structures and can result in increased construction costs.
- Proximity to Roadways – Proximity to the roadway was determined using Transportation Act 51 attributes in the GIS, and a list of assumed ROW offsets used to identify typical road widths, since actual pavement extents are not available in GIS. Assets were grouped by those not under/near a roadway, and those under/near a minor road, major road, or railroad. Sewers that were within the influence of a roadway receive a greater weight. Depending on the criticality of the road and the proximity of the pipe, failure of the asset may have a greater impact on surrounding infrastructure and lead to greater construction and traffic control considerations.
- Presence of Appurtenances – If a manhole or structure is known to contain any type of backflow prevention devices, gate, etc. that is used to provide some control in the system, then an added weight is assigned for the consequence of failure. The loss of system control and added replacement/renewal costs factor into the increased weight. The GIS system has a flag option for backflow prevention which is used to identify these structures.
- Destination – The type of receiving water body will have an impact on the consequence of failure. The failure of an outfall along the Grand River could be more significant than one discharging to a minor drain, as difficulty of construction and permitting requirements typically increase. The type of stream was categorized based on observations made for the open channel assets found logged into the city database.
- Location – Outfalls located along the river wall have a different risk than those on a flat slope. Pipes along the river wall area were assigned a greater factor, and other outfalls were assigned lower factors based on how steep of a slope they are on.
- Channel Bank Slope – The shape slope of the channel bank of a stream or open channel has been related to the consequence of failure by assuming that channels with steep slopes may be more prone to bank erosion. The shape of the channel can dictate how difficult it may be to renew, re-grade, or re-cut the channel to improve performance and lead to higher costs.
- Type of Stream / Open Channel – The type of channel impacts the consequences of failure due to higher costs associated with permitting, design, and construction on repairs to large waters of the state compared to small roadside ditches.

COST DATA

Cost information is imperative in the valuation of the assets. Several different costs for each asset or groups of assets are computed including the following:

- Baseline Current Cost – This is the cost to replace an asset in kind using present costs. The entire system baseline cost is the sum of the present worth value of all assets.

- **Baseline Future Cost** – This is the replacement cost of each asset assuming assets are replaced in the year in which their remaining useful life is zero. Future costs are calculated using an inflation factor of 1.75%. The inflation factor was determined from the national inflation rate published by the federal government in December 2012.
- **Renewal/Replacement (RR) Cost** – The RR costs are user defined and based on the specific strategy for each asset. The strategy may include, for example, replacement, rehabilitation, or do nothing. Further discussion on the RR costs begins on page 35 with the level of service discussion.
- The baseline system cost can be evaluated against the cost to replace the assets at the end of their EEL. This provides a comparison between preventative maintenance costs and the replacement costs at time of failure.

Unit Cost Development

Unit cost information for each asset was determined for inspection, maintenance, rehabilitation, and replacement activities. Other factors such as depth of installation and whether the asset was under a roadway were also taken into account in the unit cost development. By entering cost information to cover potential activities such as maintenance, inspection, and rehabilitation the software can be used to quickly generate an initial cost estimate given a defined project area. All costs are reported in 2013 dollars (Engineering News-Record cost index of 9453). The following resources were used in developing the unit cost information:

- Construction bid tabulations and contract documents from local projects.
- Construction bid tabulations and contract documents from non-local projects adjusting for geographic differences as appropriate.
- Manufacturers were contacted for assets in cases where bid tabulation data was not readily available.
- Costs for inspections, operation and maintenance activities were based on historical costs from the City of Grand Rapids and other communities.

Assumptions

The following assumptions were used when developing replacement costs.

- **Materials** – Various pipe materials exist with the collection system, for example brick, clay, metal, and concrete. Reinforced concrete was assumed for the replacement material in all cases except for ductile iron (DI) pipes. Ductile iron pipes were assumed to be replaced with PVC in cases with pipe diameters less than 12-inches and with ductile iron for the larger diameter pipes.
- **Depth** – The depth of a pipe can result in differing installation costs due to additional excavation and backfill, or changes in the strength requirements of the pipe. Three depth categories were assumed: shallow (less than or equal to 8-feet), medium (8 to 15 feet), and deep (greater than 15-feet). Assumptions for the pipe trench size for each depth were used to determine the additional cost. The depth of pipe was assumed due to incomplete inventory data. Refer to the discussion on Incomplete Attribute Information beginning on page 10 for additional information.
- **Pavement Costs** – Based on the trench width established by the depth assumptions above, a pavement removal and restoration cost was defined. Costs included the removal and construction of a new roadway and base. The process for determining if a pipe is or is not in a road is based on the GIS data.

- Soft Costs - Costs were included for engineering and construction contingencies as 15% and 25% respectively.

POPULATING INVENTORY DATA

Base Information

Base information associated with each asset was populated from the GIS. Base information includes the asset type; physical characteristics such as size, material, and depth; installation date; and proximity information to other assets. The specific information requirements for each asset are discussed with the asset group discussion beginning on page 11.

Incomplete Attribute Information

Assets with missing attribute information were populated based on assumptions. Where possible, information was assumed from adjacent resources. In situations where adjacent resource information was not available, attributes were assumed as follows:

- Material information was assumed for sewers by determining the date where the majority of storm sewers changed from clay to concrete. Sewers installed prior to this date were assumed to be clay, and those installed after this date were assumed to be concrete. Concrete as a pipe material was also assumed for pipes greater than 42-inches in diameter. A similar process was completed for manholes and catch basins.
- Sewers with no diameter listed were spot-checked and generally found to be collector sewers. The majority of collector sewers were found to be 12-inch diameter. Therefore sewers missing the diameter attributes were assumed to be 12-inches. These assumptions were checked for consistency with adjacent sewers, and corrections were made where appropriate. All laterals with no diameter were assumed to be 12-inch.
- Relative depth information was sparse, as most manholes had no measure down, and no surveyed rim elevation. Some assets had an upstream and downstream invert, but no rim elevation to relate a depth. To maintain consistency with other asset groups, the depth was broken down into shallow, medium, and deep groups. Shallow was classified as 0 to 8 feet deep and was applied to all pipes 36-inches in diameter and less. Medium was classified as 8 to 15 feet deep and was applied to all pipes greater than 36-inches and up to 72-inches in diameter. Deep was classified as greater than 15 feet deep and was applied to pipes 72-inches in diameter and above. Manholes were then assigned a depth based on the connecting pipes. All catch basins and laterals were assumed to be shallow.

The assumptions listed above were based on information currently available in GIS. Factors relying on assumptions were not assigned as much weight for use in calculating the POF and COF as factors based on observed or recorded data.

CONDITION ASSESSMENTS

Base Approach

A limited amount of condition assessments and investigations were conducted as a part of this project by both the City and the consultant. Assets investigated included manholes, sewers (as viewed through a zoom camera), open channels, stream crossings, storage basins, and pump stations. The information was used to develop condition assessment assumptions for the collection system. The condition assessment information was applied to the POF and COF evaluation factors. Details of the assessment information collected are discussed within each asset group beginning on page 13.

Municipal Work Orders

The City has begun tracking maintenance calls and work orders in Cityworks®. Since this information is linked to specific assets in the GIS, selected information from Cityworks® may be read for use in the IO toolset. The data within the work order system was reviewed. The current dataset of information was too small and covered too many different categories to be of any significant use for this analysis. This could include creating a master list of common work orders and creating drop-down lists for staff to choose from to create consistency across the system.

CONTINUOUS IMPROVEMENT PROCESS

Use of the IO toolset is intended to be a continuous improvement process. As additional or updated inventory information becomes available, the data within the toolset is intended to be updated. As the scenarios within the IO toolset are rerun they will continue to evolve along with the updated information.

Future Factors

For each asset, unique factors were selected for use in determining the POF and COF. Some of the factors were developed to rely on existing information, while others were created with the intent as placeholders for future data collection. Factors identified for future data collection were temporarily assigned a weight of zero until data is available. These potential factors were set up to encourage the collection of this data going forward. An example factor for future use is the maintenance condition of the force mains. No information was available at the time of the report on the condition of the force mains, hence a maintenance condition could not be applied. However the condition should be included in the future. All of the factors are customizable and may be adjusted at any time. Future weighting factors are further discussed with each asset group description.

POF Based on Age versus Condition

Overall limited condition assessment information was available, which results in the POF being based principally on the age of the asset. In most asset management applications, once critical assets were identified, the age of the infrastructure is typically used to determine the order upon which to begin assessments. As the system is inspected and data is accumulated, the model should be converted to be based on the condition of the asset instead of the age. Managing assets based on their condition is a better long-term approach compared to managing based on age.

Costing Information

Costing information is completely customizable and may be edited at any time. The IO toolset allows for additional costs such as a percentage to increase to account for difficult installations or assumed dollar amounts to account for miscellaneous costs such as dewatering or special removals. These additional costs may be added as desired when analyzing various scenarios.

3. ASSET GROUPS

Stormwater assets were divided into groups to facilitate data analysis. Each asset group is evaluated separately. Details on each asset group, and how the various factors were calculated, are discussed in this section.

GRAVITY MAINS AND LATERALS

This asset group includes approximately 383 miles of gravity storm sewers and catch basin laterals maintained by the City. Storm sewers and catch basin laterals are grouped together because they are typically installed at the same time and have similar characteristics. They are expected to have similar life expectancy and rate of deterioration.

Condition Assessment

City staff conducted manhole inspections on approximately 2 percent of the manholes within the system. A pole-mounted zoom camera was used for recording manhole inspections and recording limited pipe inspections information by zooming in on the view down each pipe connected to the manhole. The zoom camera process is very efficient for performing detailed manhole inspections without having to physically enter the structure. However, it is less than optimal for determining the condition of the pipes between structures. A condition rating was assigned to the pipe based on the worst visible defect.

In order to establish a basis for condition and O&M rating assumptions, a large sample of these inspections were reviewed in a PACP format to provide structural and O&M scores for each pipeline. Sewers were rated on a scale of 1 to 5 with 1 indicating excellent condition and 5 indicating failure has already occurred or is imminent. Table 3-1 provides a breakdown of typical pipe conditions based on material, age, and diameter as observed in the inspection videos.

Table 3-1 Pipe Condition Assumptions

Age Range	Size	Structural Condition				Maintenance Condition			
		VCP	Concrete	Brick	PVC	VCP	Concrete	Brick	PVC
Greater than 100 years	8 to 30 inches	5	4	5	NA	3	2	4	NA
	36-inch and larger	4	3	4	NA	4	3	4	NA
76 to 100 years	8 to 30 inches	4	3	5	NA	3	2	4	NA
	36-inch and larger	3	3	4	NA	3	4	4	NA
51 to 75 years	8 to 30 inches	3	2	4	NA	2	2	4	NA
	36-inch and larger	3	3	4	NA	2	3	4	NA
26 to 50 years	8 to 30 inches	2	2	NA	2	2	1	NA	1
	36-inch and larger	3	3	NA	NA	2	2	NA	NA
25 years and less	8 to 30 inches	NA	1	NA	1	NA	1	NA	1
	36-inch and larger	NA	1	NA	1	NA	1	NA	NA

NA = Not Applicable

A similar process was repeated for catch basin laterals that were captured as part of the zoom camera inspections. This information is summarized in Table 3-2.

Table 3-2 Catch Basin Lateral Condition Assumptions

Age Range	Structural Condition			Maintenance Condition		
	VCP	Concrete	PVC	VCP	Concrete	PVC
Greater than 100 years	5	4	NA	3	2	NA
76 to 100 years	4	3	NA	2	2	NA
51 to 75 years	3	2	NA	2	2	NA
26 to 50 years	2	2	2	1	1	1
25 years and less	NA	1	1	NA	1	1

NA = Not Applicable

These tables were then used to establish assumed conditions for the existing storm sewers.

Probability and Consequence of Failure

A summary of the POF is provided in Table 2-2 on page 7. The COF factors, weights, and values used for gravity mains, catch basin service laterals, force mains, and siphons are summarized in Table 3-3.

Table 3-3 Consequence of Failure for Gravity, Laterals, Force Mains, and Siphons

COF Factors	Weights				Value	Rating Description
	Gravity	Laterals	Force Mains	Siphons		
Depth of Pipe	3.0	0.0	3.0	3.0	1	depth <= 8 feet
					3	8 < depth <= 15 feet
					10	depth > 15 feet
Pipe Size	3.0	4.0	3.0	3.0	2	size <= 12 inches
					10	12 < size <= 24 inches
					25	24 < size <= 42 inches
					35	42 < size <= 72 inches
Proximity to Floodplain	0.5	1.0	0.5	0.5	0	Not with a floodplain
					1	Within the 100 year floodplain
					2	Within the 500 year floodplain
Proximity to Environmental Hazard	0.5	1.0	0.5	0.5	0	Not in close proximity to known hazardous site
					1	Within 100 feet of known hazardous site
					2	Within a site with known environmental hazards
Proximity to Buildings	2.0	3.0	2.0	2.0	0	More than 20 feet from a building
					1	Within 20 feet of a building
					2	Under a building
Proximity to Roadway	1.0	1.0	1.0	1.0	0	Outside of ROW
					10	Pipe is within ROW of minor road
					15	Pipe is within ROW of major road
					40	Pipe is under pavement of minor road
Total	10.0	10.0	10.0	10.0	50	Pipe is under pavement of major road

Graphical results for the gravity mains are provided in Appendix A.

Example Analysis and Results

As an example of the data and analysis, consider the stormwater pipe on Louis Street NW between Ottawa Avenue and Fulton Street (Asset ID 3238), Figure 3-1. The pipe is a 72-inch box shaped brick sewer built in 1922. Refer to Figure 3-2 for the attributes, weights, and values used in this example. Three attributes were selected to determine the POF: the percent of useful life consumed, the maintenance condition, and the structural condition.

Figure 3-1 Example Louis Street Sewer Location (Asset ID 3238)

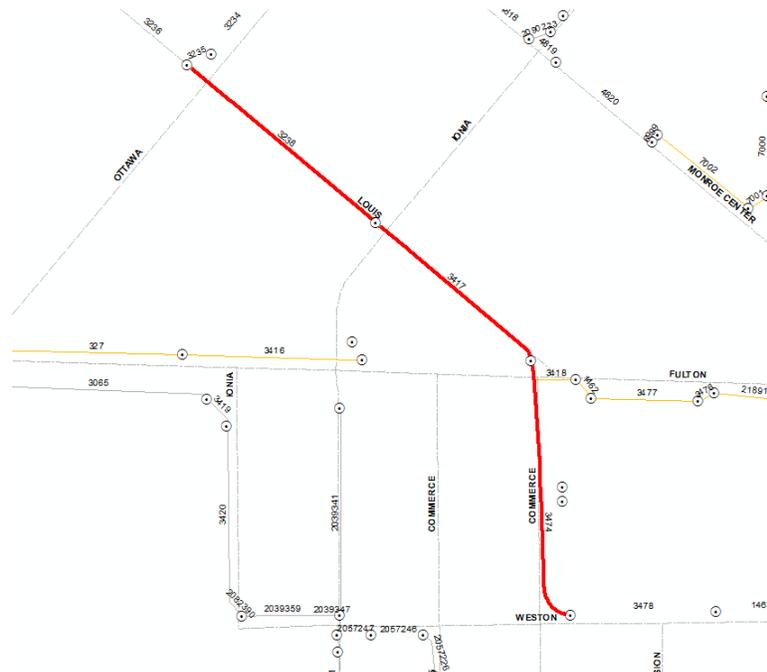


Figure 3-2 Example Louis Street Sewer Risk Variables (Asset ID 3238)

Risk	Baseline	R & R	Maintenance
PoF Factors			
Percent Consumed			
Maintenance Condition	4 - Poor		
Structural Condition	4 - Poor		
CoF Factors			
Depth	Deep > 15 feet		
Size	> 42 and <= 72		
Damage to Property	Not within a Floodplain		
Environmental	Within 100 foot of Site with known Env Haz		
Proximity to Buildings	More than 20 feet from a Building		
Proximity to Roadway	Within 25 foot of Major Roadway Centerline		
Status :	<input type="text"/>	Year Installed :	1922
		Estimated Effective Life (years) :	100
		Condition :	<input type="text"/>
		Redundancy :	1

Percent of useful life consumed is calculated as the asset age divided by the estimated effective life. In this example the asset age is 91-years (2013 minus the year built, 1922). The estimated effective life is 100-years, from Table 2-1. The percent of useful life consumed is then 91 years divided by 100 years or 0.91. Each attribute is also weighted according to their influence on the POF and based on the confidence with the attribute information. In this example the percent of useful life consumed is given a weighting factor is 7.0, from Table 2-2. The weighted value is then calculated as the percent of useful life (0.91) times the factor weight (7.0) or 6.37.

The maintenance and structural condition assessment are assigned a value from 1 to 5; with 1 being excellent condition and 5 indicating that failure is imminent. Different factors may use a different scale

range, but all scales are converted to values from zero to one. Hence, on a 5 point scale an asset with an assigned score of 3 is converted to a value of 0.6 (3 out of 5 = 0.6).

For the example on Louis Street (Asset ID 3238), the maintenance condition assessment yielded a *poor* rating, or a numeric score of 4. Based on a 5 point scale, the maintenance condition rating is converted to a value of 0.8 (4 out of 5 equals 0.8). A weight of 1.0 is assigned to the maintenance attribute, Table 2-2. The weighted value is then calculated as the rating value (0.8) times the weight (1.0) or 0.8.

The structural condition attribute is treated similar as the maintenance condition. For the Louis Street example (Asset ID 3238), the structural condition assessment rating was *poor*, or a numeric score of 4. The rating value is converted to 0.8, based on the 5 point scale (4 out of 5 equals 0.8). A weight of 2.0 is assigned to the structural attribute, refer to Table 2-2. The weighted value is then calculated as the rating value (0.8) times the weight (2.0) or 1.6.

The weighted values for the POF factors are then summed to give a total for the asset. For the Louis Street example (Asset ID 3238) the total POF factor is 8.77 (percent consumed 6.37, plus the maintenance condition 0.8, plus the structural condition 1.6). Sometimes the POF factor is expressed on a scale from zero to 100, in which case the factor would be expressed as 87.7.

Table 3-4 Example Probability of Failure Calculation

POF Factors (Table 2-2)	Rating Description (Table 2-2)	Value	Weight (Table 2-2)	Weighted Value
Percent Consumed	Actual age divided by the estimated effective life	$\frac{Age}{EEL} = \frac{91 \text{ years}}{100 \text{ years}} = 0.91$	7.0	$0.91 * 7.0 = 6.37$
Maintenance Condition	1 = Excellent 2 = Good 3 = Fair 4 = Poor 5 = Failure Imminent	$\frac{Value}{Range} = \frac{4}{5} = 0.8$	1.0	$0.8 * 1.0 = 0.8$
Structural Condition	1 = Excellent 2 = Good 3 = Fair 4 = Poor 5 = Failure Imminent	$\frac{Value}{Range} = \frac{4}{5} = 0.8$	2.0	$0.8 * 2.0 = 1.6$
Total			10.0	8.77 (or 87.7 on a scale of 1-100)

The consequence of failure calculations are based on a similar weighting process as the probability of failure calculations. Refer to Table 3-5 for a summary of the consequence of failure calculations for the Louis Street example. The example sewer is a 72-inch pipe; more than 15 feet deep; not in a floodplain; within 100-feet of a potential environmental hazard; more than 20 feet away from a building; and is located within 25-feet of the centerline of a major road.

Table 3-5 Example Consequence of Failure Calculation

COF Factor (Table 3-3)	Rating Description (Table 3-3)	Value	Weight (Table 3-3)	Weighted Value
Depth of Pipe	1 = depth ≤ 8 feet 3 = 8 < depth ≤ 15 feet 10 = depth > 15 feet	$\frac{Value}{Range} = \frac{10}{10} = 1.0$	3.0	1.0 * 3.0 = 3.00
Pipe Size	2 = size ≤ 12 inches 10 = 12 < size ≤ 24 inches 25 = 24 < size ≤ 42 inches 35 = 42 < size ≤ 72 inches 50 = size > 72 inches	$\frac{Value}{Range} = \frac{35}{50} = 0.7$	3.0	0.7 * 3.0 = 2.10
Proximity to Floodplain	0 = Not in a floodplain 1 = Within 100 year floodplain 2 = Within 500 year floodplain	$\frac{Value}{Range} = \frac{0}{2} = 0$	0.5	0 * 0.5 = 0.00
Proximity to Environmental Hazard	0 = Not within close proximity 1 = Within 100 feet 2 = Contained onsite	$\frac{Value}{Range} = \frac{1}{2} = 0.5$	0.5	0.5 * 0.5 = 0.25
Proximity to Buildings	0 = More than 20 feet away 1 = Within 20 feet 2 = Under a building	$\frac{Value}{Range} = \frac{0}{2} = 0$	2.0	0 * 2.0 = 0.00
Proximity to Roadway	0 = Not influencing roadway 3 = Within 15 feet of centerline, minor 8 = Within 25 feet of centerline, major 10 = Within 50 feet of railroad	$\frac{Value}{Range} = \frac{8}{10} = 0.8$	1.0	0.8 * 1.0 = 0.80
Total			10.0	6.15 (or 61.5 on a scale of 1-100)

The resulting BRE was calculated to be 53.9. Refer to page 5 for a discussion on the BRE. BRE is calculated as the product of the probability of failure (8.77) and the consequence of failure (6.15).

Example figures of POF, COF and BRE for this example location are provided in Figure 3-3 thru Figure 3-5.

Figure 3-3 Probability of Failure Gravity Mains Example

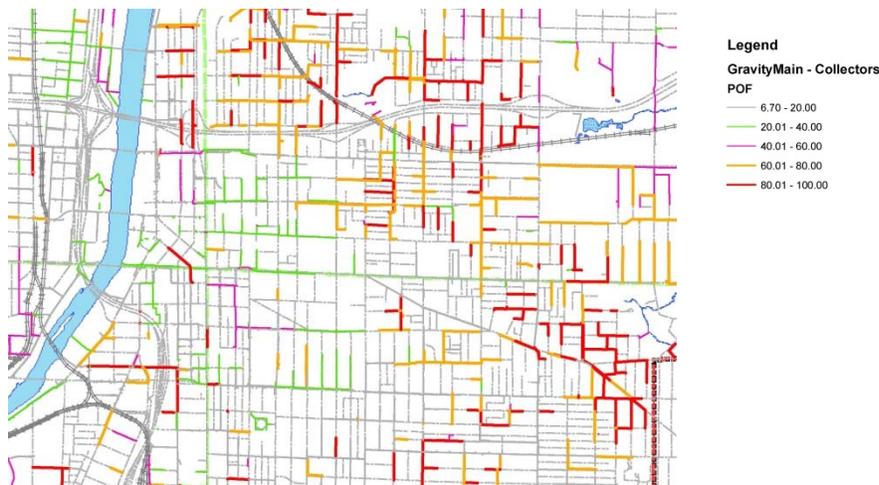


Figure 3-4 Consequence of Failure Gravity Mains Example



Figure 3-5 Business Risk Evaluation Gravity Mains Example



Estimated Effective Life Summary

Using the asset installation date and the EEL for each asset, the IO tool generates a consumed life, remaining service life, and required service date. Table 3-6 shows the approximate number of gravity mains and laterals assets by various age brackets. Using the results in the table, if the majority of assets were assigned an EEL of 100 years, there are already 268 gravity mains and 1,248 laterals that have exceeded their assumed life span.

Table 3-6 Gravity Mains and Laterals By Age

Asset Age (years)	0-25 years	26-50 years	51-75 years	76-100 years	Greater than 100 years
Gravity Mains	4,631	2,637	2,225	2,114	268
Catch Basin Laterals	7,309	2,963	3,299	3,960	1,248

There are 2,382 gravity mains and 5,208 catch basin laterals that are 75 years and older, corresponding to 99.7 and 26.0 miles respectively. This represents approximately 26% of the overall system with less than 25% of the EEL remaining.

Value of Current Assets

Table 3-7 summarizes the current and future system values for gravity mains and catch basin laterals. Refer to page 8 for the cost development methodology discussion.

Table 3-7 Value of Gravity Mains and Laterals

Asset	Quantity	Baseline System Value (Current Cost)	Baseline Future System Value (Replacement Cost at Failure)
Gravity Mains	2,030,660 feet	\$365,757,000	\$933,842,000
Laterals	514,583 feet	\$43,065,000	\$113,942,000

Figure 3-6 and Figure 3-7 illustrate the replacement costs per year based on the required service date for a 100-year timeframe. The baseline cost is based strictly on replacement costs, though in many cases pipes will only require rehabilitation or no action at all. The high annual replacement costs observed between 2090 and 2110 are a result of the recent sewer separation program associated with the CSO program.

Figure 3-6 Annual Cost to Replace Gravity Mains at End of Estimated Effective Life

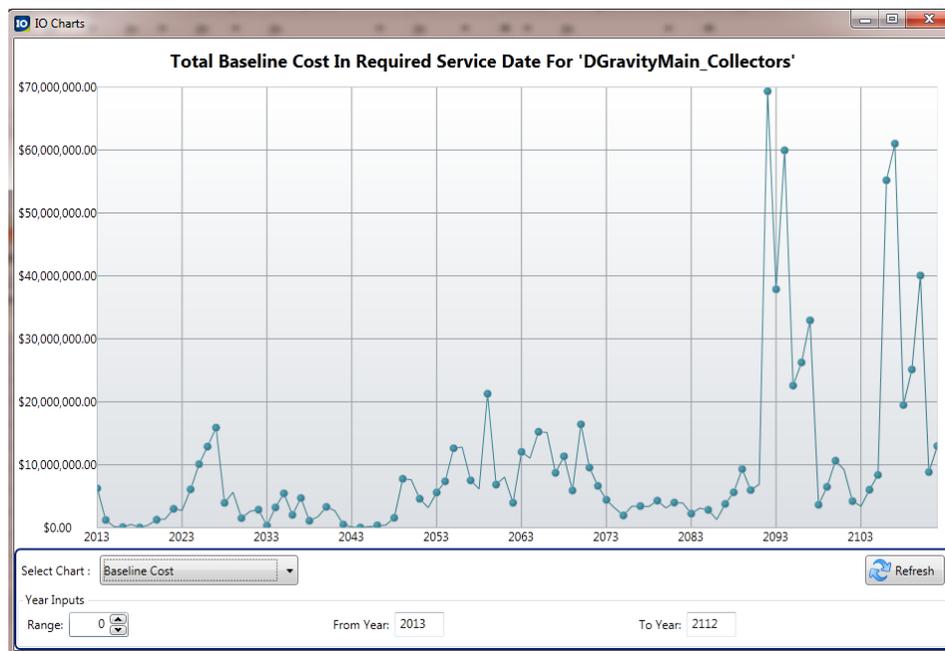


Figure 3-7 Annual Cost to Replace Laterals at End of Estimated Effective Life



PRESSURIZED MAINS

Two pressurized stormwater mains are included in the dataset. One is a 65-foot segment of force main at the Caledonia Stormwater Lift Station. Considering this lift station is identical to several others found in the City where the force main is not indicated separately in the GIS, this force main was considered integral to the lift station and not a separate asset. The second pressurized stormwater main is the Albany Stormwater Pump Station discharge line which is approximately 665-feet long and discharges to a 54-inch sewer in Buchanan Avenue. Due to the length of this force main, it was considered as a separate asset.

The pressurized mains may eventually be evaluated using a similar set of criteria as for gravity mains, but with a lower weight for the O&M condition, since the interior of a force main should not be subjected to the same O&M problems found in a gravity main. Pressurized mains are much more difficult to inspect without taking the main out of service for a period of time, and are commonly evaluated by exterior inspection. POF and COF factors are provided in Table 2-2 and Table 3-3 respectively. The sewer material is ductile iron, and the pipe was assumed to have an EEL of 100-years. Table 3-8 summarizes the baseline and future system value for the pressurized mains.

Table 3-8 Value of Pressurized Main

Asset	Quantity	Estimated End of Service	Baseline System Value (Current Cost)	Baseline Future System Value (Replacement Cost at Failure)
Pressurized Main: Albany Stormwater Pump Station	665 feet	2104	\$131,000	\$505,000

SIPHONS

Two siphons are included in the drainage system. Each siphon is represented by three segments including the drop, run, and rise of the siphon. The first asset is a 60-inch siphon across Monroe Avenue near Sligh Boulevard, which has an estimated end of service in 2068. The second asset is a 24-inch siphon crossing 28th Street at Jefferson Drive with an EEL of 2077. POF and COF factors are provided in Table 2-2 and Table 3-3 respectively. Table 3-9 summarizes the current value, future replacement costs, and inspection and maintenance costs.

Table 3-9 Value of Siphons

Asset	Quantity	Estimated End of Service	Baseline System Value (Current Cost)	Baseline Future System Value (Replacement Cost at Failure)
60-inch	51 feet	2068	\$86,000	\$195,050
24-inch	288 feet	2077	\$163,060	\$422,835
Total	339 feet		\$249,060	\$617,885

MANHOLES, AND CATCH BASINS

This asset group includes 10,554 manholes and chambers, and 17,798 catch basins. 154 storm crocks are included in the manhole, and catch basins database in GIS, and were evaluated with the catch basins.

Condition of Assets

The City has completed condition assessments of approximately 194 storm manholes via zoom camera inspection which were used to generate structural and O&M condition ratings. Manholes were rated on a scale of 1 to 5 with 5 indicating failure has already occurred or is imminent and 1 indicating excellent condition. Table 3-10 provides a breakdown of typical manhole conditions based on material, age, and diameter as observed in the reports. Catch basins were assigned conditions based on adjacent manhole condition ratings and assumptions.

Table 3-10 Assumed Condition Ratings for Manholes and Catch Basins

Age Range	Structural	O&M
> 101 years	5	4
76-100 years	4	3
51-75 years	3	2
26-50 years	2	1
0-25 years	1	1

Probability and Consequence of Failure

A summary of the POF is provided in Table 2-2 on page 7. The COF factors, weights and values used for manholes and catch basins are summarized in Table 3-11.

Table 3-11 Consequence of Failure for Manholes and Catch Basins

COF Factors	Weight MH	Weight CB	Value	Rating Description
Depth of Structure	2.5	0.0	1	depth <= 8 feet
			3	8 < depth <= 15 feet
			10	depth > 15 feet
Structure Diameter	2.5	3.0	2	size <= 12 inches
			10	12 < size <= 24 inches
			25	24 < size <= 42 inches
			35	42 < size <= 72 inches
			50	size > 72 inches
Proximity to Floodplain	0.5	1.0	0	Not within a floodplain
			1	Within the 100 year floodplain
			2	Within the 500 year floodplain
Proximity to Environmental Hazard	0.5	1.0	0	Not in close proximity to known hazardous site
			1	Within 100 feet of known hazardous site
			2	Within a site with known environmental hazards
Proximity to Buildings	2.0	4.0	0	More than 20 feet from a building
			1	Within 20 feet of a building
			2	Under a building
Proximity to Roadway	1.0	1.0	0	Outside of ROW
			10	Pipe is within ROW of minor road
			15	Pipe is within ROW of major road
			40	Pipe is under pavement of minor road
			50	Pipe is under pavement of major road
Complex Structure	1.0	NA	0	Structure has appurtenances inside
			1	No appurtenances inside the structure
Total	10.0	10.0		

Estimated Effective Life Summary

The recorded age for manholes and catch basins are displayed in Table 3-12. The age range used for manholes and catch basins was the same as that used for gravity sewers. Comparison of this data with the gravity sewer data confirms that approximately 26% of each asset group comprising the collection system was installed over 75 years ago.

The estimated effective life of a manhole was assumed to be 100-years and catch basins were assumed to be 50 years (Table 2-1). Based on this assumption, approximately 2.1% of the manholes and 45.4% of the catch basins in the system have currently exceeded their expected life.

Table 3-12 Manholes and Catch Basins by Age

Asset Age (years)	0-25 years	25-50 years	50-75 years	75-100 years	>100 years	Total
Manholes	4,411	2,338	1,857	1,917	225	10,748
Catch Basins	6,383	2,925	3,265	3,997	484	17,054
Total	10,794	5,263	5,122	5,914	709	27,802

Value of Current Assets

Table 3-13 summarizes the current and future system values for manholes and catch basins. Figure 3-8 and Figure 3-9 show the cost to replace manholes and catch basins at the end of the estimated service life over a 100 year timeframe. These costs may differ from final design estimates due to the need to increase the number of manholes and catch basins to improve drainage.

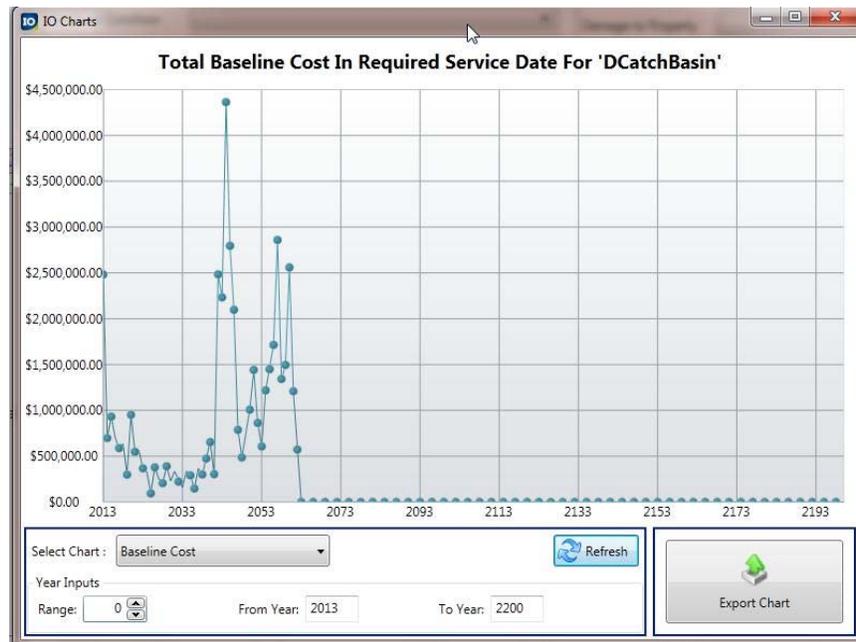
Table 3-13 Value of Manholes, Catch Basins, and Structures

Asset	Quantity	Baseline System Value (Current Cost)	Baseline Future System Value (Replacement Cost at Failure)
Manholes	10,748	\$39,051,000	\$105,349,000
Catch Basins	17,054	\$55,910,000	\$136,594,000
Total	27,802	\$94,961,000	\$241,943,000

Figure 3-8 Annual Cost to Replace Manholes at End of Estimated Effective Life



Figure 3-9 Annual Cost to Replace Catch Basins at End of Estimated Effective Life



STREAM CROSSINGS AND CULVERTS

Forty-seven (47) stream crossings are identified in the GIS. These are defined as structures spanning streams or open channels at the intersection of public roads. This asset group includes culverts ranging from 10-inches in diameter up to 12-foot by 12-foot box culverts. These assets are generally isolated and have different deterioration rates than the streams and open channels they span, making the life expectancy independent of adjacent assets. The crossings are critical to the system as failure can lead to significant disruption through flooding and closure of roadways.

Condition of Current Assets

Historical condition assessment records were not available for the culverts. In order to supplement the data available in the GIS database, field inspections were completed for 30 culverts during open channel inspections and used to confirm assumptions. In order to remain consistent, the culverts were assigned a structural and O&M condition following the same process used for the gravity mains and laterals. During the field visits, some assets were found to be in disrepair and were noted for capital improvements.

Probability and Consequence of Failure

A summary of the POF is provided in Table 2-2 on page 7. The COF factors, weights, and values used are summarized in Table 3-14.

Table 3-14 Culvert Consequence of Failure Factors

COF Factors	Weight	Value	Rating Description
Depth of Pipe	3.0	1	depth <= 8 feet
		3	8 < depth <= 15 feet
		10	depth > 15 feet
Pipe Size	3.0	2	size <= 12 inches
		10	12 < size <= 24 inches
		25	24 < size <= 42 inches
		35	42 < size <= 72 inches
		50	size > 72 inches
Proximity to Floodplain	0.5	0	Not within a floodplain
		1	Within the 100 year floodplain
		2	Within the 500 year floodplain
Proximity to Environmental Hazard	0.5	0	Not in close proximity to known hazardous site
		1	Within 100 feet of known hazardous site
		2	Within a site with known environmental hazards
Stream Type	1.0	1	Ditch
		3	Stream
Type of Crossing	2.0	5	Crosses minor road
		15	Crosses major road or railroad
Total	10.0		

Estimated Effective Life Summary

The recorded age for culverts was based on the same values assigned to gravity mains. Table 3-15 shows the number of culverts broken down by the age ranges previously established. Culverts were found to be either reinforced concrete or corrugated metal. Culverts made of reinforced concrete were assumed to have an EEL of 100 years. Corrugated metal culverts were assumed to have an EEL of 65 years. Eleven (11) of the 47, or 23 percent, of culverts in the City system have currently exceeded their expected life.

Table 3-15 Culverts by Age

Asset Age (years)	0-25 years	25-50 years	50-75 years	75-100 years	Total
Number of Culverts	4	16	24	3	47
Percent of Culverts	9%	34%	51%	6%	100%

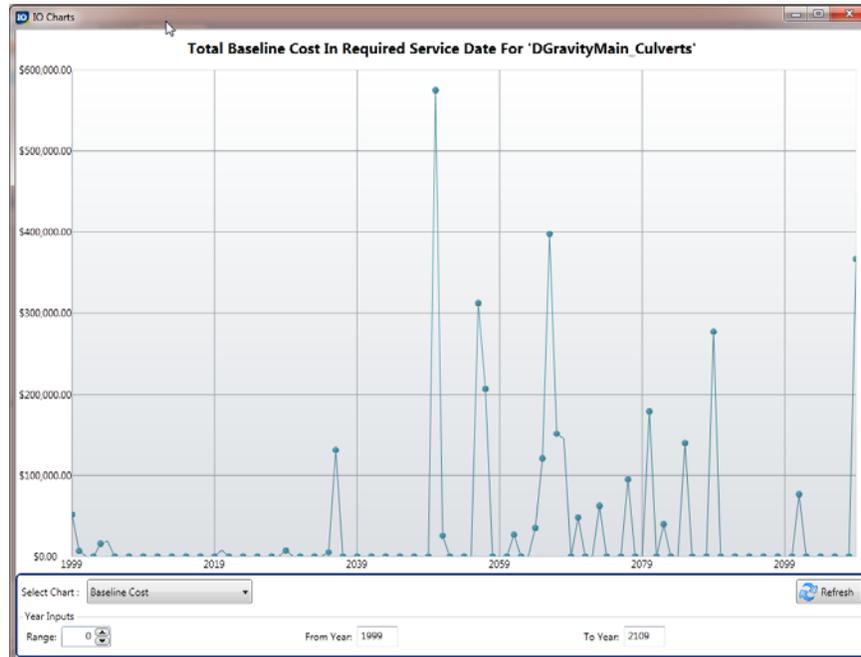
Value of Current Assets

Additional costs for end sections, headwalls, riprap, bank restoration, and pavement replacement were included in the replacement cost calculations. Table 3-16 summarizes the current and future system values for the culverts. Figure 3-10 shows the value of assets that with an expiring EELs each year over the next 100 years.

Table 3-16 Value of Stream Crossings and Culverts

Asset	Quantity	Baseline System Value (Current Cost)	Baseline Future System Value (Replacement Cost at Failure)
Culverts (stream crossings)	47	\$1,649,000	\$3,530,000

Figure 3-10 Annual Cost to Replace Culverts at End of Estimated Effective Life



OUTFALLS

A discharge point feature class is included in the GIS and indicates where pipes or streams discharge to systems owned or operated by other jurisdictions, such as the Kent County Drain Commissioner (KCDC) or waters of the state. These discharge points may be enclosed and underground or may be points open at the surface. Enclosed discharge points represent a pipe-to-pipe connection that doesn't necessarily occur at a manhole structure. Enclosed discharge points are assumed to be part of the sewer network and are not handled as individual assets in this plan. The open discharge points are considered outfalls along open bodies of water and are tracked, inspected, and reviewed in separate ways from gravity mains.

The City's GIS identifies 465 open discharge points. Thirty-six (36) of the points did not include a pipe size or other information aside from an illicit discharge elimination program (IDEP) ID. The majority of these points were located immediately downstream of an end-of-pipe discharge point and were omitted from analysis. Seventy-three (73) points were identified at the ends of culverts, pipes blind-tied to culverts, or discharge points on assets not owned by the City. These points are included with the gravity main or culvert asset analysis. Three hundred fifty-six (356) open discharge points were identified as valid physical assets, and were considered with this plan.

Condition of Assets

Condition assessment information at the outfalls was not available. Condition information from gravity sewers cannot be applied to the outfalls as they are materially different. Site visits are recommended for each asset to evaluate the structural condition of the asset.

Probability and Consequence of Failure

A summary of the POF is provided in Table 2-2 on page 7. The COF factors, weights and values used for manholes and catch basins are summarized in Table 3-17.

Table 3-17 Outfall Consequence of Failure Factors

COF Factors	Weight	Value	Actual Weight Applied	Rating Description
Structure Diameter	8.0	2	0.3	size <= 12 inches
		10	1.6	12 < size <= 24 inches
		25	4.0	24 < size <= 42 inches
		35	5.6	42 < size <= 72 inches
		50	8.0	size > 72 inches
Proximity to Floodplain	1.0	0	0.0	Not within a floodplain
		1	0.5	Within the 100 year floodplain
		2	1.0	Within the 500 year floodplain
Proximity to Environmental Hazard	1.0	0	0.0	Not in close proximity to known hazardous site
		1	0.5	Within 100 feet of known hazardous site
		2	1.0	Within a site with known environmental hazards
Location	0.0	1	0.0	Flat discharge
		2	0.0	Shallow slope <= 30 deg
		5	0.0	Steep slope > 30 deg
		10	0.0	River wall
Discharge Destination	0.0	1	0.0	Dry ditch
		5	0.0	Stream
		10	0.0	Wetland or major waterbody
Total	10.0			

Estimated Effective Life Summary

An EEL of 75 years was assigned to all outfalls. This is lower than the EEL for sewers and manholes, due to other factors which may impact the life of an outfall structure, such as bank erosion. Many existing outfalls were not designed with the same requirements for permanent erosion control measures and energy dissipation, meaning the failure of the bank may occur before the outfall fails. Table 3-18 shows that approximately 10% of the outfalls in the system have currently exceeded their EEL.

Table 3-18 Outfalls by Age

Asset Age (years)	0-25 years	25-50 years	50-75 years	75-100 years	100+ years	Total
Number of Outfalls	74	168	76	26	12	356
Percent of Outfalls	21%	47%	22%	7%	3%	100%

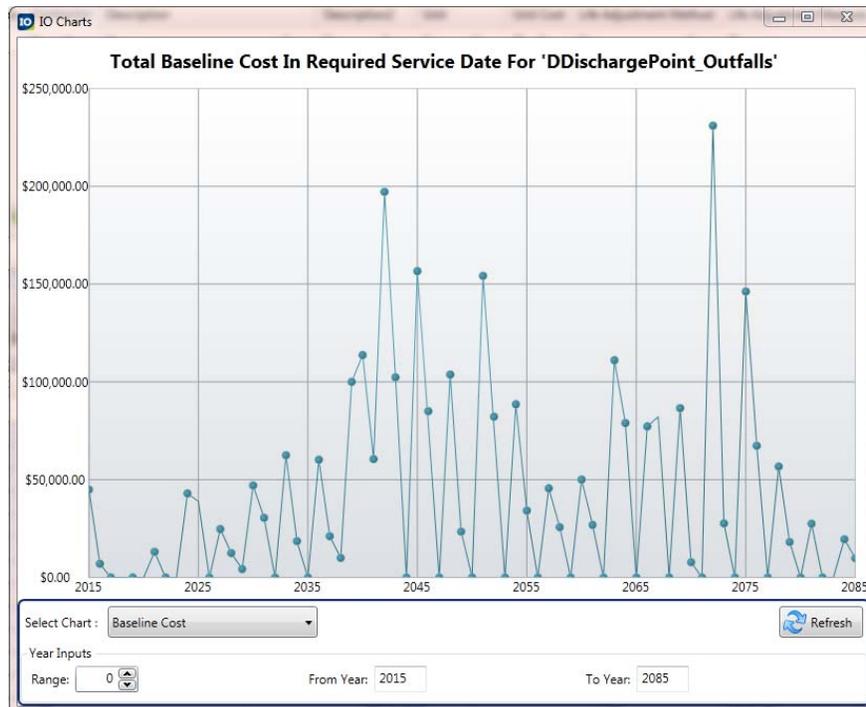
Value of Current Assets

Additional costs for associated items of work such as permanent erosion control measures and dewatering were included. Table 3-19 summarizes the baseline and future system value for the culverts. Figure 3-11 shows the value of assets that will have expiring EELs each year for a 100-year timeframe.

Table 3-19 Value of Outfalls

Asset	Quantity	Baseline System Value (Current Cost)	Baseline Future System Value (Replacement Cost at Failure)
Outfalls	356	\$1,669,000	\$2,938,000

Figure 3-11 Annual Replacement Cost of Outfalls at End of Estimated Effective Life



Floodwall Penetrations

Many storm drains discharge directly to the Grand River through the concrete floodwall that lines the river through the heart of the City. These penetrations are not listed as separate assets, but are included with the adjacent sewer. Some of these penetrations are outfitted with a backflow prevention device as well that may impact the COF and increase costs for maintenance and replacement. A separate analysis is underway to identify and provide condition assessments of the floodwall penetrations. The condition information related to these assets should be added into City GIS database as soon as the inventory information is available.

OPEN CHANNELS AND ROADSIDE DITCHES

There are a total of 39.6 miles of open channels identified in the City's GIS. There are additional open channels not included in this analysis which are under the jurisdiction of either the Kent County Drain Commissioner or the Michigan Department of Transportation.

In addition to the streams, there are also roadside ditches used for stormwater drainage. Typical maintenance issues with roadside ditches include excessive vegetation, sediment accumulation, bank erosion, and debris accumulation. Shallow roadside ditches in residential areas also commonly have driveway culverts which can become buried and plugged if not maintained.

Condition of Assets

A field investigation was conducted in November 2012 to gather condition assessment data. The field investigations consisted of visiting accessible stream crossings and performing an upstream and downstream inventory of the stream or open channel that included gathering information on the background, substrate, morphology, channel dynamics, physical appearance, in stream cover, stream corridor, adjacent land uses and a sketch of the cross section. Based on the limited locations investigated and the wide variability observed in conditions, global (or average) condition assessment results were not applied to unvisited areas. Significant observations included the following:

- A complete bank failure along the north side of Eastcastle Drive just west of Breton Road along the upper tributary to the Burton-Breton Branch of Plaster Creek has led to the collapse of the 12 inch outlet from the existing storm drain.
- Significant bank erosion has caused many trees to fall, resulting in debris and garbage accumulation impacting the path of flow in the Burton-Breton Branch of Plaster Creek upstream of 32nd Street.
- Significant erosion and overgrowth was observed along portions of Lamberton Creek between 3 Mile Road and Perkins Avenue. The condition of several steel-plate corrugated metal culverts was questionable. Several residents voiced concerns and complaints to staff during field inspections.
- An exposed pipe was observed obstructing the flow in the bottom of Hogadone Creek just downstream of a storm drain outfall on the southeast corner of Seventh Street and Oakleigh Avenue.
- Outfall pipes with separated joints were observed along the south bank of Indian Mill Creek near the end of Richmond Avenue due to bank erosion.
- A culvert crossing on Leffingwell Avenue, not included in the GIS, was located approximately 850 feet north of Bradford Street. Erosion and stabilization issues were observed in the open channels on both sides of the road. The level of erosion may be impacting an existing sanitary sewer manhole on the upstream side.

Probability and Consequence of Failure

Insufficient attribute data were available to adequately use the POF and COF analysis approach for this section of the report. For future applications the POF factors applied to open channel sections are similar to those discussed for other assets (refer to page 6). COF factors for future applications are suggested to include: the channel size, shape and bank slope along with the proximity to roads, buildings and environmental hazards.

Estimated Effective Life Summary

An EEL is not necessarily applicable to open channel systems. The most effective method of managing the asset involves regular condition assessments.

Value of Current Assets

Open channel systems, such as streams and creeks, are never truly replaced. Asset ‘replacement’ in this case would consist of renewal activities such as cleaning, reestablishing grade, benching slopes, installing permanent erosion control measures or a number of additional solutions depending on the problems identified during the assessment.

Condition inspection costs are estimated at approximately \$64,000 for the 40 miles of open channel (\$1,600 per mile). Roadside ditches require a lower level of inspection, resulting in an approximate cost of \$44,000 for the 72 miles of ditches (\$600 per mile). While the City may not ultimately be responsible for all of the maintenance and repair to these channels, an initial assessment would be beneficial for planning purposes. The baseline future system value below represents the total cost of system renewal based on the level of service assumptions made for these assets.

Table 3-20 Value of Open Channels and Ditches

Asset	Quantity	Baseline System Value (Current Cost)	Baseline Future System Value (Replacement Cost at Failure)
Open Channels	40 miles	NA	\$2,570,000
Ditches	72 miles	\$5,703,000	\$1,223,000
Total	112 miles		\$3,793,000

DETENTION AND RETENTION BASINS

Five (5) detention basins were included in the asset assessment and are identified in Table 3-21. There are additional detention basins within the City that were not included because they are owned or operated by other agencies or part of neighborhood plat developments. No specific GIS feature class is included in the GIS for detention basins. Underground detention basins were included with the green infrastructure assets.

Condition of Assets

A visual assessment of the Woodlawn detention basin was completed. Results of this inspection are summarized in Table 3-21.

Table 3-21 Stormwater Detention Basin Inventory

Name/Location	Date Installed	Type	Comments
Woodlawn Detention Basin – NE corner of Woodlawn Ave and 28 th St	1999	Open	A broken pipe between the forebay and pond was observed to be causing erosion of berm.
Kreiser Street Detention Basin	1993	Open	Silver Creek Stormwater Detention Facility. Proposed wetland restoration noted in GIS.
Calvin Avenue Detention Basin	1994	Open	Silver Creek Stormwater Detention Facility.
Otsego Detention Basin	1995	Open	Silver Creek Stormwater Detention Facility.
Corduoy Detention Basin	1994	Open	Coldbrook Creek Regional Retention.

Probability and Consequence of Failure

Insufficient attribute data were available to adequately use the POF and COF analysis approach for this portion of the report. For future applications, the POF factors applied to detention basins are similar to those discussed for other assets (refer to page 6). COF factors for future applications are suggested to include: the size, shape, side slopes, and material along with the proximity to roads, buildings and environmental hazards. In addition the various components of a storage facility should be considered. For example, the inlet structure, sediment forebay, primary storage cell, and outlet control structure could be included with the basin attributes or individually.

Estimated Effective Life Summary

The EEL for the detention basins was not calculated for this analysis. The EEL of a detention or retention basin should be based on a composite of the different elements found in each asset. The ancillary structures like inlets, outlets and overflow structures and elements such as underdrains may have a different EEL and may be evaluated as a portion of the overall asset. The basins listed in this report are less than 20 years old, with no history of problems. During the field inspection for the Woodlawn Detention Basin, some potential problems were observed as outlined in Table 3-21.

Value of Current Assets

Replacement costs for detention basins are difficult to determine, based on the fact that these are typically large assets, and are unlikely to be physically replaced. They are more likely to be maintained or renewed. Including inlet and outlet improvements, the five (5) detention basins in the City system were estimated to cost approximately \$1,725,000 to construct.

Renewal of an existing open detention or retention basin would include excavation costs for expansion or debris/sediment removal and topsoil and seeding costs for reestablishing vegetation. In some cases basins may be modified to improve water quality, which would incur a different set of costs. Typical maintenance for a standard operating open basin includes removing debris, cleaning of the underdrain, and removing sediment from the inlets and outlets. Mowing of the site and other landscaping may also be required.

Table 3-22 Value of Detention and Retention Basins

Asset	Quantity	Estimated End of Service	Baseline System Value (Current Cost)	Baseline Future System Value (Replacement Cost at Failure)
Woodlawn Detention Basin – NE corner of Woodlawn Ave and 28 th St	1	61	\$225,000	\$649,000
Kreiser Street Detention Basin	1	55	\$400,000	\$1,039,000
Calvin Avenue Detention Basin	1	56	\$400,000	\$1,057,000
Otsego Detention Basin	1	57	\$400,000	\$1,076,000
Corduoy Detention Basin	1	56	\$300,000	\$793,000
Total	5		\$1,725,000	\$4,614,000

PUMP STATIONS

The City owns and operates a total of 11 stormwater pumping stations. The eight (8) stations listed below are used during a major rainfall event to pump stormwater to the river during periods where the river level is too high to allow free gravity discharge.

- Caledonia – Constructed in 1999

- Palmer – Constructed in 1999
- Ann St (Indian Mill Creek) – Constructed in 1999
- Market Ave - Riverside – Constructed in 2008
- Wealthy – Constructed in 1996
- Front/Scribner – Constructed in 1991
- Ken-O-Sha – Constructed in 2006
- Academy (KCDC) – Constructed in 2000. Owned by the KCDC and maintained by the City.

These lift stations are not all designed to be constantly used, but are critical components in that they provide flood relief in the system during high river levels so reliable operation is mandatory. The best way to manage these types of assets is to maintain high levels of operation to ensure that there will be no excessive downtime due to repairs. It is not recommended to run assets such as pump stations to the predicted failure date.

The remaining stormwater pump stations (Alpine (1973), MARB (1995) and Albany (2000)) are in operation regardless of the river level and are used to convey flows to nearby gravity systems for sites and areas that lack adequate grade for gravity drainage.

Table 3-23 provides a summary of the pump stations.

Table 3-23 Pump Station Summary

Station	Install Year	Installation Cost	Pump Model	Capacity (GPM)	TDH (feet)	HP	Pump Qty
Academy ¹	2000	\$150,000					
Albany	2000	\$700,000	ABS - AFP 2021 GP	1400	30	23	2
Alpine	1973	\$600,000	Worthington Pump - B284TP10	300		15	3
Ann St		\$550,000	Flygt - P7045/600	4000	9	17.4	3
Caledonia	1999	\$550,000	Flygt - P7045/600	4000	9	17.4	3
Front / Scribner	1991	\$5,100,000	Flygt - PL7115	50500	15.2	250	6
Ken-O-Sha	2006	\$550,000	Flygt - P7045/600	4000	9	17.4	3
MARB	1995	\$275,000	Flygt - CP3152	1500	29	20	2
Market Ave - Riverside	2008	\$850,000	ABS - VUP 0501.10 ME 520/6-51.60 FM	10770	18	70	4
Palmer	1999	\$550,000	Flygt - P7045/600	4000	9	17.4	3
Wealthy	1996	\$2,325,167	Flygt - PL7115	50500	15.2	250	10

¹Pump Station is owned by the KCDC and maintained by the City.

Condition of Assets

Pump station inspection data is maintained in written records. Inspections conducted by Tetra Tech with the assistance of City staff included general site observations and photographs, and were used to confirm the general condition of each facility. Generally, all of the pump stations are in good condition as the City performs routine maintenance due to the criticality of these assets. Considering the nature of pump stations, the focus on replacement costs was on pump condition and replacement.

Analysis and Estimated Effective Life Summary

Insufficient attribute data were available to adequately use the POF and COF analysis approach for this report. Pump stations involve multiple assets and elements such as the pumps, force main, electrical components, wet well, etc. Each of the elements has different probabilities and consequences of failures as well as different estimated effective life spans. For example the pumps are often replaced several times before structural issues arise in the facility. The relatively recent construction, minimal use, and routine maintenance of these stations have left them in good operating condition.

Value of Current Assets

The initial installation cost for each stormwater pump station is provided in Table 3-24, along with a breakdown of components and the future system value projection.

The City presently budgets \$40,000 for the annual maintenance and inspection of their pump stations. This budget was based on bi-weekly inspections for eight (8) of the pump stations, estimating approximately \$200 each visit.

Table 3-24 Value of Pump Stations

Facility	Install Year	Install Cost ³	Baseline System Value (Current Cost)					Baseline Future System Value (Replacement Cost at Failure)
			Pumps (25 year EEL)	Electrical (75 year EEL)	Mechanical (75 year EEL)	Structure (75 year EEL) ²	Total	
Academy ¹	2000	\$150,000	NA	NA	NA	NA	NA	NA
Albany	2000	\$700,000	\$39,200	\$100,000	\$100,000	\$460,800	\$700,000	\$2,023,000
Alpine	1973	\$600,000	\$19,500	\$100,000	\$100,000	\$380,500	\$600,000	\$802,000
Ann St	1999	\$550,000	\$76,200	\$100,000	\$100,000	\$273,800	\$550,000	\$1,465,000
Caledonia	1999	\$550,000	\$76,200	\$100,000	\$100,000	\$273,800	\$550,000	\$1,465,000
Front/ Scribner	1991	\$5,100,000	\$933,000	\$250,000	\$150,000	\$3,767,000	\$5,100,000	\$10,468,000
Ken-O-Sha	2006	\$550,000	\$76,200	\$100,000	\$100,000	\$273,800	\$550,000	\$1,802,000
MARB	1995	\$125,000	\$39,200	\$30,000	\$30,000	\$25,800	\$125,000	\$265,000
Market Ave - Riverside	2008	\$850,000	\$216,400	\$150,000	\$100,000	\$383,600	\$850,000	\$2,736,000
Palmer	1999	\$550,000	\$76,200	\$100,000	\$100,000	\$273,800	\$550,000	\$1,465,000
Wealthy	1996	\$2,326,000	\$1,555,000	\$250,000	\$175,000	\$346,000	\$2,326,000	\$3,745,000
Total		\$12,051,000	\$3,107,100	\$1,280,000	\$1,055,000	\$6,458,900	\$11,901,000	\$26,236,000

¹Pump Station is owned by the KCDC and maintained by the City.

GREEN INFRASTRUCTURE

The City has recently begun implementing green infrastructure as part of their stormwater system, and is poised to increase installations as part of the overall City Sustainability Plan. Green infrastructure is designed to help reduce the volume of stormwater runoff and to improve the quality of the water discharged to surface waters.

Asset Inventory

Current installations that are maintained by the City include permeable pavement, subsurface storage systems, rain gardens and naturalized landscapes. The name, owner, installation date, and type of installation are provided in Table 3-25. The City has also recently constructed stormwater filter strips in

the parking lot of the West Downtown Development Authority and bioretention islands along Plainfield Avenue, however detailed information regarding these projects was not available during preparation of this report.

Table 3-25 Green Infrastructure Inventory

Green Infrastructure Project Name	Owner	Date Installed	Type
Environmental Services Engineering Parking Lot	City	3/1/2004	Permeable Pavement
Joe Taylor Park	City	10/1/2010	Subsurface Storage System
River of Stars	City	9/1/2002	Rain Garden
Potters House School Rain Garden	City	5/1/2011	Rain Garden
River of Dreams	City	6/1/2008	Rain Garden
Roosevelt Park Riparian planting	City	4/1/2011	Naturalized Landscape
Mid Towne Village Subsurface Storage	Mid Towne Village, LLC	8/1/2010	Subsurface Storage System
GRCHS Rain Garden and Butterfly Garden	Grand Rapids Christian High School	5/1/2008	Rain Garden
DeVries Hall rain garden	Calvin College	5/1/2007	Rain Garden
Rain Garden at Christian Reformed Church Headquarters	Christian Reformed Church	10/1/2010	Rain Garden
Native gardens and walking paths at Christian Reformed Church Headquarters	Christian Reformed Church	6/1/2012	Naturalized Landscape
Tree Planting at Christian Reformed Church Headquarters	Christian Reformed Church	7/1/2011	Naturalized Landscape
West DDA Parking	DDA		Filter Strips
Plainfield Avenue Bioretention Islands	Creston Business Assoc.	9/1/2012	Bioretention

Condition of Assets

Records of past operation and maintenance activities at the sites were not available for this report. Based on the recent installation, condition assessments were not conducted of these assets. The assets were assumed to be in adequate condition.

Estimated Effective Life Summary

Since there are a variety of different types of green infrastructure, and these types of projects are usually site-specific, it is difficult to assess these as a single asset group. For these reasons, these assets were not modeled in the IO toolset. As the City’s green infrastructure expands, these assets may be revisited to determine if they should be entered into the IO toolset.

Green infrastructure projects are site-specific and dependent on the quality of the design and installation process. An accurate EEL is difficult to assign. Each installation should be monitored and observed during actual rainfall events to document the operation and performance. Routine maintenance is mandatory to ensure optimal performance.

Value of Current Assets

Table 3-26 summarizes the current and future system values for the green infrastructure practices owned by the City.

Table 3-26 Value of Green Infrastructure

Asset	Quantity	Estimated End of Service	Baseline System Value (Current Cost)	Baseline Future System Value (Replacement Cost at Failure)
Environmental Services Engineering Parking	1	2029	\$209,400	\$276,400
Joe Taylor Park	1	2110	\$1,000,000	\$5,380,700
River of Stars	1	2052	\$10,100	\$19,900
Potters House School Rain Garden	1	2052	\$1,700	\$3,900
River of Dreams	1	2058	\$66,500	\$145,200
Roosevelt Park Riparian Planting	1	2061	\$15,400	\$35,500
GRCHS Rain Garden and Butterfly Garden	1	2058	\$10,000	\$21,900
Native Gardens at Christian Reformed Church	1	2062	\$5,100	\$12,000
Rain Garden at Christian Reformed Church	1	2060	\$17,100	\$38,700
Tree Planting at Christian Reformed Church	1	2061	\$26,000	\$59,800
Mid Towne Village Subsurface Storage 1	1	2060	\$189,700	\$1,020,800
Mid Towne Village Subsurface Storage 2	1	2060	\$250,700	\$1,349,000
Devries Hall Rain Garden	1	2057	\$40,300	\$86,500
West DDA Parking	1	NA	NA	NA
Plainfield Avenue Bioretention Islands	1	NA	NA	NA
Total	15 ¹		\$1,842,000	\$8,451,000

¹System values only available for 13 practices

ASSET GROUP REPLACEMENT COST

The baseline system value, represented as the total replacement cost, is estimated to be \$528.8 million. Table 3-27 summarizes this information by asset group. Approximately seventy percent (70%) of the current system value is associated with the gravity sewer system.

Table 3-27 Current System Replacement Value by Asset

Asset	Quantity	Baseline System Value (Current Cost)	Baseline Future System Value (Replacement Cost at Failure)
Gravity Mains	2,030,660 (ft)	\$365,757,000	\$933,842,000
Manholes	10,748 (ea)	\$39,051,000	\$105,349,000
Laterals	514,583 (ft)	\$43,065,000	\$113,942,000
Catch Basins	17,054 (ea)	\$55,910,000	\$136,594,000
Pressurized Mains	664 (ft)	\$131,000	\$505,000
Siphons	339 (ft)	\$250,000	\$618,000
Culverts	3,600 (ft)	\$1,649,000	\$3,530,000
Outfalls	356 (ea)	\$1,669,000	\$3,530,000
Open Channels	40 (mi)	NA	\$2,570,000
Roadside Ditches	72 (mi)	\$5,703,000	\$1,223,000
Detention Basins	5 (ea)	\$1,725,000	\$4,614,000
Pump Stations	11 (ea)	\$12,051,000	\$26,236,000
Green Infrastructure	13 (ea)	\$1,842,000	\$8,451,000
Total		\$528,803,000	\$1,341,004,000

4. LEVEL OF SERVICE

A major factor in the quality of community life is the quality of the community's facilities, services and amenities. Level of service is a measure of the amount and/or quality of the public facility which must be provided to meet that community's basic needs and expectations.

The City is developing a Community Based Stormwater Program. The City, with the cooperation of the West Michigan Environmental Action Council (WMEAC), has developed a baseline for the existing level of service (LOS) offered by the City, and established the framework for proposed increased levels of service. Tetra Tech used the baseline condition and this framework to develop and expand three (3) different LOS for the stormwater system. The LOS recommended were based on a set of goals for the stormwater system which are summarized in the table below.

Table 4-1 Level of Service Goals

Community Outcomes	City Responsibility
Healthy natural resources. Rivers, streams and lakes.	Reducing volumes and pollutant loads in stormwater discharge.
Improved recreational opportunities for residents.	By reducing the impact of floods on housing, business and recreational areas.
A stronger economy.	Working with developers to provide cost effective stormwater solutions.
Making Grand Rapids even more attractive place to live.	Improving the operation, functionality, and usefulness of infrastructure and responding to concerns and problems as quickly as possible.

LEVEL OF SERVICE COMPONENTS

For the purposes of this asset management plan, various components are used in describing the level of service. These components include operation and maintenance activities of the various asset groups, system renewal of the asset groups, and other activities. Each of these components is further discussed within the level of service categories (beginning on page 39) and includes projected annual costs (beginning on page 46). Additional description information on the components is provided below.

Operation and Maintenance

The operation and maintenance activities are further subdivided into the inspection, preventative maintenance, and corrective maintenance activities.

- **Inspection.** The initial assessment and ongoing inspection of the stormwater system are crucial components to implementing a comprehensive, sustainable O&M program. The initial assessment phase focuses on establishing a detailed inventory and assessment of the assets. In addition, reoccurring inspection is required to continue to evaluate the system.
- **Preventative Maintenance.** Preventative maintenance is work that is intended to extend the estimated service life through activities such as lining, root removals, sealing cracks and leaks, or installing pipe and manhole liners. Non-structural activities such as cleaning sediment and debris out of pipelines and cleaning out catch basin sumps can be identified as preventative maintenance as it improves the efficiency of operation.
- **Corrective Maintenance.** Corrective, or reactive, maintenance includes all repairs to correct defects or failures identified in the system during routine inspections. This may be the replacement of a failed pipe or structure, a point repair, or replacing a broken frame and cover on

a structure. Anything shy of full replacement is intended to extend the service life of an asset and is considered corrective maintenance. Corrective maintenance is different from planned renewal, because there is no way to completely plan for all potential failures that may occur at any given time. Corrective maintenance costs were determined by identifying the assets that have already or will meet the end of their EEL during the inspection period and assuming that a percentage of those assets will fail over that timeframe.

System Renewal

System renewal addresses the replacement of an asset at the end of its estimated effective life. Table 2-1 (page 6) identified the assumed EEL. Various level of service categories assume that the EEL would be extended either through preventative or corrective maintenance activities. At some point, the system is assumed to be replaced. Average annual replacement costs are based on the total system replacement cost divided by the respective estimated effective lifespan of the individual assets.

Other Activities

Additional miscellaneous activities are included in the level of service categories and cost estimates. These include the following:

Street Sweeping

Street sweeping is an important maintenance activity to address the water quality of stormwater runoff. Street sweeping is considered a good housekeeping practice under the NPDES stormwater permit. To ensure compliance, the City implements a street sweeping program and tracks the annual lane miles swept and amount of debris removed. The City currently spends approximately \$750,000 on street sweeping annually.

For the purpose of this report, streets are not considered a stormwater asset and hence the maintenance activity for street sweeping is considered separately from the defined asset groups. Contrast this with an activity such as cleaning catch basins. Since catch basins are one of the stormwater asset groups, the maintenance cleaning activity is associated with the preventative maintenance information for catch basins.

Studies and Planning Projects

Part of managing the stormwater assets involves conducting studies and planning projects such as analyzing the flow capacity of the drainage system; planning for the impacts of climate change; maintaining and updating stormwater drainage requirements; and applying for grants. A placeholder is provided in this report and in the projected annual costs by level of service category. Additional details regarding the specific studies and planning projects are included in the 2013 Stormwater Master Plan.

Regulatory and Developmental Compliance

Compliance with the NDPEs stormwater permit and proactively managing and regulating the stormwater runoff from development and redevelopment activities are important components of the budget. This activity also includes properly implementing and enforcing the recommended policies in the Stormwater Master Plan and Technical Reference Manual. With an added focus on installing green infrastructure, and tighter controls on the limit of post-development runoff allowed to enter the City system, these reviews are going to become increasingly thorough and time consuming. In addition to reviewing plans, the City will need to ensure proper construction and ongoing maintenance practices are applied on private property projects.

LEVEL OF SERVICE CATEGORIES

To achieve the goals above, levels of service were established that provide a reliable, responsive and sustainable stormwater system. The system must be capable of handling the current conditions, and also be able to grow and adapt to the changing needs.

Four levels of service are represented by increasing levels of annual spending requirements for the following basic services: capital/renewal projects, O&M, street sweeping, planning, regulatory compliance and development regulation. Below is a general description of each level of service.

Existing Level of Service

This is the baseline level of service. The current funding level provides for minimum O&M activities and corrective action for only the most critically failed portions of the system. Capital funding is limited to work with other City department infrastructure projects and for assessments from the Kent County Drain Commissioner. Refer to Table 4-2 for additional details.

Table 4-2 Existing Level of Service Definition

Asset	Inspection	Corrective	Preventative	System Renewal
Gravity Mains		Respond to failures and complaints for all sewer components.		
MH				
Laterals				
Catch basins		Clean 2500 annually and perform corrective maintenance.		
Force Mains	Visual inspection every 2 weeks during pump station inspection.			
Siphons	Clean and inspect annually.			
Culverts		Clean debris, corrective maintenance.		
Open Channel		Clean debris, corrective maintenance.		
Ditches				
Discharge Points	Inspect all discharge points every 5 years per MS4 requirements.			
Creek gates	Inspect annually, clean as needed.			
Detention Basins	No recorded site inspections.	Routine maintenance 3 times per year.		
Infiltration Basins		Clean and corrective maintenance every 10 years.		
Lift Stations	Inspect facility every 2 weeks. Facility log kept on site.			
Hydro Separators	Clean and inspect annually.			
Green Infra				

Level of Service C

This LOS is intended to allow the City to determine critical infrastructure and identify high priority areas. Refer to Table 4-3. Key elements of this LOS include:

- Funding would increase for O&M to allow for the assessment of the entire collection system greater than 75 years old every 10 years. Funding also assumes performing corrective maintenance where necessary and preventative maintenance on 10 percent of all inspected assets.
- Inspection of 50 percent of culverts annually, along with replacing or renewing the worst 5 percent.
- Inventory and inspection of approximately 4 miles each of open channels and ditches annually with funding for preventative maintenance, and establishing a minimal annual renewal program.
- Inspection of all discharge points every 5 years, with corrective maintenance to repair or replace the top 10 percent worst condition each year. And preventative maintenance on 5 percent of inspected outfalls annually.
- Inspections and routine maintenance on other system assets would be organized so that pertinent data are collected and stored in the GIS database.
- 10 percent of all new capital spending would be directed towards green infrastructure.
- Regulatory spending would be increased to establish a public education program.
- Capital spending would be based on an assumed system replacement every 150 years, with catch basins and laterals assigned a 100 year replacement cycle.

Table 4-3 Level of Service C Definition

Asset	Inspection	Corrective	Preventative	System Renewal
Gravity Mains	PACP CCTV inspect pipes greater than 75 years old over 10-year period.	Replace 15% of assets that have reached end of EEL over 10 years.	Perform rehabilitation to extend EEL for 10% of inspected sewers over 10 years. Clean 20% of all assets annually.	Replace every 150 years.
MH	Inspect manholes greater than 75 years old over 10-year period.	Replace 15% of assets that have reached end of EEL over 10 years.	Perform rehabilitation to extend EEL for 10% of inspected sewers over 10 years. Clean 20% of all assets annually.	Replace every 150 years.
Laterals	Inspect CB laterals greater than 75 years old over 10-year period.	Replace 15% of assets that have reached end of EEL over 10 years.	Perform rehabilitation to extend EEL for 10% of inspected laterals over 10 years. Clean 20% of all assets annually.	Replace every 100 years.
Catch basins	Clean and inspect 25% annually (Approx. 4264). Record and monitor debris levels for cleaning prioritization.	Replace 15% of assets that have reached end of EEL over 10 years.	Perform rehabilitation to extend EEL for 10% of inspected catch basins over 10 years.	Replace every 100 years.
Force Mains	Visual inspection every 2 weeks during pump station inspection. PACP CCTV inspect every 15 years.			Replace every 100 years.
Siphons	Clean and inspect annually.			Replace every 150 years.
Culverts	CCTV/walk/inspect 50% of culverts annually.	Replace/rehabilitate top 5% by POF.	Clean 20% of all assets annually.	Replace every 150 years.
Open Channel	Walk, inventory and inspect 4 miles of open channel annually.		Remove debris at 1 site per mile inspected.	Restore 7.5% minor, 3% moderate and 1% severe construction for length inspected each year.
Ditches	Inspect 4 miles of roadside ditch annually.		Clean 20% of all assets annually.	Grade or clean 10% of length inspected.
Discharge Points	Inspect all discharge points every 5 years per MS4 requirements.	Replace top 10% by POF each cycle.	Stabilize bank and erosion control at 5% of assets each cycle.	Replace every 150 years.
Creek gates	Inspect annually, clean as needed. Record and monitor conditions for prioritization.			Costs included with adjacent assets.
Detention Basins	Complete site inspection 3 times annually including routine maintenance.			Facility renovation every 100 years. Includes re-grading, seeding, renew inlet/outlet structures.
Infiltration Basins	Clean and inspect every 5 years.			Replace system every 150 years.
Lift Stations	Inspect facility every 2 weeks. Log inspection data in GIS every 6 months.			Replace pumps every 30 years, structural, mechanical and electrical components replaced every 100 years.
Hydro Separators	Clean and inspect annually. Record debris accumulation for prioritizing cleaning schedule and frequency.			Replace every 150 years.
Green	Inspect and perform			Invest 10% of all

Asset	Inspection	Corrective	Preventative	System Renewal
Infrastructure	recommended maintenance annually.			collection system capital renewal costs on GI. GI=+25% increase to construction costs.

Level of Service B

This LOS will provide a more direct basis for determining and tracking preventative maintenance. Refer to Table 4-4. Key elements of this LOS include:

- Funding would increase for O&M to allow for the assessment of the entire collection system greater than 50 years old every 10 years performing corrective maintenance where necessary and preventative maintenance on 10 percent of all inspected assets.
- Inspection of 50 percent of culverts annually, replacing or renewing the worst 10 percent.
- Inventory and inspection of approximately 5 miles each of open channels and ditches annually with funding for additional preventative maintenance and a more robust annual renewal program.
- Inspection of all discharge points every 3 years, with corrective maintenance to repair or replace the top 10 percent worst condition each year and preventative maintenance on 5 percent of inspected outfalls annually.
- Inspections and routine maintenance on other system assets would be organized so that pertinent data are collected and stored in the GIS database, with periodic testing and cleaning incorporated with the site visits.
- 20 percent of all new capital spending would be directed towards green infrastructure with a goal of pursuing runoff reduction and improved water quality.
- Regulatory spending would be increased to allow for more involved public education and outreach programs.
- Capital spending would be based on an assumed system replacement every 125 years, with catch basins and laterals assigned a 75 year replacement cycle.

Table 4-4 Level of Service B Definition

Asset	Inspection	Corrective	Preventative	System Renewal
Gravity Mains	PACP CCTV inspect pipes greater than 50 years old over 10-year period.	Replace 30% of assets that have reached end of EEL over 10 years.	Perform rehabilitation to extend EEL for 10% of inspected sewers over 10 years.	Replace every 125 years.
MH	Inspect manholes greater than 50 years old over 10-year period.	Replace 30% of assets that have reached end of EEL over 10 years.	Perform rehabilitation to extend EEL for 10% of inspected manholes over 10 years.	Replace every 125 years.
Laterals	Inspect CB laterals greater than 50 years old over 10-year period.	Replace 30% of assets that have reached end of EEL over 10 years.	Perform rehabilitation to extend EEL for 10% of inspected laterals over 10 years.	Replace every 75 years.
Catch basins	Clean and inspect 35% annually (Approx. 5969). Record and monitor debris levels for cleaning prioritization.	Replace 30% of assets that have reached end of EEL over 10 years.	Perform rehabilitation to extend EEL for 10% of inspected catch basins over 10 years.	Replace every 75 years.
Force Mains	Visual inspection every 2 weeks during pump station inspection. PACP CCTV inspect every 10 years.			Replace every 100 years.
Siphons	Clean and inspect annually.			Replace every 125 years.
Culverts	CCTV/walk/inspect 50% of culverts annually.	Replace/rehabilitate top 10% by POF.		Replace every 125 years.
Open Channel	Walk, inventory and inspect 5 miles of open channel annually.		Remove debris at 3 site per mile inspected.	Restore 15% minor, 10% moderate and 2% severe construction for length inspected each year.
Ditches	Inspect 5 miles of roadside ditch annually.			Grade or clean 10% of length inspected.
Discharge Points	Inspect all discharge points every 3 years to satisfy MS4 requirements.	Replace top 10% by POF each cycle.	Stabilize bank and erosion control at 10% of assets each cycle.	Replace every 125 years.
Creek gates	Inspect annually, clean as needed. Record and monitor conditions for prioritization.			Costs included with adjacent assets.
Detention Basins	Complete site inspection 3 times annually including routine maintenance.			Facility renovation every 75 years. Includes re-grading, seeding, renew inlet/outlet structures
Infiltration Basins	Clean, inspect and complete infiltration test every 5 years.			Replace system every 125 years.
Lift Stations	Inspect facility every 2 weeks. Integrate bi-weekly inspection data with GIS.			Replace pumps every 25 years, structural, mechanical and electrical components replaced every 75 years.
Hydro Separators	Clean and inspect annually. Record debris accumulation for prioritizing cleaning schedule and frequency.			Replace every 125 years.
Green Infrastructure	Inspect and perform recommended maintenance 3 times annually.			Invest 20% of all collection system capital renewal costs on GI. GI=+25% increase to construction costs.

Level of Service A

This is the highest LOS analyzed. Refer to Table 4-5. Key elements of this LOS include:

- Funding would increase for O&M to allow for the assessment of the entire collection system every 10 years performing corrective maintenance where necessary and preventative maintenance on 10 percent of all inspected assets.
- Inspection of all culverts annually, replacing or renewing the worst 10 percent.
- Inventory and inspection of approximately 6 miles each of open channels and ditches annually with funding for additional preventative maintenance and a comprehensive annual renewal program.
- Inspection of all discharge points every 3 years, with corrective maintenance to repair or replace the top 10 percent worst condition each year and preventative maintenance on 10 percent of inspected outfalls annually.
- Inspections and routine maintenance on other system assets would be increased and organized so that pertinent data is collected and stored immediately in the GIS database, with systematic testing and cleaning procedures incorporated with the site visits.
- 30 percent of all new capital spending would be directed towards green infrastructure applying distinct benchmarks for project performance in reducing runoff volumes and increasing water quality.
- Regulatory spending would be increased to allow for more involved public education and outreach programs, with City sponsored events such as watershed clean ups increased and attempt to incentivize public involvement.
- Capital spending would be based on an assumed system replacement every 100 years, with catch basins and laterals assigned a 50 year replacement cycle.

Table 4-5 Level of Service A Definition

Asset	Inspection	Corrective	Preventative	System Renewal
Gravity Mains	PACP CCTV inspect system over 10-year period.	Replace 50% of assets that have reached end of EEL over 10 years.	Perform rehabilitation to extend EEL for 10% of inspected sewers over 10 years.	Replace every 100 years.
MH	Inspect manholes over 10-year period.	Replace 50% of assets that have reached end of EEL over 10 years.	Perform rehabilitation to extend EEL for 10% of inspected manholes over 10 years.	Replace every 100 years.
Laterals	PACP CCTV inspect CB laterals over 10-year period.	Replace 50% of assets that have reached end of EEL over 10 years.	Perform rehabilitation to extend EEL for 10% of inspected laterals over 10 years.	Replace every 50 years.
Catch basins	Clean and inspect 50% annually (Approx. 8527). Record and monitor debris levels for cleaning prioritization.	Replace 50% of assets that have reached end of EEL over 10 years.	Perform rehabilitation to extend EEL for 10% of inspected catch basins over 10 years.	Replace every 50 years.
Force Mains	Visual inspection every 2 weeks during pump station inspection. PACP CCTV inspect every 5 years.			Replace every 75 years.
Siphons	Clean and inspect annually.			Replace every 100 years.
Culverts	CCTV/walk/inspect all culverts annually.	Replace/rehabilitate top 10% by POF.		Replace every 100 years.
Open Channels	Walk, inventory and inspect 6 miles of open channel annually.		Remove debris at 5 site per mile inspected.	Restore 25% minor, 15% moderate and 3% severe construction for length inspected each year.
Ditches	Inspect 6 miles of roadside ditch annually.			Grade or clean 10% of length inspected.
Discharge Points	Inspect all discharge points every 3 years to satisfy MS4 requirements.	Replace top 10% by POF each cycle.	Stabilize bank and erosion control at 15% of assets each cycle.	Replace every 100 years.
Creek gates	Inspect annually, clean as needed. Record and monitor conditions for prioritization.			Costs included with adjacent assets.
Detention Basins	Complete site inspection 3 times annually including routine maintenance.			Facility renovation every 50 years. Includes re-grading, seeding, renew inlet/outlet structures
Infiltration Basins	Clean, inspect and complete infiltration test every 3 years.			Replace system every 100 years.
Lift Stations	Inspect facility every 2 weeks. Integrate bi-weekly inspection data with GIS.			Replace pumps every 20 years, structural, mechanical and electrical components replaced every 50 years.
Hydro Separators	Clean and inspect annually. Record debris accumulation for prioritizing cleaning schedule and frequency.			Replace every 100 years.
Green Infrastructure	Inspect and perform recommended maintenance 6 times annually.			Invest 30% of all collection system capital renewal costs on GI. GI=+25% increase to construction costs.

Continuous Improvement Process

The level of service definitions should be periodically reviewed and updated. Specifically as the condition assessment information transitions from an age based approach to condition based, the definitions used to identify the various levels of service should be updated accordingly.

PROJECTED ANNUAL COST

The projected annual costs to provide these levels of service are shown in Table 4-6 through Table 4-9.

Table 4-6 Projected Annual Cost - Existing Level of Service

Assets	Inspection	Prevention Maintenance	Corrective Maintenance	System Renewal	Total
Gravity Mains			\$200,000	\$1,537,000	\$1,737,000
Manholes					\$0
Laterals					\$0
Catch basins			\$600,000		\$600,000
Pressurized Mains					\$0
Siphons					\$0
Culverts (stream crossings)			\$20,000		\$20,000
Open Channels			\$5,000		\$5,000
Roadside Ditches					\$0
Discharge Points					\$0
Creek gates					\$0
Detention Basins			\$5,000		\$5,000
Infiltration Basins (underground)					\$0
Lift Stations	\$40,000				\$40,000
Hydro Separators					\$0
Green Infrastructure					\$0
<i>Subtotal of asset classes</i>	<i>\$40,000</i>	<i>\$0</i>	<i>\$830,000</i>	<i>\$1,537,000</i>	<i>\$2,407,000</i>
O&M (inspection, corrective and preventative maintenance)					\$870,000
Capital Renewal (system renewal)					\$1,537,000
Street Sweeping					\$780,000
Planning					\$0
Regulatory Compliance					\$250,000
Development Regulation					\$160,000
Total					\$3,597,000

Table 4-7 Projected Annual Costs - Level of Service C

Assets	Inspection	Prevention Maintenance	Corrective Maintenance	System Renewal	Total
Gravity Mains	\$110,000	\$647,000	\$299,000	\$2,439,000	\$3,495,000
Manholes	\$6,100	\$28,000	\$12,000	\$261,000	\$307,100
Laterals	\$11,500	\$60,000	\$13,000	\$431,000	\$515,500
Catch basins	\$639,000	\$14,000	\$24,000	\$560,000	\$1,237,000
Pressurized Mains	\$200			\$1,000	\$1,200
Siphons	\$2,100			\$1,700	\$3,800
Culverts (stream crossings)	\$9,700	\$43,000		\$11,000	\$63,700
Open Channels	\$7,000	\$3,000		\$102,000	\$112,000
Roadside Ditches	\$2,100			\$19,100	\$21,200
Discharge Points	\$28,000	\$1,200	\$66,000	\$12,000	\$107,200
Creek gates	\$13,200			\$0	\$13,200
Detention Basins	\$6,500			\$11,300	\$17,800
Infiltration Basins (underground)	\$200			\$7,000	\$7,200
Lift Stations	\$57,200			\$2,219,000	\$2,276,200
Hydro Separators	\$4,000			\$700	\$4,700
Green Infrastructure	\$9,000			\$505,000	\$514,000
<i>Subtotal of asset classes</i>	<i>\$905,800</i>	<i>\$796,200</i>	<i>\$414,000</i>	<i>\$6,580,800</i>	<i>\$8,696,800</i>
O&M (inspection, corrective and preventative maintenance)					\$2,116,000
Capital Renewal (system renewal)					\$6,581,000
Street Sweeping					\$1,020,000
Planning					\$200,000
Regulatory Compliance					\$300,000
Development Regulation					\$160,000
Total					\$10,377,000

Table 4-8 Projected Annual Cost - Level of Service B

Assets	Inspection	Prevention Maintenance	Corrective Maintenance	System Renewal	Total
Gravity Mains	\$212,000	\$1,207,000	\$598,000	\$2,927,000	\$4,944,000
Manholes	\$6,100	\$55,000	\$23,000	\$313,000	\$397,100
Laterals	\$20,100	\$104,000	\$25,000	\$575,000	\$724,100
Catch basins	\$894,000	\$26,000	\$48,000	\$746,000	\$1,714,000
Pressurized Mains	\$300			\$1,400	\$1,700
Siphons	\$2,100			\$2,000	\$4,100
Culverts (stream crossings)	\$9,700	\$86,000		\$14,000	\$109,700
Open Channels	\$11,000	\$11,000		\$291,000	\$313,000
Roadside Ditches	\$3,200			\$72,000	\$75,200
Discharge Points	\$47,000	\$6,000	\$142,000	\$14,000	\$209,000
Creek gates	\$13,200			\$0	\$13,200
Detention Basins	\$6,500			\$15,000	\$21,500
Infiltration Basins (underground)	\$500			\$8,000	\$8,500
Lift Stations	\$64,400			\$2,531,000	\$2,595,400
Hydro Separators	\$4,000			\$900	\$4,900
Green Infrastructure	\$25,000			\$1,314,000	\$1,339,000
<i>Subtotal of asset classes</i>	<i>\$1,319,100</i>	<i>\$1,495,000</i>	<i>\$836,000</i>	<i>\$8,825,000</i>	<i>\$12,474,400</i>
O&M (inspection, corrective and preventative maintenance)					\$3,651,000
Capital Renewal (system renewal)					\$8,825,000
Street Sweeping					\$1,140,000
Planning					\$600,000
Regulatory Compliance					\$350,000
Development Regulation					\$160,000
Total					\$14,726,000

Table 4-9 Projected Annual Cost - Level of Service A

Assets	Inspection	Prevention Maintenance	Corrective Maintenance	System Renewal	Total
Gravity Mains	\$482,000	\$3,252,000	\$996,000	\$3,658,000	\$8,388,000
Manholes	\$16,200	\$175,000	\$37,000	\$391,000	\$619,200
Laterals	\$80,500	\$262,000	\$41,000	\$862,000	\$1,245,500
Catch basins	\$1,276,500	\$94,000	\$80,000	\$1,119,000	\$2,569,500
Pressurized Mains	\$500			\$1,800	\$2,300
Siphons	\$2,100			\$2,500	\$4,600
Culverts (stream crossings)	\$19,300	\$86,000		\$17,000	\$122,300
Open Channels	\$11,000	\$18,000		\$681,000	\$719,000
Roadside Ditches	\$5,000			\$191,000	\$196,000
Discharge Points	\$47,000	\$27,000	\$142,000	\$1,700	\$217,700
Creek gates	\$13,200			\$0	\$13,200
Detention Basins	\$6,500			\$22,500	\$29,000
Infiltration Basins (underground)	\$900			\$10,000	\$10,900
Lift Stations	\$85,800			\$3,136,000	\$3,221,800
Hydro Separators	\$4,000			\$1,000	\$5,000
Green Infrastructure	\$49,000			\$2,694,000	\$2,743,000
<i>Subtotal of asset classes</i>	<i>\$2,102,500</i>	<i>\$3,920,000</i>	<i>\$1,296,000</i>	<i>\$12,788,500</i>	<i>\$20,107,000</i>
O&M (inspection, corrective and preventative maintenance)					\$7,319,000
Capital Renewal (system renewal)					\$12,789,000
Street Sweeping					\$1,200,000
Planning					\$1,000,000
Regulatory Compliance					\$400,000
Development Regulation					\$160,000
Total					\$22,868,000

5. SUSTAINABILITY

The City has charged their staff with adapting operations to become more sustainable with regards to natural and financial resources. The level of funding required to complete full system replacement is so large that a strategic, sustainable approach is required. With the City near full developmental capacity in most areas, and the existing stormwater infrastructure already exhibiting signs of strain, the City must adopt an approach that not only addresses inadequate and aging assets, but also moves towards stormwater reduction. To help meet goals of enhancing the quality of the natural environment, policies must promote improved stormwater quality.

Applying policies to provide incentive to homeowners and businesses to reduce the amount of discharge must be combined with high performing infrastructure. There are many acceptable techniques for replacing existing gray infrastructure with green infrastructure to both reduce the volume of stormwater runoff and improve the water quality discharged to the receiving waters. This will help achieve the triple bottom line for economic, social and environmental impact. This plan incorporates the benchmarks set in the sustainability plan in several ways, including:

ECONOMIC BENEFITS

- Reducing flow rates and eliminating the need for major capital improvements such as storage facilities and increases in pipe capacity.
- Proactive inspection and design policies, coupled with effective O&M programs to reduce the number of emergency calls and allows for controlled approach to renewal.
- Increased implementation of green infrastructure best management practices leads to local job growth and talent attraction and retention.

SOCIAL BENEFITS

- Reduced runoff and a well maintained system will reduce the occurrences of flooding and reduce complaints.
- Well planned, integrated capital improvement projects can minimize disruption to residents and businesses.
- Implementation of green infrastructure best management practices creates attractive, green public spaces, more trees, and cleaner streets.
- Improved local water quality helps maintain public health and safety and enhances recreational activities.

ENVIRONMENTAL BENEFITS

- Improved runoff quality can lead to higher water quality in surface waters.
- Reductions in stormwater runoff preserve and restore ecological habitats, biodiversity, and stream stability.

6. PROPOSED ASSESSMENT PROGRAM

INTRODUCTION

The largest portion of the 20-year capital improvement plan will include renewal of existing assets through projects which have yet to be defined. The majority of the stormwater assets include gravity sewers and associated manholes. To effectively determine which assets require renewal, a comprehensive assessment program is required. Considering a large percentage of the stormwater system should be in acceptable condition, money spent on inspection can be a very good investment. For a relatively low cost, a significant number of assets can be inspected to enable making decisions on whether to rehabilitate or replace assets, or in many cases do nothing.

Information obtained from the assessment program should be incorporated into the GIS for use in the IO toolset to identify assets with the highest probability and consequence of failure. This will provide a ranking of assets that require attention, and then renewal projects may be identified. Accumulation of CCTV inspection data will also assist in identifying trends in the data regarding asset condition as a function of age, material, and general geographic locations.

For the assessment program, Level of Service B was selected as the baseline for developing projects and costs.

METHODOLOGY

Annual Inspections Assignments

Level of Service B indicates that the all assets greater than 50-years would be investigated over a 10-year period. The gravity sewers and associated infrastructure make up the bulk of the assets, and were the primary focus of the assessment program. Assets that met the Level of Service B definition (Table 4-4) were identified and prioritized. The prioritized assessment list was then divided into fiscal years based on the annual assessment spending budget.

Proposed Renewal Strategy

For the purpose of estimating future expenditures the assets to be rehabilitated or replaced are based on the following assumptions:

1. Assets with an EEL less than or equal to 10 years will be replaced. Pipes were assumed to be replaced with the same size pipe.
2. Assets with an EEL greater than 10 years and less than or equal to 25 years will be rehabilitated. This assumes these assets will receive a liner to extend the effective life.
3. Twenty five percent (25%) of assets with an EEL greater than 25 years will require rehabilitation.
4. Gravity mains that are smaller than current City design standards (12 inch diameter) will be replaced with a 12 inch pipe.

The actual repair or replacement method selected would be based on the results of the assessment phase. The actual renewal strategy selected should also take into consideration a hydraulic evaluation and other infrastructure improvements.

RESULTS

Based on Level of Service B (page 42) , a total of 4,953 reaches of gravity sewer were identified for the assessment program. The annual assessment cost for performing this level of service is approximately

\$212,000. The assets requiring evaluation were prioritized and distributed over the proposed ten year program schedule. The results of prioritizing the assessment of the gravity mains are provided on system maps in Appendix B. An excerpt of these maps is shown in Figure 6-1 to illustrate the level of detail provided.

Figure 6-1 Assessment Strategy Example Map

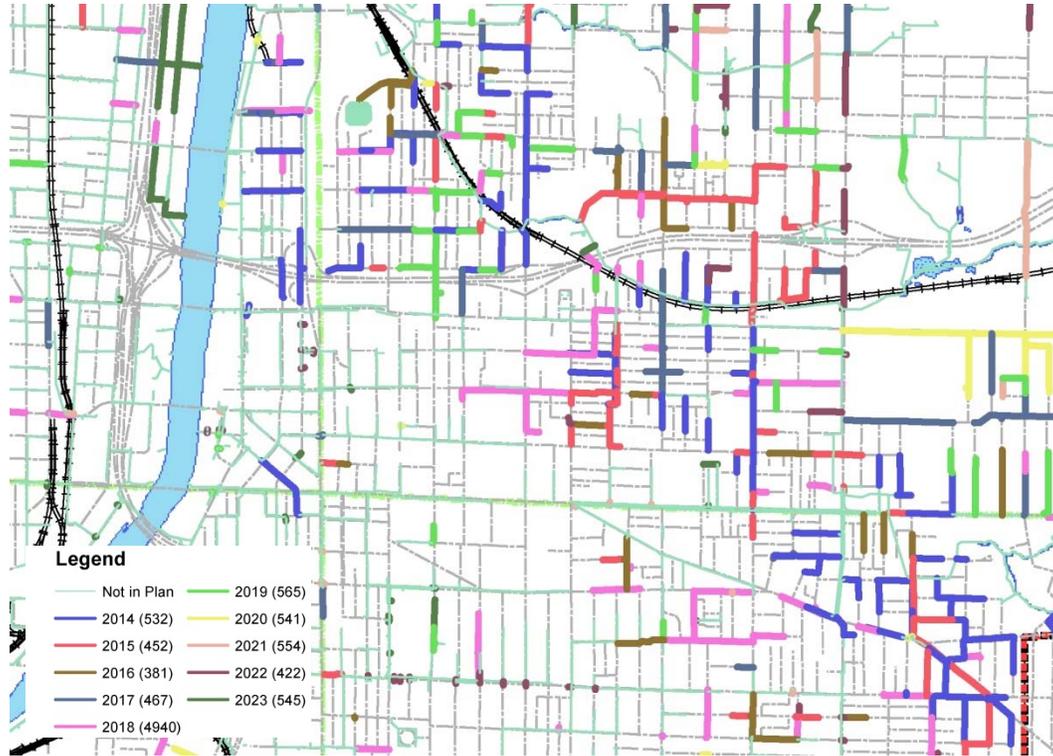


Table 6-1 summarizes the number and length of gravity mains to be assessed each year. Using the proposed renewal strategy (page 53), an estimated annual renewal cost is provided. Renewal costs initially begin high and decrease over time because the oldest pipes are assessed first and are replaced instead of rehabilitated based on the proposed renewal strategy. As the program progresses, the amount of deficient sewers is expected to decrease as the effective life of the system increases.

Table 6-1 Projected 10-Year Gravity Main Assessment

Year	FY	Number of Reaches	Pipe Assessment Length (LF)	Cost for Selected Renewal
1	2014	532	117,159	\$14,233,000
2	2015	452	98,633	\$15,383,000
3	2016	381	87,094	\$17,635,000
4	2017	467	103,480	\$14,557,000
5	2018	494	103,331	\$14,682,000
6	2019	565	115,766	\$8,371,000
7	2020	541	113,964	\$3,329,000
8	2021	554	118,038	\$3,562,000
9	2022	422	87,020	\$4,673,000
10	2023	545	107,023	\$4,355,000
Totals:		4,953	1,051,508	\$100,780,000

DISCUSSION

Planning Work Following Assessments

Based on the lack of historical assessment data or a defined asset improvement program, an initial ‘catching up’ phase is expected where more work is identified than can be repaired in a given fiscal year. Some recommended factors to use in determining a prioritization for construction projects include:

- Assets that are at or near failure.
- Assets that are critical to operation, such as trunk sewers.
- Assets found within sensitive areas such as business districts or areas of environmental concern.
- Coordination with other infrastructure projects.

During detailed design for these projects, projects should be assembled by grouping together similar types of work. For example initiating a sewer rehabilitation program to line pipes and restore structures along the collection system separately from replacement projects which require open cut construction. Other factors to consider would be general location of the proposed repairs to confine the project to specific geographic areas in order to minimize disruption to businesses and residents.

Once the oldest parts of the system are assessed, there will be a gradual reduction in major defects, until the types of problems found shift from structural issues in old and poorly constructed sewers to maintenance issues. Pipe and manhole assets that aren’t in failure mode can usually be repaired or improved using trenchless techniques such as cleaning, root removals and lining to significantly extend the expected life of a sewer, which should then be recorded in the GIS database so a work history can be followed for each asset. This allows tracking of which pipes were renewed, and also helps to identify recurring problems so that more or less frequent inspections can be made. A 10-year inspection cycle was proposed for the initial assessment phase to account for the large quantity of assets to be inspected.

Planning for Years 10 Through 20

After the first 10-year inspection period, the results of the assessment program should be evaluated to determine where to focus the remaining asset investigation. Potential options for years 10 through 20 of the capital improvement plan include:

- Begin inspection of assets less than 50-years old.
- Re-inspect assets greater than 50-years old that were not renewed during the previous assessment cycle.
- Establish a frequent cleaning and inspection program for assets which exhibited high sedimentation to monitor the accumulation of debris in problem areas.

7. CAPITAL IMPROVEMENTS

INTRODUCTION

This section of the report identifies capital projects for assessment, design, and construction. A Level of Service B was selected as the baseline for developing projects and costs. Key differences between LOS B and existing operations include:

- Inspect all elements of the collection system including gravity mains, laterals, manholes, and catch basins over 50 years old within a 10 year period.
- Completion of a thorough inventory and inspection of all open channels and roadside ditches in the system, including culverts and outfalls found along each channel.
- Increased inspection and maintenance procedures for detention/retention basins, pump stations and green infrastructure.
- Implement a comprehensive system renewal program that repairs failed or failing infrastructure, and includes systematic assessment and replacement or rehabilitation of aging assets.
- Emphasize low impact design and green infrastructure to assist in flow volume reduction and improvements to water quality

The activities shown in Table 4-4 were used to develop funding requirements to meet this level of service. Funding needed for each level of service B is detailed in Table 4-8, on page 48 and is summarized below in Table 7-1. The capital improvement plan was based on this cost, and activities and projects were selected to meet this level of annual spending.

Table 7-1 Projected Annual Cost Level of Service B Summary

Stormwater Activity	Annual Funding Requirement
Capital Renewal	\$8,825,000
O&M	\$3,651,000
Street Sweeping	\$1,140,000
Planning	\$600,000
Regulatory Compliance	\$350,000
Development Regulation	\$160,000

METHODOLOGY

Specific capital improvement projects were selected for the 20-year plan using various methods based on historical information, recent field investigations, and the results of the asset inventory and risk assessment. Three main categories of projects were identified, including:

- Capital projects initiated by other departments
- Previously identified stormwater projects
- Miscellaneous identified projects

Capital Projects For Other Utilities

The City has capital improvement projects scheduled through 2018. These already defined projects from the Streets, Sewage, and Water departments may overlap with potential stormwater improvement projects. Performing road, sewer, and water projects together may benefit the City by providing

engineering and construction cost savings. Completing all needed improvements in an area also helps avoid issues such as a sewer failure beneath a recently resurfaced road. Key considerations and benefits for the different project types are shown below.

Streets Projects

Street projects are categorized as full reconstruction or resurfacing projects. Full reconstruction projects are ideal projects for also making stormwater improvements as there will not be added restoration costs for pavement replacement associated with sewer construction.

Resurfacing projects will receive less priority though are still considered. If the adjacent stormwater asset has less remaining life than the expected pavement repair, the stormwater project should be included with the street project. Costs to do any open cut replacement can be minimized due to less pavement to restore to the top of the milled profile of the surface. Excavation limits could also be limited to what is deemed necessary, rather than having to replace an entire lane or road width to avoid unsightly pavement patches which tend to settle and fail at accelerated rates.

Sewage Projects

In most cases sanitary sewers are located deeper than the storm sewers. Repair of sanitary sewers often impacts both the pavement and adjacent stormwater infrastructure. Performing necessary stormwater improvements in conjunction with sanitary projects can provide greater efficiency in design, and allow for correction of sub-optimal system layouts. Ancillary project costs such as mobilization and pavement restoration can be shared with a combined project, providing an overall cost savings.

Water Projects

Water Department projects provide similar benefits to projects initiated by the Sewage Department, in that pavement and traffic control costs may be split amongst participating parties. Watermain design standards for separation from other utilities and installation methods used to maintain the existing water main service during replacements may also result in good opportunities to evaluate and improve system layout and efficiencies.

Project Evaluation

The City has identified 307 proposed capital improvement projects through 2018. These projects were reviewed to determine if there were adjacent stormwater assets that may need renewal based on the EEL. This evaluation resulted in 44 projects likely requiring stormwater improvements. Planning level cost estimates were based on the renewal strategy discussed on page 59..

Previously Identified Projects

The City provided previous stormwater studies (refer to Table 7-2) for review, including the 1994 Stormwater Master Plan, the 1987 Drainage and Erosion Report, and available sub-watershed studies. These studies identified a variety of recommended stormwater improvement projects. These projects were compared with an outstanding unfunded projects list created by the City in 2010 to verify which recommended improvements were not completed. The projects described in the earlier studies generally only included planning level details, and did not include conceptual design information. Based on the available information, the following steps were taken to add these projects to the CIP:

- GIS was used to verify the recommended projects that have not been completed.
- The IO software was used to evaluate the overall risk of the stormwater assets in the recommended project areas, and generate a priority ranking. Even though projects were ranked, all applicable projects were included in the CIP.

- Costs were generated for each project using previously identified costs, and cost-forwarded to the present day using the Engineering News Record construction price index.

Due to the lack of detailed information and the amount of time that has passed since these projects were identified, these areas should be reviewed prior to project development. This will help verify the need and extent of each project so new costs may be determined.

Table 7-2 Historical Reports

Report Title	Date	Prepared For	Prepared By
Drainage/Erosion Report City of Grand Rapids	September 1987	City of Grand Rapids	City Engineer
Coldbrook Creek SMP	July 1985	Kent County Drain Commissioner	Fishbeck, Thompson, Carr & Huber
Buck Creek and Plaster Creek Watershed Management Plan	October 1988 & January 1991	Kent County Drain Commissioner	Camp Dresser & McKee
Report on Combined Sewer System Study	October 1, 1990	City of Grand Rapids	Fishbeck, Thompson, Carr & Huber; Black & Veatch
Palmer Drain Watershed Study	June 1992	City of Grand Rapids	Prein & Newhof
Indian Mill Creek Watershed Stormwater Management Plan Summary, Conclusions and Recommendations – Draft	October 27, 1993	Alpine Charter Township City of Grand Rapids City of Walker	McNamee, Porter & Seeley
Indian Mill Creek SMP	March 1994	City of Grand Rapids	McNamee, Porter & Seeley
Stormwater Master Plan	November 1994	City of Grand Rapids	McNamee, Porter & Seeley
Report on Improvements to the Whiskey Creek Watershed	February 1999	City of Grand Rapids City of Kentwood and Kent County Drain Commissioner	Black & Veatch
Report on Whiskey Creek Watershed Analysis	October 2004	City of Grand Rapids City of Kentwood and Kent County Drain Commissioner	Black & Veatch

Miscellaneous Projects

As part of preparing the asset management plan, several areas were identified by the City or during field investigations as areas with historical or recent problems. A conceptual solution was identified for each problem area to generate overall project costs. Project costs were developed using the conceptual plan entered into the IO toolset.

Renewal Strategy

To estimate the amount of work that will be found during the assessment project, a renewal strategy was established to generate cost estimates. The capital improvement portion of the IO tool allows the user to assign different proposed work activities directly to the assets using an established scenario, or set of criteria. The Engineer can use this scenario to evaluate all of the assets in a given area and determine the cost to complete the proposed activity or activities which may include inspections, replacement, or cured-in-place lining on an asset-by-asset basis. To better quantify the potential spending requirements for the

assets inspected during the assessment program, assumptions were made to represent the potential work that may be required. Table 7-3 shows the assumptions made for the stormwater collection system

Table 7-3 Renewal Strategy

Remaining Useful Life	Assumed Action
≤ 10 Years	Replacement
> 10 Years and ≤ 25 Years	Rehabilitation (lining)
> 25 Years	Do Nothing (unless assessment identifies defects)

Replacement pipes are assumed to be the same size as the existing system. This assumed strategy was input into the tool as a scenario and the costs generated were considered to be anticipated spending needs for comparison against the baseline asset replacement value. The actual repair or replacement method selected would be based on the results of the assessment phase. The actual renewal strategy selected should also take into consideration a hydraulic evaluation and other infrastructure improvements.

Cost Determination

Unit cost information for each asset was determined for inspection, maintenance, rehabilitation, and replacement activities. Other factors such as depth of installation and whether the asset was under a roadway were also taken into account in the unit cost development. By entering cost information to cover potential activities such as maintenance, inspection, and rehabilitation the software can be used to quickly generate an initial cost estimate given a defined project area. Unless otherwise noted, all costs are reported in 2013 dollars. The following resources were used in developing the unit cost information:

- Construction bid tabulations and contract documents from local projects.
- Construction bid tabulations and contract documents from non-local projects adjusting for geographic differences as appropriate.
- Manufacturers were contacted for assets in cases where bid tabulation data was not readily available.

Costs for inspections, operation and maintenance activities were based on historical costs from the City of Grand Rapids and other communities.

CAPITAL PROJECTS FOR OTHER UTILITIES

A five-year list of 427 proposed capital improvement projects for construction through 2018 was reviewed. From this list projects that are receiving funding and that would be conducive to renewing stormwater assets were identified. This resulted in 80 individual line items from the list, of which 10 were Drain Commissioner reimbursement funds and 25 that were repeated as multiple year projects, resulting in 44 unique projects. Each of these project areas was assigned costs for system inspection, full system replacement, and replacement based on the strategy summarized in Table 7-3. It is recommended to plan for the assessment cost in the first year and the full replacement cost; 50% per year for 2 years following the assessment. Unspent funds can be placed in a reserve and used the following year, or for additional system inspection in other high risk areas. Replacement and rehabilitation budgets should be updated following the assessment.

Table 7-4 summarizes the estimated stormwater costs for the various capital projects identified by other departments for the next five years. Table 7-5 shows the same cost information but tabulates the information by fiscal year.

Table 7-4 Stormwater Costs for Department 5-year Capital Improvement Projects

Project #	Fiscal Year	Project Name	Stormwater Rank	Baseline Current Replacement Value (\$1000s)	Baseline Future Replacement Cost (\$1000s)	Renewal Strategy Cost (\$1000s)	Inspection Cost (\$1000s)
1746	2016-18	Plaster Creek Sanitary Trunk Sewer	M/H	\$624	\$1,242	\$71	\$13
2879	2016-17	Alpine Ave - Leonard St to Richmond St	L	\$1,194	\$4,010	\$58	\$16
2883	2016-17	Alpine Ave - Richmond St to Nason St	H	\$782	\$1,615	\$21	\$13
2925	2016-17	Fulton St - Fuller Ave to Benjamin Ave	L	\$252	\$898	\$40	\$4
2929	2016-17	Fulton St - Lafayette Ave to College Ave	M	\$268	\$866	\$42	\$5
2933	2016-17	Fulton Ave - Woodward Ave to Lakeside Ave	M	\$1,064	\$3,291	\$162	\$13
2947	2016-17	Leonard St - Alpine Ave to Turner Ave	L	\$825	\$2,522	\$84	\$13
2952	2016-17	Leonard St - Hillburn Ave to Country Club Ave	M	\$186	\$458	\$13	\$1
1426	2017	Garfield Ave - Butterworth Ave to Fulton St	L	\$343	\$1,115	\$52	\$6
1821	2017	Nason - Will to Turner	L	\$18	\$59	\$9	\$1
2887	2017-18	Burton St - Breton Ave to East Beltline	M	\$1,594	\$3,398	\$232	\$25
2937	2017	Kalamazoo Ave - 36th St to Forrester Ave	M/H	\$1,476	\$3,169	\$256	\$21
2956	2017-18	Leonard St - Plainfield Ave to Lafayette Ave	M	\$78	\$196	\$26	\$2
2960	2017-18	Leonard St - Walker Ave to Alpine Ave	L/M	\$1,482	\$4,137	\$92	\$21
2964	2017-18	Michigan St - College Ave to Eastern Ave	L/M	\$709	\$2,081	\$241	\$12
2968	2017-18	Michigan St - Diamond Ave to Fuller Ave	L	\$339	\$1,097	\$105	\$6
2975	2017-18	Monroe Ave - Lyon St to Michigan St	L	\$912	\$3,330	\$166	\$10
1406	2018	Albany-Ionia -Shelby Water Main Replacement	H	\$127	\$177	\$83	\$3
1423	2018	Langley - Plymouth to Kalamazoo Watermain	H	\$212	\$408	\$170	\$4
1425	2018	Forrester St - Water Main Replacement	M	\$84	\$119	\$91	\$2
1431	2018	Garfield Ave and Crosby St Water Main	L	\$237	\$640	\$59	\$4
2508	2018	Broadway Sanitary Trunk Sewer	H	\$4,506	\$13,773	\$372	\$56
Total				\$34,054	\$85,755	\$9,267	\$501

** All costs are reported in thousands of dollars (\$1,000s)

Table 7-5 Stormwater Costs for Department 5-year Capital Improvement Projects by Fiscal Year

No.	Project Name	2015 (\$1000s)	2016 (\$1000s)	2017 (\$1000s)	2018 (\$1000s)
1746	Plaster Creek Sanitary Trunk Sewer	\$13	\$24	\$24	\$24
2879	Alpine Ave - Leonard St to Richmond St	\$16	\$29	\$29	
2883	Alpine Ave - Richmond St to Nason St	\$13	\$11	\$11	
2925	Fulton St - Fuller Ave to Benjamin Ave	\$4	\$20	\$20	
2929	Fulton St - Lafayette Ave to College Ave	\$5	\$21	\$21	
2933	Fulton Ave - Woodward Ave to Lakeside Ave	\$13	\$81	\$81	
2947	Leonard St - Alpine Ave to Turner Ave	\$13	\$42	\$42	
2952	Leonard St - Hillburn Ave to Country Club Ave	\$1	\$7	\$7	
1426	Garfield Ave - Butterworth Ave to Fulton St		\$6	\$52	
1821	Nason - Will to Turner		\$1	\$9	
2887	Burton St - Breton Ave to East Beltline		\$25	\$116	\$116
2937	Kalamazoo Ave - 36th St to Forrester Ave		\$21	\$128	\$128
2956	Leonard St - Plainfield Ave to Lafayette Ave		\$2	\$13	\$13
2960	Leonard St - Walker Ave to Alpine Ave		\$21	\$46	\$46
2964	Michigan St - College Ave to Eastern Ave		\$12	\$121	\$121
2968	Michigan St - Diamond Ave to Fuller Ave		\$6	\$53	\$53
2975	Monroe Ave - Lyon St to Michigan St		\$10	\$83	\$83
1406	Albany - Ionia - Shelby Water Main Replacement			\$3	\$83
1423	Langley - Plymouth to Kalamazoo Watermain			\$4	\$170
1425	Forrester St - Water Main Replacement			\$2	\$91
1431	Garfield Ave and Crosby St Water Main			\$4	\$59
2508	Broadway Sanitary Trunk Sewer			\$56	\$372
Total		\$78	\$339	\$925	\$1,359

** All costs are reported in thousands of dollars (\$1,000s)

PREVIOUSLY IDENTIFIED PROJECTS

Capital improvement projects previously identified are summarized in Table 7-6. The source information includes the 1994 Stormwater Master Plan and the Stormwater Asset Management Plan Basis created by the City in 2010. The Plan Basis document also included additional miscellaneous projects the Environmental Services Department identified through complaints and O&M records. The analysis included verifying which projects were not completed and checking the risk level of the stormwater assets in each area. The projects described were limited to planning level recommendations such as adding system storage, increasing pipe capacity, and repairing erosion in open channels and ditches. While costs were previously provided, insufficient information is available describing the cost derivation. Table 7-7 provides a description of problems identified by the City. Additional details for the miscellaneous project list are required in order to estimate costs from IO toolset.

Due to the lack of detailed information of these projects and the nearly twenty years that have passed since the majority of the improvements were identified in the 1994 SWMP, it is suggested that these areas are reviewed to verify the need and extent of each project so new costs may be assessed. Projects including replacement of sewers or construction of new sewers may be treated in a similar manner as the capital project areas discussed in the previous section. These areas may be inspected through an annual O&M program, or included in nearby or adjacent projects.

Table 7-6 Previously Identified Stormwater Improvement Projects

Project FY	Project Name	Description	Watershed	Budget (1994 \$)	Est. Cost (2013 \$)	Comments
2015	Indian Mill Creek Dredging	Dredging	Indian Mill Creek	\$100,000 (1)	\$436,000	MDEQ allowed partial dredging per 1994 SWMP, remaining portion still needs to be completed as drain is severely overgrown. Assume base cost doubled due to increased regulatory requirements and 20+ years of additional sedimentation.
2016	Burton-Breton Branch of Plaster Creek - Channelization and Cleaning	Channelization and Cleaning	Burton-Breton	\$180,000 (2)	\$253,300	City provided limits of project and noted that bank stabilization has already occurred. Project only includes cleaning and channelization.
2016	Burton-Breton Branch of Plaster Creek - Enlargement of Culverts	Enlargement of Culverts crossing Okemos Dr and Annchester Drive	Burton-Breton	\$1,000,000 (2)	\$198,300	Project previously included check dams and work along the drain. Check dams removed, but drain to be cleaned immediately downstream of the culvert replacements.
2016	Indian Mill Creek Flap Gate at Jennette Ave	Backflow Prevention	Indian Mill Creek	\$10,000	\$18,000	Install flap gate after Indian Mill Creek dredging and cleaning is complete.
2017	Oakleigh Ave in Hogadone District - Channelization and Cleaning	Storm Sewer	Hogadone	\$150,000	\$261,000	Flooding in backyards along Oakleigh between Lake Michigan Drive and 7th St. Channelization and cleaning of the drain required between 7th St and Lake Michigan Drive.
2019	Maple Grove Detention Pond	Detention	Plaster Creek	\$300,000	\$522,000	City has purchased the property, but has not initiated construction of the project.

Note (1): 1987 Pricing, doubled updated cost to reflect more stringent permitting and regulations

Note (2): Costs updated per City Comments and changes to project

Table 7-7 Miscellaneous Projects

FY	Project Name	Description	Proposed Solution	Estimated Project Cost
2015	Colton Dr Culvert Replacement	2639 Colton Dr SE, humped driveway culvert, roadside ditches in disrepair and filled in.	Replace culvert and driveway approach, regrade ditch on both sides of Colton from Covington to Ardmore.	\$15,100
2015	Eastcastle Drain Improvements	Outfall and bank failure Eastcastle Drive just west of Breton Road	Replace outfall and repair erosion damage along outfall discharge path to stream.	\$15,600
2016	Capilano Stormwater Improvements	2701 Capilano - 18" Culvert to open ditch, both in massive disrepair	Replace 18" pipe back to MH and clean and channelize the open channel to the downstream culvert.	\$41,400
2016	Outfall replacement Indian Mill Creek at Richmond	Separated outfall in Indian Mill Creek near Richmond Ave	Replace outfall and repair erosion , complete bank stabilization at Indian Mill Creek	\$6,600
2017	Moreland and Longmeadow Stormwater Improvements	2552 Longmeadow - erosion since subdivision to the east was built, increased flow from Moreland to Longmeadow.	Extend curb and gutter and new storm sewer on Moreland west to the bend.	\$138,200
2017	Coldbrook Drain Rehabilitation - Michigan Ave and Fuller	KCDC enclosed bridge under Michigan at Fuller Ave	Propose more permanent rehabilitation solution and costs, approximately 100' of 114" x 75" pipe across Michigan Street ROW.	\$250,000
2018	Plaster Creek Bank Erosion	Plaster Creek Erosion along Union Ave just north of 28th St - Bank restoration along approx 1500' of plaster creek. Bank cut approximately 10 feet back at bends and roughly 7 feet high.	Full design channel protection and naturalized bank stabilization	\$506,500
2018	Eastridge Stormwater Improvements	711 Eastridge Dr. SE, Inadequate storm drainage, steep slopes	Assuming surface flooding, propose adding catch basins at intersection of Eastridge and Eastview. Upsize downstream pipes to outfall.	\$94,000
2018	Shawmut Hills Baseball Diamond Stormwater Improvements	Baseball Diamond, 610 Fairfield - Shawmut Hills	Regrade ditches along houses on Fairfield and Burrit. Including addition of underground infiltration basin to store runoff.	\$74,300
2019	Leffingwell Culvert and Erosion Repair	Culvert at Leffingwell Ave 850' north of Bradford St. significant bank erosion at crossing, erosion in stream US, impacting sewer manhole.	Perform bank stabilization and add spillways for road runoff to eliminate future erosion. Channelization of bank upstream of crossing to avoid/protect manhole.	\$15,100
2019	Brookshire Outfall Replacement and Erosion Repair	30" outfall failed causing major bank erosion	Replace outfall and stabilize bank.	\$70,700

20-YEAR CAPITAL IMPROVEMENT PLAN

Projects that were identified using the aforementioned methods were then sorted and compiled into the capital improvements. Each type of project was prioritized in a different way. Projects related to other department capital works had assessment costs designated the year before anticipated construction, with construction costs broken up for multi- year projects. Previously identified system deficiencies were assigned to a year based on which projects were considered a high priority. Since most of these projects will require additional examination, they were scheduled later in the proposed sequence. The assessment program is intended to begin immediately in order to begin accumulating condition assessment information as soon as possible. The capital improvement plan for this report has been based upon providing a B Level of Service as described in Table 4-4 (page 43).

The detailed 20-year capital improvement plan broken down to the fundamental spending categories is shown in Table 7-8 (years 2013 through 2022) and Table 7-9 (years 2023 through 2032). Appendix C contains location maps for the various capital projects.

Information regarding the planning and regulatory compliance line items contained with the 20-year capital improvement plan tables are provided in the Stormwater Master Plan (2013).

Table 7-8 20-Year Plan (FY 2014-2023)

Description	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total Project Costs (based on proposed year)										
Capital Projects for Other Utilities	\$120	\$74	\$339	\$925	\$1,359	\$1,500	\$1,500	\$1,500	\$1,500	\$1,500
Previously Identified Projects	\$0	\$436	\$470	\$261	\$0	\$522	\$0	\$0	\$0	\$0
Assessment Program Repairs	\$0	\$3,949	\$3,732	\$3,198	\$2,717	\$2,726	\$3,419	\$3,505	\$3,592	\$3,681
Miscellaneous Projects	\$0	\$31	\$48	\$286	\$675	\$86	\$0	\$0	\$0	\$0
Lift Station Fund	\$0	\$2,531	\$2,575	\$2,620	\$2,666	\$2,713	\$2,760	\$2,809	\$2,858	\$2,908
Green Infrastructure	\$0	\$1,314	\$1,337	\$1,360	\$1,384	\$1,408	\$1,433	\$1,458	\$1,484	\$1,510
Drainage Improvements and Misc. Repairs	\$175	\$175	\$178	\$181	\$184	\$188	\$191	\$194	\$198	\$201
KCDC Assessments	\$45	\$45	\$46	\$47	\$47	\$48	\$49	\$50	\$51	\$52
Emergency Repairs	\$1,197	\$250	\$254	\$259	\$263	\$268	\$273	\$277	\$282	\$287
<i>Subtotal Capital Renewal</i>	<i>\$1,537</i>	<i>\$8,825</i>	<i>\$8,980</i>	<i>\$9,137</i>	<i>\$9,297</i>	<i>\$9,459</i>	<i>\$9,625</i>	<i>\$9,793</i>	<i>\$9,965</i>	<i>\$10,139</i>
O&M Costs										
Collection System	\$800	\$3,222	\$3,278	\$3,335	\$3,394	\$3,453	\$3,513	\$3,575	\$3,637	\$3,701
Open Channels, Culverts, Outfalls	\$25	\$329	\$335	\$341	\$347	\$353	\$359	\$365	\$372	\$378
Detention Basins	\$5	\$7	\$7	\$7	\$7	\$8	\$8	\$8	\$8	\$8
Pump Stations	\$40	\$64	\$66	\$67	\$68	\$69	\$70	\$71	\$73	\$74
Green Infrastructure	\$0	\$29	\$30	\$30	\$31	\$31	\$32	\$32	\$33	\$33
<i>Subtotal O&M</i>	<i>\$870</i>	<i>\$3,651</i>	<i>\$3,715</i>	<i>\$3,780</i>	<i>\$3,846</i>	<i>\$3,913</i>	<i>\$3,982</i>	<i>\$4,052</i>	<i>\$4,122</i>	<i>\$4,195</i>
Street Sweeping	\$780	\$1,140	\$1,160	\$1,180	\$1,201	\$1,222	\$1,243	\$1,265	\$1,287	\$1,310
Planning	\$0	\$600	\$611	\$621	\$632	\$643	\$654	\$666	\$678	\$689
Regulatory Compliance	\$250	\$350	\$356	\$362	\$369	\$375	\$382	\$388	\$395	\$402
Development Regulation	\$160	\$160	\$163	\$166	\$169	\$171	\$174	\$178	\$181	\$184
Totals	\$3,597	\$14,726	\$14,984	\$15,246	\$15,513	\$15,784	\$16,060	\$16,342	\$16,628	\$16,919

*All costs reported in \$1,000s

Table 7-9 20-Year Plan (FY 2024-2033)

Description	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Total Project Costs (based on proposed year)										
Capital Projects for Other Utilities	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500
Previously Identified Projects	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Assessment Program Repairs	\$3,272	\$3,364	\$3,458	\$3,554	\$3,651	\$3,250	\$3,351	\$3,453	3,557	3,663
Miscellaneous Projects	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Lift Station Fund	\$2,959	\$3,010	\$3,063	\$3,117	\$3,171	\$3,227	\$3,283	\$3,341	\$3,399	\$3,459
Green Infrastructure	\$1,536	\$1,563	\$1,590	\$1,618	\$1,646	\$1,675	\$1,705	\$1,734	\$1,765	\$1,796
Drainage Improvements and Misc. Repairs	\$205	\$208	\$212	\$216	\$219	\$223	\$227	\$231	\$235	\$239
KCDC Assessments	\$53	\$54	\$54	\$55	\$56	\$57	\$58	\$59	\$60	\$61
Emergency Repairs	\$292	\$297	\$303	\$308	\$313	\$319	\$324	\$330	\$336	\$342
<i>Subtotal Capital Renewal</i>	<i>\$10,316</i>	<i>\$10,497</i>	<i>\$10,681</i>	<i>\$10,868</i>	<i>\$11,058</i>	<i>\$11,251</i>	<i>\$11,448</i>	<i>\$11,648</i>	<i>\$11,852</i>	<i>\$12,060</i>
O&M Costs										
Collection System	\$3,766	\$3,832	\$3,899	\$3,967	\$4,037	\$4,107	\$4,179	\$4,252	\$4,327	\$4,402
Open Channels, Culverts, Outfalls	\$385	\$391	\$398	\$405	\$412	\$420	\$427	\$434	\$442	\$450
Detention Basins	\$8	\$8	\$8	\$9	\$9	\$9	\$9	\$9	\$9	\$10
Pump Stations	\$75	\$77	\$78	\$79	\$81	\$82	\$84	\$85	\$86	\$88
Green Infrastructure	\$34	\$34	\$35	\$36	\$36	\$37	\$38	\$38	\$39	\$40
<i>Subtotal O&M</i>	<i>\$4,268</i>	<i>\$4,343</i>	<i>\$4,419</i>	<i>\$4,496</i>	<i>\$4,575</i>	<i>\$4,655</i>	<i>\$4,736</i>	<i>\$4,819</i>	<i>\$4,903</i>	<i>\$4,989</i>
Street Sweeping	\$1,333	\$1,356	\$1,380	\$1,404	\$1,428	\$1,453	\$1,479	\$1,505	\$1,531	\$1,558
Planning	\$701	\$714	\$726	\$739	\$752	\$765	\$778	\$792	\$806	\$820
Regulatory Compliance	\$409	\$416	\$424	\$431	\$439	\$446	\$454	\$462	\$470	\$478
Development Regulation	\$187	\$190	\$194	\$197	\$200	\$204	\$208	\$211	\$215	\$219
Totals	\$17,215	\$17,516	\$17,822	\$18,134	\$18,452	\$18,775	\$19,103	\$19,437	\$19,778	\$20,124

*All costs reported in \$1,000s

8. CONCLUSIONS AND RECOMMENDATIONS

SUMMARY

A 20-year citywide asset and capital management plan was developed for the public stormwater infrastructure system. The plan demonstrates how the City's goal of establishing and delivering certain levels of service may be achieved through effective and sustainable management of the stormwater system. By developing a proactive long-term plan to stormwater asset management, the City will have a sustainable system ensuring the well-being of the community, the environment, and future generations.

The general process by which the asset management plan was developed began with an inventory and assessment of the existing stormwater assets. The inventory was primarily based on the existing GIS. Assessment information for each asset group was populated from field inspection information. Next a risk analysis was conducted, including determining the probability and consequence of failure for each asset. Unit costs information was assigned to each asset group for inspection, maintenance, rehabilitation, and replacement.

Four levels of service were identified. These include three new levels of service (A, B and C) along with the current, or existing level of service. The unit price information was then used to estimate the inspection, maintenance, rehabilitation, and replacement costs for each asset group. The annual financial budget was estimated for each level of service. For planning purposes a Level of Service B was assumed.

The risk analysis was based primarily on the age of the assets due to the limited assessment information. A 10-year assessment program was developed for each level of service, as a means to transition the program from an age based system to a condition based approach. Different levels of effort were assumed for each level of service. A detailed 10-year assessment program was developed and indicated which assets should be inspected each year based on the B Level of Service assumption.

Stormwater capital improvement projects were identified from projects initiated from other departments, from previous studies and reports, through the assessment work done, and based on staff knowledge of the drainage system. Detailed costs budgets were developed for each of the identified projects based on the asset management system put into place. A comprehensive 5-year capital improvement plan was identified along with suggested budgeting information for 20-years.

To aid in the analysis, the system information was organized and stored in a computer model. The computer model provides easy access to the information for planning purposes and a mechanism to keep the information updated over time.

CONCLUSIONS

The current value of the stormwater drainage system is estimated at \$523 million. Ninety-six percent (96%) of the current investment in the drainage system is represented by the separate storm sewers, manholes, and catch basins. The remaining four percent (4%) is attributable to the pump stations, force mains, siphons, culverts, basins and green infrastructure components. Twenty-six percent (26%) of the gravity main system has less than twenty-five (25%) of its estimated effective life remaining.

The asset management system developed offers a powerful tool for managing the stormwater assets and developing cost budgets for future work. Some asset groups have better information than others, for example not much information was known on the open channel systems. A limited amount of information was available on the conditions of assets.

Infrastructure asset management is best accomplished when comprehensive inventory and assessment information is known. An aged based assessment approach is a good starting point when first setting up an asset management program. Asset management based on actual condition assessment is the preferred long term approach.

The comprehensive review and planning allowed for detailed development of annual budgets. The annual budgets take into account the 10-year assessment program to establish asset conditions, routine maintenance, anticipated rehabilitation and replacement costs, and the detailed capital improvement plans. The budgets allow for proactive management of the stormwater drainage system. In addition, the tools developed allow for efficient cost estimating for assessing and planning for future stormwater work when other projects are identified, for example when a street project is planned.

Although a capacity analysis was not included in the asset management or in the current capital improvement projects, the framework has been established to allow for incorporation of this information at a later date. A separate stormwater management plan was prepared that discusses the capacity analysis as well as other planning, policies, and design ideas for the stormwater system.

NEXT STEPS

Asset management is a continuous improvement process. As stormwater assets are added or modified and as additional information is obtained, the City's GIS and IO Toolset should be updated. Maintaining up-to-date information is crucial to successfully managing the separate stormwater drainage system.

The next steps should include:

- Continuously update and improve the dataset of information. This includes the inventory and assessment information for the various assets stored in the City's GIS and subsequently linked to the IO Toolset.
- Transition the management approach from an age based to a condition based system. The transition should occur as part of the proposed assessment program.
- As additional information is collected, periodically review and update the IO Toolset parameters. The parameters include: the weights and values assigned to the probability and consequence of failure variables; unit price cost information; planned project areas; and the renewal strategy variables.
- Use the IO Toolset as a planning and cost estimating tool for operation, maintenance, rehabilitation and renewal projects.
- Prepare and update financial budgets.

RECOMMENDATIONS

From a big picture perspective, a fundamental recommendation is to start proactively managing the stormwater system. Historically construction of the system has occurred with major development and major infrastructure projects such as the CSO program. This can be visually seen in Figure 3-6, on page 19, as the peaks of the estimated replacement costs periodically over time. Proactively managing the system will help level out the annual expenditures.

Streambank Erosion Strategy

Proactively managing the stormwater system is extended to include the open channel system within the city limits. As observed during the assessment phase of this project, significant erosion is occurring in parts of the open channel system. Often streambank erosion is due to unstable hydrology resulting from poorly managed stormwater runoff from development. Much of the open channel system is designated as Waters of the State and is regulated by the State of Michigan and the Army Corp of Engineers. Complicating matters, the City often does not have legal easements of the land containing the open channels. Historically, the state and federal agencies have not taken a proactive role in resolving streambank erosion issues. Development of a long term strategy to manage eroding streambanks is recommended.

Transition to Condition Based Asset Management

As previously discussed, transitioning the age-based asset system to a condition-based system is recommended. Specific assessment and data management recommendations to address this issue are presented in the following sections.

Sewer Assessment

Establish an annual cleaning and CCTV inspection program designed to complete a full inspection of the entire system every 10 years. The present day cost to clean and inspect all gravity mains in the system is approximately \$4,819,000, barring potential additional costs like heavy cleaning. Catch basin laterals are not recommended for cleaning and CCTV. Cleaning and inspecting laterals would be an additional cost of approximately \$804,000. CCTV inspections should be done using the PACP scoring system. PACP scoring provides for a consistent inspection and evaluation process, so all sewers inspected will have consistent structural and O&M condition information. The frequency of re-inspection can be modified based on results achieved from the initial investigation of the entire system. Cleaning and CCTV should be prioritized based on the risk assessment.

Manhole and Catch Basin Assessment

All existing manholes and catch basins should be inventoried, checked for connectivity and inspected using Manhole Assessment Certification Program (MACP). The MACP scoring system provides for a consistent inspection and evaluation process so that all structures inventoried have consistent structural and O&M condition ratings. The frequency of re-inspection can be modified based on results upon completion of the entire system.

Culvert Assessment

All stream crossings should be cleaned and CCTV inspected using the PACP rating system. The frequency of re-inspection can be modified based on results upon completion of the entire system and the selected level of service. Estimated cost to clean and inspect the culverts in the system is approximately \$20,000, not including potential extra work like heavy cleaning.

Outfall Assessment

An inspection and inventory of the outfalls is recommended. Information should be collected on the condition of both the outfall and adjacent stream bank. These inspections could be completed by the same crew tasked with performing open channel inspections. The estimated cost to inspect these assets individually is approximately \$34,000 including time to travel to individual site locations. If these assets are inspected during open channel investigations, the inspection cost is approximately \$19,000.

Open Channel and Ditch Inventory and Assessment

The open channels and roadside ditches should be inspected and assessed for condition. There is no attribute data currently entered for open channels and roadside ditch assets in the GIS database. The recommended first step is a full survey of all streams and open channels within the City limits. The survey should include points defining the beginning and ends, and representative cross-sections. It is recommended to conduct the survey based on the needs of a hydraulic model. This provides a consistent methodology and will minimize future data needs if a model analysis is performed. Breaking the assets into logical groupings such as segments between stream crossings, or other significant markers will also assist in managing particular lengths of the open channels. Problem locations should be recorded GPS coordinates. Inspections of the open channels may be done in conjunction with the recommended outfall inspections.

Green Infrastructure Assessment

The City has a limited number of green infrastructure installations to date. As more green infrastructure practices are implemented, having a program to track new installations and routine O&M activities performed will be crucial to the long-term performance and success of these practices. It is recommended that standard checklists be used for inspections. The *Low Impact Development Manual for Michigan* contains example checklists.

Data Management

Collection of data is recommended to be completed through the use of electronic devices that run GIS Arc applications. This will allow field staff to have the system information readily available to confirm locations and asset inventory information. Data entry forms should be embedded in the application to ensure consistent and pertinent data collection with minimal post-processing.

Available attribute information such as date installed, material, size, shape, and elevations from existing record drawings or current inventories should be added to the GIS. Maintaining the information in a central database will ensure consistency and will help to minimize assumptions. Some of the information recommended for use may need to be obtained during asset inspections and inventories. Plans for gathering the data should be finalized, with a clear work plan for obtaining the correct information, and staff training to implement the program. This recommendation applies to all of the various asset groups such as gravity mains, laterals, manholes, catch basins, stream crossings, culverts, outfalls, etc.

Various assets should be separated out from grouped features in GIS. For instance, culverts, siphons, and pressurized mains are all included under gravity mains. Pulling these subtypes out of the group will allow for flexibility in tailoring specific factors for each unique asset group.

Some assets such as siphons and pressurized mains are broken into several segments with unique asset IDs. While this may be useful for accurately portraying differences in slope, etc. it can be counterproductive in the IO tool and produce duplicate results when performing GIS queries. If multi-segment assets are maintained, comments should be included with references to the associated segments.

GIS information from other departments should be integrated together. It is reasonable to keep specific information unique to each department's GIS database; however, information such as the actual road outline, pavement type, and thickness would be beneficial for use in compiling project specific costs.

Information regarding the capacity of conveyance (pipes, culverts and open channels) and storage basin elements could be kept in GIS and used as a potential factor in the IO software. If a stormwater system capacity analysis is completed, conveyance and storage elements that do not meet the requirements could be weighted higher for the probability of failure, consequence of failure, or be used to assume a larger system for a renewal strategy. For example undersized culverts can lead to increased flooding and accelerated erosion at the inlet and outlet of the crossing.

For stream crossing and culverts, additional data such as the presence/type of end sections, headwalls, and permanent erosion control measures should be indicated.

Approximately 36 out of 465 outfalls do not have a size associated with them. The majority of the outfall sizes can be obtained by checking the size of the pipe they are attached to, but many are not connected to a pipe in GIS. The consistent feature of these assets was that they were all labeled as IDEP points. It is recommended that all outfalls are assigned the proper information, and to include a flag within the asset for IDEP to avoid confusion, or create a separate layer for IDEP points. Several connections that were identified as open discharge points, were actually closed discharge points, or blind ties to culverts, and should be reviewed when clarifying the layer.

Seventy-two (72) miscellaneous blind ties and culvert end sections are noted to be a discharge point. A review of how these assets are classified is recommended in order to develop a better system for tracking the preferred asset attributes and ongoing programs like IDEP.

An asset class for storage basins is recommended to be added to the GIS database. Attribute data should be populated like any other asset group. How components such as inlets, outlets, sedimentation basins, and various chambers of the storage basins are recorded should be planned in advance.

The City currently conducts inspections on the pumps and piping in each of their stormwater facilities on a bi-weekly basis. Documentation of these inspections is currently kept in the station along with pump run logs, but the data isn't currently entered to the GIS system. A full station assessment should be conducted during a typical inspection and all pertinent data such as the pumps information and individual run times should be logged into the GIS system so that information can be readily available. A pump subtype should be added to the pump stations so that specific attributes relating to the pumps can be stored separately from the station facility itself. Information such as the pump curves and operating set points could also be linked to the assets in GIS.

The GIS database for green infrastructure should continue to be maintained and updated as new practices are constructed. As-built drawings should be maintained in a central location to access as needed.

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APPENDIX A. GRAVITY MAINS RISK ASSESSMENT

A1. PROBABILITY OF FAILURE MAPS

Figure A-1 Gravity Mains Probability of Failure NW

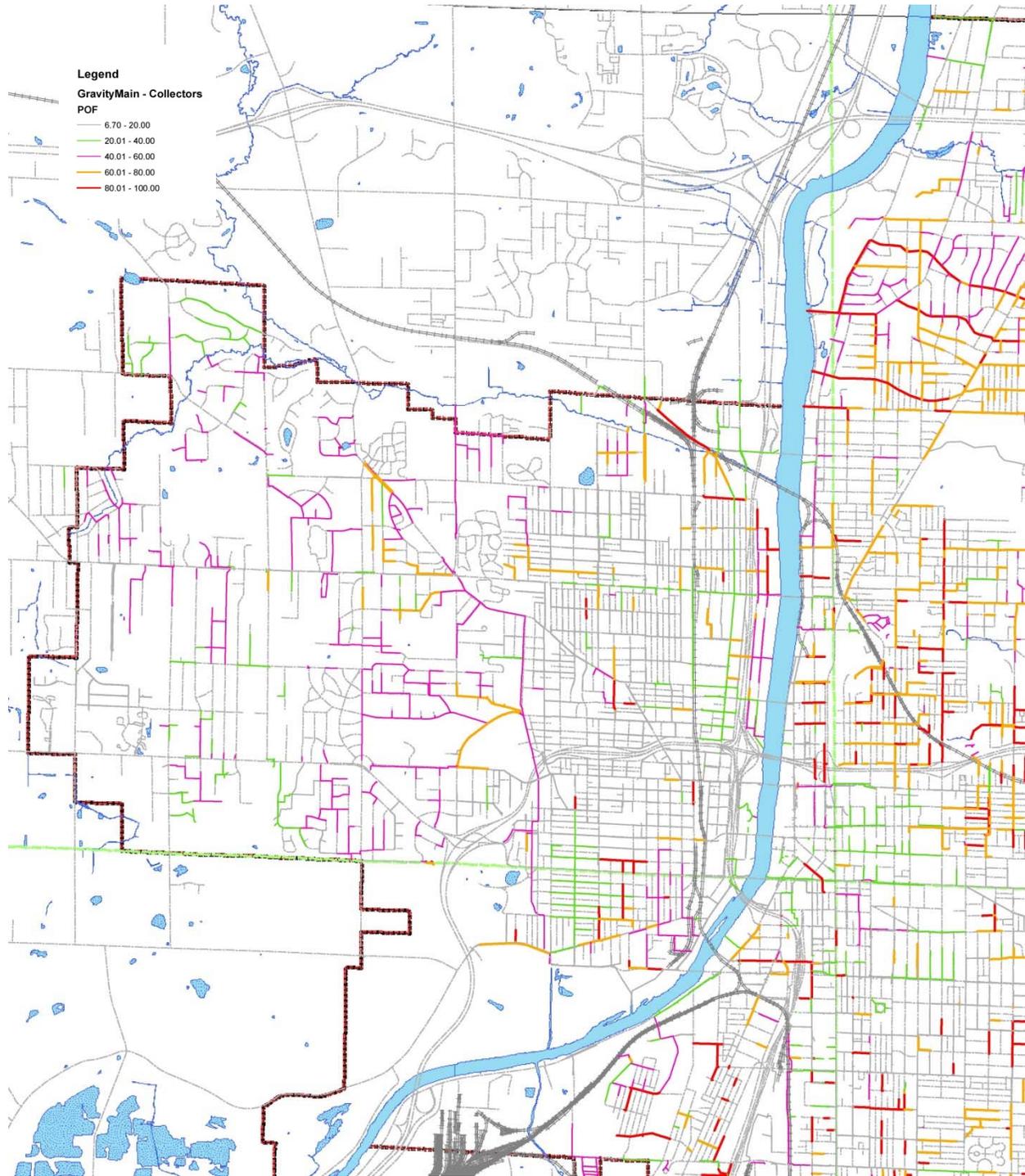


Figure A-2 Gravity Mains Probability of Failure NE

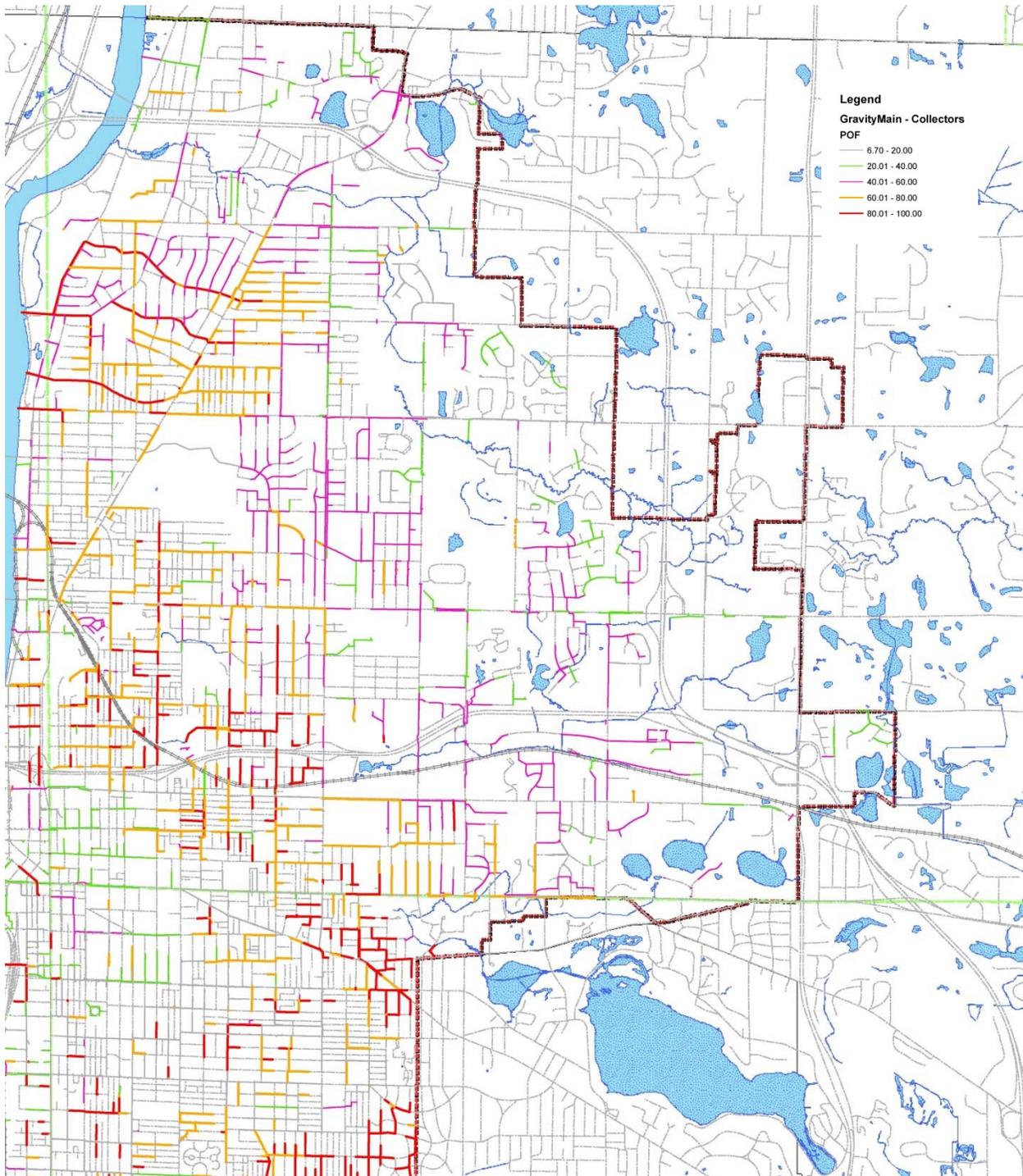


Figure A-3 Gravity Mains Probability of Failure SW

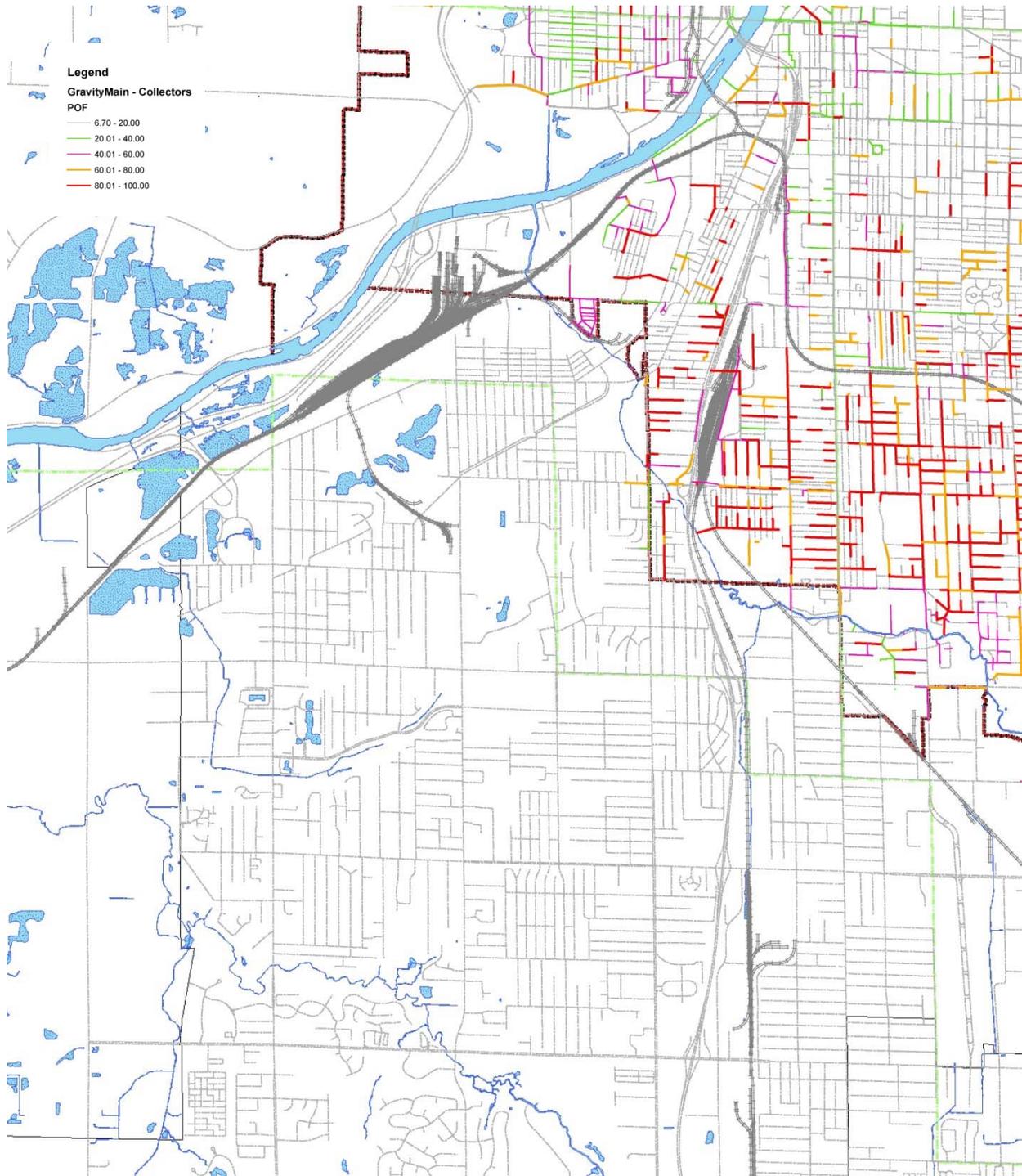
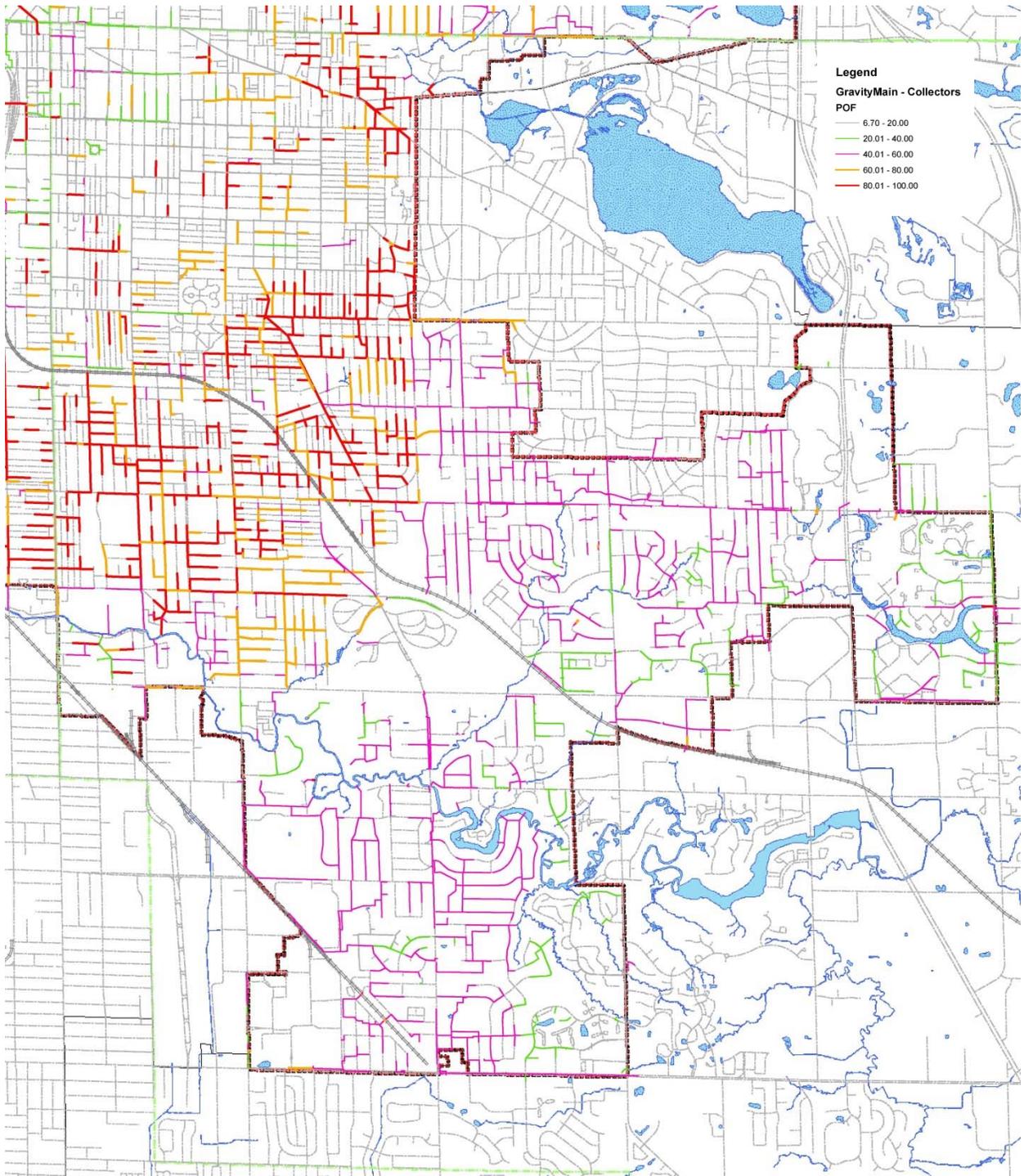


Figure A-4 Gravity Mains Probability of Failure SE



A2. CONSEQUENCE OF FAILURE MAPS

Figure A-5 Gravity Mains Consequence of Failure NW

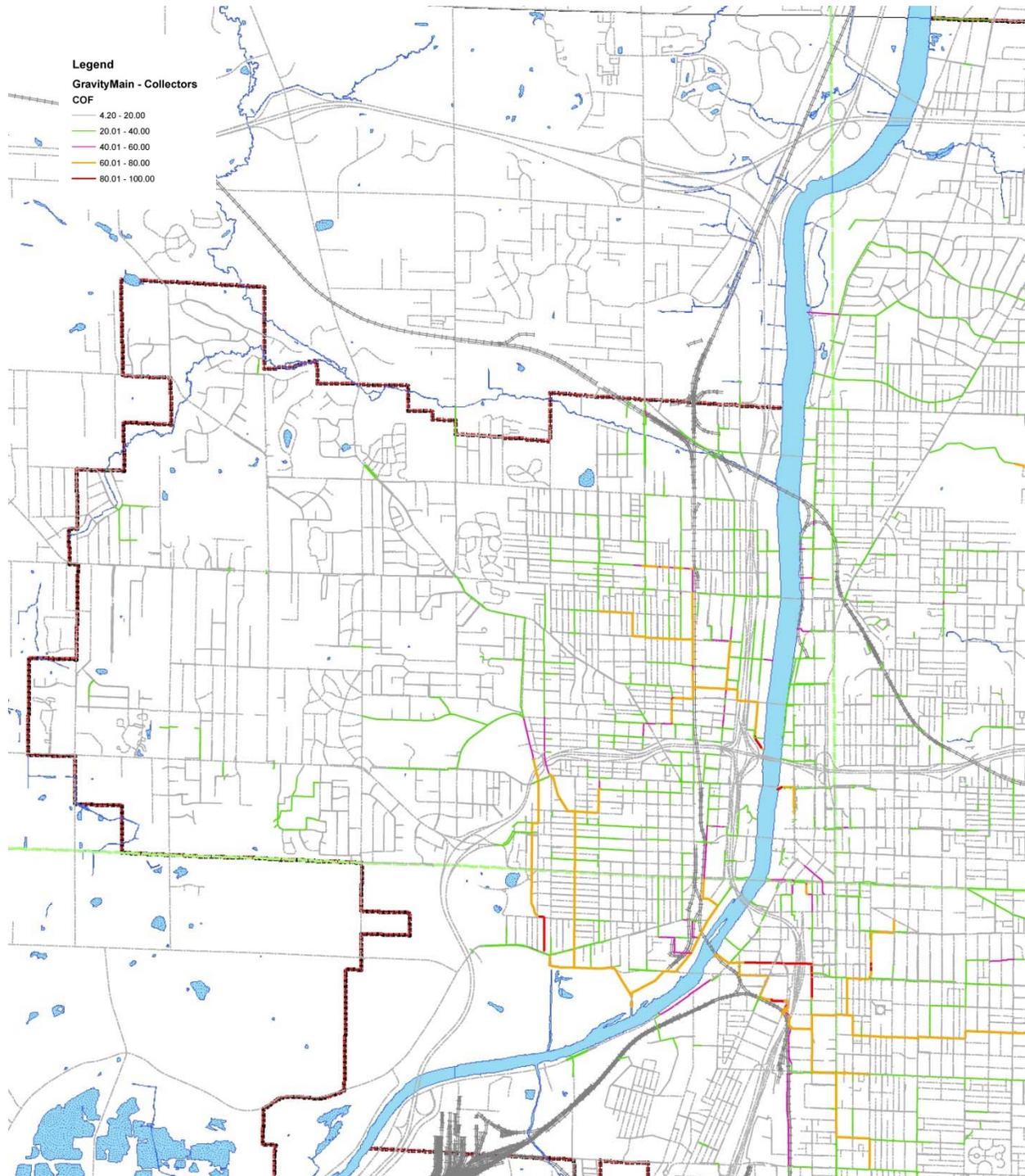


Figure A-6 Gravity Mains Consequence of Failure NE

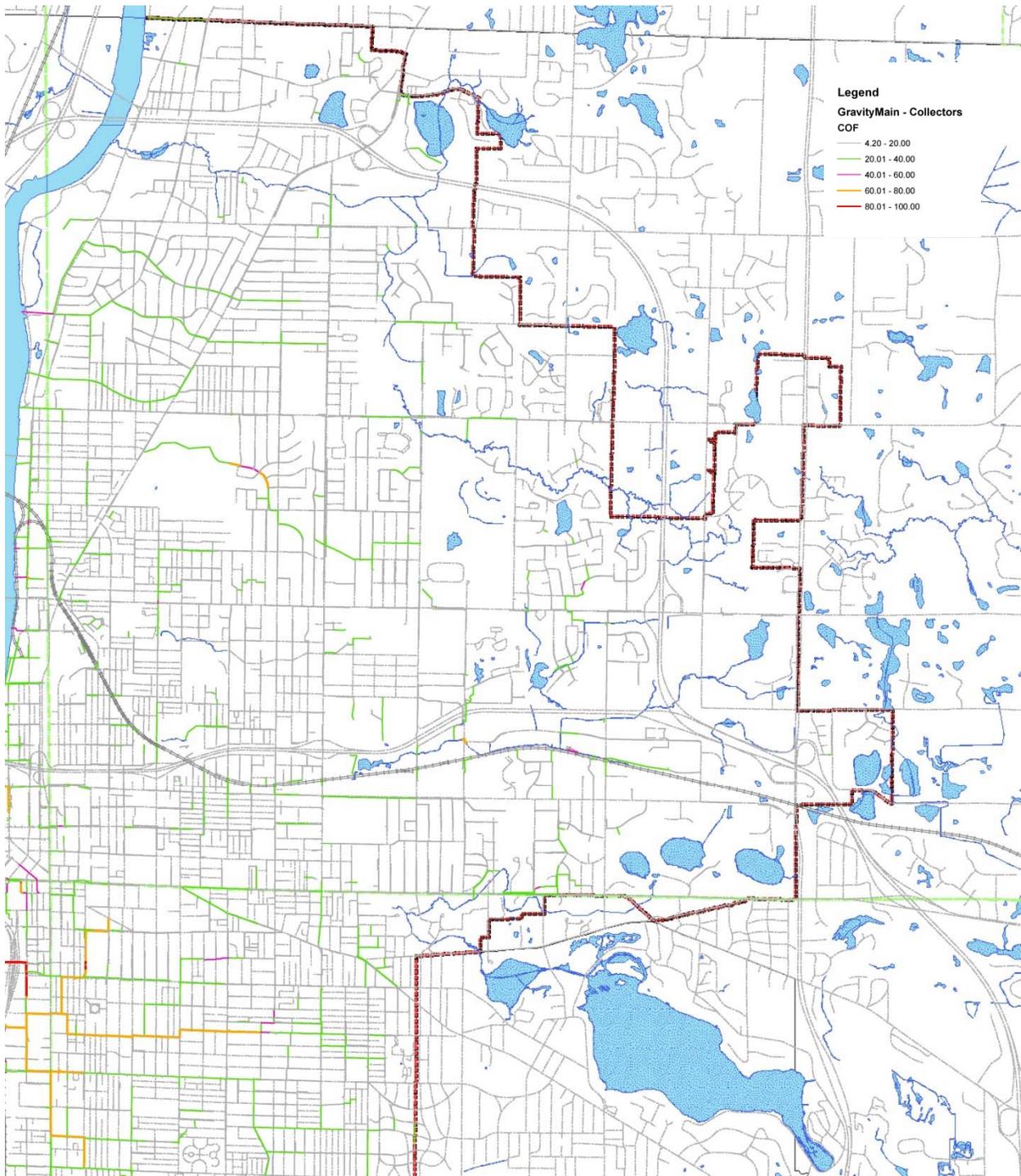


Figure A-7 Gravity Mains Consequence of Failure SW

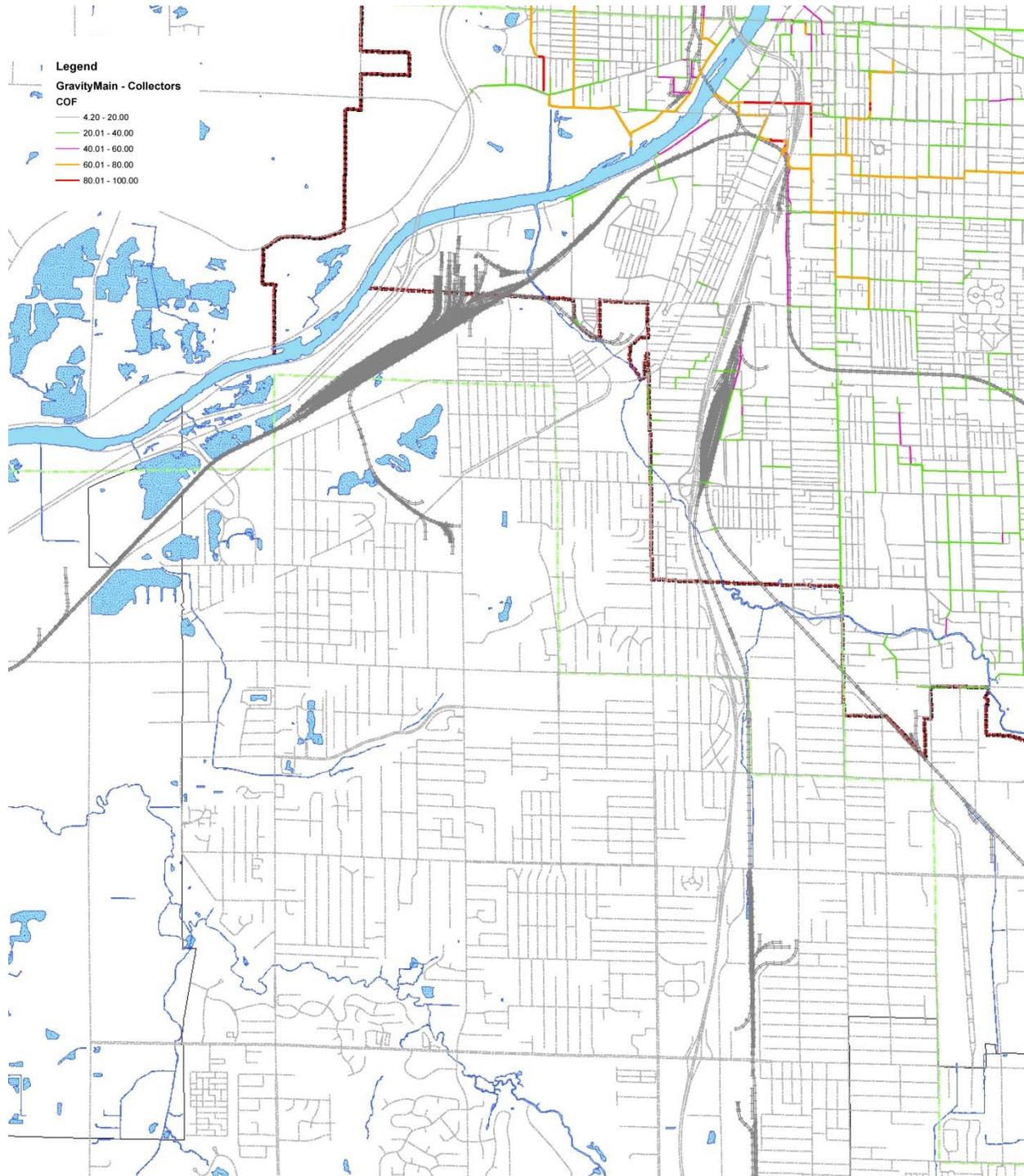
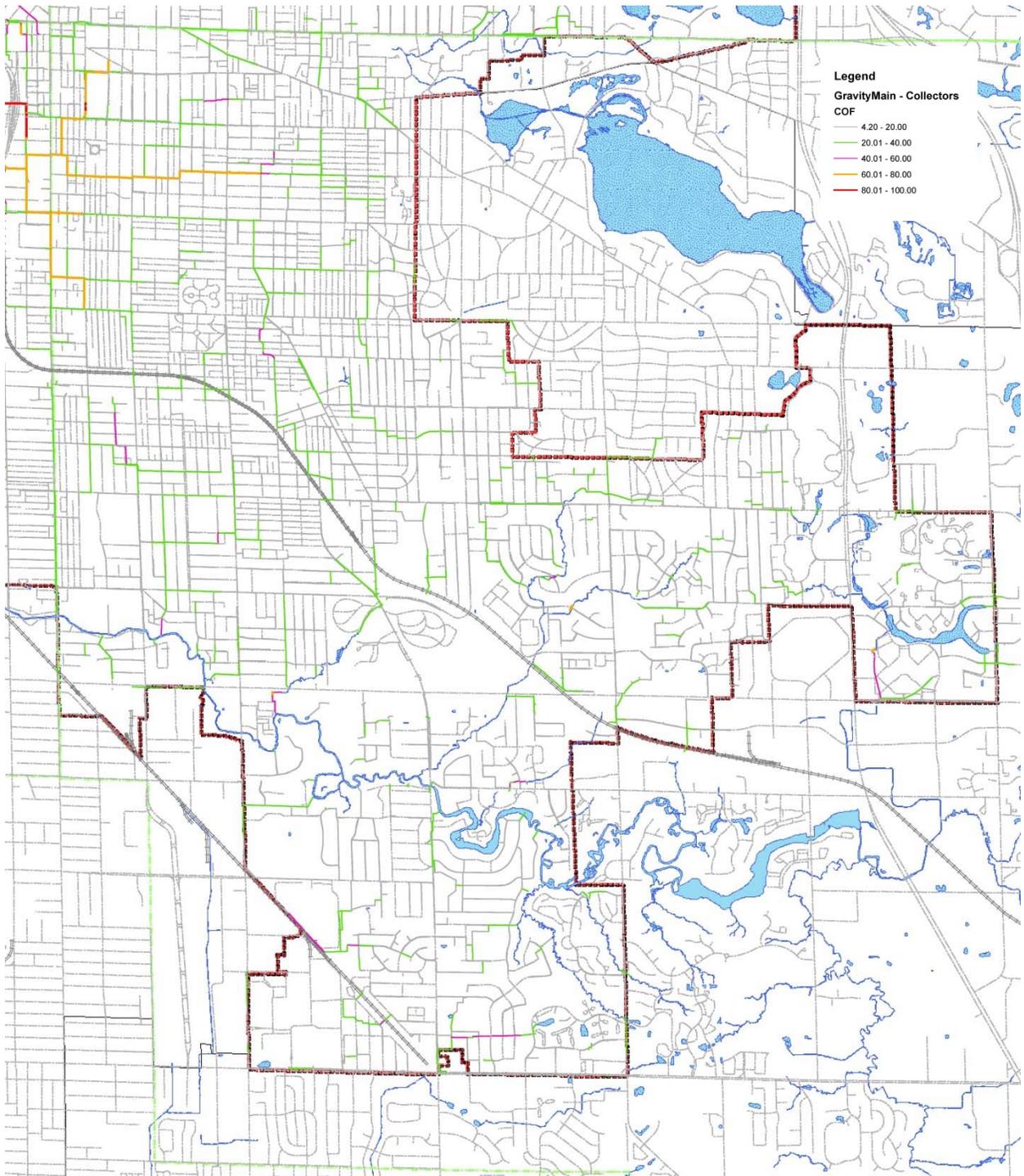


Figure A-8 Gravity Mains Consequence of Failure SE



A3. BUSINESS RISK EXPOSURE MAPS

Figure A-9 Gravity Mains Business Risk Exposure NW

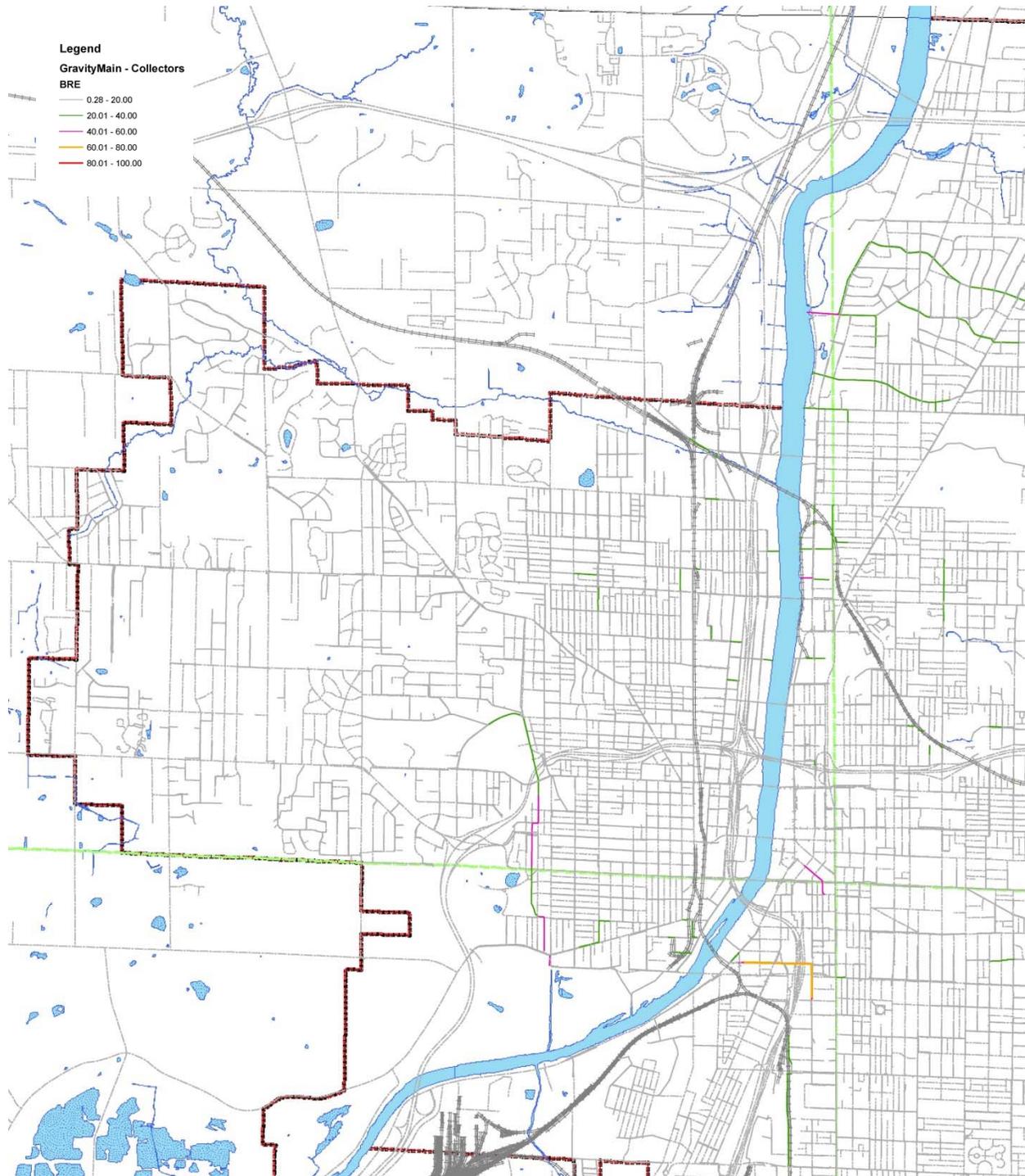


Figure A-10 Gravity Mains Business Risk Exposure NE

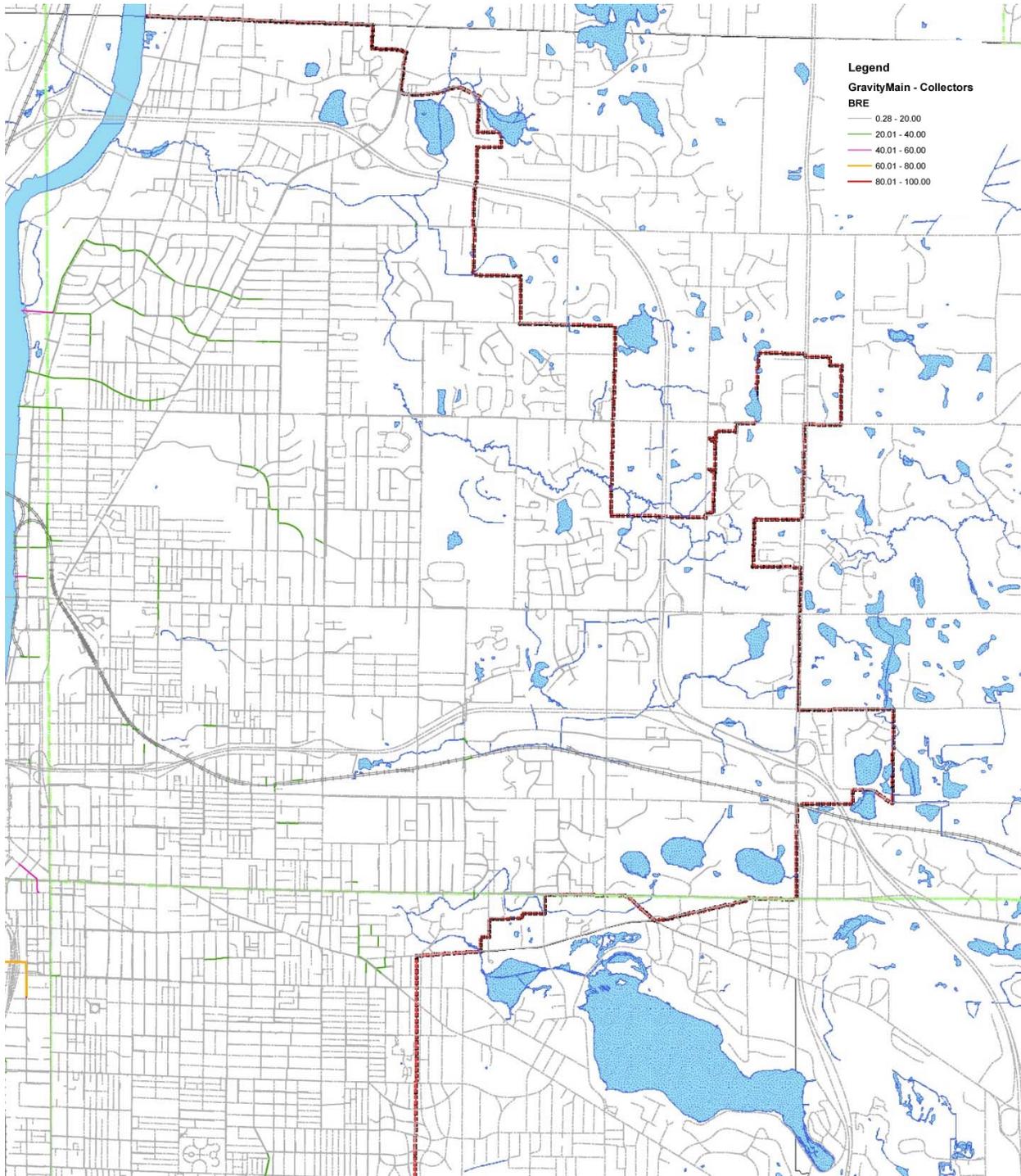


Figure A-11 Gravity Mains Business Risk Exposure SW

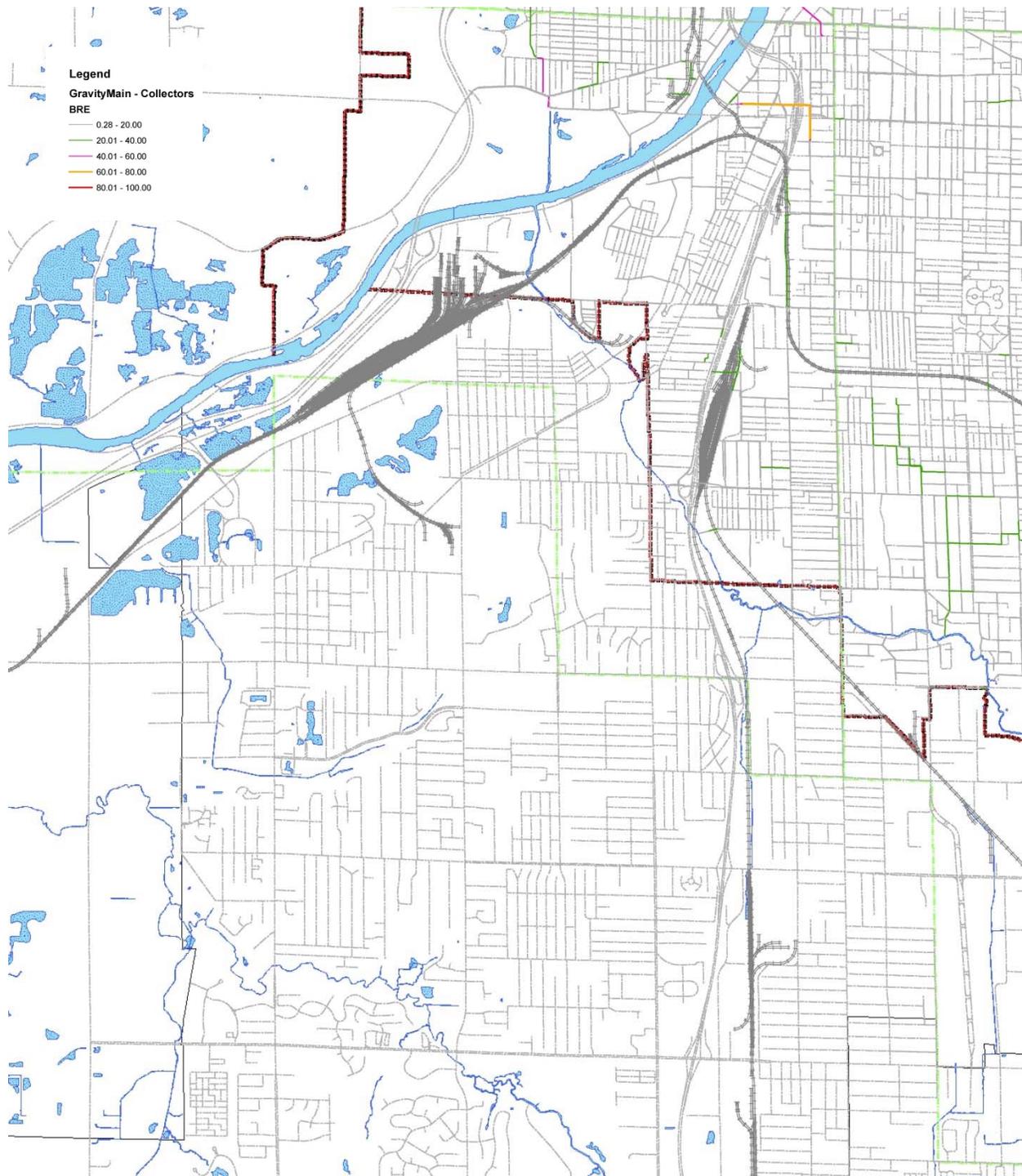
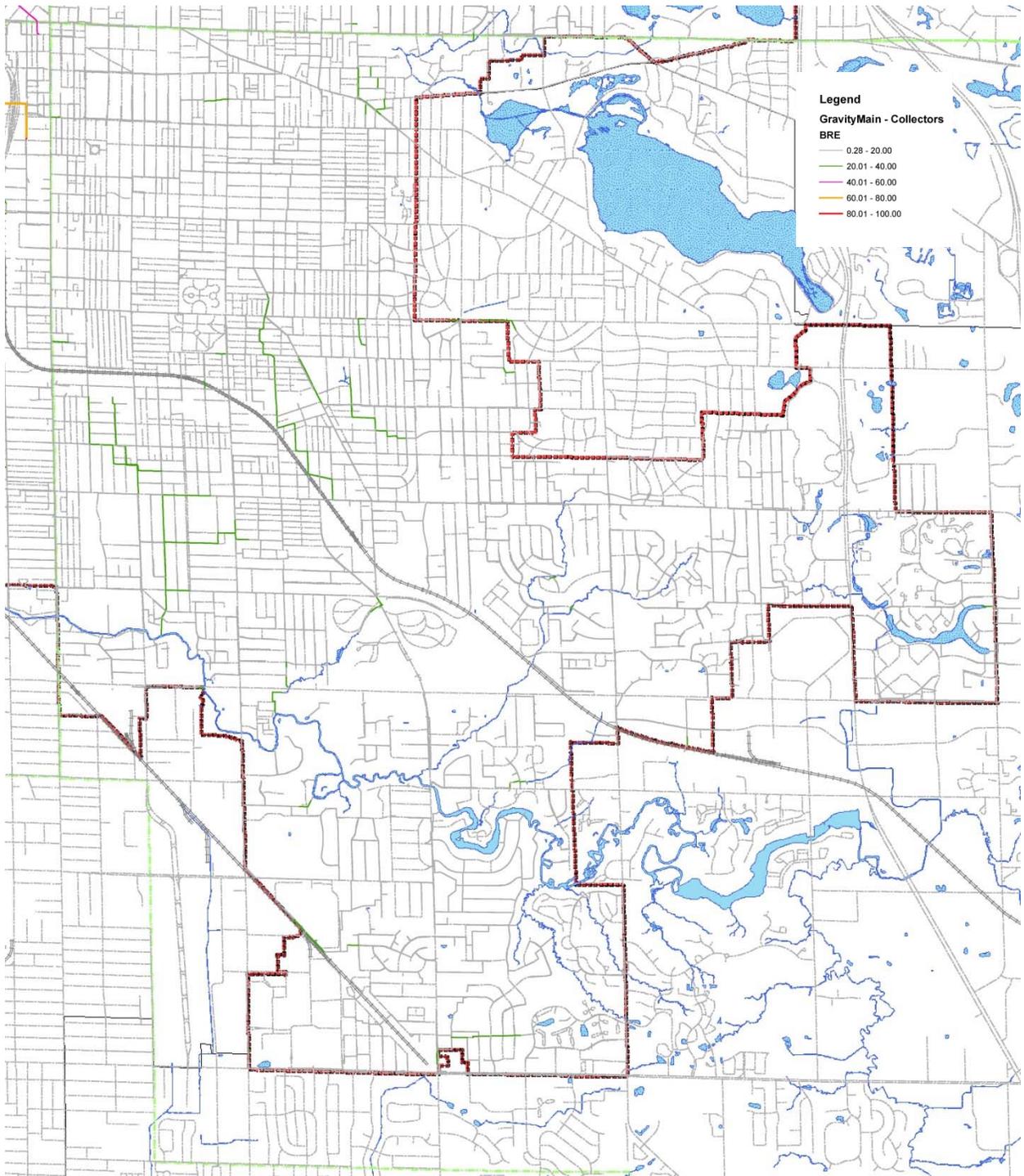


Figure A-12 Gravity Mains Business Risk Exposure SE



APPENDIX B. ASSESSMENT STRATEGY LOS B

Figure B-1 Assessment Strategy NE

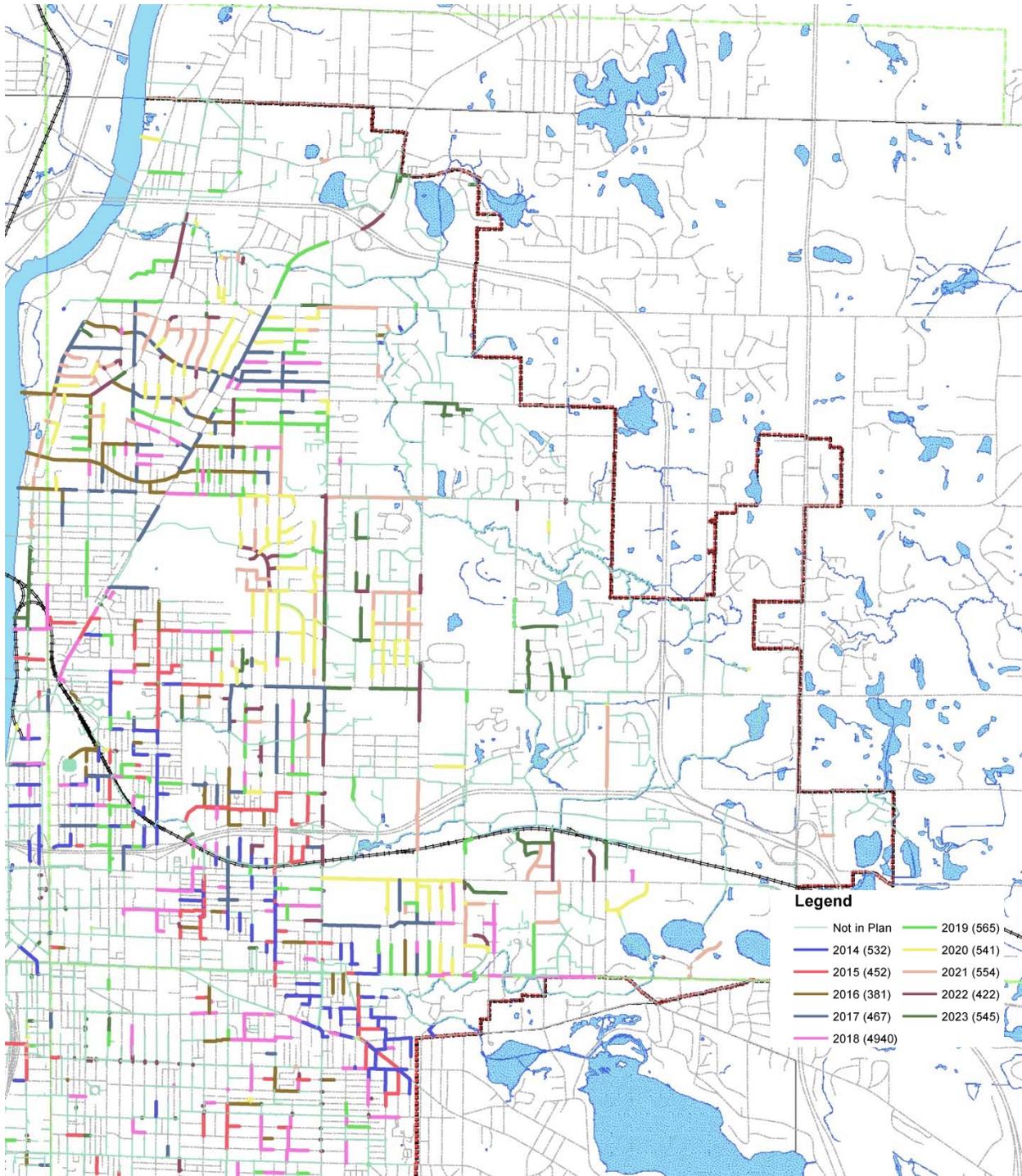


Figure B-2 Assessment Strategy NW

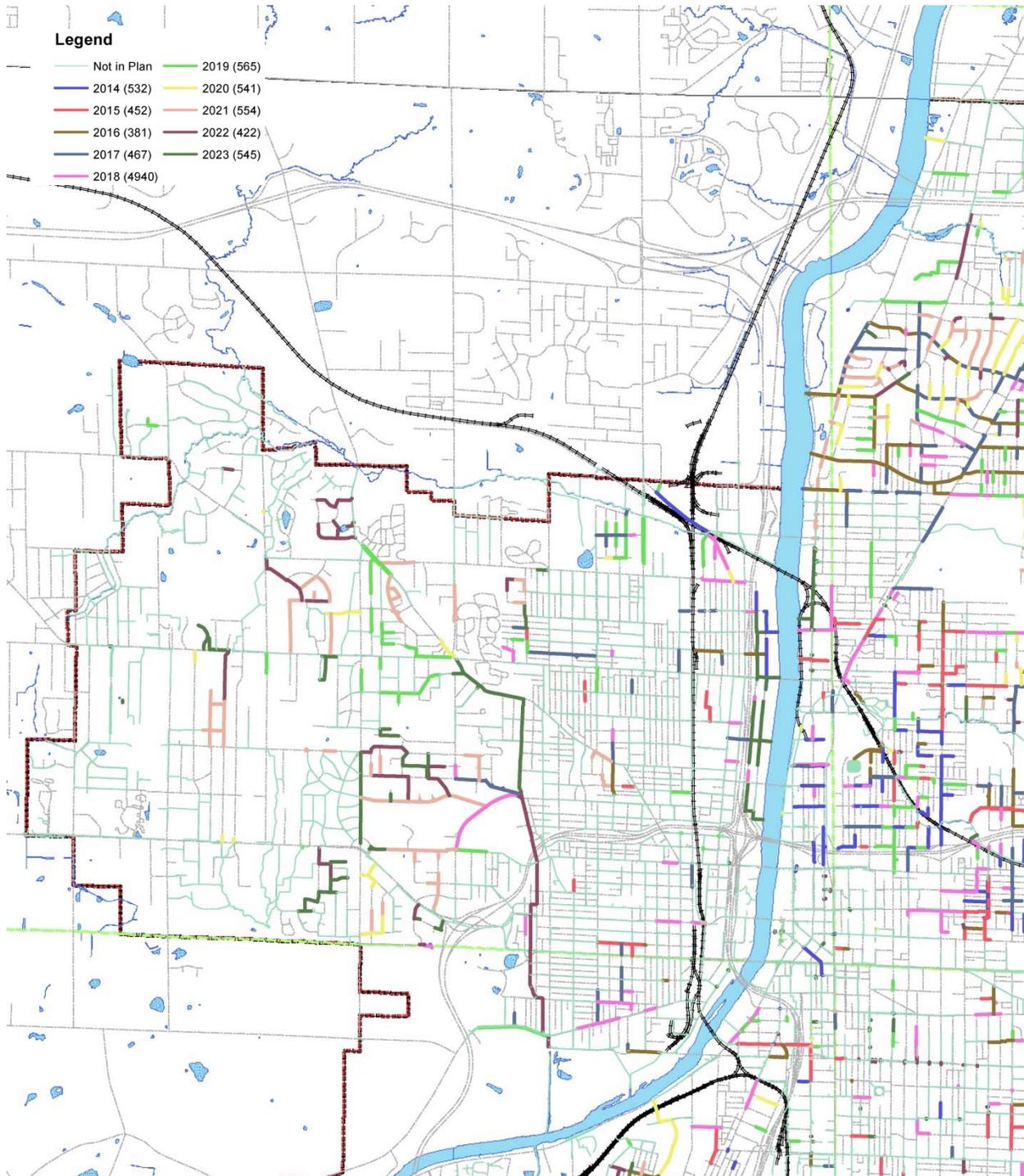


Figure B-3 Assessment Strategy SW

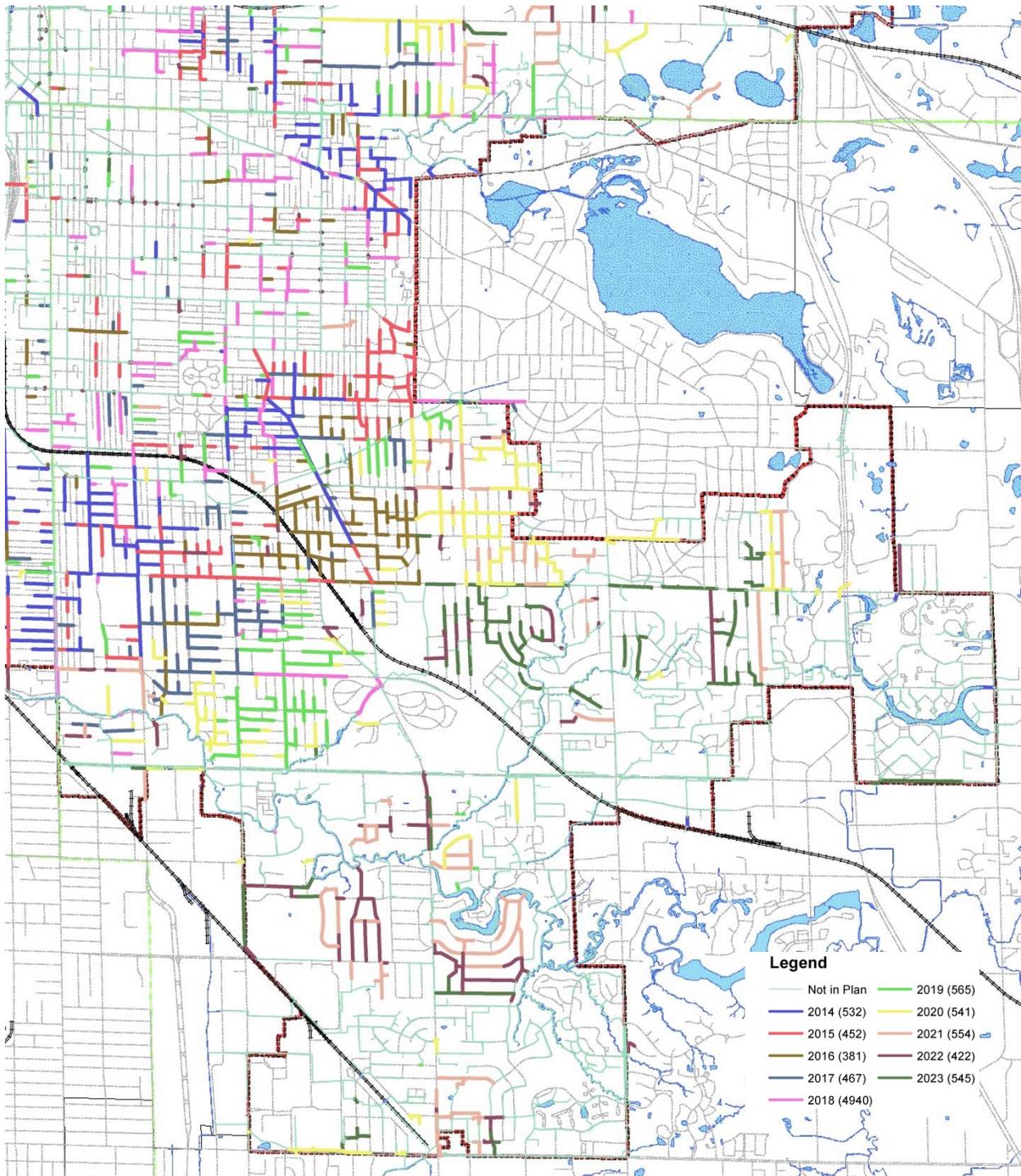
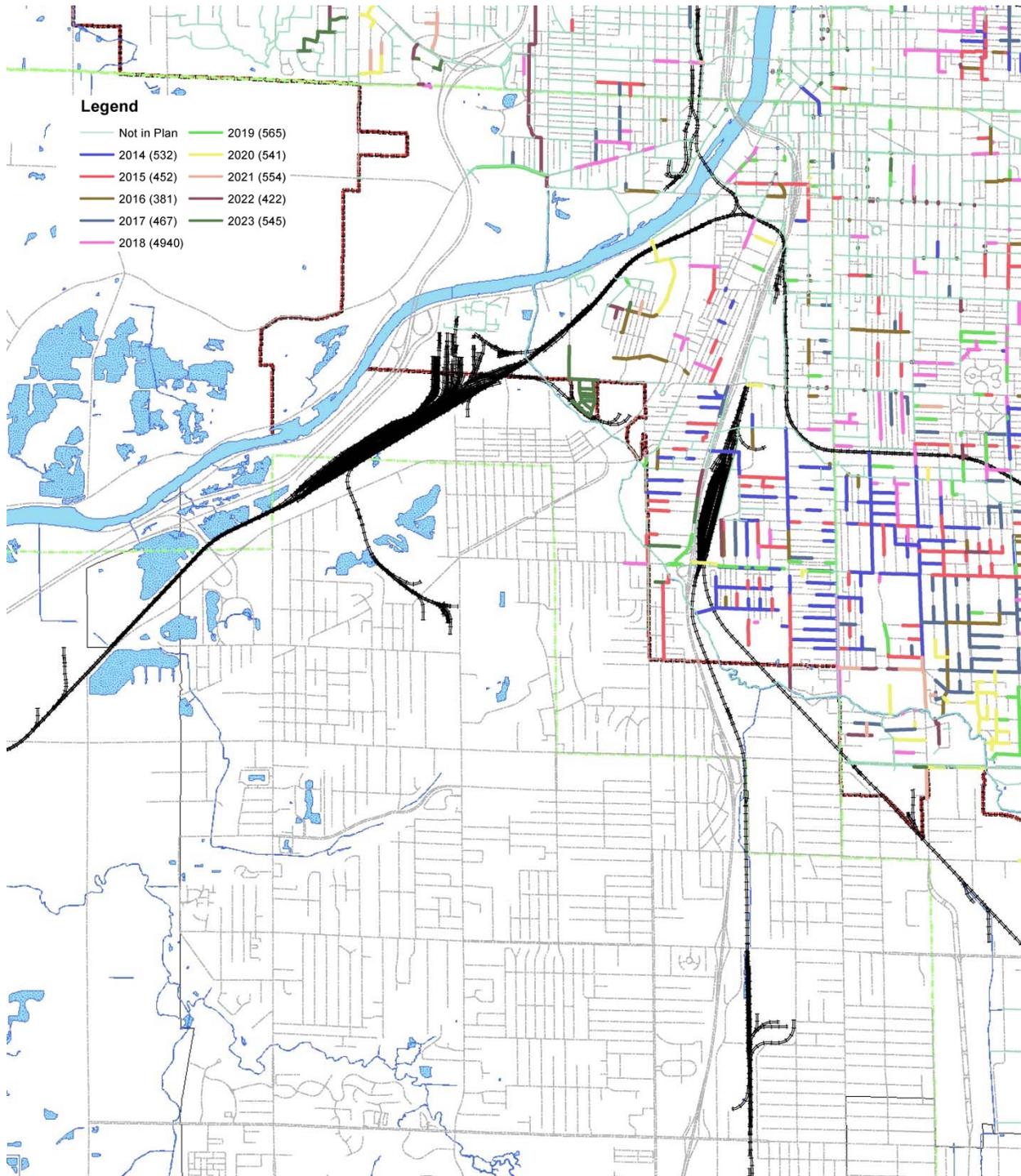


Figure B-4 Assessment Strategy NW



APPENDIX C. CAPITAL PROJECTS

C1. LOCATIONS OVERVIEW

Figure C-1 Capital Projects NW

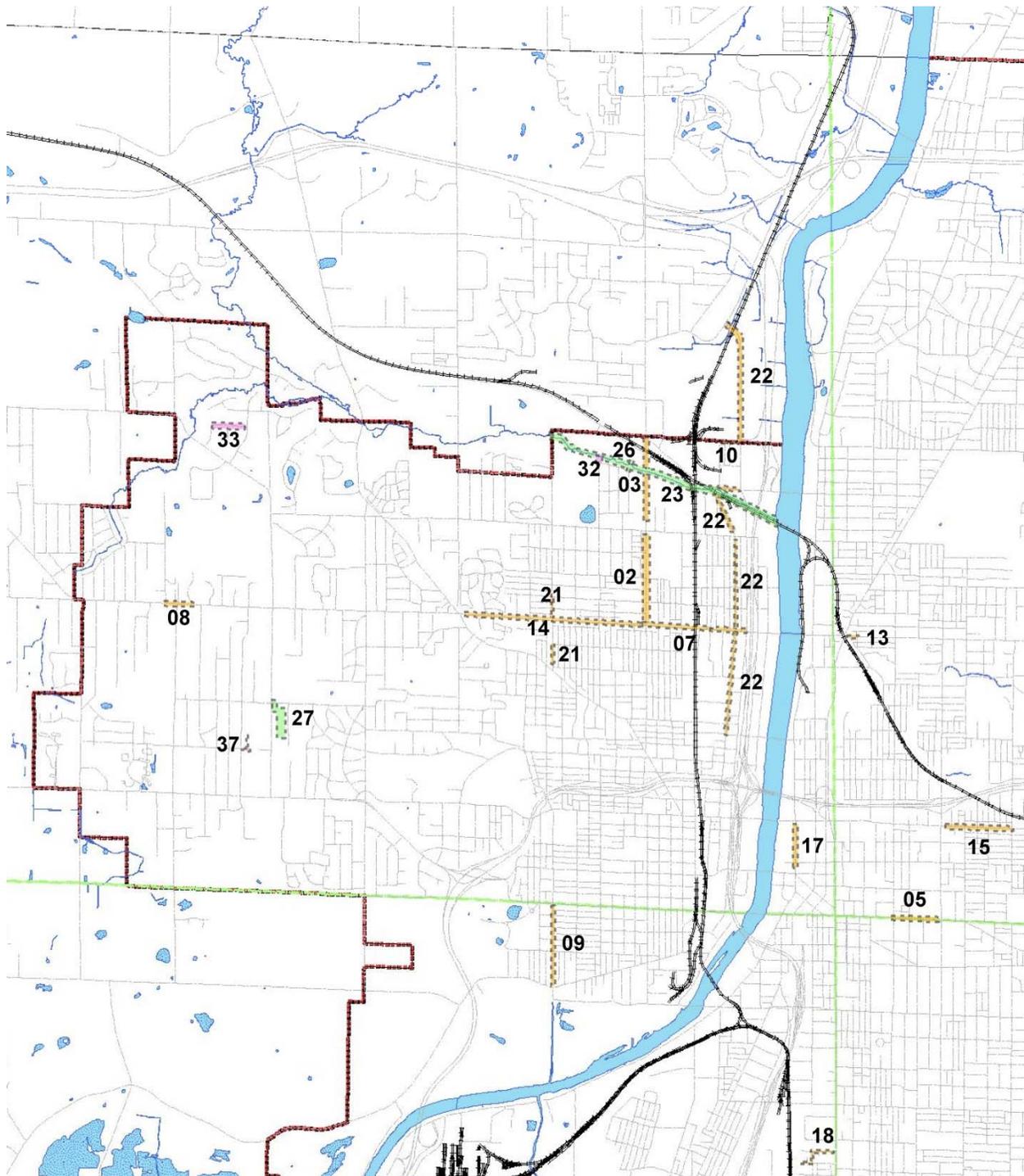


Figure C-2 Capital Projects NW

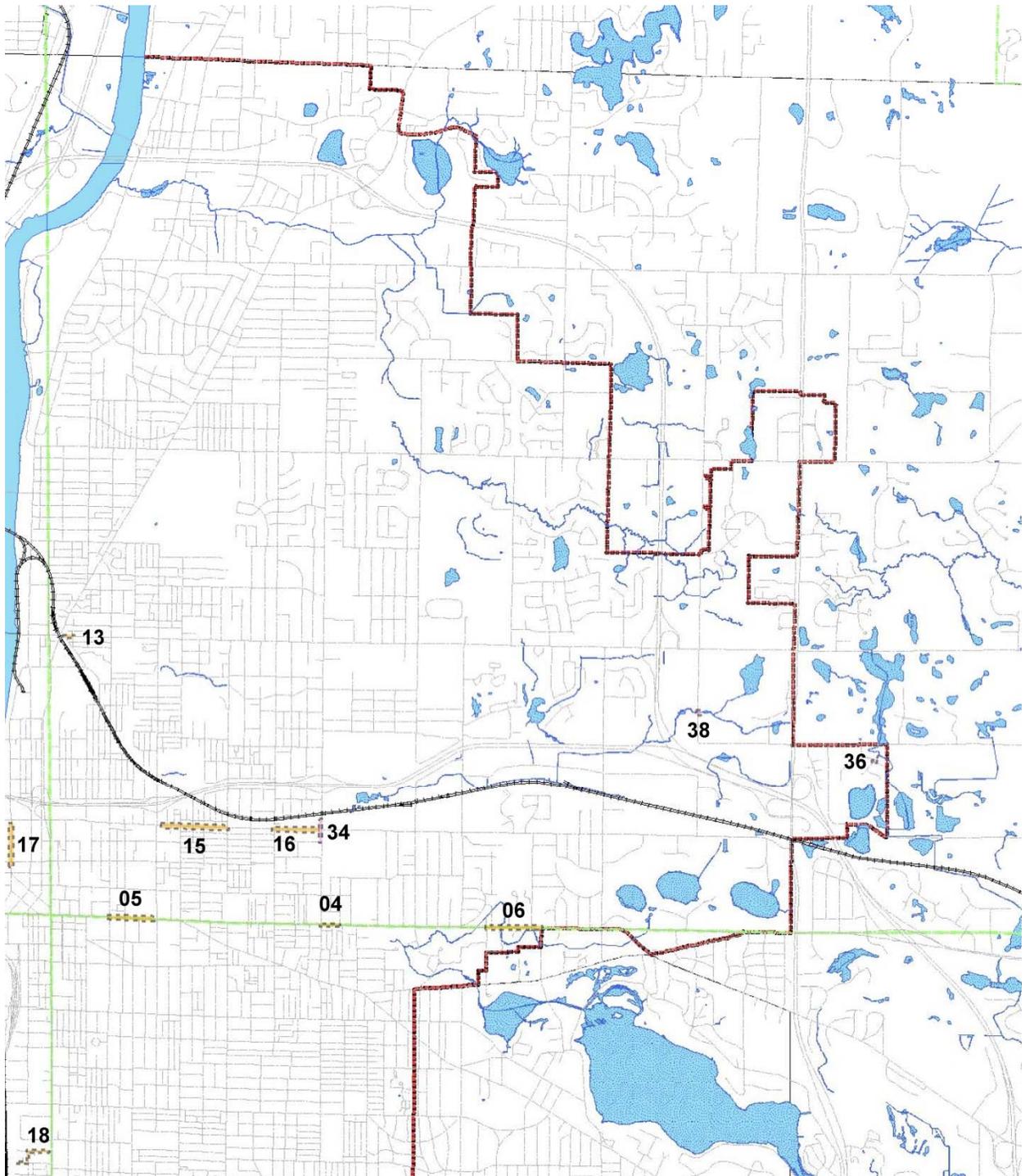


Figure C-3 Capital Projects SE

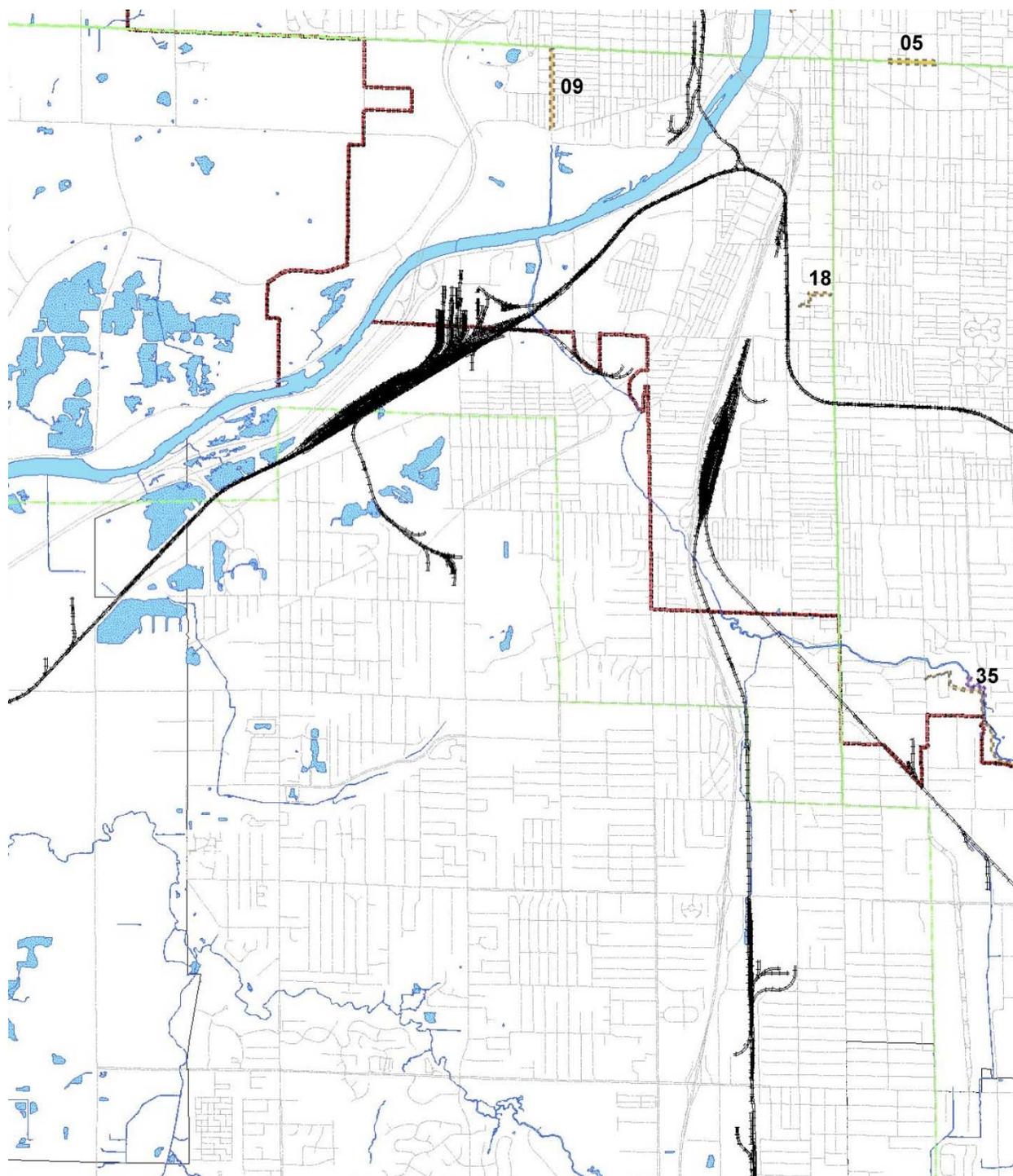
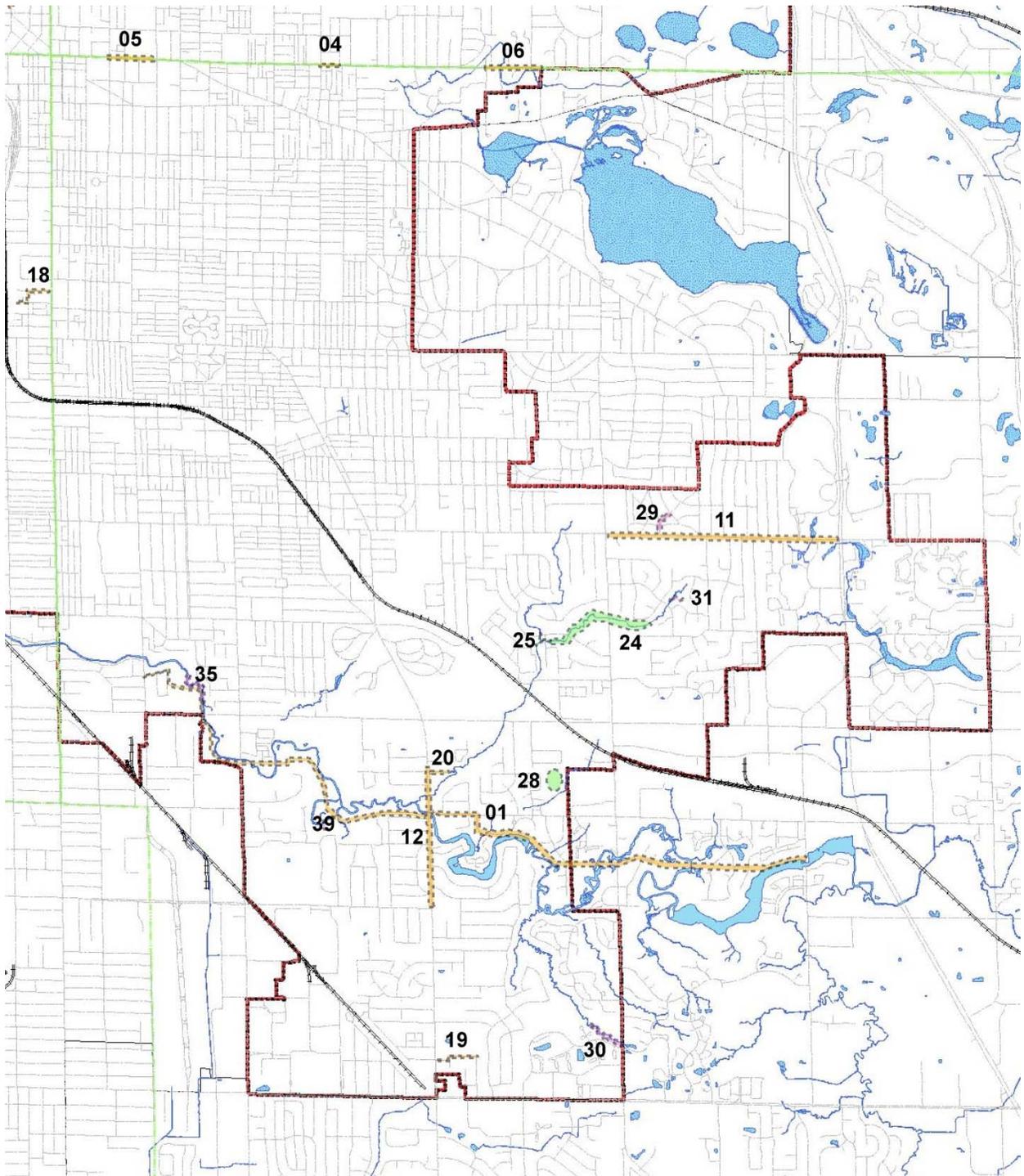
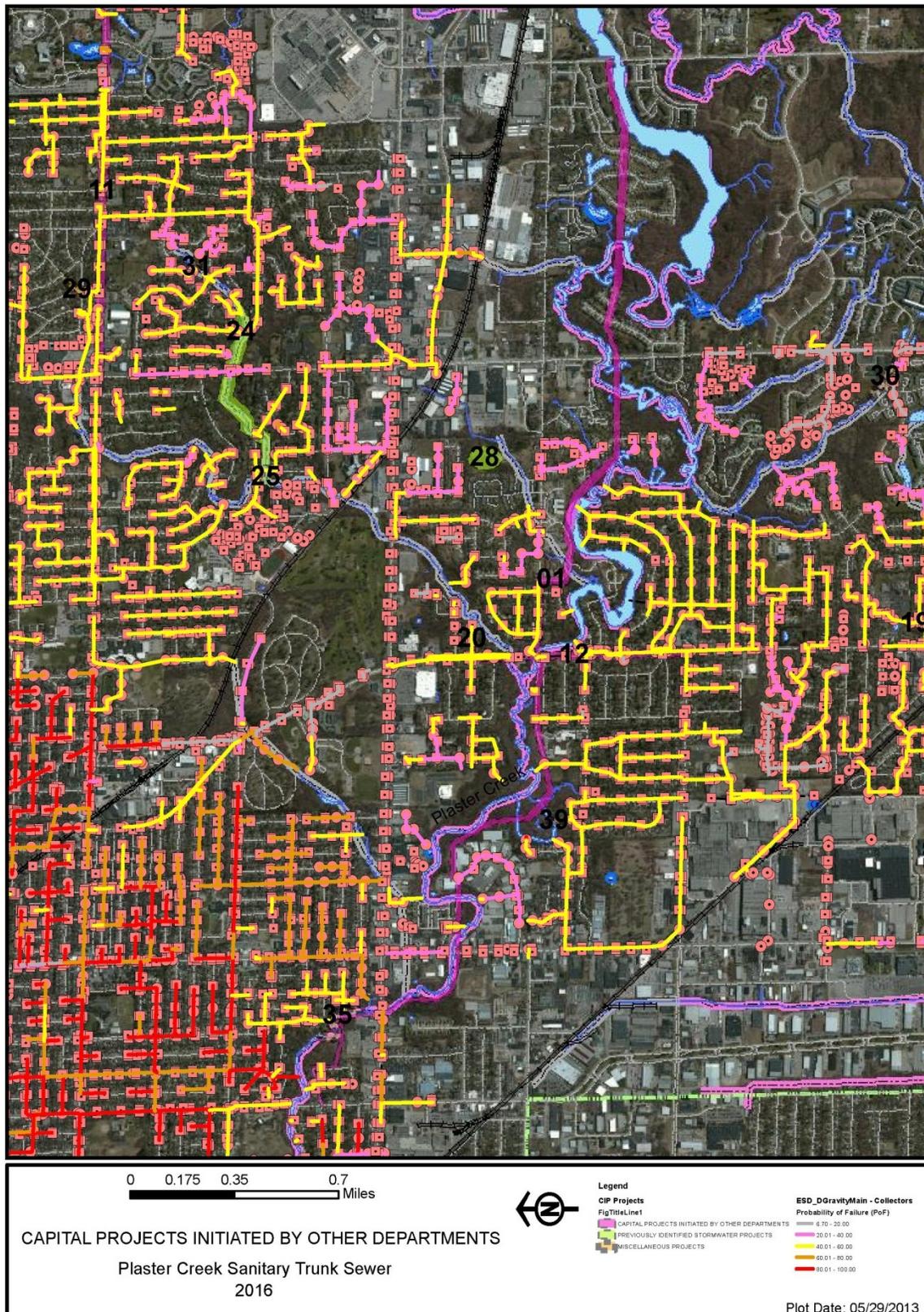
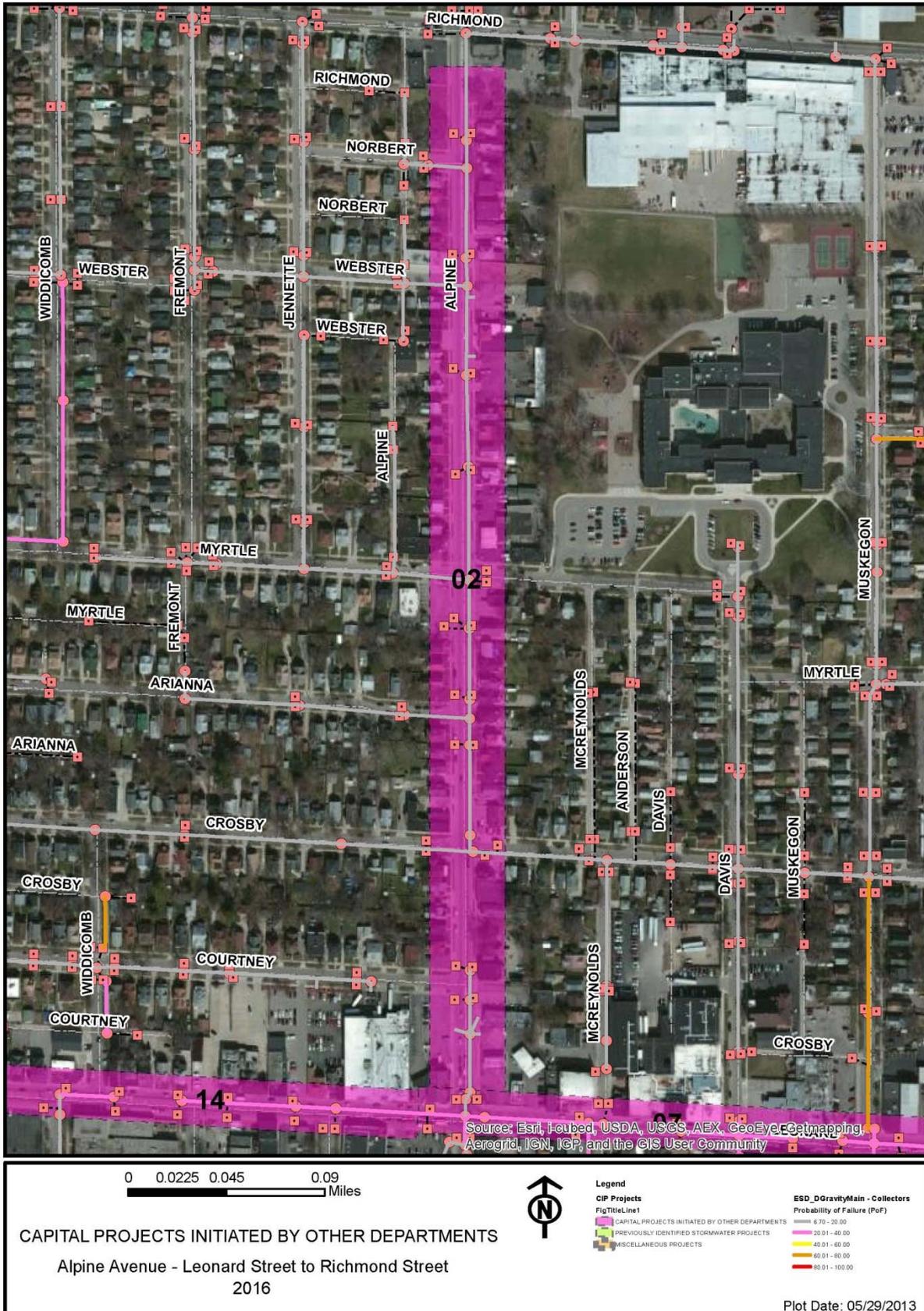


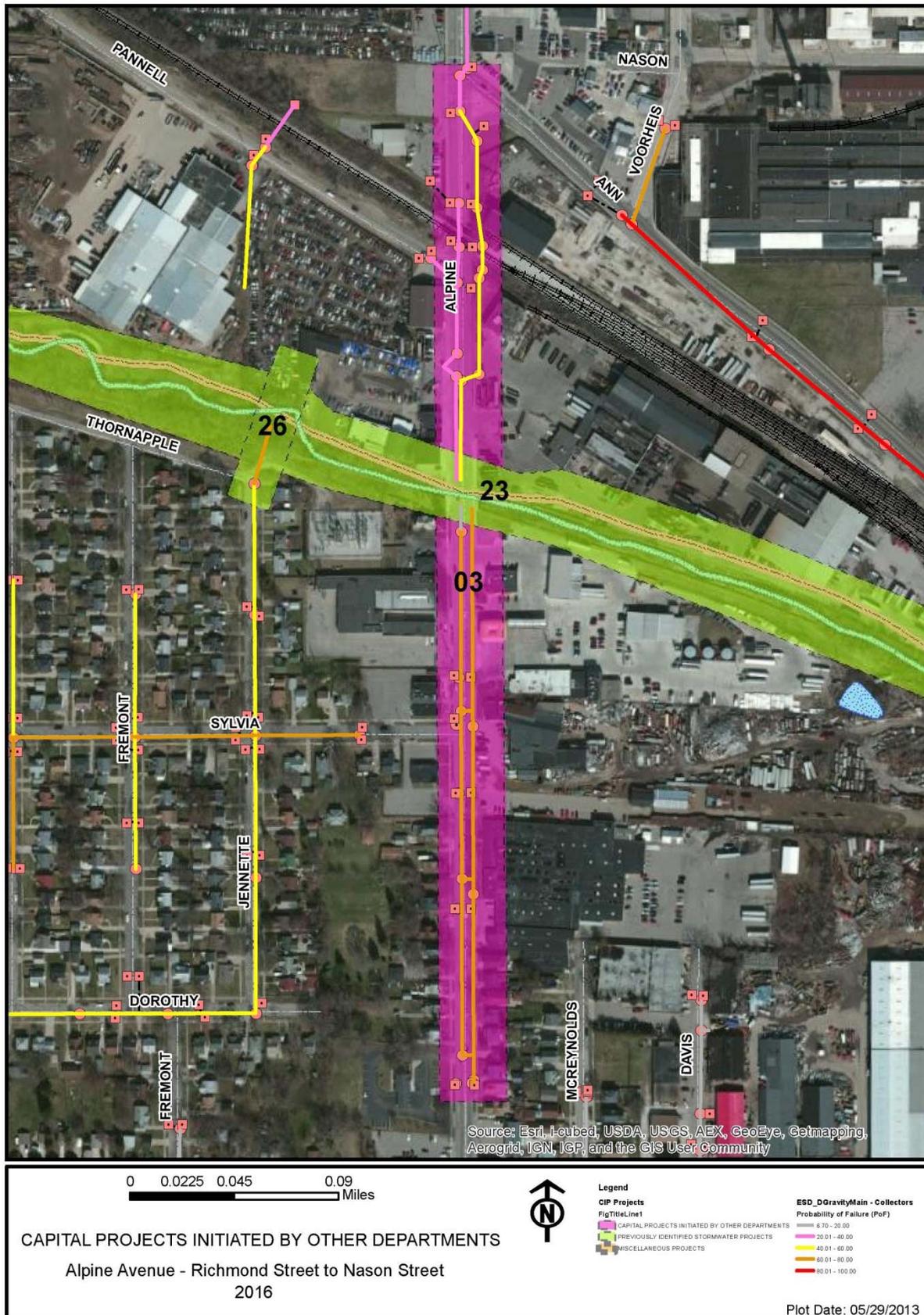
Figure C-4 Capital Projects SE

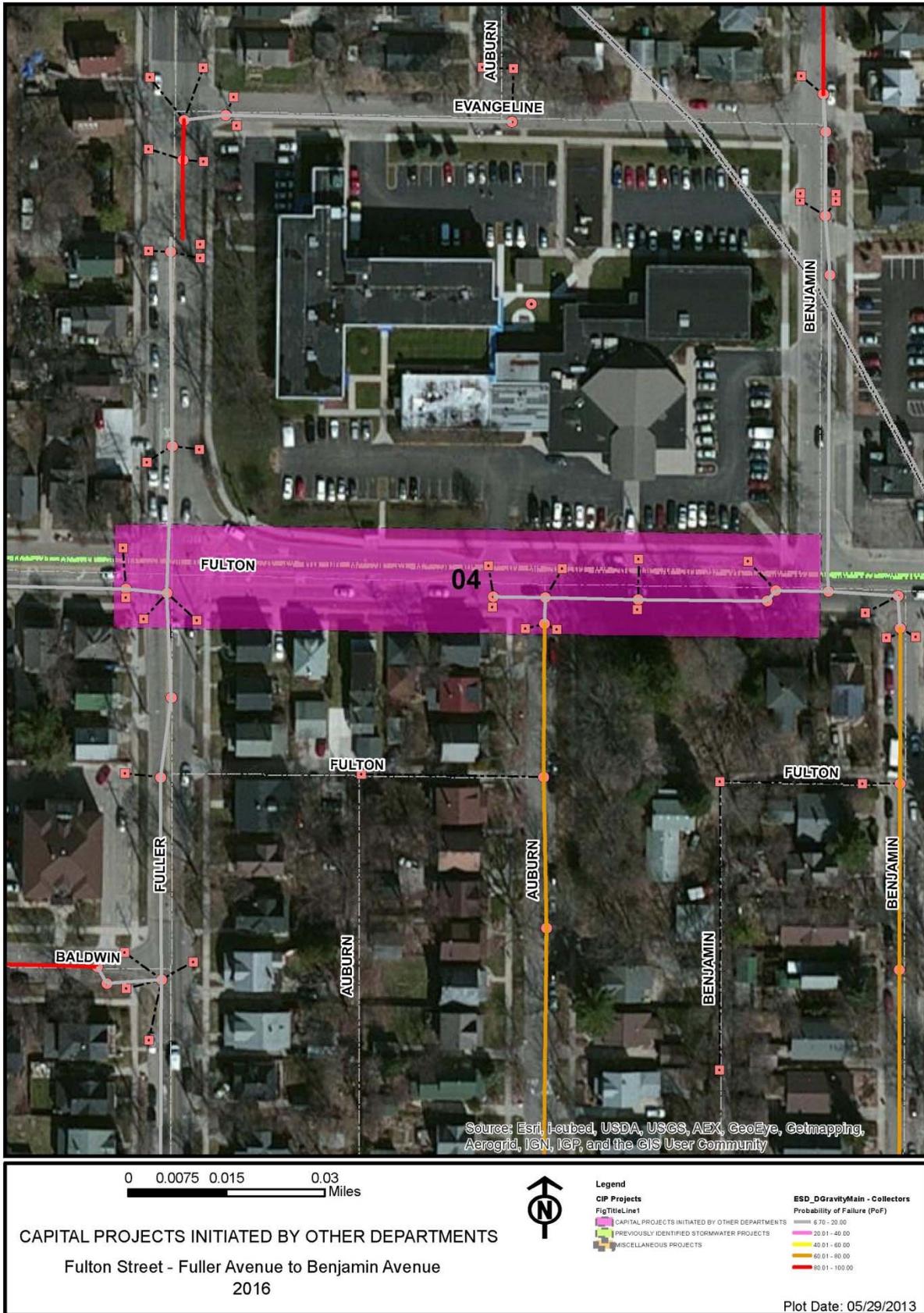


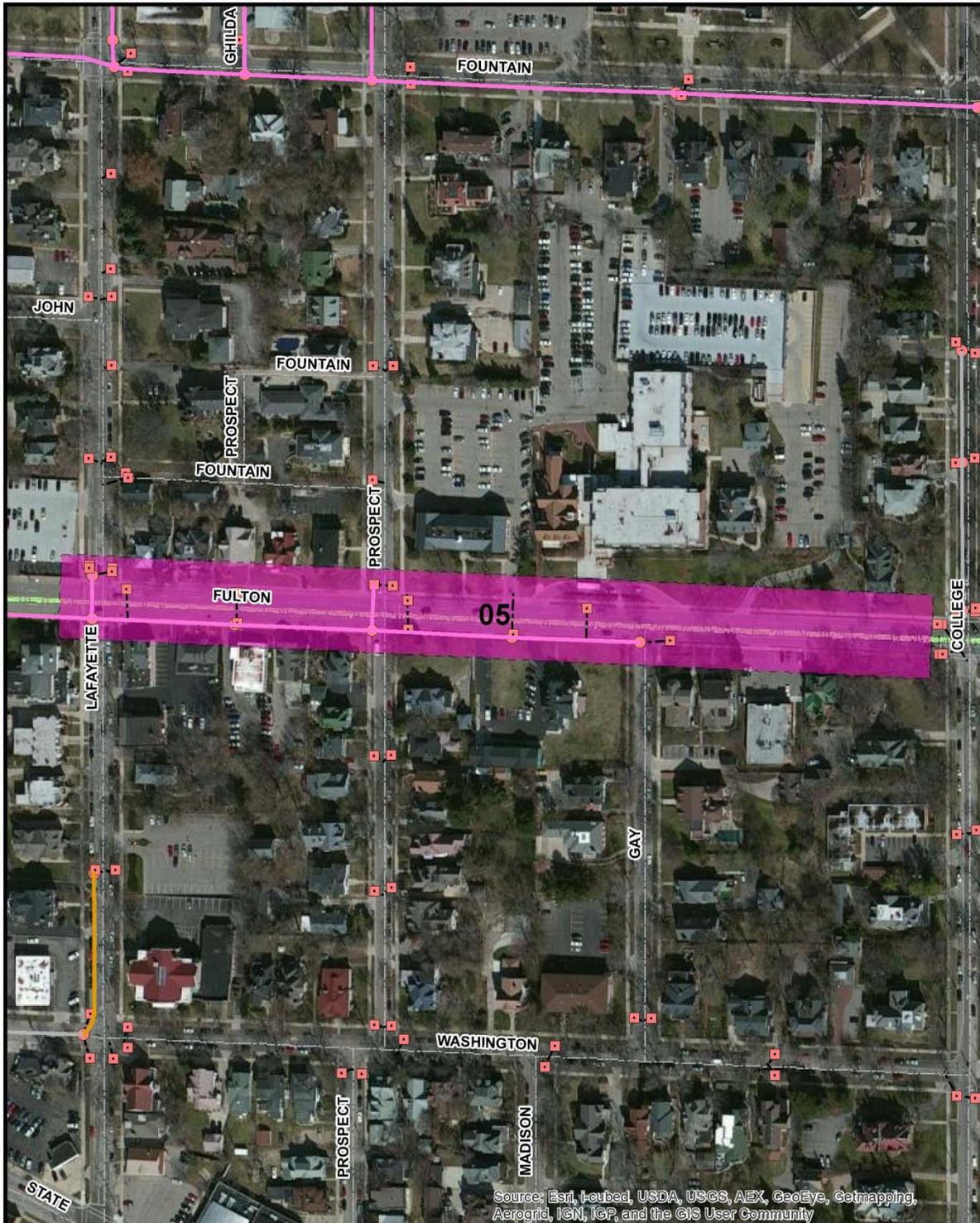
C2. DETAILED INFORMATION











0 0.015 0.03 0.06 Miles

CAPITAL PROJECTS INITIATED BY OTHER DEPARTMENTS
 Fulton Street - Lafayette Avenue to College Avenue
 2016

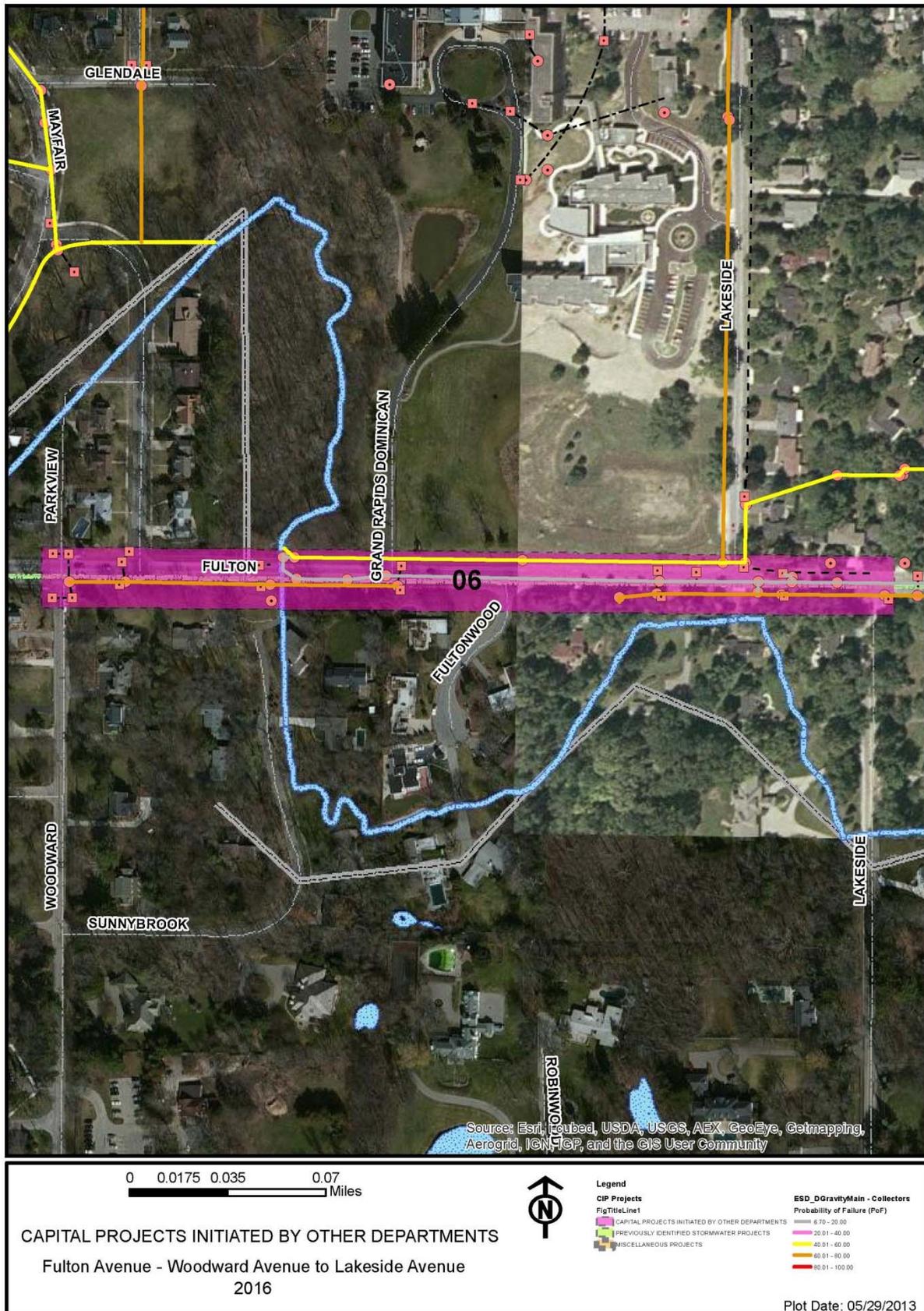
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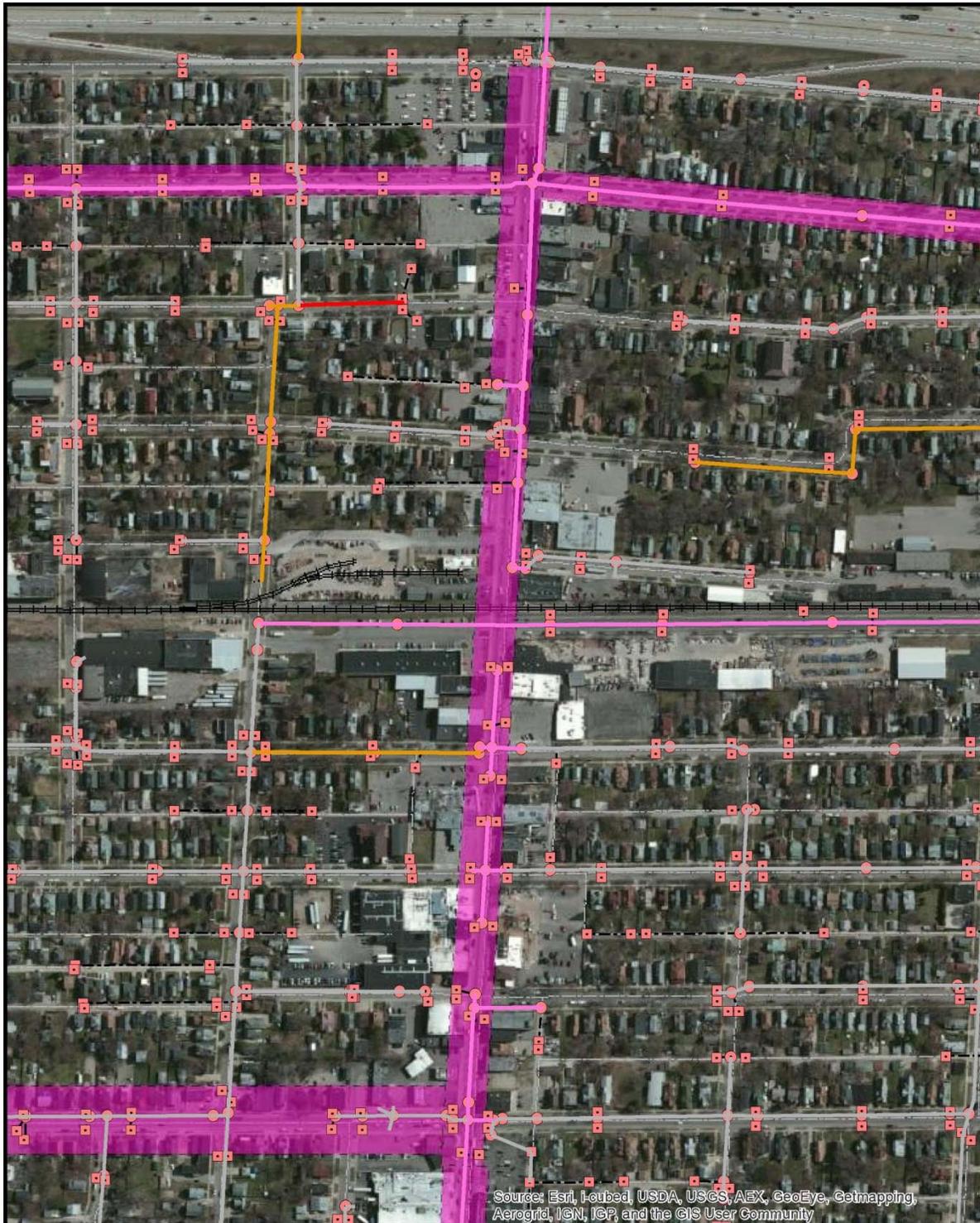
- CIP Projects
- FigTitleLine1
- CAPITAL PROJECTS INITIATED BY OTHER DEPARTMENTS
- PREVIOUSLY IDENTIFIED STORMWATER PROJECTS
- MISCELLANEOUS PROJECTS

ESD_DGravityMain - Collectors
 Probability of Failure (PoF)

- 8.70 - 20.00
- 20.01 - 40.00
- 40.01 - 60.00
- 60.01 - 80.00
- 80.01 - 100.00

Plot Date: 05/29/2013





Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

0 0.0275 0.055 0.11 Miles

CAPITAL PROJECTS INITIATED BY OTHER DEPARTMENTS

Leonard Street - Alpine Avenue to Turner Avenue
2016



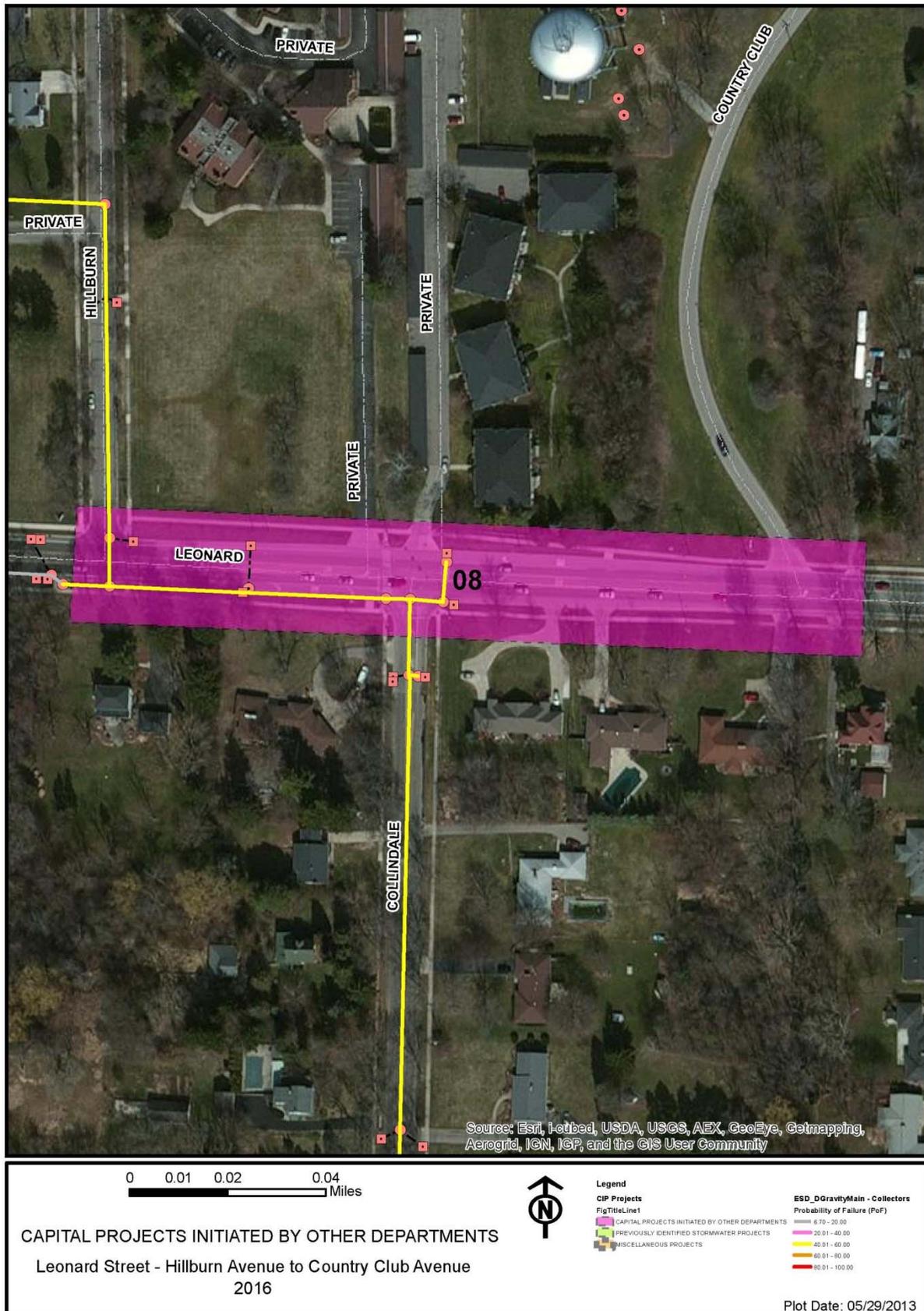
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CIP Projects
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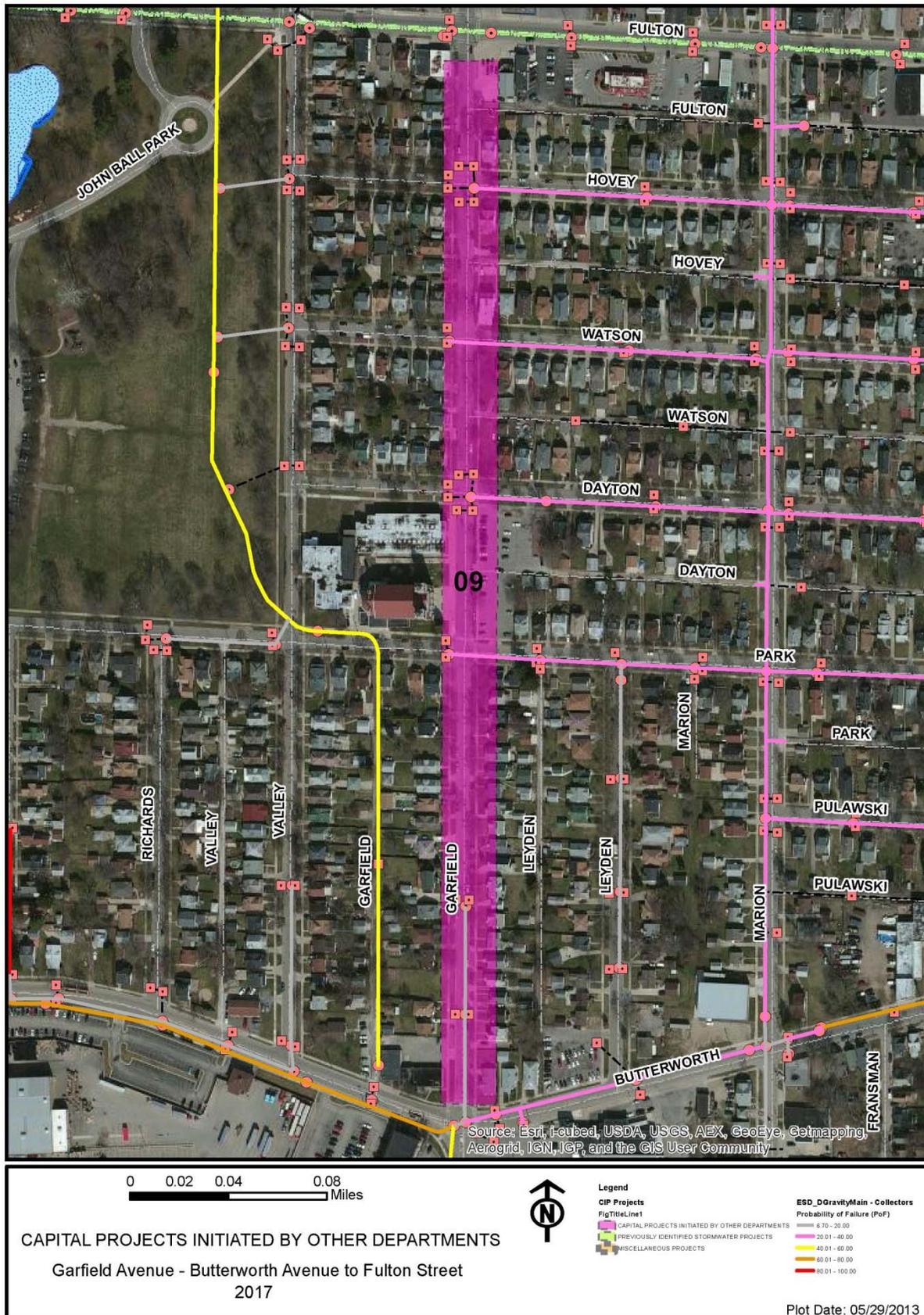
■ CAPITAL PROJECTS INITIATED BY OTHER DEPARTMENTS
■ PREVIOUSLY IDENTIFIED STORMWATER PROJECTS
■ MISCELLANEOUS PROJECTS

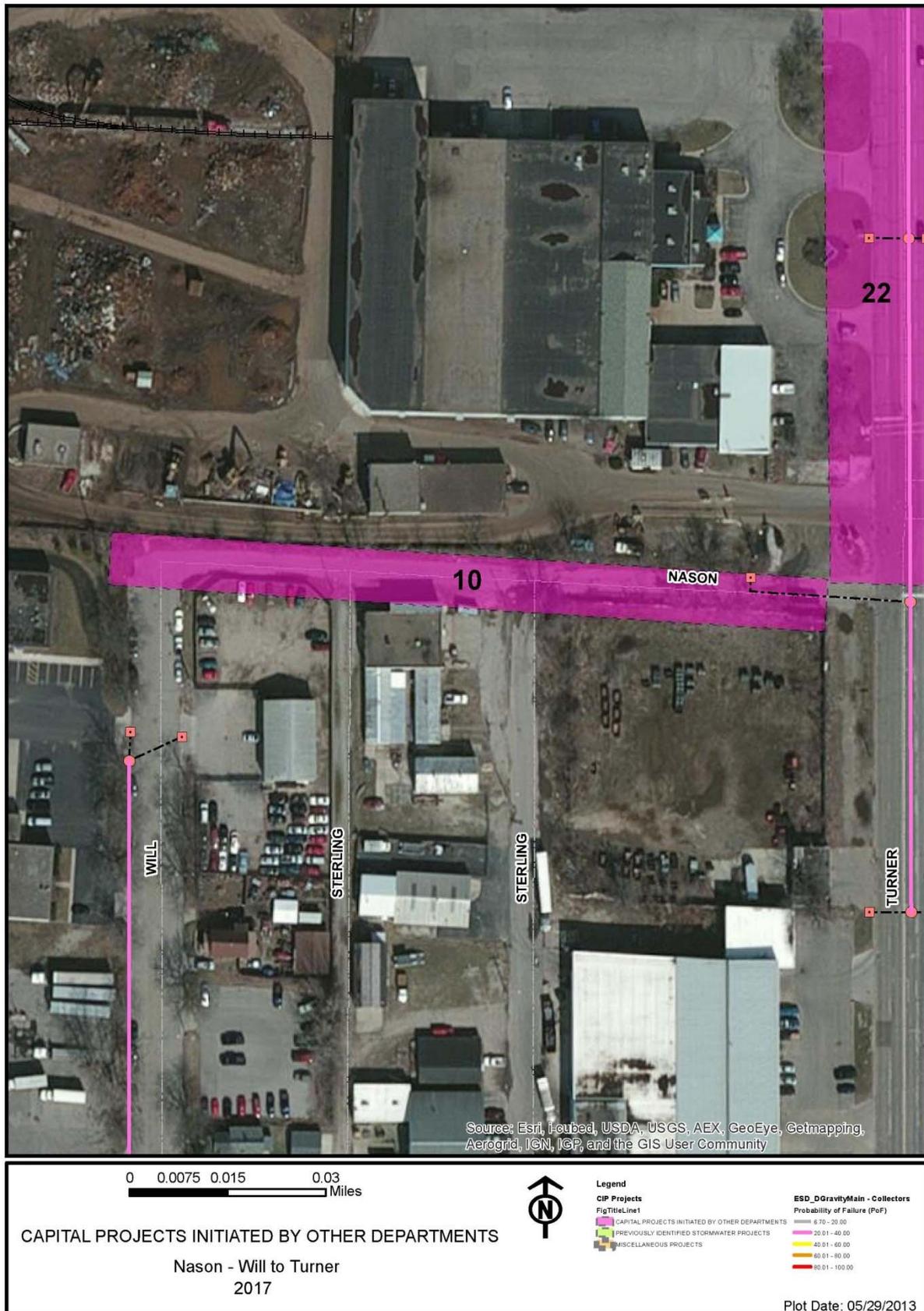
ESD_DGravtyMain - Collectors
Probability of Failure (PoF)

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40.01 - 60.00	60.01 - 80.00
80.01 - 100.00	

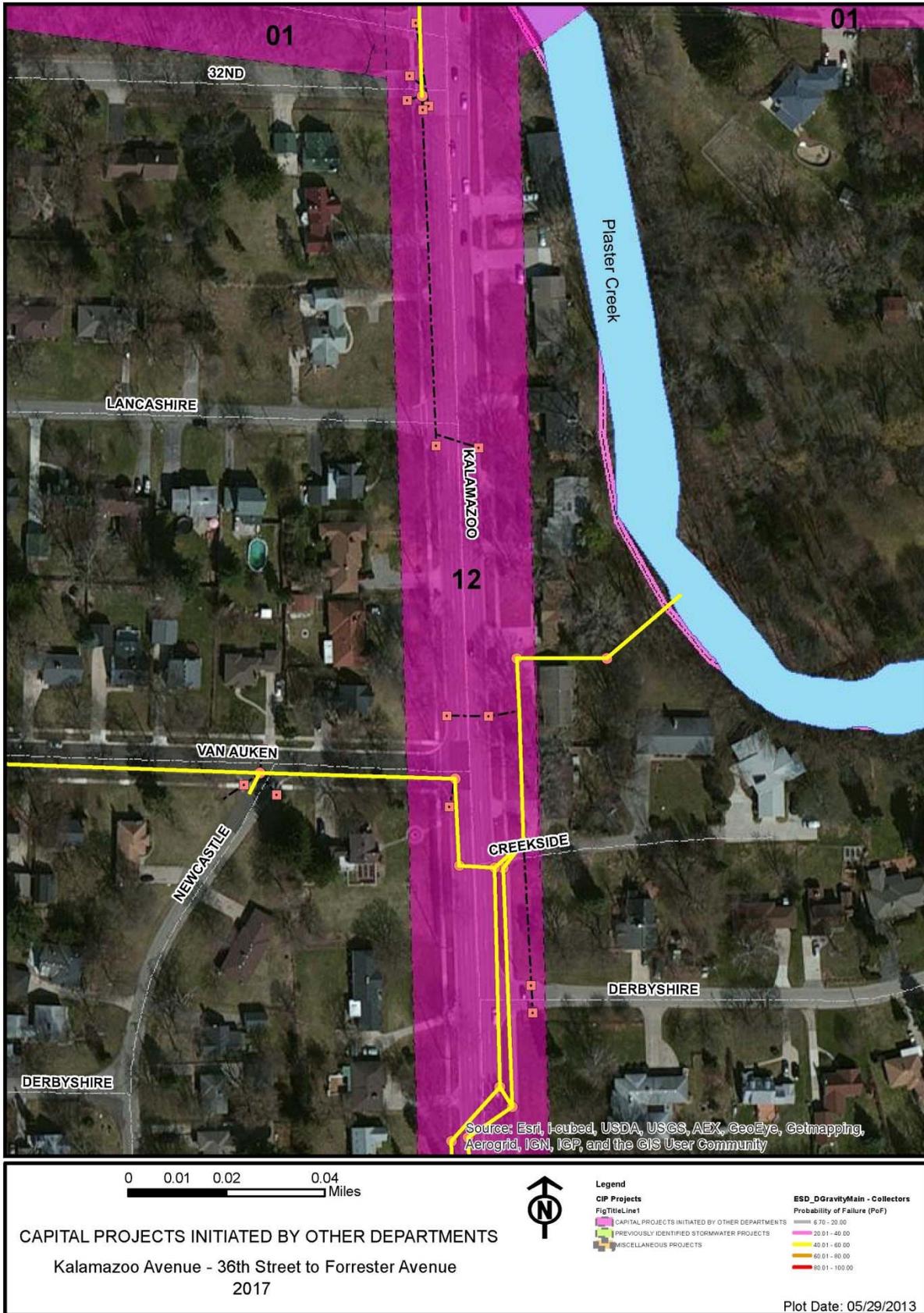
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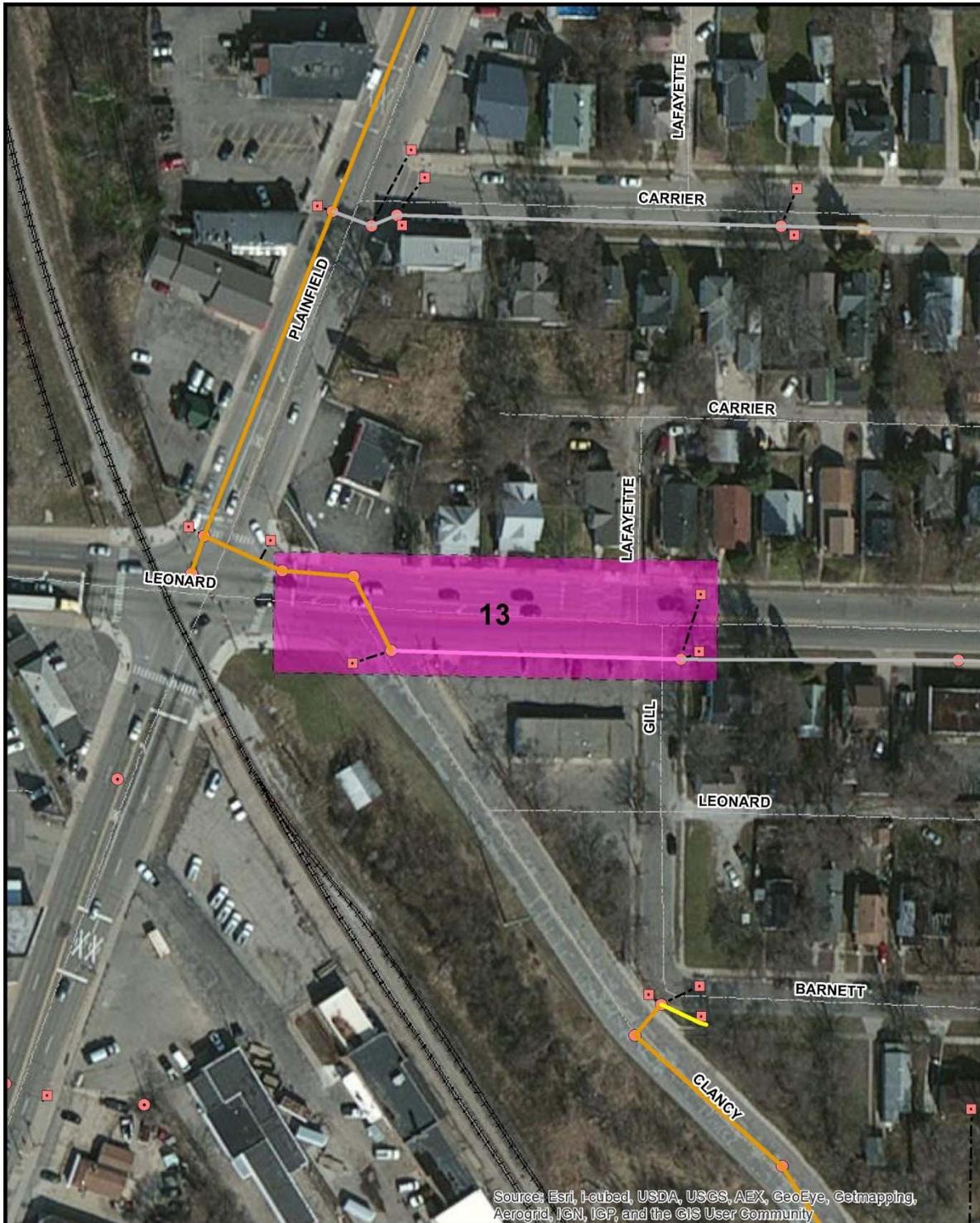


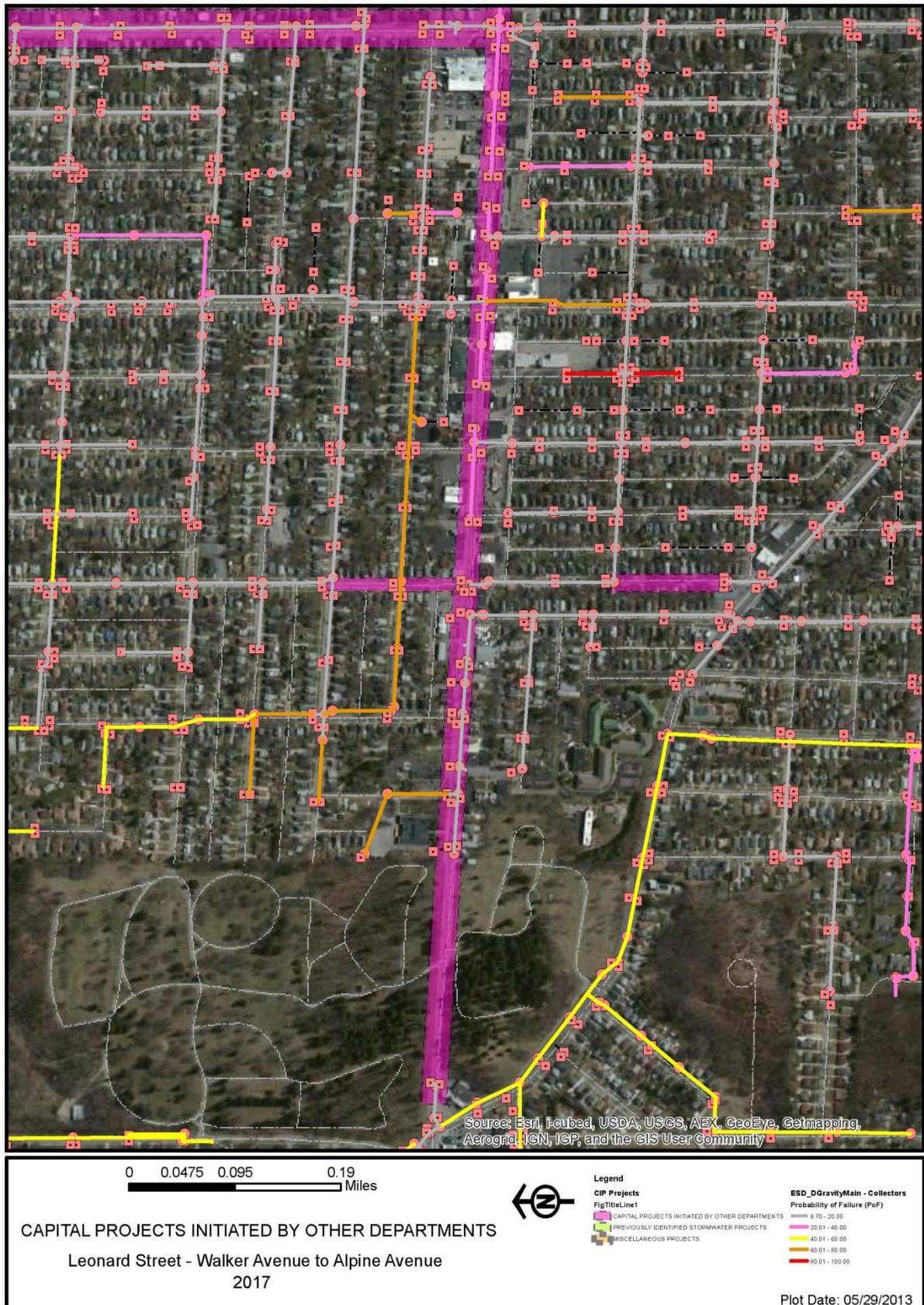


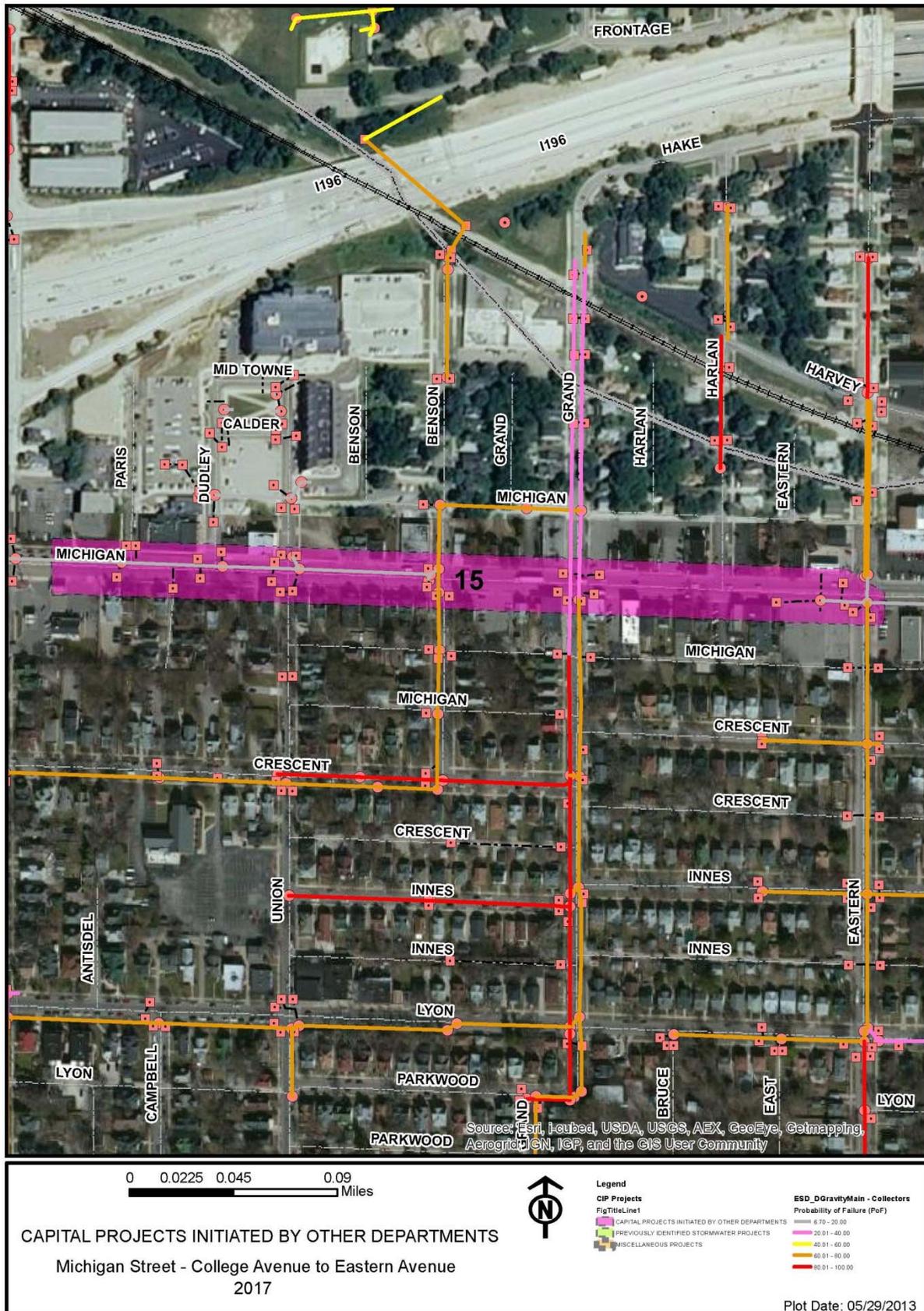


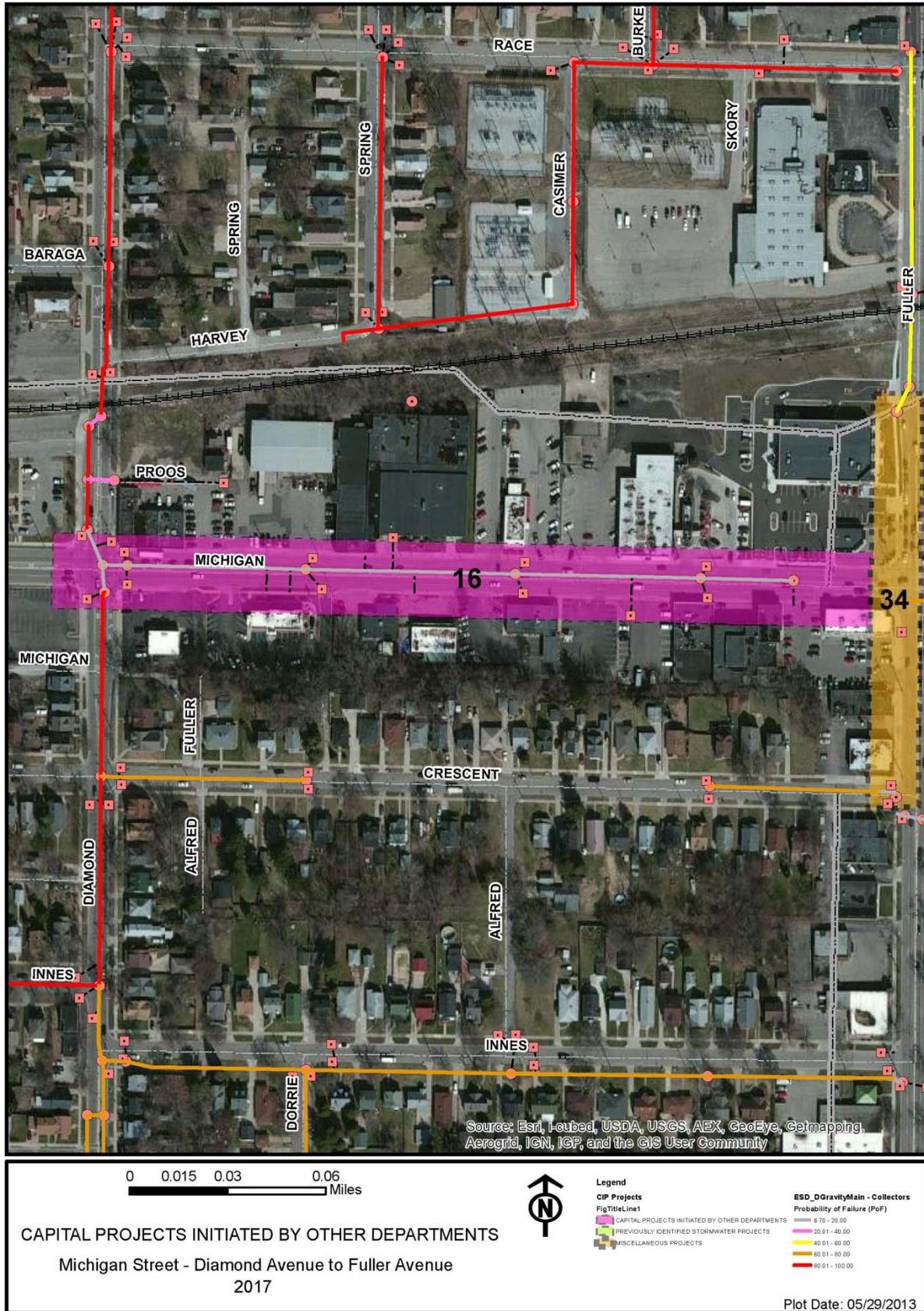


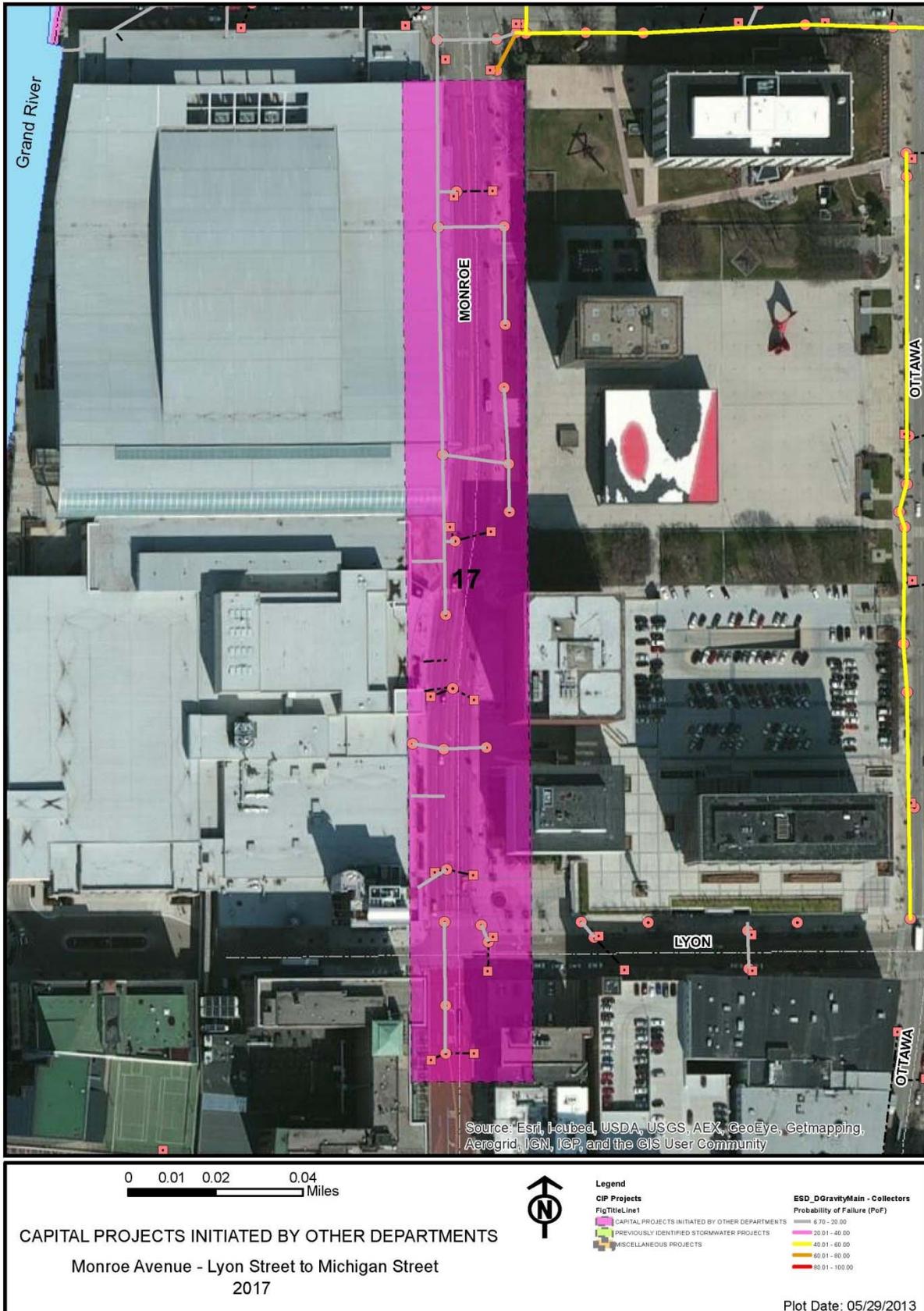




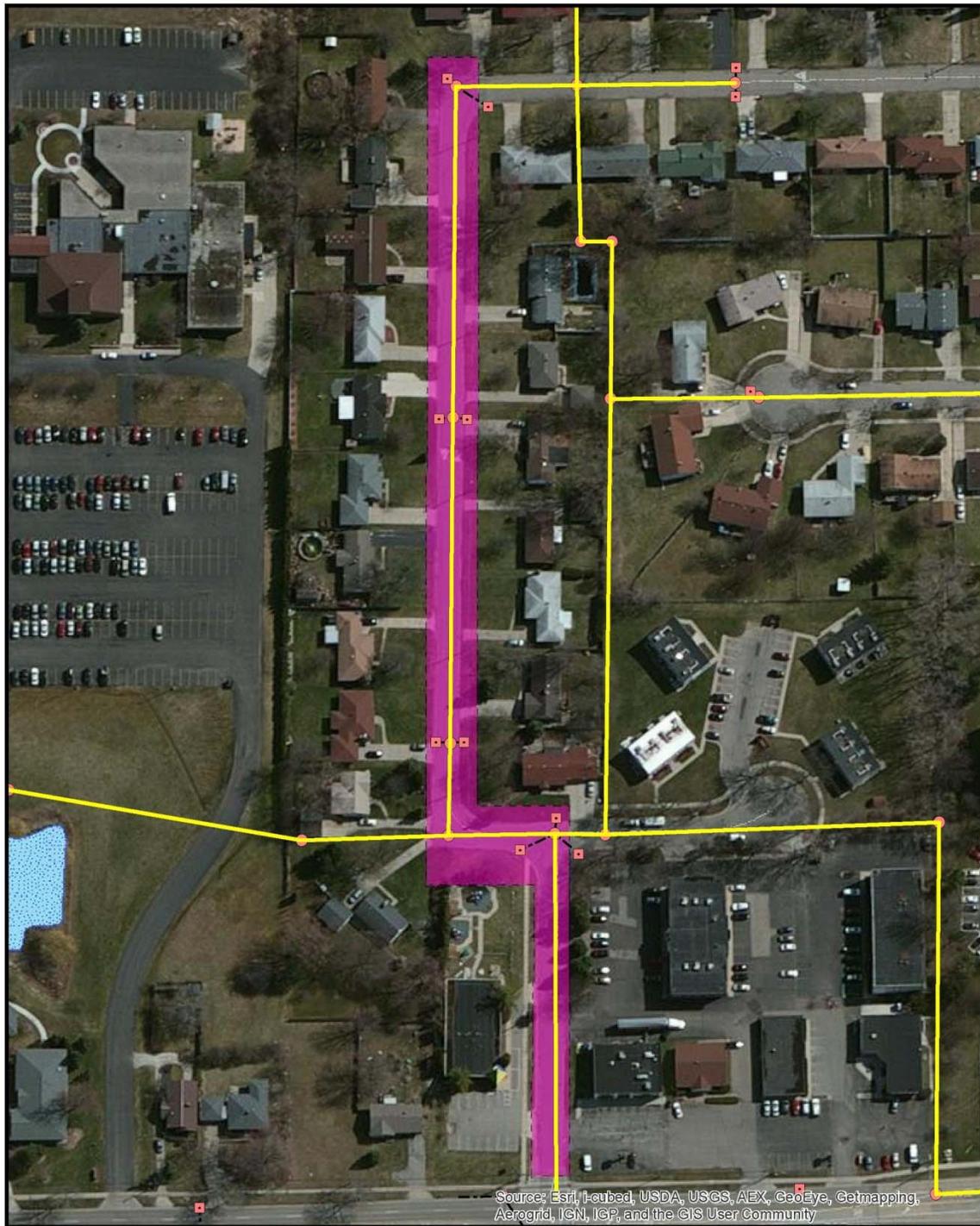




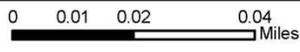








Source: Esri, i-labeled, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

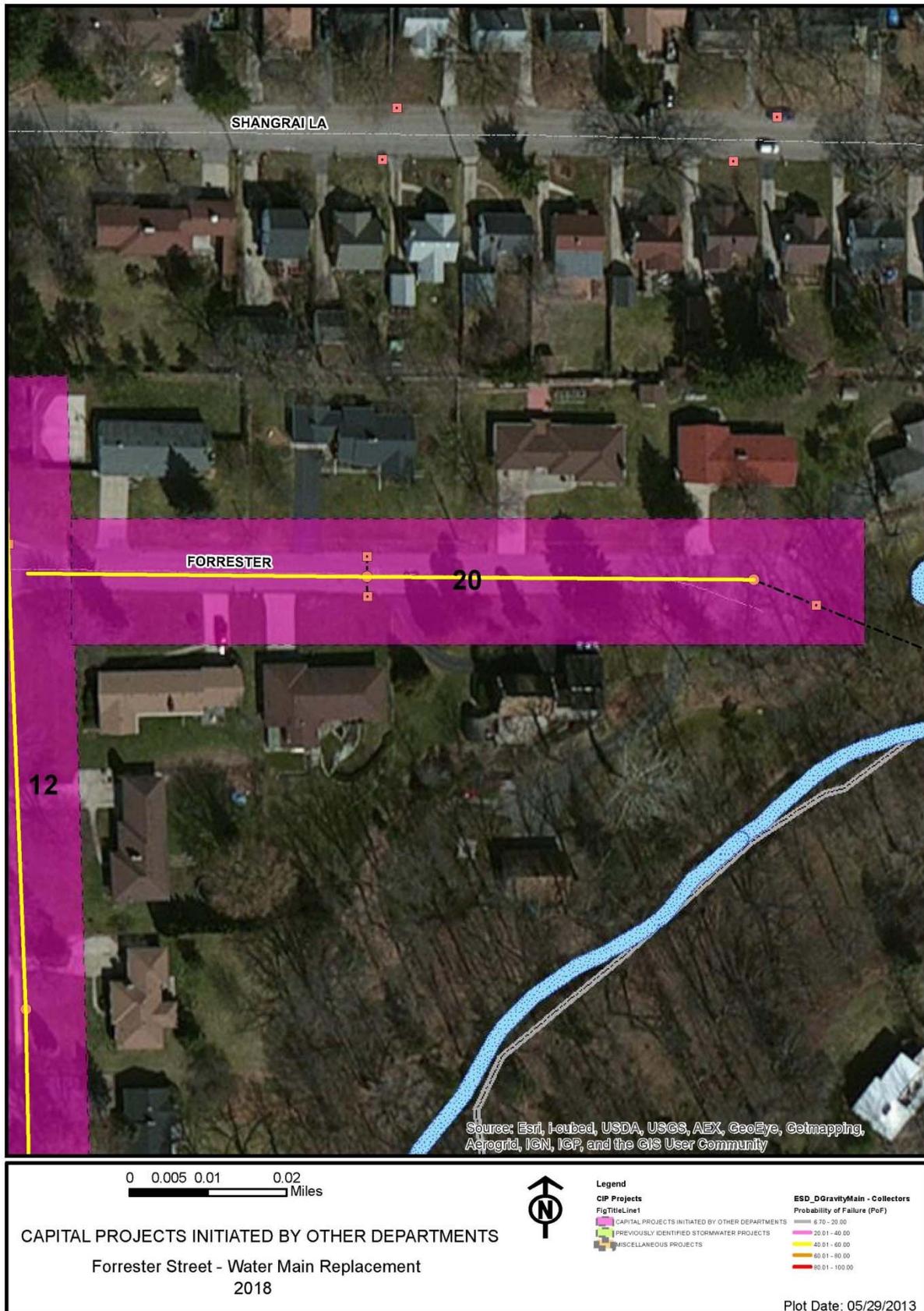


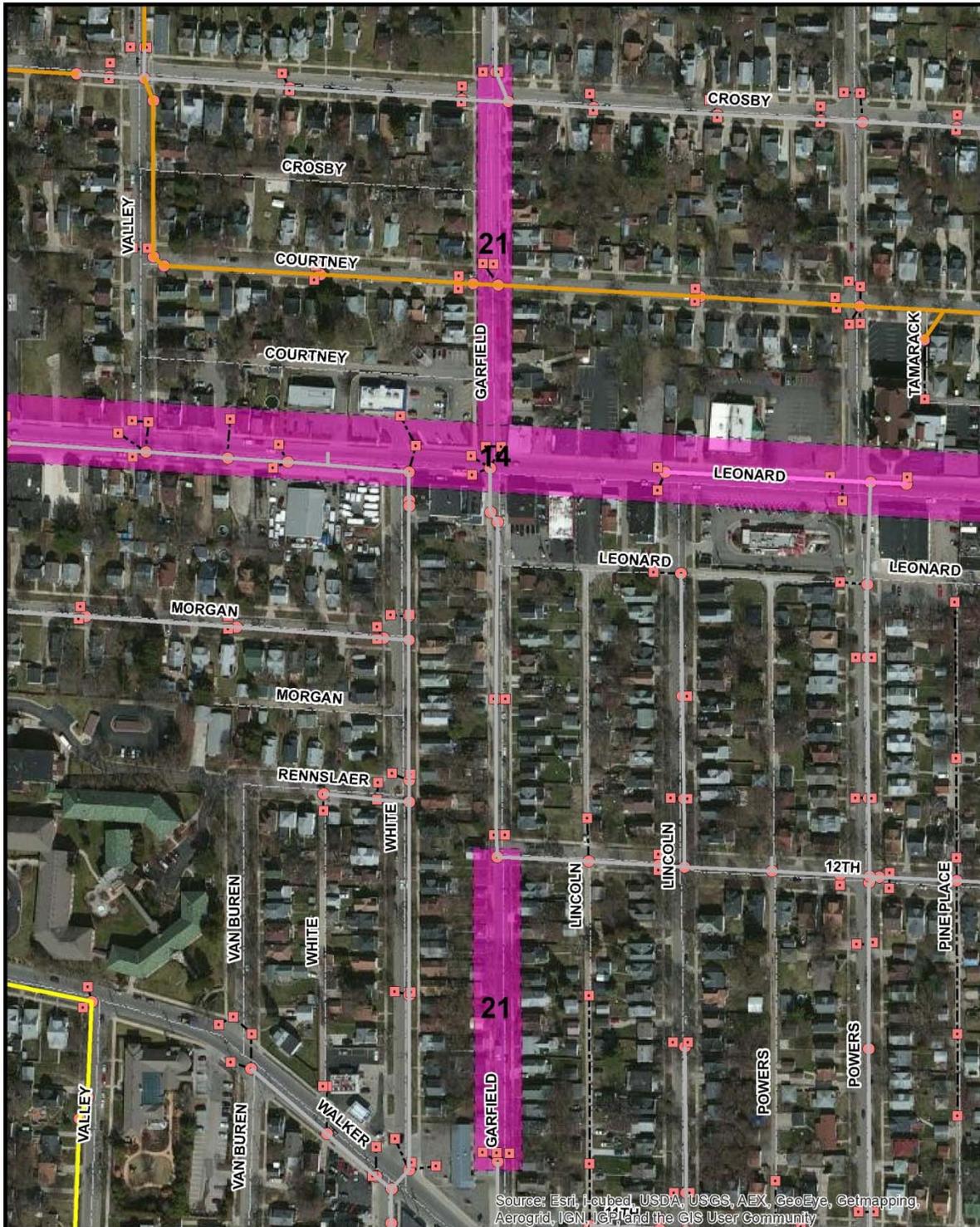
CAPITAL PROJECTS INITIATED BY OTHER DEPARTMENTS

Langley Street - Plymouth Avenue to Kalamazoo Avenue, Watermain Replacement
2018

- Legend**
- CIP Projects**
 - FigTitleLine1
 - CAPITAL PROJECTS INITIATED BY OTHER DEPARTMENTS
 - PREVIOUSLY IDENTIFIED STORMWATER PROJECTS
 - MISCELLANEOUS PROJECTS
 - ESD_DGravityMain - Collectors**
 - Probability of Failure (PoF)
 - 6.70 - 20.00
 - 20.01 - 40.00
 - 40.01 - 60.00
 - 60.01 - 80.00
 - 80.01 - 100.00

Plot Date: 05/29/2013





0 0.0175 0.035 0.07 Miles

CAPITAL PROJECTS INITIATED BY OTHER DEPARTMENTS
Garfield Avenue and Crosby Street Water Main Replacement
2018

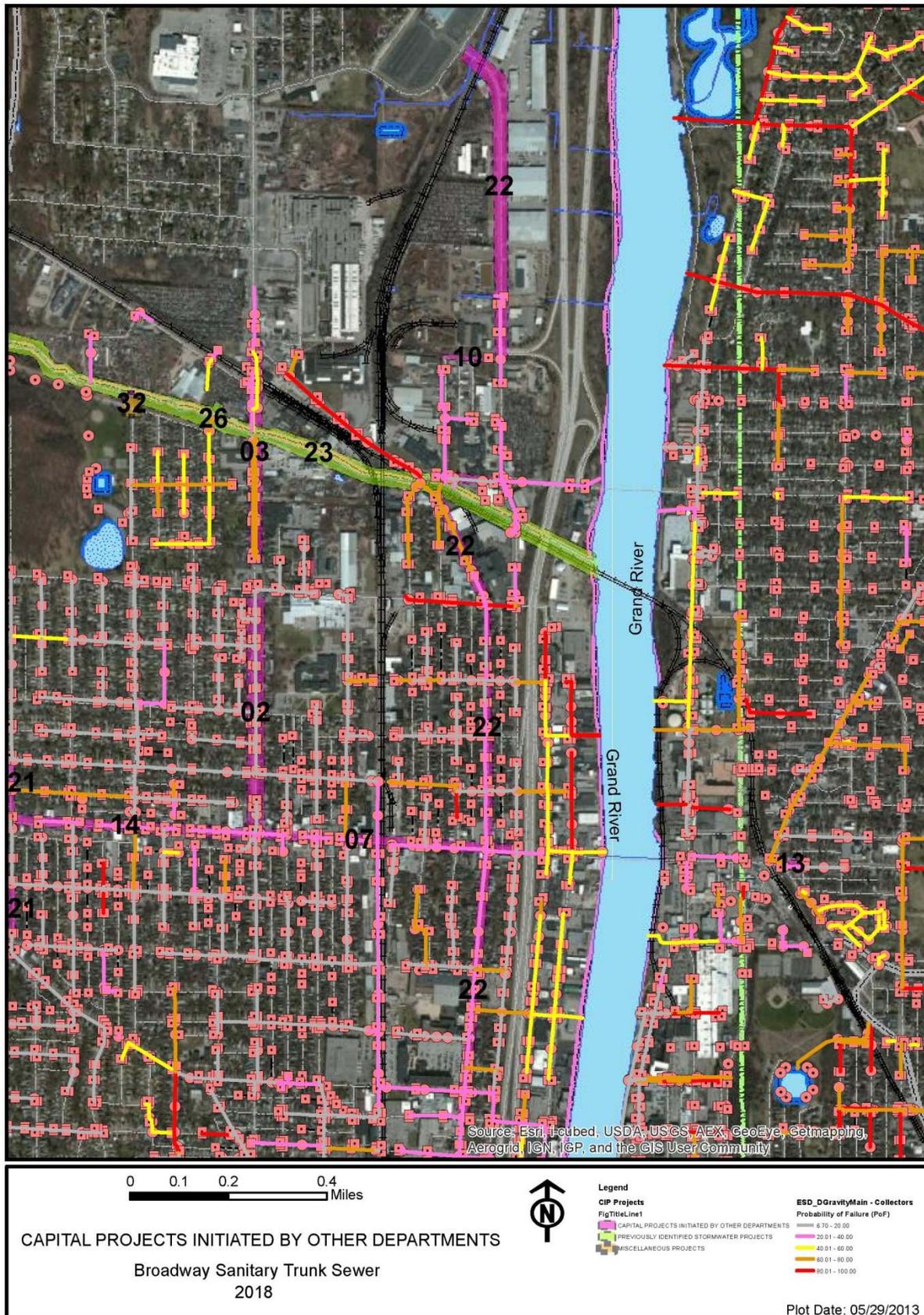
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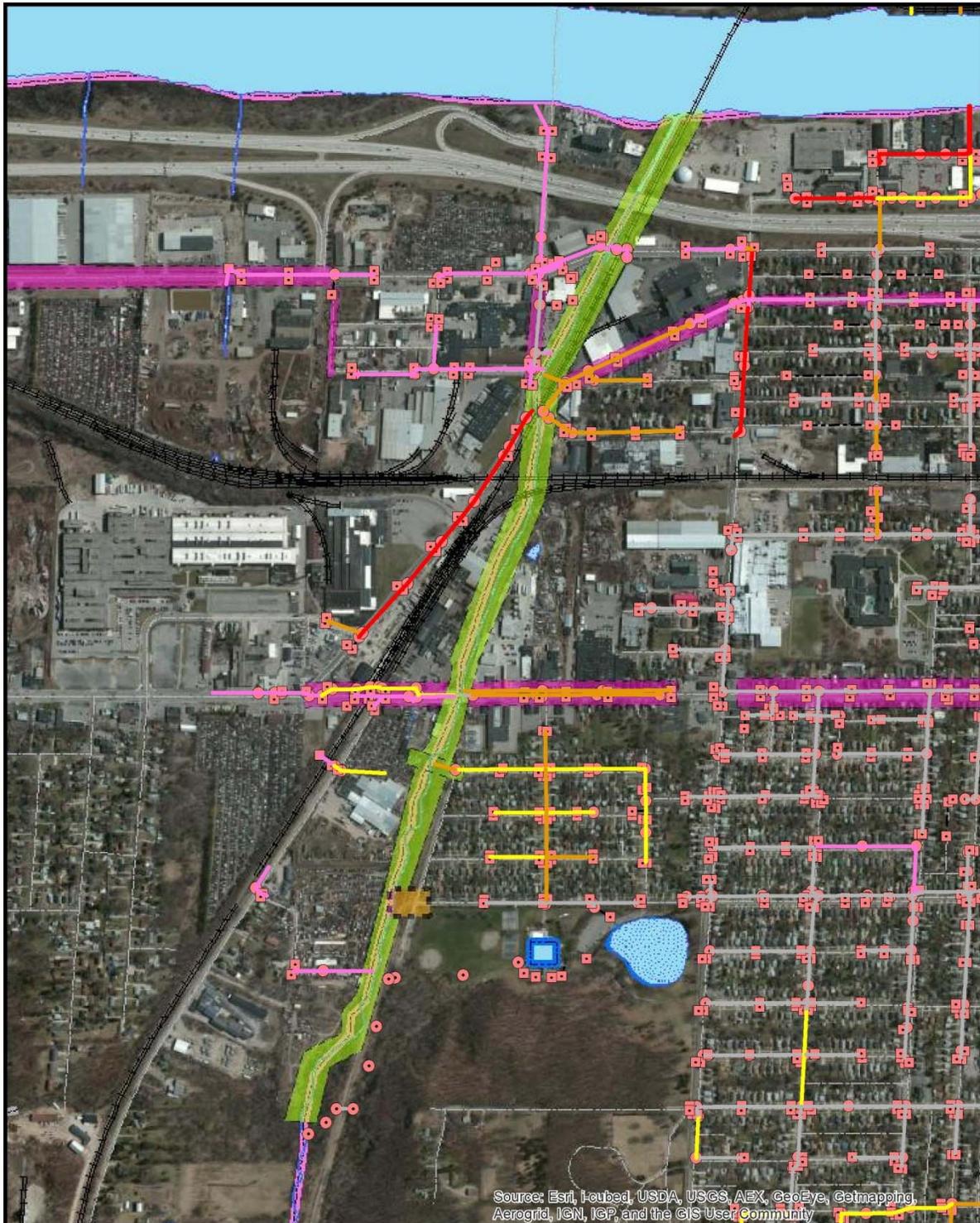
- CIP Projects
- FigTitleLine1
- CAPITAL PROJECTS INITIATED BY OTHER DEPARTMENTS
- PREVIOUSLY IDENTIFIED STORMWATER PROJECTS
- MISCELLANEOUS PROJECTS

ESD_DGravityMain - Collectors
 Probability of Failure (PoF)

- 8.70 - 20.00
- 20.01 - 40.00
- 40.01 - 60.00
- 60.01 - 80.00
- 80.01 - 100.00

Plot Date: 05/29/2013





0 0.05 0.1 0.2 Miles

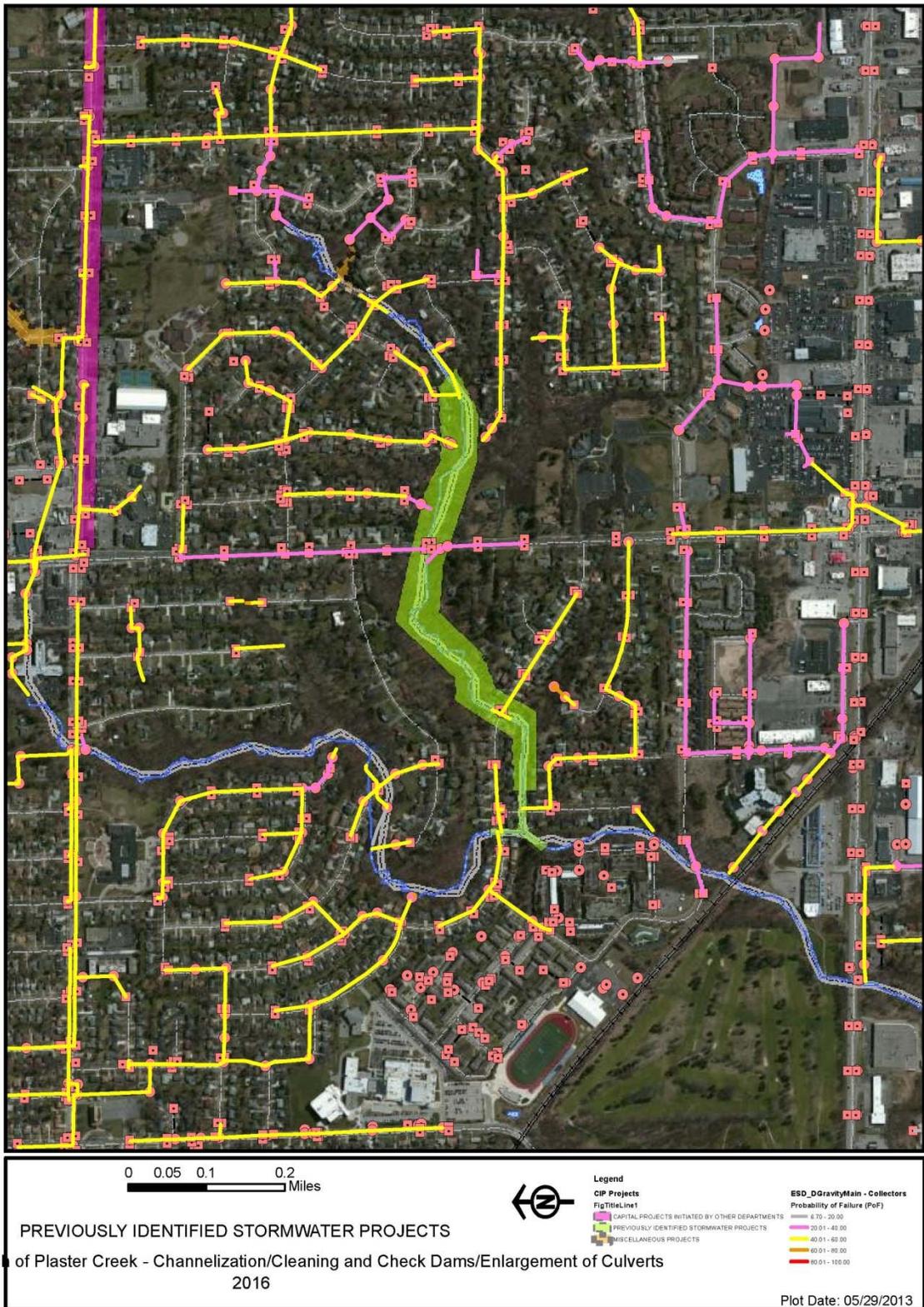
PREVIOUSLY IDENTIFIED STORMWATER PROJECTS
 Indian Mill Creek Dredging
 2015

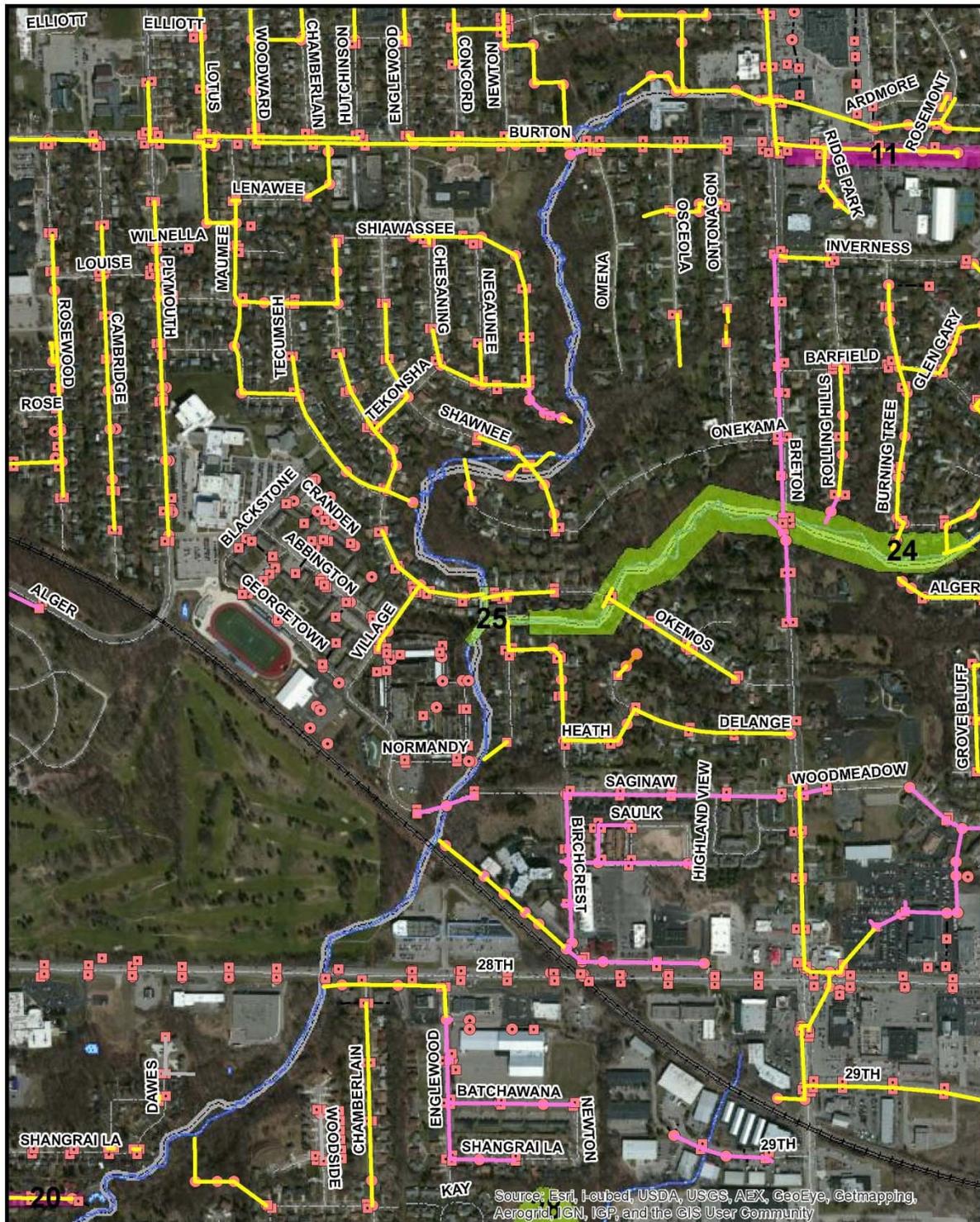
Legend

CIP Projects
 FigTitleLine1
 CAPITAL PROJECTS INITIATED BY OTHER DEPARTMENTS
 PREVIOUSLY IDENTIFIED STORMWATER PROJECTS
 MISCELLANEOUS PROJECTS

ESD_DGravityMain - Collectors
 Probability of Failure (PoF)
 8.70 - 20.00
 20.01 - 40.00
 40.01 - 60.00
 60.01 - 80.00
 80.01 - 100.00

Plot Date: 05/29/2013





0 0.05 0.1 0.2 Miles

PREVIOUSLY IDENTIFIED STORMWATER PROJECTS

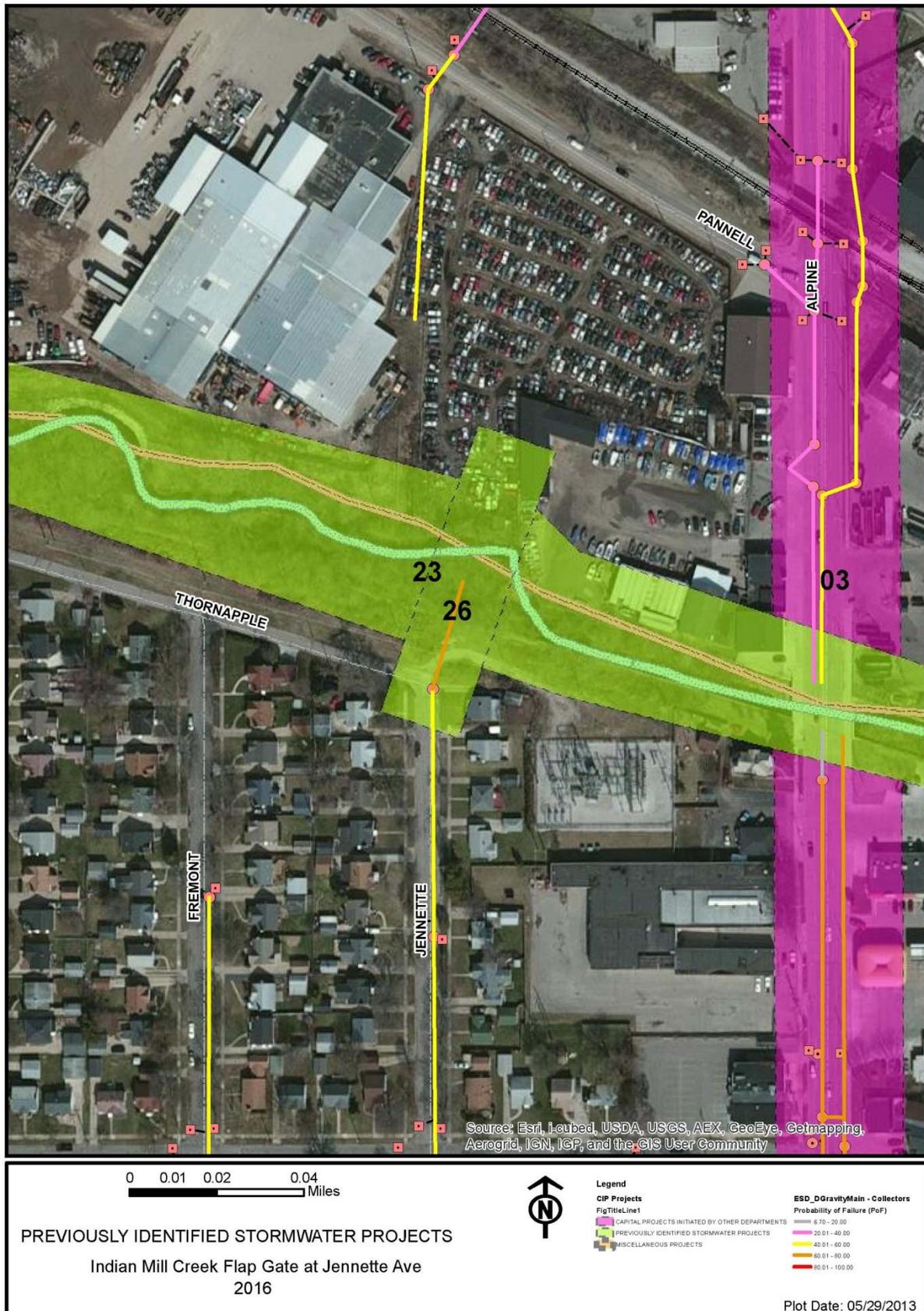
Burton-Breton Branch of Plaster Creek - Enlargement of Culverts
 Burton-Breton Branch of Plaster Creek - Enlargement of Culverts
 Burton-Breton Branch of Plaster Creek - Enlargement of Culverts

Legend

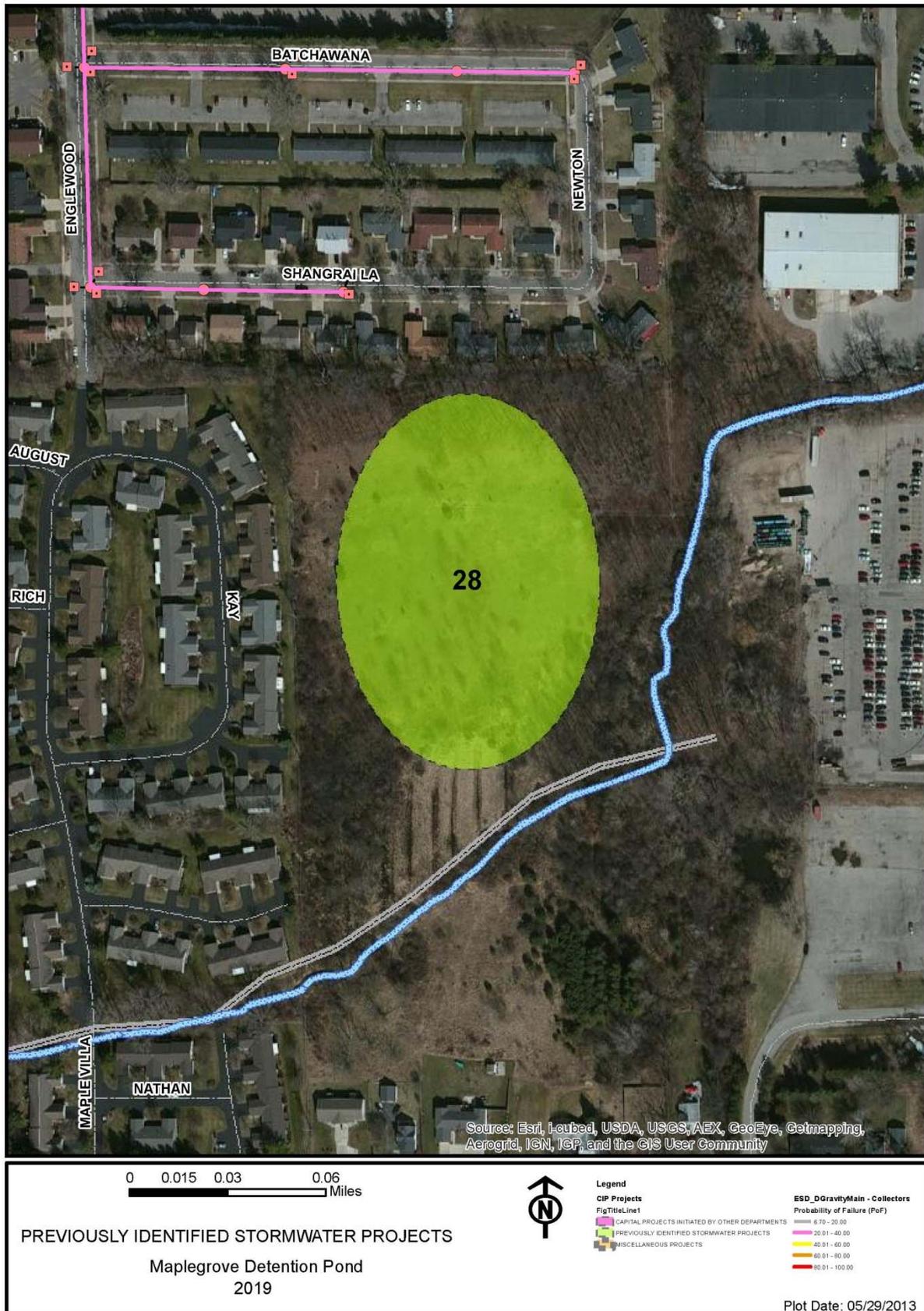
CIP Projects
 FigTitleLine1
 CAPITAL PROJECTS INITIATED BY OTHER DEPARTMENTS
 PREVIOUSLY IDENTIFIED STORMWATER PROJECTS
 MISCELLANEOUS PROJECTS

ESD_DGravityMain - Collectors
 Probability of Failure (PoF)
 8.70 - 20.00
 20.01 - 40.00
 40.01 - 60.00
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 80.01 - 100.00

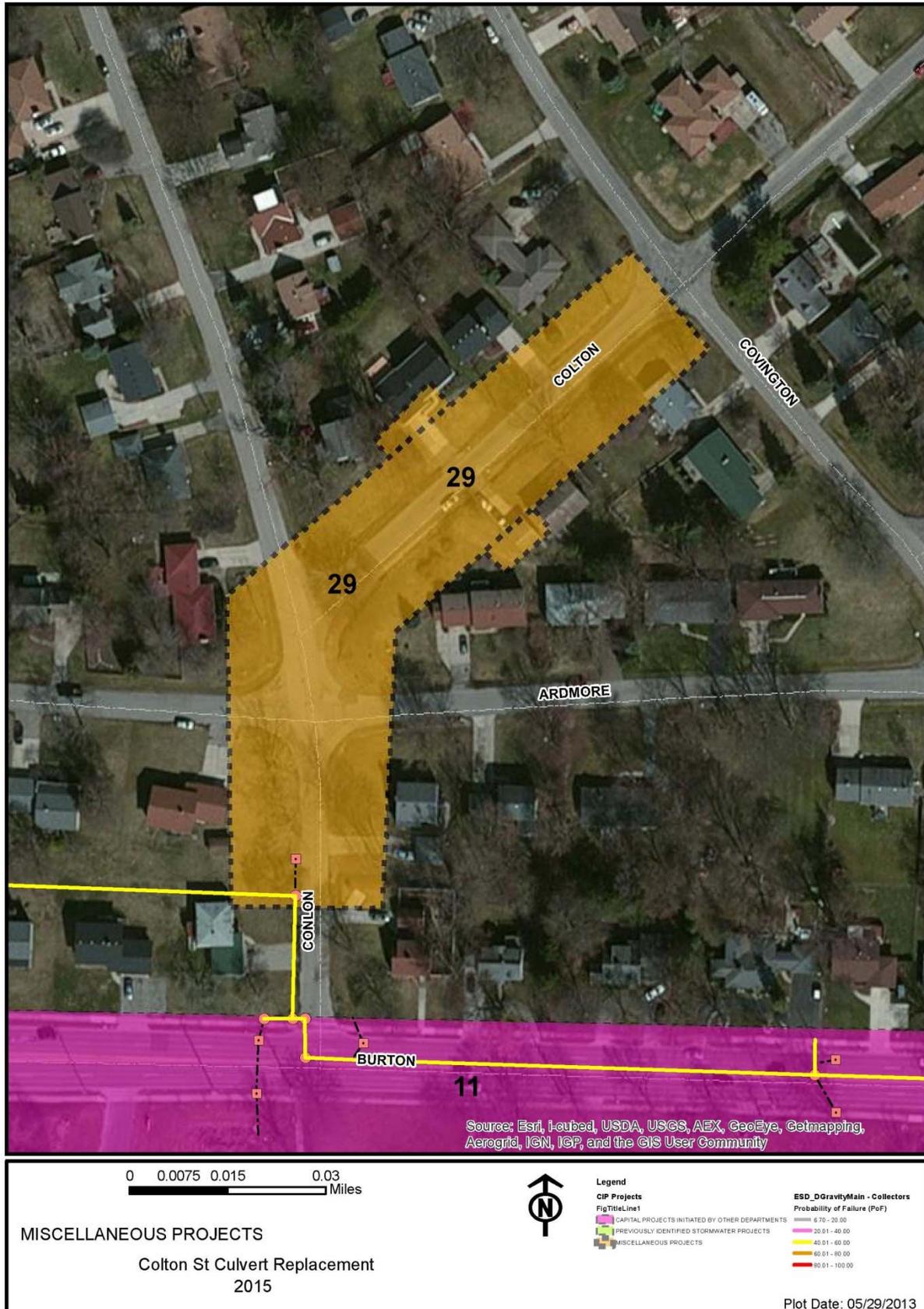
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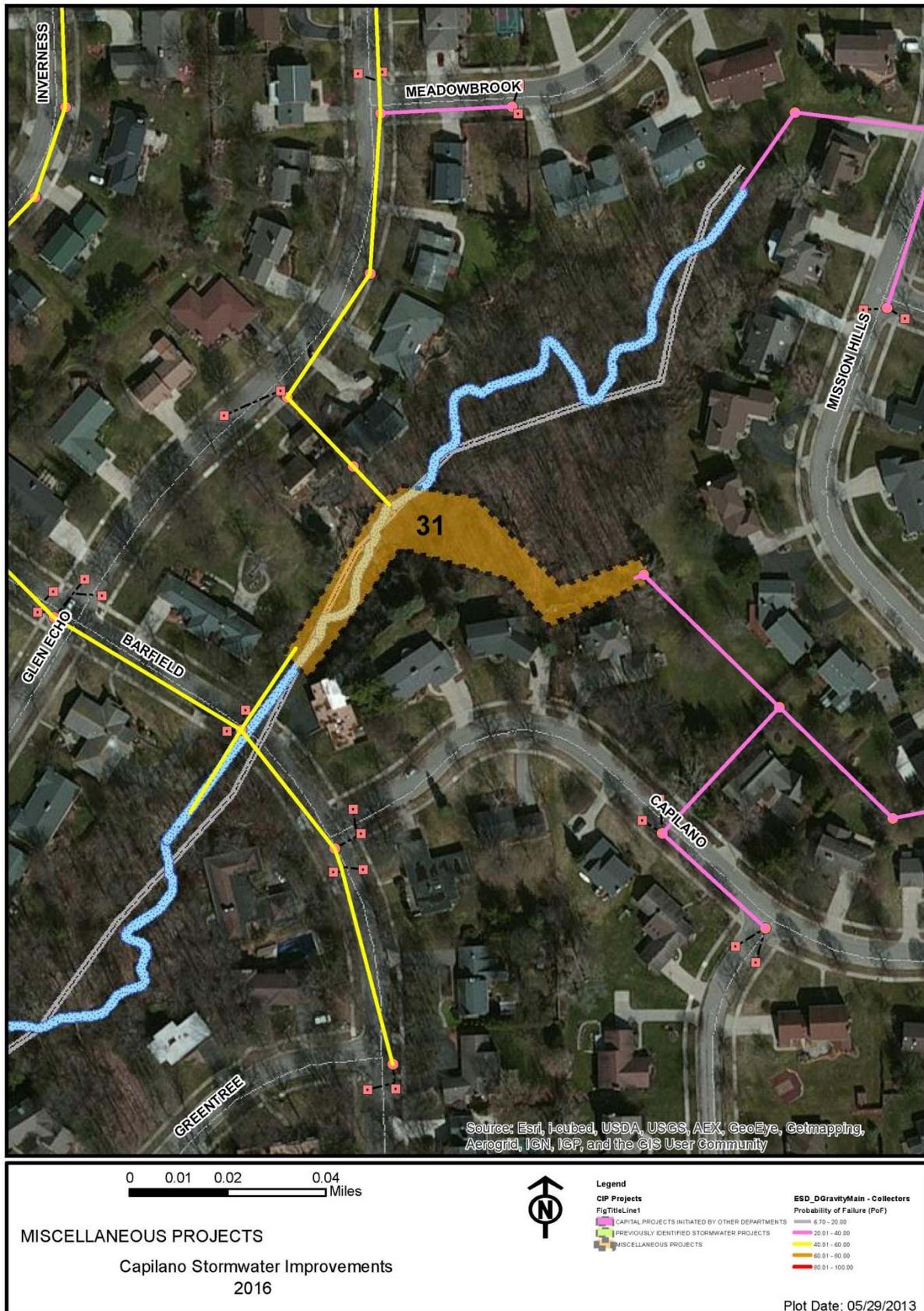






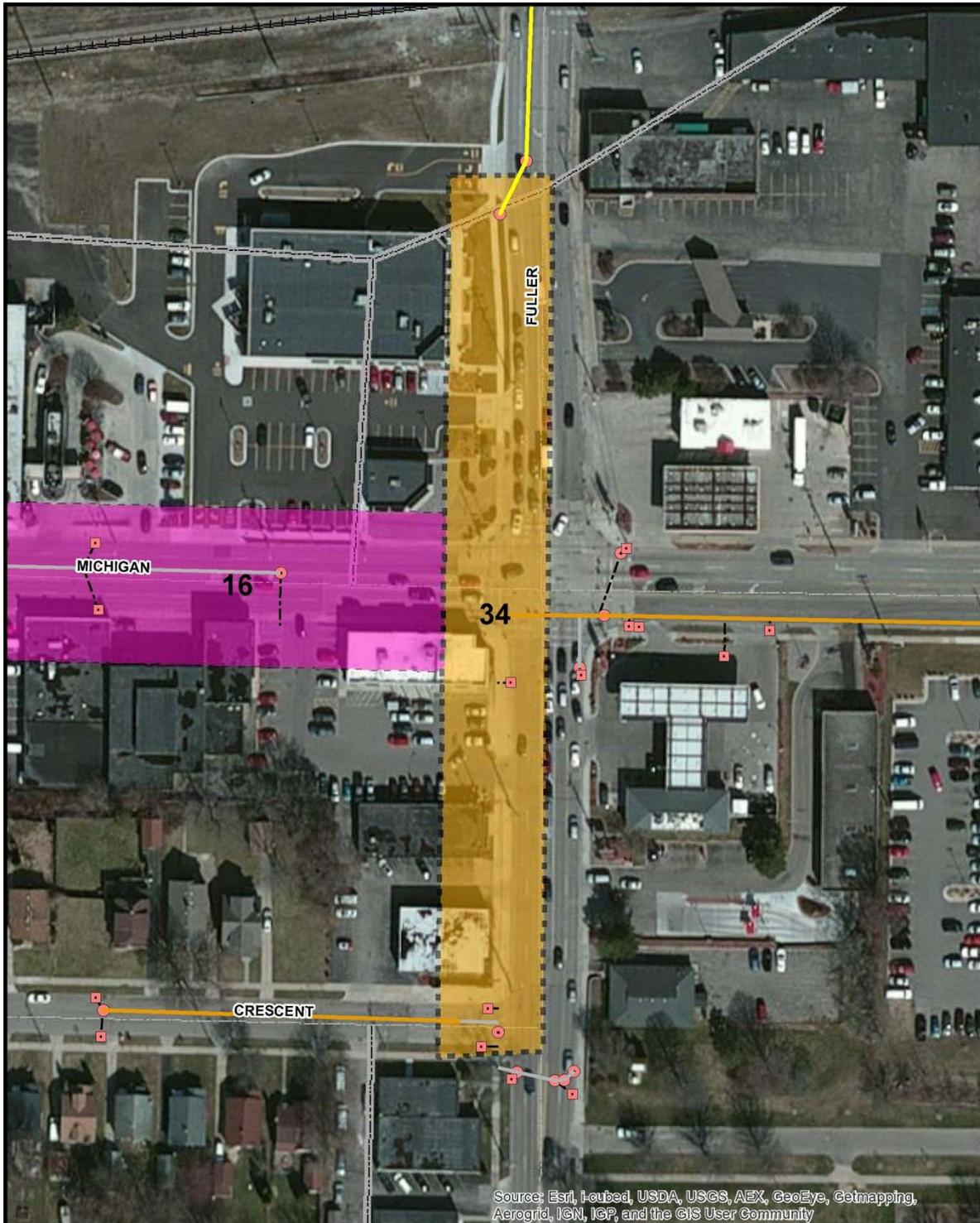












MISCELLANEOUS PROJECTS

Coldbrook Drain Rehabilitation - Michigan Ave and Fuller
2017

0 0.0075 0.015 0.03 Miles

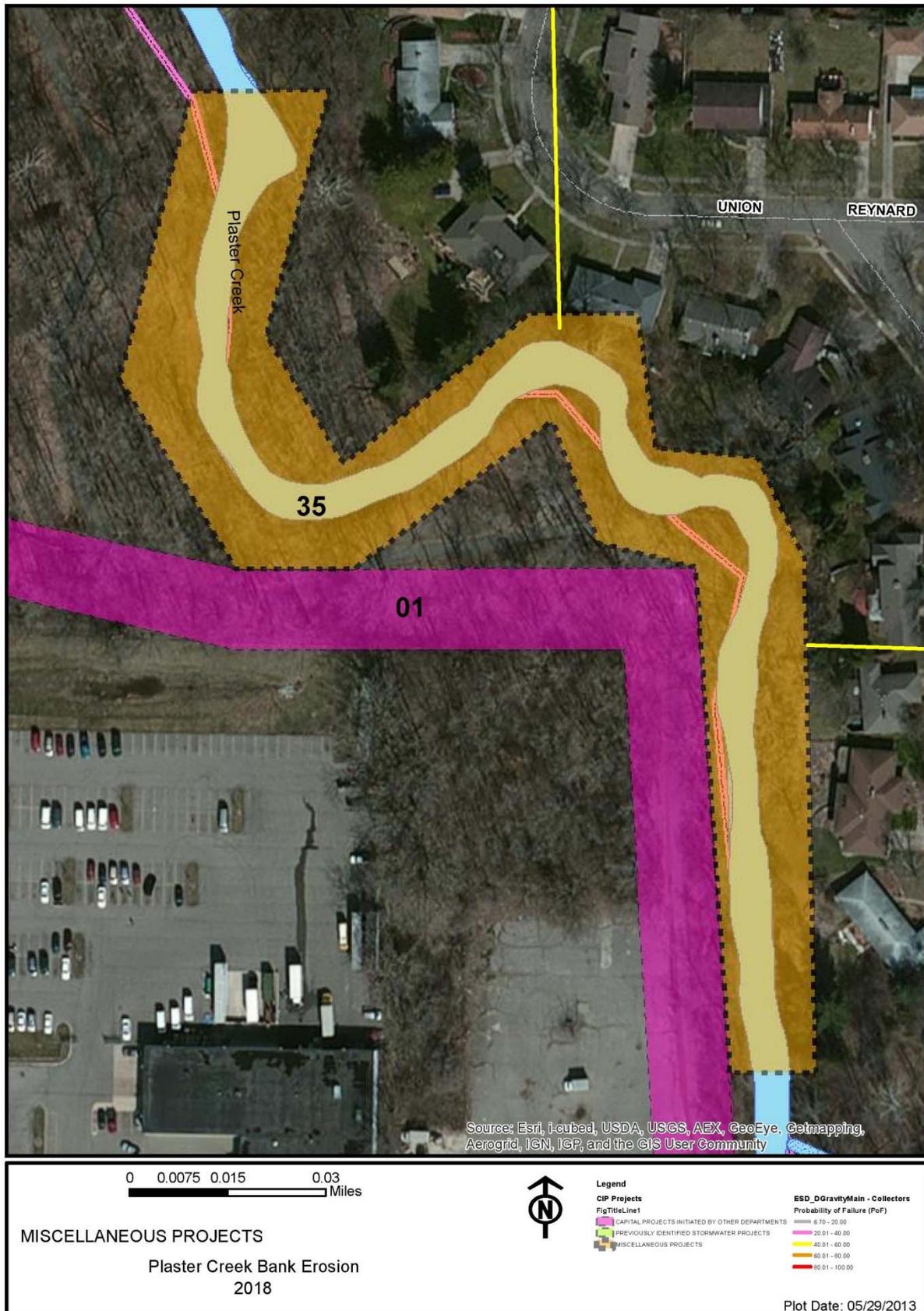
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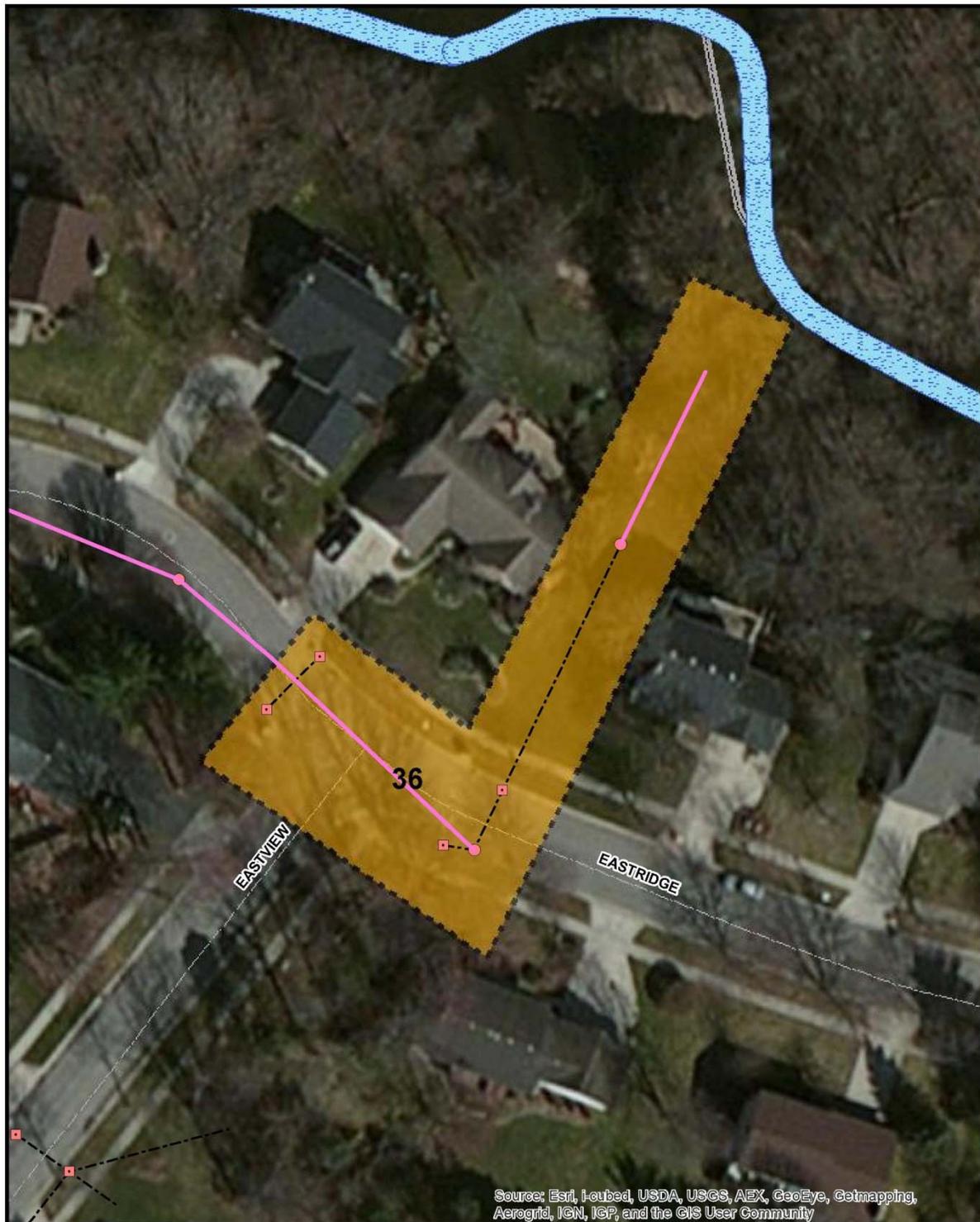
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- FigTitleLine1
- CAPITAL PROJECTS INITIATED BY OTHER DEPARTMENTS
- PREVIOUSLY IDENTIFIED STORMWATER PROJECTS
- MISCELLANEOUS PROJECTS

ESD_DGravityMain - Collectors
Probability of Failure (PoF)

- 8.70 - 20.00
- 20.01 - 40.00
- 40.01 - 60.00
- 60.01 - 80.00
- 80.01 - 100.00

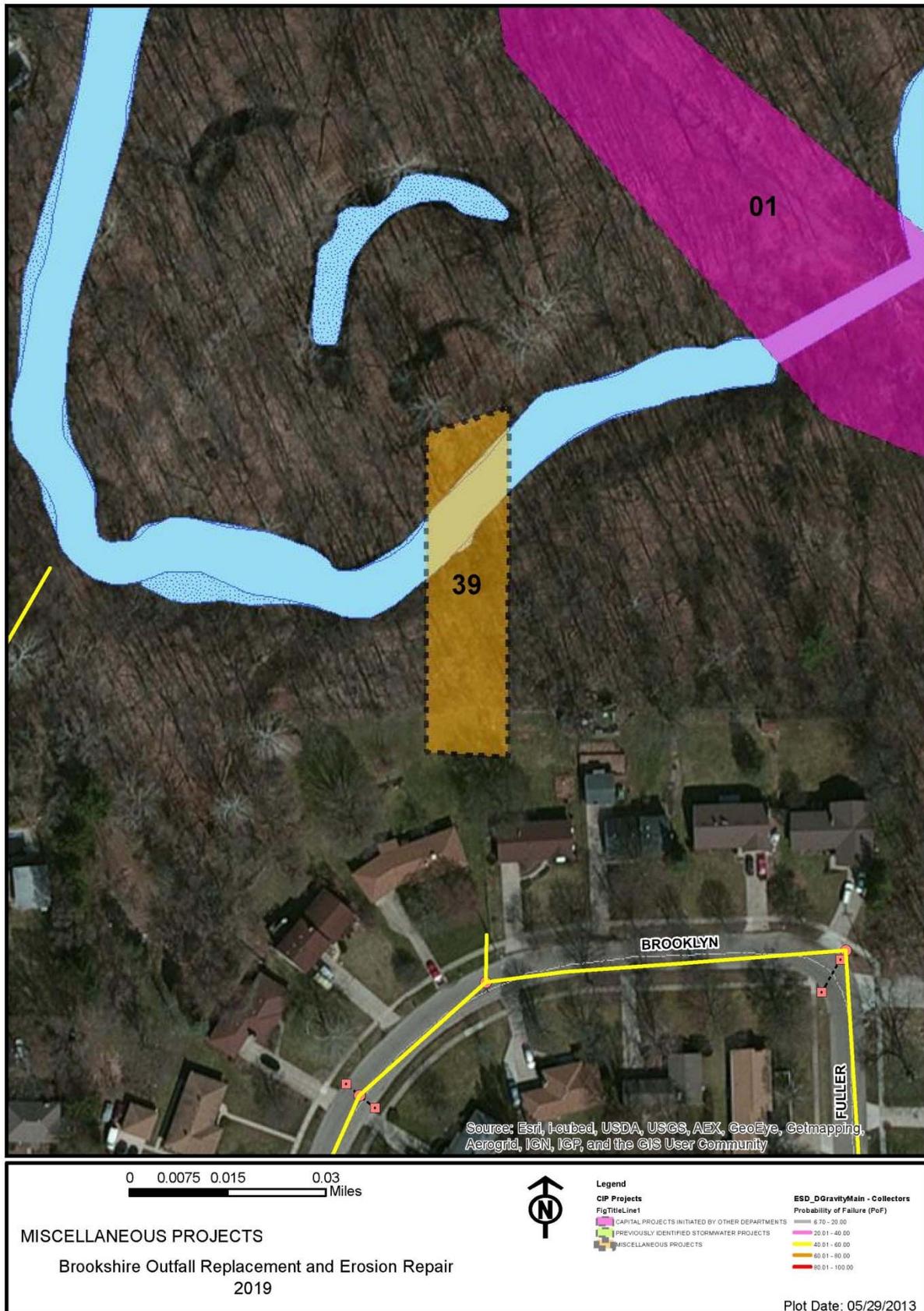
Plot Date: 05/29/2013











APPENDIX D. PROPOSED CAPITAL PROJECTS FY 2017 – FY 2021

Fiscal Year	Project Name	Revenue Amount
2017	Drainage Improvements and Emergency Repairs	\$80,000
2017	Kent County Drain Commission Special Assessments	\$45,000
2017	Moerland and Longmeadow Stormwater Improvements	\$117,470
2017	Burton-Breton Branch of Plaster Creek - Enlargement of Culverts	\$168,000
2017	Private Partnerships/Grant for Green Infrastructure	\$76,000
2017	Richmond Park Daylighting	\$36,673
2017	CIPP Rehab of Storm Sewers – Various Sites	\$100,000
	FY2017 TOTAL	\$623,143
2018	Drainage Improvements and Emergency Repairs	\$204,712
2018	Kent County Drain Commission Special Assessments	\$45,000
2018	Oakleigh Ave in Hogadone District - Channelizing and Cleaning	\$45,000
2018	Richmond Park Bioswales	\$60,000
2018	Richmond Park Daylighting	\$320,000
2018	CIPP Rehab of Storm Sewers – Various Sites	\$100,000
	FY2018 TOTAL	\$774,712
2019	Drainage Improvements and Emergency Repairs	\$131,489
2019	Kent County Drain Commission Special Assessments	\$45,000
2019	Indian Mill Creek Dredging	\$65,400
2019	Oakleigh Ave in Hogadone District - Channelizing and Cleaning	\$221,850
2019	Coldbrook Drain Rehabilitation - Michigan and Fuller	\$37,500
2019	Shawmut Hills Baseball Diamond and Channel Stormwater Improvements	\$74,300
2019	Capilano Stormwater Improvements	\$41,400
2019	Water Quality Improvement from Green Opportunity Plan	\$209,347
2019	CIPP Rehab of Storm Sewers – Various Sites	\$100,000
	FY2019 TOTAL	\$926,286
2020	Indian Mill Creek Dredging	\$370,600
2020	Maplegrove Detention Pond	\$78,300
2020	Plaster Creek Bank Erosion	\$75,975
2020	Coldbrook Drain Rehabilitation - Michigan and Fuller	\$212,500
2020	Drainage Improvements and Emergency Repairs 2020+	\$195,482
2020	Kent County Drain Commissioner Special Assessments 2020+	\$45,000
2020	CIPP Rehab of Storm Sewers – Various Sites	\$100,000
	FY2020 TOTAL	\$1,077,857

2021	Burton-Breton Branch of Plaster Creek - Channelization and Cleaning	\$37,995
2021	Maplegrove Detention Pond	\$443,700
2021	Plaster Creek Bank Erosion	\$430,525
2021	Drainage Improvements and Emergency Repairs 2020+	\$97,209
2021	Water Quality Improvement from Daylighting Plan	\$75,000
2021	Kent County Drain Commissioner Special Assessments 2020+	\$45,000
2021	CIPP Rehab of Storm Sewers – Various Sites	\$100,000
	FY2021 TOTAL	\$1,229,429

ADDENDUM #1

Update to Annual Maintenance Goals

March 24, 2023

To determine what facilities need improvement, an assessment of all the facilities need to be completed through cleaning and televising. The 2013 Stormwater Asset Management and Capital Improvement Plan has set the goal to attain Level of Service “C”. A plan was set forth to perform assessments on all assets 75-years and older over a ten-year period. The ten-year plan included preventative maintenance on 10% of all assets within these qualifications. Table 1 summarizes the current annual cleaning and inspection goals to maintain a Level of Service “C”.

Table 1. Current Asset Management Data for Level of Service C Goals

Asset Management Item	Annual Goal
Storm Main Cleaned (ft)	410,000
Storm Main Televised (ft)	53,650
Catch Basins Cleaned (ea)	4,164

In 2022, a complete cycle of assessments was completed on all qualifying infrastructure per the 2013 Stormwater Asset Management Plan. The assessment on the qualifying infrastructure showed most of the storm mains and catch basins were in better shape than expected. Televising the pipes that were 75-years and older identified very few issues. We have identified more issues while televising younger pipes in preparation for construction projects. These issues have consisted primarily of finding lines run through our storm mains and sanitary cross connections.

With the expectation of less maintenance and the condition of the stormwater mains over 75-years of age in good condition, a recommendation to remove the qualification of the age of infrastructure being over 75-years be removed.

Removal of the age requirement will allow the entire system to be assessed and optimize the use and time of personnel and equipment. With this restriction removed, new goals were created. Table 2 shows the proposed goals for each asset management to be changed.

Table 2: Asset Management Proposed Changes to Annual Goals

Asset Management Item	Proposed Goal
Storm Main Televising	176,623 LF
Storm Main Cleaning	176,623 LF
Catch Basin Cleaning	3,670 EA

This proposed age qualification change will lengthen the televising and cleaning cycle from ten-years to twelve-years while capturing every stormwater main in the system. The proposal allows for crews and equipment to work more efficiently through the system. A cleaning crew and equipment can be dispatched and teamed with a televising crew and equipment. This will provide a better-quality recording of the stormwater pipes having them cleaned right before the televising of the pipe.

The new goals will allow an assessment of all catch basins on a five-year rotation schedule. With the cycle

completed and design of the catch basins having a bigger sump requiring less maintenance, we can lower the annual goal and target a few hundred catch basins that are in heavy sediment areas or have historically required more cleaning.

4. CULVERT INVENTORY AND ASSESSMENT, DECEMBER 11, 2019

To: Mike Staal and Carrie Rivette, City of Grand Rapids

Cc:

From: Dan Christian, Tetra Tech

Date: December 11, 2019

Subject: Culvert Inventory and Assessment

This memorandum summarizes the work that was done to inventory and assess culverts within the City of Grand Rapids under the SAW grant project. The objective of this task was to inventory culverts within the City's storm system including rights-of-way and easements, but driveway culverts to privately owned parcels were not included. An initial mapping exercise was completed to identify areas in the City to look for the culverts. A geodatabase schema was agreed upon to store the data collected.

The culverts were located and inventoried in the field based on the MDOT and TAMS *Asset Collection & Condition Assessment Guide for 1- to 10-ft Span Culverts* (2018). The core attributes are provided in Table 1. Photos were taken at each end of the culverts; one looking inside the pipe and one showing the culvert and the surrounding area.

Table 1 Asset Collection and Condition Assessment Attributes (MDOT-TAMS)

Barrel Attributes	End Attributes	Condition Attributes (1 to 9 scale)
Culvert Installation Date (date)	Installation Date (date)	Invert Deterioration
Asset Collection Date (date)	End Section (multiple choice)	Joints
Culvert Material (multiple choice)	End Location (multiple choice)	Section Deformation
Culvert Shape (multiple choice)	End Section Material (multiple choice)	Corrosion
Culvert Height (numeric)	Invert Above Channel Bottom (logical or multiple choice)	Road Over
Culvert Width (numeric)	Riprap (logical)	End Section
Liner (logical)	Safety Gate (logical)	Apron
Liner Material (multiple choice)	End Extension (logical)	Scour
Liner Diameter (numeric)	Extension material same as Original Culvert (logical)	Riprap
Depth of Cover (multiple choice)	Extension Shape Same as Original Culvert (logical)	Sediment
Service Status (multiple choice)	Extension Dimensions Same as Original Culvert (logical)	Invert Location
Spatial Quality Index (multiple choice)		Embankment
Stream Substrate (multiple choice)		Footing Exposed
Water Depth (numeric)		
Ditch Vegetation (multiple choice)		
Length (calculated)		

Culverts were prioritized based on the results of the condition attributes data collected. Culverts in poorer condition and those in priority areas were inspected with CCTV equipment and assessed based on the NASSCO PACP methodology. Culverts with completed PACP inspection results were identified in the City's Cityworks asset management system.

Inventory and visual condition assessment information was completed on 209 culverts with a combined length of approximately 18,700 linear feet. Video inspection along with PACP rating was completed on 94 culverts with a total length of approximately 8,700 linear feet. A listing of the inventoried culverts, and those CCTV'd, are provided in Table 2. Limited information is shown in the tabular data, refer to the GIS files for more comprehensive information. Electronic GIS files of the inventory and assessment results along with the photographs, video inspection files, and PACP ratings were provided to the City.

Table 2 Culverts Inventoried

ID	Street	Matl	Shape	Height (in)	Width (in)	Length (ft)	CCT V
2619434	Leffingwell Ave NE	RCP	Circ.	36	36	77	Yes
2619435	Leffingwell Ave NE	RCP	Circ.	48	48	108	No
2619436	Leffingwell Ave NE	RCP	Circ.	36	36	52	Yes
2619437	Bradford St NE	Metal	Circ.	34	36	49	Yes
2619438	W I 96	RCP	Circ.	48	48	205	No
2619439	E Beltline Ave NE	RCP	Circ.	24	24	269	Yes
2619440	Leffingwell Ave NE	RCP	Circ.	30	30	107	Yes
2619441	Leffingwell Ave NE	RCP	Circ.	24	24	126	No
2619443	Leffingwell Ave NE	Conc.	Circ.	24	24	250	No
2619444	Leffingwell Ave NE	RCP	Circ.	12	12	39	Yes
2619447	E Beltline Ave NE	CPE	Circ.	36	36	205	No
2619448	Cornerstone College Dr NE	CPE	Circ.	34	38	104	Yes
2619449	Cornerstone College Dr NE	CPE	Circ.			93	No
2619450	Cornerstone College Dr NE	CPE	Circ.	24	24	69	No
2619451	Cornerstone College Dr NE	RCP	Circ.	27	27	36	Yes
2619453	E Beltline Ave NE	RCP	Circ.	30	30	84	Yes
2619454	Michigan St NE	RCP	Circ.	36	36	238	No
2619455	Maryland Ave NE	RCP	Circ.	36	36	120	Yes
2619456	Maryland Ave NE	RCP	Circ.	48	48	69	No
2619459	Maryland Ave NE	RCP	Circ.	48	48	24	No
2619460	Maryland Ave NE	RCP	Circ.	42	42	86	Yes
2619461	Oak Industrial Dr NE	RCP	Circ.	54	54	274	Yes
2619462	Oak Industrial Dr NE	RCP	Circ.	54	54	83	Yes
2619463		RCP	H.Ellip	58	90	111	Yes
2619464	Oak Industrial Dr NE	Metal	Circ.	36	36	18	No
2619466	Plymouth Ave NE	RCP	Circ.	96	96	39	Yes
2619467		RCP	Circ.	96	96	227	No
2619468	Knapp St NE	RCP	Circ.	72	72	94	Yes
2619469		RCP	Circ.	54	54	109	Yes
2619470	St Johns Home Dr NE	CMP	Circ.	12	12	19	No
2619471		CMP	Circ.	90	90	85	Yes
2619472		CMP	H.Ellip	78	108	98	Yes
2619473	Knapp St NE	RCP	H.Ellip	72	120	95	No
2619474	Aberdeen St NE	RCP	Circ.	96	96	97	No

ID	Street	Matl	Shape	Height (in)	Width (in)	Length (ft)	CCT V
2619475	3 Mile Rd NE	RCP	Circ.	60	60	57	No
2619476	3 Mile Rd NE	CMP	Circ.	96	96	114	No
2619478		Conc.	Box	96	120	117	Yes
2619479	Plainfield Ave NE	CMP	Circ.	42	42	120	Yes
2619480		Conc.	3Side		204	14	No
2619481	Plaza Dr NE	CMP	Circ.	42	42	68	Yes
2619482	Cheney Ave NE	RCP	Circ.	84	84	98	No
2619483	Byers St NE	RCP	Circ.	24	24	29	Yes
2619484	Coit Ave NE	Conc.	Box	48	96	76	Yes
2619485		Conc.	Box			68	Yes
2619488	Lamberton Lake Dr NE	CMP	Arch	42	63	92	Yes
2619489	Lamberton Lake Dr NE	CMP	Arch	42	63	27	Yes
2619491	Wealthy St SW	CMP	Arch	48	96	10	No
2619492		RCP	Circ.	24	24	120	No
2619493	Leonard St NE	RCP	Circ.	30	30	124	Yes
2619494	Worcester Dr NE	RCP	Circ.	54	54	310	No
2619495	Chesapeake Dr NE	RCP	Circ.	27	27	98	Yes
2619496	Olson St NE	RCP	Circ.	48	48	86	Yes
2619497		RCP	Circ.	96	96	113	No
2619499	Cornerstone College Dr NE	CMP	Circ.	12	12	48	No
2619500	E Beltline Ave NE	Conc.	H.Ellip	34	54	33	Yes
2619501	E Beltline Ave NE	Conc.	H.Ellip	34	54	34	Yes
2619502	Cascade Rd SE	Conc.	Circ.	48	48	130	No
2619503	E Fulton St	RCP	3Side		48	69	Yes
2619504	W I 196	RCP	Circ.	72	72	262	Yes
2619505	W I 196	CMP	Circ.	48	48	164	No
2619506	Michigan St NE	RCP	Circ.	48	48	89	No
2619507	Michigan St NE	CMP	Arch	42	68	76	Yes
2619508		CMP	Circ.	30	30	45	Yes
2619509	Robinson Rd SE	Conc.	Circ.	30	30	246	No
2619510		Conc.	H.Ellip	36	48	15	No
2619511	Elderberry Ln SE		H.Ellip	29	45	9	Yes
2619512	Elderberry Ln SE		H.Ellip	29	45	9	Yes
2619513		Conc.	Box	42	46	23	Yes
2619514	Wilcox Park Dr SE	Conc.	Circ.	72	72	123	No
2619515	Honeysuckle Ln SE	Conc.	3Side	3.4	8.4	29	Yes
2619516	Honeysuckle Ln SE	Conc.	H.Ellip	18	30	35	No
2619517	White Pine Ln SE	Conc.	H.Ellip	72	111	79	No
2619518	E Fulton St	Conc.	H.Ellip	29	46	17	Yes
2619519	E Fulton St	Conc.	H.Ellip	29	46	16	Yes
2619520	Wege Circle Dr SE	Conc.	3Side		96	13	Yes
2619521	Parkview Dr NE	Conc.	Circ.	60	60	1,131	No
2619522	Lakeside Dr SE	RCP	Circ.	48	48	62	Yes
2619523	Lakeside Dr SE	RCP	Circ.	36	36	61	Yes

ID	Street	Matl	Shape	Height (in)	Width (in)	Length (ft)	CCT V
2619524		RCP	H.Ellip	44	68	32	No
2619525		Conc.		3.8	120	21	No
2619526	Lakeside Dr SE	Conc.	H.Ellip	44	68	16	Yes
2619527	E Fulton St	RCP	H.Ellip	48	75	18	Yes
2619528	E Fulton St	RCP	H.Ellip	45	68	27	Yes
2619529	Fultonwood Dr SE	Conc.	H.Ellip	35	54	19	Yes
2619530		RCP	Circ.	54	54	227	Yes
2619531	E Fulton St	RCP	Circ.	54	54	340	Yes
2619532		RCP	H.Ellip	54	68	94	No
2619533	28th St SE	CMP	Arch	58	79	19	Yes
2619534	28th St SE	Conc.	3Side	30	120	133	No
2619535	28th St SE	CMP	Circ.	72	72	82	Yes
2619536	Burton St SE	Conc.	Circ.	36	36	121	No
2619537	Burton St SE	Conc.	Circ.	42	42	80	Yes
2619538	E Mall Dr SE	Conc.	H.Ellip	72	112	70	Yes
2619539		Conc.	H.Ellip	68	105	120	Yes
2619540	Camelot Dr SE	Conc.	V.Ellip	96	58	88	Yes
2619541	University Dr SE	Conc.	Circ.	36	36	71	Yes
2619542		Conc.	Circ.	60	60	49	Yes
2619543	Haleh CIR SE	Conc.	Circ.	48	48	73	Yes
2619544	Burton Ridge Rd SE	RCP	Circ.	66	66	68	No
2619545	E Beltline Ave SE	Conc.	3Side	2.8	242	11	No
2619546		RCP	Circ.	30	30	97	Yes
2619547		RCP	H.Ellip	42	68	93	Yes
2619548	29th St SE	RCP	Circ.	36	36	92	No
2619549	Maple Villa Dr SE	RCP	Circ.	48	48	89	Yes
2619550	Brook Trl SE	RCP	Circ.	42	42	96	Yes
2619551	Breton Rd SE	RCP	Circ.	36	36	183	Yes
2619552	Breton Rd SE	RCP	Circ.	36	36	352	Yes
2619553	Saginaw Rd SE	Conc.	Circ.	108	108	199	Yes
2619554	Saginaw Rd SE	RCP	Circ.	36	36	41	Yes
2619555	Saginaw Rd SE	M.Stone	Arch	84	72	79	Yes
2619556	Okemos Dr SE	RCP	H.Ellip	52	84	97	Yes
2619557	Annchester Dr SE	RCP	H.Ellip	48	64	97	Yes
2619558	Okemos Dr SE	RCP	H.Ellip	48	76	248	No
2619559	Breton Rd SE	RCP	Circ.	54	54	216	Yes
2619560	Barfield Dr SE	RCP	Circ.	30	30	264	Yes
2619561	Greentree Dr SE	Plastic	Circ.	24	24	368	No
2619562	Greentree Dr SE	Plastic	Circ.	24	24	364	No
2619563	Glen Echo Dr SE	Plastic	Circ.	24	24	365	No
2619564		RCP	Circ.	66	66	576	Yes
2619565	Burton St SE	RCP	Circ.	60	60	181	Yes
2619566	Burton St SE	CMP	Circ.	48	48	68	Yes
2619567	Burton St SE	CMP	Circ.	42	42	13	Yes

ID	Street	Matl	Shape	Height (in)	Width (in)	Length (ft)	CCT V
2619568	Brooklyn Ave SE	CMP	Circ.	36	36	31	No
2619569	Brooklyn Ave SE	CMP	Circ.	42	42	141	No
2619570	Oak Industrial Dr NE	RCP	H.Ellip	39	60	110	No
2619571	Leffingwell Ave NE	RCP	Circ.	30	30	43	Yes
2619572		CMP	Circ.	21	21	120	Yes
2619573	Kent Skills Center Dr NE	CMP	Circ.	30	30	26	Yes
2619574		Plastic	Circ.	36	36	45	Yes
2619575	Carrier Creek Blvd NE	RCP	Circ.	54	54	89	Yes
2619576	Hubert St NE	CMP	Circ.	42	42	55	No
2619577		CMP	Circ.	36	36	52	No
2619578		RCP	Circ.	30	30	80	Yes
2619579		Conc.	Circ.	24	24	29	No
2619580	Wealthy St SW	CMP	Circ.	36	36	127	No
2619581	Wealthy St SW	CMP	Circ.	36	36	127	No
2619582	Eastern Ave SE	RCP	Circ.	36	36	156	Yes
2619583	Brooklyn Ave SE	Conc.	Circ.	36	36	60	No
2619584		Conc.	Circ.	36	36	63	No
2619585	Walsh St SE	Conc.	Circ.	18	18	60	No
2619586	Walsh St SE	Conc.	Circ.	18	18	67	No
2619587		CMP	Circ.	36	36	72	No
2619588		RCP	Circ.	24	24	80	Yes
2619590	Richmond St NW	RCP	Circ.	84	84	49	Yes
2619591	Whitmore Ave NW	RCP	Circ.	60	60	86	Yes
2619592	Lamont Ave NW	RCP	Circ.	48	48	58	Yes
2619593	Lamont Ave NW	RCP	Circ.	48	48	20	Yes
2619594	Whitmore Ave NW		Circ.	18	18	27	Yes
2619596	Laughlin Dr NW	Conc.	Circ.	18	18	45	Yes
2619597	Laughlin Dr NW	RCP	Circ.	27	27	25	Yes
2619598	Benning Ave NW	RCP	Circ.	48	48	59	Yes
2619599	Maynard Ave NW	Plastic	Circ.	24	24	44	Yes
2619600	Richmond St NW	CMP	Circ.	0	0	65	No
2619601	Blythe Ct NW	Conc.	Circ.	15	15	61	No
2619602	Ducoma Dr NW	Conc.	Circ.	15	15	24	No
2619603	Oakleigh Rd NW	RCP	Circ.	15	15	15	No
2619604	Oakleigh Rd NW	CMP	Circ.	36	36	36	No
2619605	Oakleigh Rd NW	Conc.	Circ.	21	21	58	No
2619606	Oakleigh Rd NW	Conc.	Circ.	15	15	17	No
2619607	Oakleigh Rd NW	RCP		24	24	66	No
2619608	7th St NW	Conc.	Circ.	12	12	19	No
2619609	Oakleigh Rd NW	RCP	Circ.	42	42	63	No
2619610	Oakleigh Rd NW	CMP	Circ.	0	0	13	No
2619611	Burritt St NW	Conc.	Circ.	15	15	29	No
2619613	Lake Michigan Dr NW	RCP	Circ.	36	36	29	No
2619615	Thornridge Ct NW	Conc.	Circ.	15	15	17	No

ID	Street	Matl	Shape	Height (in)	Width (in)	Length (ft)	CCT V
2619616	Thornridge Ct NW	Conc.	Circ.	42	42	72	No
2619617	Lake Michigan Dr NW	RCP	Circ.	18	18	41	No
2619618	Burritt St NW	Conc.	Circ.	12	12	62	No
2619619	Charlotte Ave NW	Conc.	Circ.	15	15	36	No
2619620	Burritt St NW	Conc.	Circ.	0	0	32	No
2619621	7th St NW	Conc.	Circ.	10	10	11	No
2619622	Fairfield Ave NW	Conc.	Circ.	10	10	16	No
2619623	Fairfield Ave NW	Conc.	Circ.	15	15	41	No
2619624	Carpenter Ave NW	Clay	Circ.	8	8	24	No
2619625	Woodpath Dr NW	Conc.	Circ.	12	12	43	No
2619626	Carpenter Ave NW	Conc.	Circ.	12	12	25	No
2619627	7th St NW	Conc.	Circ.	12	12	13	No
2619628	Westview Ave NW	Conc.	Circ.	12	12	14	No
2619629	Alger St SE	RCP	H.Ellip	37	60	154	No
2619630	Kalamazoo Ave SE	RCP	Circ.	42	42	59	No
2619631	Shangrai La Dr SE	Conc.	Circ.	12	12	44	No
2619632	Shangrai La Dr SE	Conc.	Circ.	12	12	41	No
2619633	Shangrai La Dr SE	Conc.	Circ.	12	12	53	No
2619634	Van Auken St SE	Conc.	Circ.	12	12	41	No
2619635	Van Auken St SE	Conc.	Circ.	12	12	28	No
2619636	Newcastle Dr SE	Conc.	Circ.	15	15	47	No
2619637	Newcastle Dr SE	Conc.	Circ.	18	18	56	No
2619638	Newcastle Dr SE	Conc.	Circ.	15	15	38	No
2619639	Giddings Ave SE	Conc.	Circ.	12	12	39	No
2619640	Derbyshire St SE	Conc.	Circ.	12	12	44	No
2619642	Van Auken St SE	Conc.	Circ.	15	15	52	No
2619643		RCP	Circ.	18	18	136	No
2619644	Ardmore St SE	Conc.	Circ.	12	12	46	No
2619645	Ardmore St SE	RCP	Circ.	18	18	77	No
2619646	Colton Dr SE	Plastic	Circ.	12	12	43	No
2619647	Woodlawn Ave SE	Conc.	Circ.	10	10	21	No
2619648	Vassar St SE	Conc.	Circ.	12	12	34	No
2619649	Norfolk Rd SE	Conc.	Circ.	12	12	45	No
2619650	Wooster Ave SE	Conc.	Circ.	0	0	35	No
2619651	Covington Dr SE	Conc.	Circ.	12	12	44	No
2619655	Covington Dr SE	Conc.	Circ.	12	12	21	No
2619656	Ridgewood Ave SE	Conc.	Circ.	12	12	27	No
2619657	Sherwood Dr SE	Conc.	Circ.	10	10	33	No
2619658	Sherwood Dr SE	Conc.	Circ.	10	10	29	No
2619659	Sherwood Dr SE	RCP	Circ.	15	15	42	No
2619660	Ridgewood Ave SE	Conc.	Circ.	12	12	17	No
2619661	Woodcliff Ave SE	Conc.	Circ.	12	12	18	No
2619662	Maple Bluff Dr SE	RCP	Circ.	60	60	114	No

5. SIGNAL ASSETS

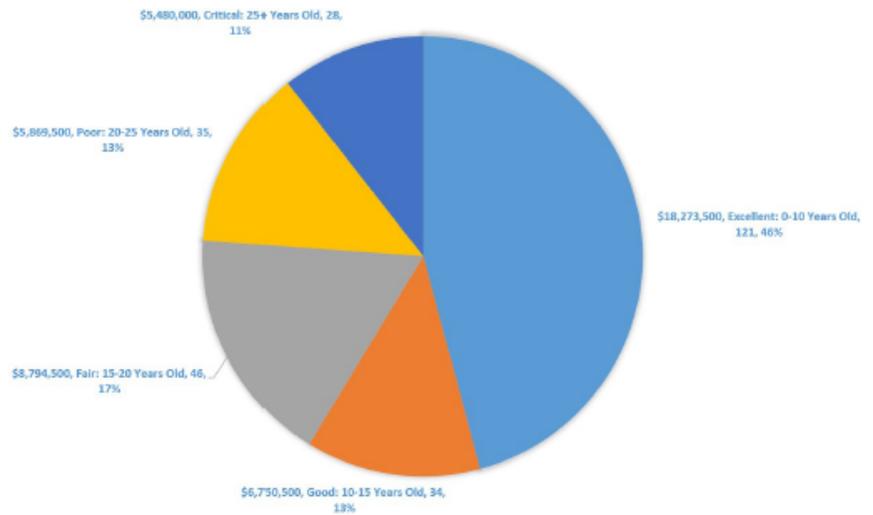
Grand Rapids makes sure traffic is safe and efficient through intentional design. We construct, operate and maintain the City's traffic control systems including all of its traffic sign and signal assets.

Inventory of Assets

Grand Rapids is in the process of inventorying the traffic signals. There are 215 signals, 32 flashers and 17 rectangular rapid flashing beacons (RRFB). The condition and the estimated cost of work is presented below:

Condition	Signals	Flashers	RRFBs	Asset	Cond	Estimate
Excellent: 0-10 Years Old	81	23	17	121		\$18,273,500
Good: 10-15 Years Old	32	2	0	34		\$6,750,500
Fair: 15-20 Years Old	45	1	0	46		\$8,794,500
Poor: 20-25 Years Old	29	6	0	35		\$5,869,500
Critical: 25+ Years Old	28	0	0	28		\$5,480,000
Total	215	32	17	264		\$45,168,000

ASSET CONDITION - ALL GR OWNED ELECTRONIC TRAFFIC CONTROL DEVICES



Goals

The asset management program will track asset age and condition with the goal to reconstruct assets as their condition deteriorates.

Planned Projects

Grand Rapids' policy is to evaluate traffic signal assets based on condition assessment for replacement or repair during any reconstruction, rehabilitation, preventive maintenance, or schedule maintenance activities on the roadway affected by the particular signal. It also conducts replacements or repairs for those traffic signal assets reported as non-functional or as performing with reduced function. Grand Rapids adheres to regular maintenance and servicing policies outlined in the *Michigan Manual of Uniform Traffic Control Devices*.

6. FINANCIAL RESOURCES

The financial resources for streets and bridges are outlined in City of Grand Rapids Asset Management Plan for Pavements, July 2017 and the City of Grand Rapids 2020 Bridge Asset Management Plan . Culvert maintenance and capital expenditures are not funded through the Vital Streets program, but through Major/Local Street funds and Sewer System funds and Capital Improvement Fund. There are some funds provided in the Vital Streets fund for Traffic Safety projects which may include Capital signal work. The operation and maintenance of the traffic signals is funded through the Major/Local Street funds.

7. RISK OF FAILURE ANALYSIS

Transportation infrastructure is designed to be resilient. The system of interconnecting roads and bridges maintained by Grand Rapids provides road users with multiple alternate options in the event of an unplanned disruption of one part of the system. There are, however, key links in the transportation system that may cause significant inconvenience to users if they are unexpectedly closed to traffic. Key transportation links include:

- **Geographic divides:** Areas where a geographic feature (river, lake, hilly terrain, or limited access road) limits crossing points of the feature; bridge failures, in particular, can create loss of access to entire regions of the City. This is especially true of the Grand Rapids’ bridges that span the Grand River through the heart of the City.
- **Main access to key commercial districts:** Areas with a large concentration of businesses or where large-size business will be significantly impacted if a road is unavailable. This is especially true in the annexed areas of Grand Rapids that typically lack an extensive grid system.
- The City of Grand Rapids 2020 Bridge Asset Management Plan outlines the critical bridge assets. The critical pavement assets would include our Principal and Minor Arterial corridors which typically include higher traffic volumes and transit and freight and are a priority for investment decisions:

Principal Arterial Corridors

Alpine Avenue	Grandville Avenue	Monroe Avenue
Burton Street	Hall Street	Oakes Street
Division Avenue	Kalamazoo Avenue	Pearl Street
Franklin Street	Leonard Street	Plainfield Avenue
Fuller Avenue	Market Avenue	Wealthy Street
Fulton Street	Michigan Street	

Minor Arterial Corridors

3 Mile Road	Covell Avenue	Market Avenue
32nd Street	East Paris Avenue	Michigan Street
36 th Street	Eastern Avenue	Monroe Avenue
Alger Street	Fountain Street	O Brien Road
Alpine Avenue	Franklin Street	Oakes Street
Ann Street	Fuller Avenue	Ottawa Avenue
Breton Avenue	Grandville Avenue	North Park Street
Bridge Street	Hall Street	Plymouth Avenue
Buchanan Avenue	Ionia Avenue	Richmond Street
Burton Street	Jefferson Avenue	Seward Avenue
Butterworth Street	Kalamazoo Avenue	State Street
Century Avenue	Knapp Street	Stocking Avenue
Cherry Street	Lake Michigan Drive	Turner Avenue
Clyde Park Avenue	Lake Drive	Walker Avenue
Coit Avenue	Lexington Avenue	Wealthy Street
College Avenue	Lyon Street	Weston Street
Collindale Avenue	Madison Avenue	

- For the Traffic Signal system, the assets in poor condition are documented through preventative maintenance. This information is used to prioritize both repairs and asset reconstruction.

8. COORDINATION WITH OTHER ENTITIES

An asset management plan provides a significant value for infrastructure owners because it serves as a platform to engage other infrastructure owners using the same shared right of way space. Grand Rapids communicates with both public and private infrastructure owners to coordinate work in the following ways:

The City's asset managers meet beginning in the Fall and through the end of the calendar year to develop the City's five year Capital plan. The purpose is to identify improvements that each asset may be desiring to make and to work to coordinate timing and funding if other assets in the same corridor should be improved as well. Any major private development project, that asset managers are aware of, are discussed as well.

The scope of each project can also be discussed and, if necessary, modified as a project proceeds through design. These opportunities are provided at the time of the project being discussed at the City's Design Team meetings where the scope of the project and elements of the project are determined. There is a second opportunity at the time the plans/specifications are circulated throughout City departments and to private utilities as part of the City's checkprint process.

There is also communication with private utilities such as DTE (gas) and CE (electric) and others to review their Capital plans and seek to coordinate the schedules of Grand Rapids projects and their projects to minimize disruption and avoid wasting valuable resources by redoing work.

EXAMPLE COORDINATED PLANNING

Grand Rapids maintains drinking water, sanitary sewer, storm sewer, street lighting/telecommunications assets in addition to transportation assets. Grand Rapids is developing an asset management process for all of its assets by coordinating the upgrade, maintenance, and operation of all major assets.

Planned projects for sub-surface infrastructure that Grand Rapids owns are listed in comprehensive master plans for drinking water distribution and wastewater collection systems. The storm sewer system asset management plan is included in this document. A priority plan has been developed for street lighting and is being developed for traffic signal assets. These are coordinated with the transportation infrastructure plans to maximize value and minimize service disruptions and cost to the public.

Grand Rapids takes advantage of coordinated infrastructure work to reduce cost and maximize value using the following policies:

- Roads which are in poor condition that have a subsurface infrastructure project planned which will destroy more than half the lane width will be rehabilitated or reconstructed full width using Vital Streets funds to repair the balance of the road width.

- Subsurface infrastructure projects which will cause damage to pavements in good condition will be delayed as long as possible, or methods that do not require pavement cuts will be considered. If the work cannot be postponed, the street will be rotomilled and resurfaced full width.
- Subsurface utility projects will be coordinated to allow all under pavement assets to be upgraded in the same project regardless of ownership, if possible.

9. PROOF OF ACCEPTANCE

PUBLIC ACT 325

CERTIFICATION OF TRANSPORTATION ASSET MANAGEMENT PLAN

Certification Year: 2023

Local Road-owning Agency Name: City of Grand Rapids

Beginning October 2019 and on a three-year cycle thereafter, certification must be made for compliance to Public Act 325. A local road-owning agency with 100 certified miles or more must certify that it has developed an asset management plan for the road, bridge, culvert, and traffic signal assets. Signing this form certifies that the hitherto referred agency meets with minimum requirements as outlined by Public Act 325 and agency-defined goals and objectives.

This form must be signed by the chairperson of the local road-owning agency or the county executive and chief financial officer of the local road-owning agency.

Signature 	Signature 
Printed Name Mark Washington	Printed Name Moly Clarin
Title City Manager	Title Chief Financial Officer
Date 9/20/2023	Date 9/20/2023

Due every three years based on agency submission schedule

Submittal Date: September 29, 2023

See attached City Commission meeting minutes and/or resolution.

The resolution by our City Commission for the City of Grand Rapids Asset Management Plan for Pavements, July 2017 is included in the plan. The City Commission approved a resolution for the City of Grand Rapids 2020 Bridge Asset Management Plan on September 29, 2020. **The City Commission approved a resolution for the Certification of the City of Grand Rapids 2023 Transportation Asset Management Plan on September 19, 2023.**

92938 Result: Adopted.

Mover: O'Connor. Supporter: Robbins.

WHEREAS:

1. The City of Grand Rapids has adopted the core principles of asset management in its ongoing process of maintaining, upgrading and operating its physical assets cost-effectively, based on a continuous physical inventory and assessment of its local and major streets networks including bridges; and
2. Act 325 of the State of Michigan Public Acts of 2018 requires that local road agencies submit an asset management plan for roads, bridges and related transportation infrastructure; and
3. The City of Grand Rapids has been following, and will continue to follow, the core principles of asset management in the ongoing maintenance and rehabilitation of its transportation assets; and
4. The City of Grand Rapids has an approved Transportation Asset Management Plan dated September 2020 for pavements, bridges, stormwater and traffic signal assets for the process of maintaining, upgrading and operating these physical assets under the City's jurisdiction and is required every three years to update, accept and submit said plan, therefore;

RESOLVED:

1. That the City Commission hereby accepts the Transportation Asset Management Plan, September 2023.

I hereby certify that the foregoing is a true transcript of the action of the City Commission of the City of Grand Rapids, Michigan, in public session held September 19, 2023.



Joel H. Hondorp, City Clerk

A. TRAFFIC SIGNALS ASSET MANAGEMENT PLAN SUPPLEMENT

Traffic Signals Primer

Types

Electronic traffic control devices come in a large array of configurations, which include case signs (e.g., keep right/left, no right/left turn, reversible lanes), controllers, detection (e.g., cameras, push buttons), flashing beacons, interconnects (e.g., DSL, fire station, phone line, radio), pedestrian heads (e.g., hand-man), and traffic signals. This asset management plan is only concerned with traffic signals (Figure D-1) as a functioning unit and does not consider other electronic traffic control devices.



Figure D-1: Example of traffic signals

Condition

Traffic signal assessment considers the functioning of basic tests on a pass/fail basis. These tests include battery backup testing, components testing, conflict monitor testing, radio testing, and underground detection.

Treatments

Traffic signals are maintained in accordance with the *Michigan Manual on Uniform Traffic Control Devices*. Maintenance of traffic signals includes regular maintenance of all components, cleaning and servicing to prevent undue failures, immediate maintenance in the case of emergency calls, and provision of stand-by equipment. Timing changes are restricted to authorized personnel only.

B. GLOSSARY & ACRONYMS

Glossary

Alligator cracking: Cracking of the surface layer of an asphalt pavement that creates a pattern of interconnected cracks resembling alligator hide. This is often due to overloading a pavement, sub-base failure, or poor drainage.¹

Asset management: A process that uses data to manage and track road assets in a cost-effective manner using a combination of engineering and business principles. Public Act 325 of 2018 provides a legal definition: “an ongoing process of maintaining, preserving, upgrading, and operating physical assets cost effectively, based on a continuous physical inventory and condition assessment and investment to achieve established performance goals”.²

Biennial inspection: Inspection of an agency’s bridges every other year, which happens in accordance with National Bridge Inspection Standards and Michigan Department of Transportation requirements.

Bridge inspection program: A program implemented by a local agency to inspect the bridges within its jurisdiction systematically in order to ensure proper functioning and structural soundness.

Capital preventative maintenance: Also known as CPM, a planned set of cost-effective treatments to address of fair-rated infrastructure before the structural integrity of the system has been severely impacted. These treatments aim to slow deterioration and to maintain or improve the functional condition of the system without significantly increasing the structural capacity. Light capital preventive maintenance is a set of treatments designed to seal isolated areas of the pavement from water, such as crack and joint sealing, to protect and restore pavement surface from oxidation with limited surface thickness material, such as fog seal; generally, application of a light CPM treatment does not provide a corresponding increase in a segment’s PASER score. Heavy capital preventive maintenance is a set of surface treatments designed to protect pavement from water intrusion or environmental weathering without adding significant structural strength, such as slurry seal, chip seal, or thin (less than 1.5-inch) overlays for bituminous surfaces or patching or partial-depth (less than 1/3 of pavement depth) repair for concrete surfaces.

Chip seal: An asphalt pavement treatment method consisting of, first, spraying liquid asphalt onto the old pavement surface and, then, a single layer of small stone chips spread onto the wet asphalt layer.

City major: A road classification, defined in Michigan Public Act 51, that encompasses the generally more important roads in a city or village. City major roads are designated by a municipality’s governing body and are subject to approval by the State Transportation Commission. These roads do not include roads under the jurisdiction of a county road commission or trunkline highways.

City minor: A road classification, defined in Michigan Public Act 51, that encompasses the generally less important roads in a city or village. These roads include all city or village roads that are not city major road and do not include roads under the jurisdiction of a county road commission.

¹ https://en.wikipedia.org/wiki/Crocodile_cracking

² Inventory-based Rating System for Gravel Roads: Training Manual

Composite pavement: A pavement consisting of concrete and asphalt layers. Typically, composite pavements are old concrete pavements that were overlaid with HMA in order to gain more service life.

Concrete joint resealing: Resealing the joints of a concrete pavement with a flexible sealant to prevent moisture and debris from entering the joints. When debris becomes lodged inside a joint, it inhibits proper movement of the pavement and leads to joint deterioration and spalling.

Concrete pavement: Also known as rigid pavement, a pavement made from portland cement concrete. Concrete pavement has an average service life of 30 years and typically does not require as much periodic maintenance as HMA.

Cost per lane mile: Associated cost of construction, measured on a per lane, per mile basis. Also see *lane-mile segment*.

County local: A road classification, defined in Michigan Public Act 51, that encompasses the generally less important and low-traffic roads in a county. This includes all county roads that are not classified as county primary roads.

County primary: A road classification, defined in Michigan Public Act 51, that encompasses the generally more important and high-traffic roads in a county. County primary roads are designated by board members of the county road commissions and are subject to approval by the State Transportation Commission.

CPM: See *Capital preventive maintenance*.

Crack and seat: A concrete pavement treatment method that involves breaking old concrete pavement into small chunks and leaving the broken pavement in place to provide a base for a new surface. This provides a new wear surface that resists water infiltration and helps prevent damaged concrete from reflecting up to the new surface.

Crack seal: A pavement treatment method for both asphalt and concrete pavements that fills cracks with asphalt materials, which seals out water and debris and slows down the deterioration of the pavement. Crack seal may encompass the term “crack filling”.

Crush and shape: An asphalt pavement treatment method that involves pulverizing the existing asphalt pavement and base and then reshaping the road surface to correct imperfections in the road’s profile. Often, a layer of gravel is added along with a new wearing surface such as an HMA overlay or chip seal.

Crust: A very tightly compacted surface on an unpaved road that sheds water with ease but takes time to be created.

Culvert: A pipe or structure used under a roadway that allows cross-road drainage while allowing traffic to pass without being impeded; culverts span up to 20 feet.³

Dowel bar retrofit repair: A concrete pavement treatment method that involves cutting slots in a cracked concrete slab, inserting steel bars into the slots, and placing concrete to cover the new bars and fill the slots. It aims to reinforce cracks in a concrete pavement.

³ Adapted from Inventory-based Rating System for Gravel Roads: Training Manual

Dust control: A gravel road surface treatment method that involves spraying chloride or other chemicals on the gravel surface to reduce dust loss, aggregate loss, and maintenance. This is a relatively short-term fix that helps create a crusted surface.

Expansion joint: Joints in a bridge that allow for slight expansion and contraction changes in response to temperature. Expansion joints prevent the build up of excessive pressure, which can cause structural damage to the bridge.

Federal Highway Administration: Also known as FHWA, this is an agency within the U.S. Department of Transportation that supports state and local governments in the design, construction, and maintenance of the nation’s highway system.⁴

Federal-aid network: Portion of road network that is comprised of federal-aid routes. According to Title 23 of the United States Code, federal-aid-eligible roads are “highways on the federal-aid highways systems and all other public roads not classified as local roads or rural minor collectors”.⁵ Roads that are part of the federal-aid network are eligible for federal gas-tax monies.

FHWA: See *Federal Highway Administration*.

Flexible pavement: See *hot-mix asphalt pavement*.

Fog seal: An asphalt pavement treatment method that involves spraying a liquid asphalt coating onto the entire pavement surface to fill hairline cracks and prevent damage from sunlight and oxidation. This method works best for good to very good pavements.

Full-depth concrete repair: A concrete pavement treatment method that involves removing sections of damaged concrete pavement and replacing it with new concrete of the same dimensions in order to restore the riding surface, delay water infiltration, restore load transfer from one slab to the next, and eliminate the need to perform costly temporary patching.

Geographic divides: Areas where a geographic feature (e.g., river, lake, mountain) limits crossing points of the feature.

Grants: Competitive funding gained through an application process and targeted at a specific project type to accomplish a specific purpose. Grants can be provided both on the federal and state level and often make up part of the funds that a transportation agency receives.

Gravel surfacing: A low-cost, easy-to-maintain road surface made from aggregate and fines.

Heavy capital preventive maintenance: See *Capital preventive maintenance*.

HMA: See *hot-mix asphalt pavement*.

Hot-mix asphalt overlay: Also known as HMA overlay, this a surface treatment that involves layering new asphalt over an existing pavement, either asphalt or concrete. It creates a new wearing surface for traffic and to seal the pavement from water, debris, and sunlight damage, and it often adds significant structural strength.

Hot-mix asphalt pavement: Also known as HMA pavement, this type of asphalt creates a flexible pavement composed of aggregates, asphalt binder, and air voids. HMA is heated for placement and

⁴ Federal Highway Administration webpage <https://www.fhwa.dot.gov/>

⁵ Inventory-based Rating System for Gravel Roads: Training Manual

compaction at high temperatures. HMA is less expensive to construct than concrete pavement, however it requires frequent maintenance activities and generally lasts 18 years before major rehabilitation is necessary. HMA makes up the vast majority of local-agency-owned pavements.

IBR: See *IBR element, IBR number, and/or Inventory-based Rating System™*.

IBR element: A feature used in the IBR System™ for assessing the condition of roads. The system relies on assessing three elements: surface width, drainage adequacy, and structural adequacy.⁶

IBR number: The 1-10 rating determined from assessments of the weighted IBR elements. The weighting relates each element to the intensity road work needed to improve or enhance the IBR element category.⁷

Interstate highway system: The road system owned and operated by each state consisting of routes that cross between states, make travel easier and faster. The interstate roads are denoted by the prefix “I” or “U.S.” and then a number, where odd routes run north-south and even routes run east-west. Examples are I-75 or U.S. 2.⁸

Inventory-based Rating System™: Also known as the IBR System™, a rating system designed to assess the capabilities of gravel and unpaved roads to support intended traffic volumes and types year round. It assesses roads based on how three IBR elements, or features—surface width, drainage adequacy, and structural adequacy—compare to a baseline, or “good”, road.⁹

Investment Reporting Tool: Also known as IRT, a web-based system used to manage the process for submitting required items to the Michigan Transportation Asset Management Council. Required items include planned and completed maintenance and construction activity for roads and bridges and comprehensive asset management plans.

IRT: See *Investment Reporting Tool*.

Jurisdiction: Administrative power of an entity to make decisions for something. In Michigan, the three levels of jurisdiction classification for transportation assets are state highways, county roads, and city and village streets. State highways are under the jurisdiction of the Michigan Department of Transportation, county roads are under the jurisdiction of the road commission for the county in which the roads are located, and city and village streets are under the jurisdiction of the municipality in which the roads are located.

Jurisdictional borders: Borders between two road-owning-agency jurisdictions, or where the roads owned by one agency turn into roads owned by another agency. Examples of jurisdictional borders are township or county lines.

Lane-mile segment: A segment of road that is measured by multiplying the centerline miles of a roadway by the number of lanes present.

Lane-mile-years: A network’s total lane-miles multiplied by one year; a method to quantify the measurable loss of pavement life.

⁶ Inventory-based Rating System for Gravel Roads: Training Manual

⁷ Inventory-based Rating System for Gravel Roads: Training Manual

⁸ <https://www.fhwa.dot.gov/interstate/faq.cfm#question3>

⁹ Adapted from Inventory-based Rating System for Gravel Roads: Training Manual

Light capital preventive maintenance: See *Capital preventive maintenance*.

Limited access areas: Areas—typically remote areas—serviced by few or seasonal roads that require long detours routes if servicing roads are closed.

Main access to key commercial districts: Areas where large number or large size business will be significantly impacted if a road is unavailable.

Maintenance grading: A surface treatment method for unpaved roads that involves re-grading the road to remove isolated potholes, washboarding, and ruts, and then restoring the compacted crust layer.

MDOT: See *Michigan Department of Transportation*.

MDOT's Local Bridge Program Call for Projects: A call for project proposals for replacement, rehabilitation, and/or preventive maintenance of local bridges that, if granted, receives bridge funding from the Michigan Department of Transportation. The Call for Projects is made by the Local Bridge Program.

MGF: See *Michigan Geographic Framework*.

Michigan Department of Transportation: Also known as MDOT, this is the state of Michigan's department of transportation, which oversees roads and bridges owned by the state or federal government in Michigan.

Michigan Geographic Framework: Also known as MGF, this is the state of Michigan's official digital base map that contains location and road information necessary to conduct state business. The Michigan Department of Transportation uses the MGF to link transportation assets to a physical location.

Michigan Public Act 51 of 1951: Also known as PA 51, this is a Michigan legislative act that served as the foundation for establishing a road funding structure by creating transportation funding distribution methods and means. It has been amended many times.¹⁰

Michigan Public Act 325 of 2018: Also known as PA 325, this legislation modified PA 51 of 1951 in regards to asset management in Michigan, specifically 1) re-designating the TAMC under Michigan Infrastructure Council (MIC); 2) promoting and overseeing the implementation of recommendations from the regional infrastructure asset management pilot program; 3) requiring local road three-year asset management plans beginning October 1, 2020; 4) adding asset classes that impact system performance, safety or risk management, including culverts and signals; 5) allowing MDOT to withhold funds if no asset management plan submitted; and 6) prohibiting shifting finds from a country primary to a county local, or from a city major to a city minor if no progress toward achieving the condition goals described in its asset plan.¹¹

Michigan Public Act 499 of 2002: Also known as PA 499, this legislation requires road projects for the upcoming three years to be reported to the TAMC.

Michigan Transportation Asset Management Council: Also known as the TAMC, a council comprised of professionals from county road commissions, cities, a county commissioner, a township official, regional and metropolitan planning organizations, and state transportation department personnel. The

¹⁰ Inventory-based Rating System for Gravel Roads: Training Manual

¹¹ Inventory-based Rating System for Gravel Roads: Training Manual

council reports directly to the Michigan Infrastructure Council.¹² The TAMC provides resources and support to Michigan’s road-owning agencies, and serves as a liaison in data collection requirements between agencies and the state.

Michigan Transportation Fund: Also known as MTF, this is a source of transportation funding supported by vehicle registration fees and the state’s per-gallon gas tax.

Microsurface treatment: An asphalt pavement treatment method that involves applying modified liquid asphalt, small stones, water, and portland cement for the purpose of protecting a pavement from damage caused by water and sunlight.

Mill and hot-mix asphalt overlay: Also known as a mill and HMA overlay, this is a surface treatment that involves the removal of the top layer of pavement by milling and the replacement of the removed layer with a new HMA layer.

Mix-of-fixes: A strategy of maintaining roads and bridges that includes generally prioritizes the spending of money on routine maintenance and capital preventive maintenance treatments to impede deterioration and then, as money is available, performing reconstruction and rehabilitation.

MTF: See *Michigan Transportation Fund*.

National Bridge Inspection Standards: Also known as NBIS, standards created by the Federal Highway Administration to locate and evaluate existing bridge deficiencies in the federal-aid highway system to ensure the safety of the traveling public. The standards define the proper safety for inspection and evaluation of all highway bridges.¹³

National Center for Pavement Preservation: Also known as the NCPP, a center that offers education, research, and outreach in current and innovative pavement preservation practices. This collaborative effort of government, industry, and academia entities was established at Michigan State University.

National Functional Class: Also known as NFC, a federal grouping system for public roads that classifies roads according to the type of service that the road is intended to provide.

National highway system: Also known as NHS, this is a network of roads that includes the interstate highway system and other major roads managed by state and local agencies that serve major airports, marine, rail, pipelines, truck terminals, railway stations, military bases, and other strategic facilities.

NBIS: See *National Bridge Inspection Standards*.

NCPP: See *National Center for Pavement Preservation*.

NCPP Quick Check: A system created by the National Center for Pavement Preservation that works under the premise that a one-mile road segment loses one year of life each year that it is not treated with a maintenance, rehabilitation, or reconstruction project.

NFC: See *National Functional Class*.

Non-trunkline: A local road intended to be used over short distances but not recommended for long-distance travel.

¹² Inventory-based Rating System for Gravel Roads: Training Manual

¹³ <https://www.fhwa.dot.gov/bridge/nbis/>

Other funds: Expenditures for equipment, capital outlay, debt principal payment, interest expense, contributions to adjacent governmental units, principal, interest and bank fees, and miscellaneous for cities and villages.

PA: See *Michigan Public Act 51*, *Michigan Public Act 325*, and/or *Michigan Public Act 499*.

Partial-depth concrete repair: A concrete pavement treatment method that involves removing spalled or delaminated areas of concrete pavement, usually near joints and cracks, and replacing with new concrete. This is done to provide a new wearing surface in isolated areas, to slow down water infiltration, and to help delay further freeze-thaw damage.

PASER: See *Pavement Surface Evaluation and Rating system*.

Pavement reconstruction: A complete removal of the old pavement and base and construction of an entirely new road. This is the most expensive rehabilitation of the roadway and also the most disruptive to traffic patterns.

Pavement Surface Evaluation and Rating system: Also known as the PASER system, the PASER system rates surface condition on a 1-10 scale, where 10 is a brand new road with no defects, 5 is a road with distress but that is structurally sound and requires only preventative maintenance, and 1 is a road with extensive surface and structural distresses that is in need of total reconstruction. This system provides a simple, efficient, and consistent method for evaluating the condition of paved roads.¹⁴

Pothole: A defect in a road that produces a localized depression.¹⁵

Preventive maintenance: Planned treatments to an existing asset to prevent deterioration and maintain functional condition. This can be a more effective use of funds than the costly alternative of major rehabilitation or replacement.

Proactive preventive maintenance: Also known as PPM, a method of performing capital preventive maintenance treatments very early in a pavement's life, often before it exhibits signs of pavement defect.

Public Act 51: See *Michigan Public Act 51 of 1951*

Public Act 325: See *Michigan Public Act 325 of 2018*

Public Act 499: See *Michigan Public Act 499 of 2002*

Reconstruction and rehabilitation programs: Programs intended to reconstruct and rehabilitate a road.

Restricted load postings: A restriction enacted on a bridge structure when is incapable of transporting a state's legal vehicle loads.

Rights-of-way ownership: The owning of the right-of-way, which is the land over which a road or bridge travels. In order to build a road, road agencies must own the right-of-way or get permission to build on it.

Rigid pavement: See *concrete pavement*.

¹⁴ Adapted from Inventory-based Rating System for Gravel Roads: Training Manual

¹⁵ Inventory-based Rating System for Gravel Roads: Training Manual

Road infrastructure: An agency's road network and assets necessary to make it function, such as traffic signage and ditches.

Road: The area consisting of the roadway (i.e., the travelled way or the portion of the road on which vehicles are intended to drive), shoulders, ditches, and areas of the right of way containing signage.¹⁶

Roadsoft: An asset management software suit that enables agencies to manage road and bridge related infrastructure. The software provides tools for collecting, storing, and analyzing data associated with transportation infrastructure. Built on an optimum combination of database engine and GIS mapping tools, Roadsoft provides a quick, smooth user experience and almost unlimited data handling capabilities.¹⁷

Ruts/rutting: Deformation of a road that usually forms as a permanent depression concentrated under the wheel path parallel to the direction of travel.¹⁸

Scheduled maintenance: Low-cost, day-to-day activities applied to bridges on a scheduled basis that mitigates deterioration.¹⁹

Sealcoat pavement: A gravel road that has been sealed with a thin asphalt binder coating that has stone chips spread on top.

Service life: Time from when a road or treatment is first constructed to when it reaches a point where the distresses present change from age-related to structural-related (also known as the critical distress point).²⁰

Slurry seal: An asphalt pavement treatment method that involves applying liquid asphalt, small stones, water, and portland cement in a very thin layer with the purpose of protecting an existing pavement from being damaged by water and sunlight.

Structural improvement: Pavement treatment that adds strength to the pavement. Roads requiring structural improvement exhibit alligator cracking and rutting and are considered poor by the TAMC definitions for condition.

Subsurface infrastructure: Infrastructure maintained by local agencies that reside underground, for example, drinking water distribution systems, wastewater collection systems, and storm sewer systems.

TAMC: See *Michigan Transportation Asset Management Council*.

TAMC pavement condition dashboard: Website for viewing graphs of pavement and bridge conditions, traffic and miles travelled, safety statistics, maintenance activities, and financial data for Michigan's cities and villages, counties, and regions, as well as the state of Michigan.

TAMC's good/fair/poor condition classes: Classification of road conditions defined by the Michigan Transportation Asset Management Council based on bin ranges of PASER scores and similarities in defects and treatment options. Good roads have PASER scores of 8, 9, or 10, have very few defects, and require minimal maintenance. Fair roads have PASER scores of 5, 6, or 7, have good structural support but a deteriorating surface, and can be maintained with CPM treatments. Poor roads have PASER scores

¹⁶ Inventory-based Rating System for Gravel Roads: Training Manual

¹⁷ Inventory-based Rating System for Gravel Roads: Training Manual

¹⁸ Paving Class Glossary

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of 1, 2, 3, or 4, exhibit evidence that the underlying structure is failing, such as alligator cracking and rutting. These roads must be rehabilitated with treatments like heavy overlay, crush and shape, or total reconstruction.

Tax millages: Local tax implemented to supplement an agency’s budget, such as road funding.

Thin hot-mix asphalt overlay: Application of a thin layer of hot-mix asphalt on an existing road to re-seal the road and protect it from damage caused by water. This also improves the ride quality and provides a smoother, uniform appearance that improves visibility of pavement markings.²¹

Transportation infrastructure: All of the elements that work together to make the surface transportation system function including roads, bridges, culverts, traffic signals, and signage.

Trigger: When a PASER score gives insight to the preferred timeline of a project for applying the correct treatment at the correct time.

Trunkline abbreviations: The prefixes *M-*, *I-*, and *US* indicate roads in Michigan that are part of the state trunkline system, the Interstate system, and the US Highway system. These roads consist of anything from 10-lane urban freeways to two-lane rural highways and even one non-motorized highway; they cover 9,668 centerline miles. Most of the roads are maintained by MDOT.

Trunkline bridges: Bridge present on a trunkline road, which typically connects cities or other strategic places and is the recommended route for long-distance travel.²²

Trunkline maintenance funds: Expenditures under a maintenance agreement with MDOT for maintenance activities performed on MDOT trunkline routes.

Trunkline: Major road that typically connects cities or other strategic places and is the recommended route for long-distance travel.²³

Washboarding: Ripples in the road surface that are perpendicular to the direction of travel.²⁴

Wedge/patch sealcoat treatment: An asphalt pavement treatment method that involves correcting the damage frequently found at the edge of a pavement by installing a narrow, 2- to 6-foot-wide wedge along the entire outside edge of a lane and layering with HMA. This extends the life of an HMA pavement or chip seal overlay by adding strength to significantly settled areas of the pavement.

Worst-first strategy: Asset management strategy that treats only the problems, often addressing the worst problems first, and ignoring preventive maintenance. This strategy is the opposite of the “mix of fixes” strategy. An example of a worst-first approach would be purchasing a new automobile, never changing the oil, and waiting till the engine fails to address any deterioration of the car.

List of Acronyms

CPM: capital preventive maintenance

²¹ [second sentence] <http://www.kentcountyroads.net/road-work/road-treatments/ultra-thin-overlay>

²² https://en.wikipedia.org/wiki/Trunk_road

²³ https://en.wikipedia.org/wiki/Trunk_road

²⁴ Inventory-based Rating System for Gravel Roads: Training Manual

FHWA: Federal Highway Administration

HMA: hot-mix asphalt

I: trunkline abbreviation for routes on the Interstate system

IBR: Inventory-based Rating

M: trunkline abbreviation for Michigan state highways

MDOT: Michigan Department of Transportation

MTF: Michigan Transportation Fund

NBIS: National Bridge Inspection Standards

NCPP: National Center for Pavement Preservation

NHS: National Highway System

PA 51: Michigan Public Act 51 of 1951

PASER: Pavement Surface Evaluation and Rating

R&R: reconstruction and rehabilitation programs

TAMC: (Michigan) Transportation Asset Management Council

US: trunkline abbreviation for routes on the US Highway system